

Introduction to Borland Database Engine

This is the complete user guide and reference for Borland® Database Engine.

Borland Database Engine (BDE) is the proven 32-bit Windows-based core database engine and connectivity software behind Delphi®, Delphi Client/Server®, Paradox® for Windows, and Visual dBASE® for Windows. BDE offers a rich and robust set of features to assist developers of client-server applications.

Architecture: The BDE database-driver architecture includes numerous shared services utilized by database drivers and other functions. The included set of database drivers enables consistent access to standard data sources: Paradox, dBASE, and text databases. You can add Microsoft ODBC drivers as needed to the built-in ODBC socket. Optionally, Borland's SQL Links product provides access to a range of SQL servers, including InterBase, Oracle, and Sybase. Together with its database drivers and consistent API, BDE gives Microsoft Windows 95 and Windows NT application developers a direct, clean, separate, and shared high-level access to multiple data sources.

Object-orientation: BDE is object-oriented in design. At run time, application developers interact with BDE by creating various BDE objects. These run-time objects are then used to manipulate database entities, such as tables and queries. BDE's extensive application program interface (API) provides direct C and C++ optimized access to the database engine, as well as BDE's built-in drivers for dBASE, Paradox, and text databases.

Guide to programming with BDE: The core database engine files consist of a set of DLLs that are fully re-entrant and thread-safe. Included with BDE are a helpful set of supplemental tools and examples with sample code to get you started. See Introduction to BDE programming for detailed examples of each stage of the programming process, including a BDE template program that you can copy and use as a functional framework for building your own BDE applications. Also, in the Function reference of this guide you will find examples illustrating the use of each function in both C and Delphi (Pascal) languages.

What's new: See What's new for BDE 3.0? for an overview of BDE 3.0 features and important changes from previous versions of BDE.

Configuration: You configure the BDE system by running the BDE Configuration Utility (BDECFG32.EXE). BDE provides flexible and powerful configuration management capabilities.

Local SQL: Included with BDE is Borland's Local SQL, a subset of ANSI-92 SQL enhanced to support Paradox and dBASE (standard) naming conventions for tables and fields (called "columns" in SQL). Local SQL lets you use SQL to query "local" standard database tables that do not reside on a database server as well as "remote" SQL servers. Local SQL is also essential to make multi-table queries across both local standard tables and those on remote SQL servers.

(Note: You might occasionally encounter internal references to the older name for the BDE API: the "Integrated Database Application Program Interface" or "IDAPI".)

{button ,AL("intro")} Other topics in this introduction to BDE

{button ,AL("bdedocs")} Other BDE online documentation

Features

BDE offers these features:

- A uniform and consistent API to access multiple database formats including dBASE, Paradox, Text, InterBase, Oracle, Sybase, and Microsoft SQL Server as well as any Microsoft Open Database Connectivity (ODBC) data source. Developers can easily change where and in what format the data resides without having to rewrite their application.
- BDE is ideally suited for client/server applications because it enables application developers to access both local and server data, which allows easy upsizing of the applications.
- BDE gives applications direct and live access to data sources without the need for importing and exporting.
- BDE is the highest performance database engine for Paradox and dBASE file formats.
- BDE serves the needs of developers coming from two different paradigms: set and navigational. BDE allows access to data using ISAM (Indexed Sequential Access Method, which is also used by the Paradox Engine), SQL (Structured Query Language), or QBE (Query by Example).
- BDE is a data-integration engine, providing services that can be shared across different database servers. This includes the ability to easily copy data from one format to another, as well as linking and querying data across formats. For example, you can do a query across a dBASE and an Oracle table, copy records from InterBase to Paradox, or establish one-to-many relationships between an InterBase and an Oracle table.
- BDE's query engines provides a consistent query language for SQL and QBE and set-oriented access. You can define and access data in both SQL-based servers and file-based databases.
- BDE supports full 32-bit functionality, including multi-threading, preemptive multi-tasking, universal naming convention (UNC), and long filenames. You can run multiple queries in the background while using BDE features in the foreground. Multiple applications can run simultaneously and can access the same database files. You can access servers by pathname rather than by drive letters. You can give BDE files long, descriptive names--up to 260 characters--that may contain spaces.

{button ,AL("intro")} [Other topics in this introduction to BDE](#)

BDE components

This table is a high-level overview of Borland Database Engine software components.

Component	Description
<u>Core BDE files</u>	Core .DLL files are the essential files that make up the Borland Database Engine.
<u>BDE API functions</u>	The Borland Database Engine API, a set of function calls for managing the environment, configuration, session, error handling, record and table locking, cursor, index, query, transaction, database, table, and schema operations.
SnipIt Code Viewer	Use to display and run precompiled and linked code segments that demonstrate the use of BDE functions.
<u>BDE Configuration Utility</u>	Convenient tool for configuring BDE: to register drivers and aliases, set date format options, and customize BDE drivers. (BDECFG32.EXE)
<u>Database Desktop</u>	Use to view, create, and restructure tables and run queries with a graphic interface.
Query engines	BDE's shared high-performance SQL database query engine supports Structured Query Language (SQL) with extensive ANSI SQL 92. BDE's QBE query engine supports Query by Example (QBE) languages.
<u>Database drivers</u>	Three standard database drivers (Paradox, dBASE, and Text) are included with BDE.
Optional drivers	Other database drivers may be added as needed, including drivers for InterBase servers and native SQL drivers for Oracle, Sybase, and Microsoft SQL Server.
ODBC connectivity	ODBC connectivity that allows access to any data source for which an ODBC driver is available. (BDE applications get the benefits of BDE even when using an ODBC driver.)
DBPing	Allows you to connect to SQL databases.
<u>Tools & examples</u>	A collection of tools to ease the task of application development. A series of sample programs demonstrate the use of BDE functions. (In addition to these, you will find many examples, both C and Delphi style, throughout this online guide.)

{button ,AL("intro")} [Other topics in this Introduction to BDE](#)

Core Borland Database Engine files

The core BDE files include:

Core File	Description
IDAPI32.DLL	Primary BDE DLL
BLW32.DLL	International Language Driver support functions
IDBAT32.DLL	Contains the batch operations
IDQBE32.DLL	Local QBE Query Engine
IDSQ32.DLL	SQL Query Engine
IDASCI32.DLL	ASCII Text driver
IDPDX32.DLL	Paradox Driver
IDDBAS32.DLL	dBASE driver
IDODBC32.DLL	ODBC Socket Driver (allows the use of any ODBC 2.0 driver)
IDR20009.DLL	Resource file for error messages
BDECFG32.EXE	BDE configuration utility for managing configuration information stored in the Windows Registry and aliases in the IDAPI.CFG
BDECFG32.HLP	Help file for the configuration utility
BDECFG32.CNT	Help Contents file for BDECFG32.HLP. This must remain in same directory with BDECFG32.HLP
BDE32.HLP	The online reference for 32-bit BDE.
BDE32.CNT	Help Contents file for BDE32.HLP. This should remain in same directory with BDE32.HLP.
IDAPI.CFG	File containing application-specific BDE configuration information, primarily database aliases
*.bll	International sort order information

{button ,AL("intro")} [Other topics in this introduction to BDE](#)

Tools and examples

The Borland Database Engine includes a number of supplemental tools and examples that simplify the job of developing applications with BDE.

Tool	Description
Database Desktop	Simple user interface for viewing and creating tables
BDE Configuration Utility	Main BDE tool for managing driver and system configuration.
Default configuration file	Depending on whether you save the settings in the BDE Configuration Utility in 32-bit or composite 16-bit/32-bit format, some or all configuration information may be stored in the default configuration file.
DLL Swap	Tool to switch between the debug ("debug layer") and non-debug versions of BDE. The Debug Layer is the version of BDE that can output trace information and perform extra parameter checking.
BDE32.TOK	BDE syntax highlighting file for the BC 4.x IDE.
BDE32.HLP	BDE WinHelp File for 32-bit systems only.
DBPing	Connection testing utility
Query	Dynamic SQL and QBE tool
Example File	Description
SNIPIT	60 simple examples written in C. Range from basic to advanced concepts.
INVENTORY	Simple inventory example, works on Paradox tables. Written in C.
ADDRESS	Simple AddressBook example. Works with any table type. Written in C.
TABLES	Sample tables.
Template program	A complete basic BDE program written in C and suitable for use as a template for structuring your own programs.
Chk function	The complete code for the Chk function, which returns more complete error information about BDE functions than would be returned by the standard error string.

See [Introduction to BDE programming](#) for detailed examples of each stage of the programming process. Also see the [Function reference](#) section of this guide for examples illustrating the use of each function in both C and Delphi (Pascal) languages.

{button ,AL("intro")} [Other topics in this introduction to BDE](#)

Initialization

You should be aware of how BDE is loaded at startup. This is important if you have other versions or multiple copies of BDE on your system.

The search algorithm for loading the BDE dll, Idapi32.dll, is:

- 1 Current directory (might be different from applications startup directory!).
If not found, then:
- 2 BDE path registry entry:
HKEY_LOCAL_MACHINE/ SOFTWARE/ Borland/
Database Engine/ DLLPATH/xxxxx
If not found, then:
- 3 LoadLibrary algorithm. Application's startup directory.
 - 1 Current directory. If not found, then
 - 2 System directory. If not found, then
 - 3 Windows directory. If not found, then
 - 4 PATH enviroment

Loading driver dll's follows the same pattern, except the first directory to be searched is the directory where Idapi32.dll loaded (replaces step1).

Note: Loading from a current directory of an application might be useful in certain situations, but it effectively prevents other BDE applications from running simultaneously, because they would likely find another Idapi32.dll and fail at initialization time (Dbilnit) with DBIERR_MULTIPLEIDAPI.

Shared memory loading addresses for DLLs

BDE reserves certain preferred memory addresses for use by its DLLs. In most cases, if a DLL cannot be loaded at its preferred address, it will load at some other address determined by the system.

However the DLLs listed below must be loaded at the same preferred address in all applications using BDE. The native BDE drivers reserve the following addresses:

BDE DLLs	Addresses
IDAPI32.DLL	0x4BDE0000
IDPDX32.DLL	0x4CDE0000
IDDBAS32.DLL	0x4DDE0000
IDASCI32.DLL	0x4EDE0000

If these memory locations are already in use by other applications, the BDE DLLs assigned to those locations might not load, in which case an error message would be generated:

- If Idapi32.dll cannot load because the address space is already used, then DBIERR_CANTLOADIDAPI is returned.
- If any of the shared drivers cannot load because of a conflict, then DBIERR_CANTLOADLIBRARY is returned with the name of the driver.

SQL drivers are not shared and do not require fixed loading addresses.

Multiple Initializations and Exits

You may make multiple calls of Dbilnit from within the same process, but each Dbilnit should be paired with a corresponding DbExit.

Error Recovery

In the event of a fatal application error, it is recommended to use DbExit to shut down BDE cleanly.

In the event of a fatal BDE error, it is recommended to close down all applications using BDE.

{button ,AL("intro")} Other topics in this introduction to BDE

Database Desktop

(\DBD\DBD32.EXE)

The Database Desktop (DBD) is basically a stripped-down version of Paradox for Windows. It lets you visually create, inspect, and modify tables. This greatly simplifies the task of creating tables in BDE.

Configuration utility

The BDE Configuration Utility: \IDAPI\BDECFG32.EXE

The BDE Configuration Utility is a visual tool for managing BDE system configuration information in the Windows Registry and alias information in the BDE configuration file (IDAPI.CFG).

You can also modify system information and existing aliases by using the functions: [DbiOpenCfgInfoList](#), [DbiAddAlias](#), and [DbiDeleteAlias](#).

For detailed information on the BDE Configuration Utility and the meanings of all BDE configuration settings, see [BDE Configuration Utility Guide](#).

For an overview from a developers' perspective and complete guidance on configuring ODBC connectivity, see [Configuration management](#)

Default configuration file

The BDE configuration file used at application startup: \IDAPI\IDAPI.CFG It is listed in the Windows Registry as CONFIGFILE01.

For example:

```
HKEY_LOCAL_MACHINE/ SOFTWARE/ Borland/  
Database Engine/CONFIGFILE01
```

You may name your configuration file anything provided that:

- it ends in ".CFG"; and
- is no more than 255 characters long, including spaces; and
- does not contain the characters:
 \ / : * ? " < > |

The configuration file always contains database aliases and the active NET DIR entry for Paradox tables in the Paradox section of the configuration file. This NET DIR setting is always active and will take precedence over any other NET DIR parameters that may exist in older 16-bit configuration files, or in the System Init section of the current configuration file, or in the Registry.

If saved in the Windows 3.11-compatible format (16-/32-bit composite), the configuration file may duplicate some of the System and Driver entries in the Registry.

The Registry includes all driver information, entries, the size of the Buffer Manager (Database Data cache), and various other system information.

For details on saving configuration information in the BDE Configuration Utility and where and how that information is stored, see [Saving configuration information](#)

DLL Swap

`\BDE32\BIN\DLLSWP32.EXE`

The DLL swap utility is used to swap between the debug and non-debug versions of the BDE. The debug layer is useful during application development. When enabled, the debug layer will do additional parameter checking for BDE functions, as well as providing trace information. In its normal state, the core BDE DLLs do not do much parameter validation. While this provides a speed improvement if the parameters are correct, it usually involves a GP fault if the parameters are incorrect.

The debug layer switches the DLL that is to be used. By default, the BDE ships the files IDAPI32.DLL and DBG32.DLL. IDAPI32.DLL is the non-debug version of the BDE, while DBG32.DLL is the debug version. The DLL swap utility will copy IDAPI32.DLL to NODBG32.DLL, and then copy DBG32.DLL to IDAPI32.DLL. Or, if DLLSwap has already been run, it will go the other way, restoring the non-debug version of the BDE.

Note that the BDE function DbiDebugLayerOptions must be called with the proper parameters to enable the debug layer. Calling this function with the non-debug version of the BDE will not result in any harm, so this code can be left in the application regardless of which DLL is being used.

BDE32.TOK

(\BDE32\DOC\BDE32.TOK)

This file is used by the BC 4.x IDE to provide syntax highlighting for BDE functions and types. The BDE32TOK.TXT file in the same directory provides information on using this file.

BDE32.HLP

(\BDE32\DOC\BDE32.HLP)

This is the WinHelp file that you are looking at right now. It contains the complete user's guide and BDE function reference. It requires the presence of WINHELP.EXE and Windows 95/NT and its associated WinHelp Contents file, BDE32.CNT.

Note that this file can be linked into the BC 4.x IDE by using the OpenHelp mechanism (\BC5\BIN\OHELPCFG.EXE to configure).

DBPING

(\BDE32\EXAMPLES\C\DBPING\DBPING32.EXE)

This example is used to determine if the BDE can connect to a given database. Basically, this application attempts to connect to the specified alias using the DbiOpenDatabase function.

QUERY

(\BDE32\EXAMPLES\QUERY\QUERY32.EXE)

This is a basic InterActive query tool which allows the user to connect to any data source and perform *ad hoc* queries. That is, the user can type in SQL Queries or QBE Queries and see the results of the operation.

SNIPIT

(\BDE32\EXAMPLES\SNIPIT\SNIPIT32.EXE)

This example contains many simple examples on BDE. Run the program to get an idea of the examples provided.

INVENTORY

(\BDE32\EXAMPLES\C\INVENTORY\INVTRY32.EXE)

This is a simple, stand alone, C windows application using the BDE. Because this example works only with Paradox tables, it is a good example to use for people familiar with the Paradox Engine. Note that all engine code is isolated in the ENGINE.C file, so it should be easy to incorporate aspects of this program in user applications.

ADDRESS

`\BDE32\EXAMPLES\C\ADDRESS\ADDRESS32.EXE`

An enhanced version of the sample inventory table, this example will work with all table types. This is a good example of performing basic BDE operations on a given table type (driver).

TABLES

\BDE32\EXAMPLES\TABLES

This directory contains a number of sample tables used by the SNIPIT examples.

Configuration management

BDE Configuration Utility Guide

The Borland Database Engine Configuration Utility (BDECFG32.EXE) is a redistributable application that you use to set up and manage your application's configuration. The utility is displayed in a visual notebook format, with tabbed pages containing the parameters for BDE system configuration, database aliases, database server drivers, and ODBC connectivity. The utility includes context-sensitive help to guide you in making configuration changes (BDECFG32.HLP).

The BDE Configuration Utility is installed with the Borland Database Engine. Assuming you have no other BDE-based applications on your workstation at installation time, the installation program sets up IDAPI.CFG as the default BDE configuration file. This means that the first time you open the BDE Configuration Utility it will display the parameters stored in IDAPI.CFG as well as the Windows Registry

The default configuration file, if any, is defined in the Windows Registry under:

```
HKEY_LOCAL_MACHINE/SOFTWARE/Borland/Database Engine/CONFIGFILE01
```

The BDE Configuration Utility gives you the option of saving configuration information in two formats: 32-bit format and a composite 16-/32-bit format for compatibility with 16-bit BDE applications. See Saving configuration information for details about how and where configuration information may be stored.

For complete information on configuring the BDE system, managing database aliases, and configuring database server drivers, see: BDE Configuration Utility Guide

Overriding configuration file defaults

You can override the default configuration file by using the BDE function Dbilnit, but only one configuration file may be used at a time. Thus, if one application is active and you attempt to override the default configuration file while a second application starts with a different configuration file, this error message would be generated: DBIERR_CFGMULTIFILE,

Regardless of whether or not you override the default configuration file by using Dbilnit, the NET DIR entry in the Paradox section of the configuration file is always active and will take precedence over any other NET DIR parameters that may exist in older 16-bit configuration files, or in the System Init section of the current configuration file, or in the Registry. These other NET DIR entries will have no effect. To access a Paradox table on a network drive, the active NET DIR parameter in the Paradox section of the BDE configuration file must point to a network drive.

Any other information in the Drivers and System sections will be drawn from the Registry.

{button ,AL("intro")} Other topics in this Introduction to BDE

Overview of new features and changes in this release

[New and enhanced BDE 3.0 API features](#)

[New and enhanced BDE 3.0 data structures](#)

This section is an overview of the new features and enhancements for Borland Database Engine version 3.0, along with other changes since the last release, BDE version 2.51. You can get detailed descriptions of many of these features by using the jumps to other topics in this online reference.

32-bit Windows support

BDE 3.0 supports 32-bit Windows 95 and Windows NT platforms, including the following features:

- Multithreading within a single application. You can run multiple queries in the background within BDE while using BDE features in the foreground.
- Preemptive multitasking--multiple applications can run simultaneously and can access the same database files.
- Shared memory manager and shared buffer manager

Long filenames

You can give BDE files long, descriptive names--up to 260 characters--that may contain spaces. These limitations apply:

- To use filenames containing spaces in a QBE or SQL script, you must enclose the filename in double quotation marks.
- Paradox tables support filenames longer than 79 characters only if the table level is 7.
- Lookup/Valchk tables for Paradox support a maximum 79 characters.
- SQL servers have a maximum table name length of 30 characters. The servers themselves may have limitations on table name formats (for example, Sybase and Microsoft SQL Server do not allow spaces in table names).

Universal Naming Convention (UNC)

You can use the universal naming convention to access database servers by using their pathnames rather than mapped drive letters. UNC pathnames begin with a double backslash (\\). Using UNC ensures access regardless of how a client machine may have mapped the servers.

New SQL Query Engine

The new SQL query engine has been completely rewritten for extended functionality and high performance.

Transactions on Paradox and dBASE

You can now cleanly rollback (revert) or commit updates to Paradox and dBASE tables. A transaction does not overwrite another transaction's dirty data. Applications can perform updates in a consistent manner.

Cached updates

The cached updates feature allows users to retrieve data from a database and make changes to that temporarily cached data without immediately writing to the actual underlying database. Users can make changes over a prolonged period with a minimum amount of resource locking at the actual database. After modifying the data, users call an update function to save their changes in the actual database. The update function sends to the database a batch of all inserts, deletes, and modifications made since the last update function call.

Miscellaneous changes

- The method for preparing queries has changed, requiring the use of a new BDE function, [DbiQAlloc](#), to obtain a statement handle. See [Executing queries in stages](#)
- BDE configuration data is maintained in the Win32 Registry, except for database aliases, which are still maintained in IDAPI.CFG, the BDE configuration file. See [Configuration management](#).

- The NET DIR parameter specifies the directory location of the Paradox network control file PDOXUSRS.NET. This parameter is stored in the Paradox section of the BDE configuration file and has precedence over any other NET DIR parameters that may exist in older 16-bit configuration files, or in the System Init section of the current configuration file, or in the Registry. These other NET DIR entries will have no effect. To access a Paradox table on a network drive, the active NETDIR parameter in the BDE configuration file must point to a network drive.

Client/server database driver enhancements

These client/server enhancements generally apply to all drivers including the ODBC socket.

- Performance Improvements including: bulk transfer, fast opens, unidirectional access, caching prepared queries, single row refresh option, and server specific optimizations.
- Schema Inquiry. Schema inquiry functions have been enhanced to give additional information: Integrity constraints, function lists, stored procedure definitions (the code), domains, synonyms, and view definitions.
- Capabilities information includes all capabilities supported by ODBC and those required by ReportSmith and the new SQL Query Engine.
- DbiCreateTable supports definition of field-level and referential integrity constraints. In addition, you can create temporary (disk) tables or in-memory tables by using DbiCreateInMemTable.
- Batch Functions. If both source and destination of a batch function are on the same server, the operation is moved to the server. You can now control how many modified records to include in a batch.
- Governors to limit the number of rows that are transferred to the client. See MAX ROWS in SQL settings.
- The SQL Trace feature helps you track problems by logging SQL statements sent to the servers when their BDE function calls are executed.
- Location of vendor libraries are registered in the system configuration and are dynamically loaded by the SQL drivers.
- Additional passthrough controls provide access to native handles and control structures for enhancing performance with SQL servers.
- Sync with server name space

Specific database driver enhancements

- The new Paradox driver for level 6 tables now supports:
 - Long filenames
 - Up to 255 record locks on a shared table
 - Up to 255 valchecks on a table
 - Unique secondary indexes
 - Descending indexes
 - Default values for "NOW", time, and timestamp fields, and auto increment fields
- The dBASE driver now supports:
 - Security and encryption as supported by Visual dBASE for Windows,
 - Clipper indexes
 - Up to 100 record locks on a shared table
- The Text driver now supports storing the schema for a text file in a .SCH.
- The InterBase driver has been updated to support 4.0
- The Microsoft SQL Server 6.0 driver has been enhanced with increased performance and features.
- The ODBC driver is more resilient and more transparent.
- The Oracle driver has been upgraded to latest client libraries (Version 7.x). All the common SQL driver enhancements are supported in the Oracle SQL driver (if applicable).
- The Sybase driver has been updated to support 4.0 with performance improvements.

{button ,AL("new")} What's new?

New SQL Query Engine

[Client/server database driver enhancements](#)

The new features of the BDE 3.0 SQL query engine include:

- Enhanced performance
- View and constraint definitions
- Greater support for updateable queries.
- Expanded support for low-level cursor query capabilities (BDE Filters in SQL)
- Full SQL 92 entry-level support for INSERT/DELETE/UPDATE queries.
- Nested grouping, including constructs such as SUM(MIN(Field)) in projections.
- The UNION set operation
- User-friendly progress reports and error messages
- Support for interactive query builders

These new features are documented in [Local SQL Guide](#)

Other SQL enhancements are briefly described in the subsequent sections.

Subqueries

Subqueries are supported in both WHERE and HAVING clauses. In addition to scalar comparison operators (=, <, > ...) additional predicates using IN, ANY, ALL, EXISTS are supported.

Scalar expressions with both aggregation and arithmetic

More complex aggregate expressions are supported. Such as:

```
SUM( Field * 10 )
SUM( Field ) * 10
SUM( Field1 + Field2 )
```

Improvements in GROUP BY and ORDER BY queries.

Previous restrictions, such as requiring projection of all grouping or ordering columns are removed. Expressions are allowed in GROUP BY and ORDER BY. For example:

```
... GROUP BY MonthOf( DateField ) ...
```

Note: Expressions in this context deviate from the SQL92 standard, but are supported by Oracle, Microsoft Access, and others.

Updateable queries

BDE 3.0 provides expanded support for both single table and multiple table updateable queries or views. You can also constrain any updateable query by setting the query statement property stmtCONSTRAINED to TRUE before execution. For updateable queries with calculated fields, an additional field property identifies a result field as both read only and calculated.

See "Updateable queries" under "Data manipulation" in [Local SQL Guide](#). Also see [DbiQAlloc](#).

BDE function calls on query results

If a query returns a cursor, that cursor will fully support the low-level capabilities of a cursor returned from DbOpenTable. Thus filters and field maps may be applied to further refine the result set.

{button ,AL("new")} [What's new?](#)

Client/server database driver enhancements

Microsoft SQL Server 6.0 driver

- The driver name is MSSQL (Note that the Sybase driver name is SYBASE)
- The DLL name is SQLMSS32.DLL (Note that Sybase DLL name is now SQLSYB32.DLL)
- BDE 3.0 supports the new 6.0 NUMERIC and DECIMAL data types. These types are translated to logical fldFLOAT, but they are retrieved from the server in the native NUMERIC format so that a user is guaranteed no data loss when working with the physical data (xltNONE).
- The Vendor library is dynamically loaded when SQL Link DLL, SQLMSS32.DLL, is loaded.

Sybase driver

- The driver name is SYBASE (Note that the Microsoft SQL Server driver name is MSSQL)
- BDE 3.0 supports the new 6.0 NUMERIC and DECIMAL data types. These types are translated to logical fldFLOAT, but they are retrieved from the server in the native NUMERIC format so that a user is guaranteed no data loss when working with the physical data (xltNONE).

Enhanced InterBase 4.0 support

- BDE 3.0 supports the creation of new InterBase 4.0 NUMERIC and DECIMAL data types
- When connected to InterBase 4.0, you can use the GetInfo call to retrieve effected row count. This enhances performance.

Simplified table qualification

Object names are returned with owner qualification only if the current user is *not* the owner.

Statement row count

A new read-only statement property (stmtROWCOUNT) is provided to retrieve affected row count for INSERT, UPDATE, and DELETE statements:

```
stmtROWCOUNT    0x000600141    //ro UINT32    Rows affected by a stmt
```

Single row refresh

A new function, [DbiForceRecordReread](#), allows a single record to be reread from the server on demand. It refreshes one row only, rather than clearing the cache. This alternative offers several advantages over using [DbiForceReread](#), which clears the cache, or [DbiGetRecord](#) with a lock.

Batch-move enhancement

Data can be moved in batches between tables in different (or same) data sources by using [DbiBatchMove](#). A new database property, [dbBATCHCOUNT](#) and the Registry configuration option BATCH COUNT let you control the number of records to include in a batch before an auto-commit occurs. In this way you can adjust the size of a batch to accommodate server transaction logs that are not big enough to handle the whole batch.

SQL Trace

The SQL Trace facility is a very useful debugging tool. It opens the SQL "black box," allowing you to track the SQL statements sent to the servers when their BDE function calls are executed. This tool is implemented as the SQL TRACE option in the Windows Registry in conjunction with the callback [cbTRACE](#) to return trace information.

Governor to limit fetched records

The BDE configuration option MAX ROWS lets you limit the number of records a user can fetch from the server with each single SQL statement. You can use this option as a system governor to prevent users from unintentionally tying up valuable system resources. For example, a database administrator may set up users' configuration files to prevent them from tying up server and network resources if they happen to do a "SELECT * ..." on a huge table. The Maximum Rows governor allows you to make it impossible for a user to generate a million record query by mistake. For details on MAX ROWS, see

SQL settings

There is also a new cursor property, curMAXROWS, which allows you to override the database MAX ROWS option on a per cursor basis. This property can be set by using DbisetProp and has the same behavior as MAX ROWS.

Synonym support

Many server vendors (including Oracle) provide objects called *synonyms*. Synonyms are alternate names for other objects, such as tables or views. SQL Links 3.0 now provides the option to include synonyms in the table lists returned from DbisetTableList and DbisetFileList. See [SQL Links Guide](#)

Synonyms are supported by a new field in the [TBLBaseDesc](#) structure called [bSynonym](#).

You'll find the new BDE configuration option LIST SYNONYMS in the Registry's DB OPEN section for Oracle DRIVERS and DATABASES. For information on LIST SYNONYMS, see [SQL Links Guide](#).

Enhanced schema inquiry

Two new schema information retrieval functions allow you to retrieve the list of functions (and arguments) supported by the data source. This information can be useful for clients developing a visual query builder. See [DbisetFunctionList](#) and [DbisetFunctionArgList](#)

Table creation: integrity constraints

Integrity constraints ensure that references in the key fields of secondary tables (in the same database) or foreign tables (in another database) are maintained to key fields in a primary table. For example, if several tables have keys referencing the primary key Customer ID in the Customer table, then this dependency must be checked so that referenced customer IDs cannot be deleted, orphaning records in secondary or foreign tables. These enhancements mainly affect the BDE API Function [DbisetCreateTable](#).

{button ,AL("new")} [What's new?](#)

New and enhanced BDE 3.0 API features

The following functions have been added to the BDE API 3.0 since version 2.51.

Function Name	Description
<u>DbiBeginDelayedUpdates</u>	Converts cursor to a cached updates cursor.
<u>DbiEndDelayedUpdates</u>	Takes cursor out of cached updates mode and returns a new cursor handle.
<u>DbiApplyDelayedUpdates</u>	Client calls to either commit or rollback changes
<u>DbiOpenFunctionList</u>	Retrieves a list of functions supported by the data source.
<u>DbiOpenFunctionArgList</u>	Retrieves the arguments to functions supported by the data source.
<u>DbiQAlloc</u>	Allocates a new statement handle when preparing a SQL query
<u>DbiQGetBaseDescs</u>	Returns the original database, table, and field names of the fields that make up the result set of a query.
<u>DbiForceRecordReread</u>	Rereads a single record (row) from the server on demand, refreshing one row only rather than clearing the cache.
<u>DbiValidateProp</u>	Validates a property.

Enhanced BDE API functions

The [Function reference](#) of this guide provides complete examples illustrating the use of each function in both C and Delphi (Pascal) languages.

The following functions can now access data in blocks larger than 64 KB. The size of the blocks depends on how large a buffer you allocate.

- DbiWriteBlock
- DbiReadBlock
- DbiPutBlob
- DbiGetBlob

DbiCreateTable now supports up to 255 valchecks and integrity constraints for Paradox.

DbiQPrepare now accepts a statement handle instead of a pointer to a statement handle. It requires that you first call DbiQAlloc to allocate a new statement handle. See [Executing queries in stages](#)

The following functions have been modified to support simple transactions on Paradox and dBASE tables:

- DbiBeginTran
- DbiEndTran
- DbiGetTranInfo

{button ,AL("new")} [What's new?](#)

New and enhanced BDE 3.0 data structures

Properties

The following new properties have been added to BDE 3.0

Property Name	Location	Type	Description
curMAXROWS	0x04050002I	//rw INT32	Max number of rows to fetch from server
dbSERVERVERSION	0x04040005I	//ro UINT16	Major server version number
dbBATCHCOUNT	0x04040006I	//rw UINT16	Batch modification count before auto-commit
dbTRACEMODE	0x04040007I	//rw UINT16	Part of the SQL Trace implementation. Used to programatically override the DRIVER option for any database by using DbisetProp
stmtROWCOUNT	0x00060014I	//ro UINT32	Rows affected by a statement
stmtCONSTRAINED	0x00060031I	//rw BOOL	Constrain input
stmtFLDDESCS	0x00060032I	//rw pFLDDDESC	Answer FieldDescs
stmtCURPROPS	0x00060033I	//rw pCURProps	Answer Curprops
curGETEXTENDEDINFO	0x04050003I	//rw BOOL	Whether to retrieve referential integrity descriptions when opening tables

Changes to existing data structures

Structure	New Field	Type	Description
<u>IDXDesc</u>	abDescending	boolean array	To support descending/unique secondary indexes
<u>FLDDesc</u>	bCalcField	BOOL16	Is Calculated field (computed)
<u>FLDDesc</u>	iUnused[2	UINT16	Reserved for future use
<u>FLDType</u>	szNativeName	DBINAME	Name used in SQL DDL statements
<u>eCBType</u>	<u>cbTRACE</u>	option	A system level callback used to implement the SQL Trace facility that retrieves trace information.
<u>TBLBaseDesc</u>	bSynonym	BOOL16	Set to TRUE if the object is a synonym

New data structures

Structure	Description
<u>DBIEnumFld</u>	Defines an enumerated field
<u>DBIFUNCArgDesc</u>	Describes the arguments to a remote database function
<u>DBIFUNCDesc</u>	Describes a remote database function

New Registry options

Option Name	Section	Size	Type	Description
SHAREDMEMSIZE	SYSTEMINIT	1024	(in k)	Default is 1Mb
SHAREDMEMLOCATION	SYSTEMINIT	0X6BDE0000 (hex)		0 => use internal default

SQLTRACE MODE	DRIVER\ <i>drivername</i> \INIT	UINT16	For each SQL driver.
LIST SYNONYMS	DB OPEN		For Oracle DRIVERS and DATABASES.
MAX ROWS	DB OPEN	UINT32	For all SQL DRIVERS and DATABASES
BATCH COUNT	DB OPEN	UINT16	For all SQL DRIVERS and DATABASES, batch modified record count before auto-committing.

{button ,AL("new")} [What's new? topics](#)

Architectural overview

BDE has a driver-based architecture. Each distinct database format or data source usually requires a separate BDE driver. A given driver can support a closely related family of data sources. For example, the dBASE driver supports dBASE III, dBASE IV and later, and some FoxPro™ (v. 2.5, 2.6) file formats.

BDE is object-oriented in design, making it easy to extend and customize. To extend BDE to access an additional database system, simply install the appropriate BDE driver or ODBC driver for that database system.

In a client/server environment, the applications and development tools reside on the client PCs, while the data source resides on the SQL server. BDE is ideally suited for a client/server environment, because it provides transparent access to both server databases and local databases on PCs.

{button ,AL("concepts")} [More basic concepts](#)

Shared Services

BDE is based upon the software components model. To ease driver development and maximize reuse, the BDE infrastructure provides the following shared services.

Note: These shared components are mostly internal to BDE and its drivers; they are described here to help you understand the BDE architecture.

Buffer Manager

BDE's priority-based buffer manager enables all BDE drivers to share the same buffer pool. Buffers owned by different drivers can coexist in this buffer pool. BDE drivers are not required to use the common buffer manager, but using it maximizes overall system resources.

Sort Engine

BDE's high-performance sort engine is used internally by the query engine and by the Paradox and dBASE drivers.

OS services

BDE's OS services isolate the BDE environment from all OS and platform dependencies, including file I/O, network access, and OS level memory allocation. This makes BDE highly portable.

Memory manager

BDE's memory manager provides a sub-allocation service, minimizing OS overhead for small memory allocations.

BLOB cache

BDE's BLOB caching service makes BLOB access as efficient as possible, so that programmers are not required to use their own caching schemes. The BLOB cache is accessible to all BDE drivers. Multiple BLOBs can be simultaneously opened. The BLOB cache automatically overflows into a shared physical file to handle arbitrarily large BLOBs. The BLOB cache makes random access to BLOBs possible, eliminating the need for application developers to transfer BLOBs to files. This facility is available from BDE even when the data source/server does not provide random access to BLOBs.

Query Engine

The shared query engine supports both SQL and QBE query languages with data format independence. For details about BDE 3.0 SQL Query Engine, see [New SQL Query Engine](#)

SQL Generator

The query engine supports QBE as an alternate query language, which is more intuitive to end users than SQL. When the QBE query is directed toward a SQL-based server, the SQL generator module of the QBE engine translates the query into an equivalent SQL query.

Restructure

A restructure service is currently available for Paradox and dBASE formats. Restructuring enables the application developer to add, drop, or modify fields and drop or modify any structural aspects of a table. This module creates new tables when appropriate, translating and copying data to the new table as necessary.

Batch table functions

A set of generic batch services is available. These include copying data from one format to another, reading and writing blocks of records, and renaming tables.

Data translation service

BDE's data translation service enables many BDE functions and services to do cross-database operations. Given any two compatible formats, the data translation service calculates the optimal conversion. Data is translated from the database's native physical data format to the common BDE logical data format, and vice versa.

Linked cursors

BDE implements linked cursors to automatically support one-to-many relationships between two tables. A linked detail cursor tracks its master cursor using the join key and the records accessible by the detail cursor are constrained by the master record. Developers can use linked cursors to build sophisticated multi-table applications with little programming.

In-memory tables

In-memory tables provide efficient access to unlimited virtual memory in a table format. The sort engine uses in-memory tables to create intermediate batches. SQL drivers use in-memory tables for caching data locally. Developers can create and access in-memory tables by using BDE function calls used for accessing persistent tables. See [DbiCreateInMemTable](#).

Note that in-memory tables cannot be:

- made permanent
- indexed
- moved in batches
- saved to disk

SQL driver services

All SQL-based drivers (including the ODBC connectivity module) are built using SQL driver services. The following driver services are included:

- Mapping navigational BDE calls to SQL, making it possible to upsize Paradox and dBASE applications transparently.
- Local caching of records, making it possible to browse on query results.
- Schema inquiry services.
- BLOB handling services that are built using the BLOB cache module.
- Debugging by using the [SQL Trace](#) facility to track SQL statements sent to servers by BDE functions.

System manager

The system manager manages all system-level resources. It loads drivers on demand and keeps track of open databases and cursors. When an application exits, the system manager frees the resources allocated to that application.

Configuration manager

The configuration manager maintains the BDE global system configuration information in the Windows Registry and application-specific information in the BDE configuration file (IDAPI.CFG). At startup time this information is used to customize the BDE environment.

The BDE functions [DbiOpenCfgInfoList](#), [DbiAddAlias](#), and [DbiDeleteAlias](#) give the application access to the configuration file. You use the [BDE configuration utility](#) (BDECFG32.EXE) to register drivers and aliases, set date format options, and customize BDE drivers.

Language drivers

BDE architecture incorporates language drivers to address the needs of the international market. Each language driver encodes the collating sequence, capitalization rules, and OEM/ANSI translation rules to suit its particular language. BDE is bundled with nearly ninety language drivers.

All the native BDE drivers and all BDE shared services support these language drivers, so that the entire BDE environment is automatically "international" enabled. No porting is necessary. Application developers can deploy applications in international markets using the same engine. See [International compatibility](#)

Resources

All resources, such as error messages, for a language are placed in a separate dynamic link library.

BDE can simultaneously support resources in different languages. An application can register its language at startup time.

{button ,AL("concepts")} More basic concepts

BDE API functions

The Borland Database Engine includes an API for directly accessing its functionality. The API consists of a set of functions that can be called from any programming language capable of calling Windows DLLs. BDE functions are optimized for calling from C or C++; however, Delphi Pascal syntax is also provided in the function reference.

Over the years, two different types of database systems have developed that traditionally supported different data access approaches:

- PC-based database systems (such as Paradox, dBASE, and B-Trieve) have supported the indexed sequential access method (ISAM) type of data access. However, these systems have supported different kinds of APIs.
- Server-based database systems (such as InterBase, Sybase, Oracle, and DB2) have supported the ANSI standard SQL language. However, an industry standard for an API is just emerging: X/Open SQL Call Level Interface (CLI). This standard addresses only SQL-based database needs, and does not fully address ISAM type data source requirements.

Unified access

BDE functions unify access to both PC-based or ISAM databases and server-based SQL databases with a consistent cursor-based API. BDE supports the basic APIs for both types of databases, extending powerful features of each type to the other. For example, BDE's navigational features are influenced by ISAM databases, and are extended to support server-based databases. Similarly, the Query portion of BDE is influenced by the SQL standard, and is extended to support ISAM databases. Support of these basic API features on both kinds of databases makes BDE unique. For example, Paradox and dBASE exploit these features to support transparent access to SQL data sources.

Through each driver, BDE gives the application developer access to the unique features of each database system, such as data types, primary indexes for Paradox tables, delete flags and expression indexes for dBASE tables, and special processing for SQL databases. For this reason, BDE functions are not a least-common-denominator API.

Purposes

For all supported databases for which a BDE native driver or an ODBC driver is available, BDE API function calls serve the following purposes:

- Opening and closing of databases
- Getting and setting properties of BDE objects: system, clients, sessions, drivers, databases, cursors, and statements
- Accessing and manipulating data stored in each database system
- Defining the structure of a database in each database system, such as creating tables and indexes
- Performing operations across database systems, such as copying and joining tables

{button ,AL("concepts")} [More basic concepts](#)

BDE objects

BDE is object-oriented in design. At run time, application developers interact with BDE by creating various BDE objects. These run-time objects are then used to manipulate database entities, such as tables and queries. Programming for BDE involves interaction with the following BDE objects:

- [System](#)
- [Clients](#)
- [Sessions](#)
- [Database drivers](#)
- [Databases](#)
- [Cursors](#)
- [Query statements](#)

Each BDE object type is defined by a set of properties. Values are initially assigned to properties when the object is created. For example, the table name CUSTOMER is the value assigned to the table name property of the cursor object when the CUSTOMER table is opened with [DbiOpenTable](#).

The BDE API interface provides a set of functions that the application developer can use to retrieve existing values of properties ([DbiGetProp](#)) and reset these values ([DbiSetProp](#)).

For a complete list of BDE object types and their properties, see [Getting and Setting Properties](#)

For an overview of persistent objects common to most database systems, see [Database Entities](#).

{button ,AL("concepts")} [More basic concepts](#)

{button ,AL("bdeobjects")} [More BDE objects](#)

System

One system object controls the resources common to all applications running on the same machine. The BDE API system object is automatically created when the first client initializes. At this time, any configurable settings, such as the maximum memory allowed for the buffer pool, are read from the Windows Registry.

{button ,AL("bdeobjects")} [More BDE objects](#)

Clients

A new client object is created when an application calls the BDE initialization function. This first call to DbiInit is necessary before any other BDE call can be made. The client object is maintained automatically by BDE and exists mainly as a context for all the system resources used by BDE on behalf of each client. The client object has properties which can be set, such as which language is to be used for error messages.

Database Drivers are owned by the client or the system; once a driver is loaded, all other clients registered with BDE have access to it.

{button ,AL("bdeobjects")} More BDE objects

Sessions

An application can maintain one or more sessions. Sessions provide the means to isolate a set of database access operations without the need to start another instance of the application. A default session is automatically created when each application initializes. The session object is a container for all other BDE run-time objects that can be created:

- [Databases](#)
- [Cursors](#)
- [Query statements](#)

Any object created in the context of one session may not be used in the context of another session. The session is also the owner of all table and record locks acquired by all objects within the session. This means that a table or record lock acquired using one cursor in a session is owned by all cursors in the session that are opened on the same table. Any of the cursors on the same table can release such a lock. Additional sessions can be created to allow for different locking contexts.

Another property of the session is the private directory, where BDE places all temporary file-based tables created on behalf of the session. In addition, the session owns two properties specific to the Paradox driver: passwords (for gaining access to password protected tables) and the network control directory, where the PDOXUSRS.NET file is located.

{button ,AL("bdeobjects")} [More BDE objects](#)

Database drivers

Each driver is implicitly loaded by the system when an application first requests a service from that driver. At that time, any configurable settings found in the Windows Registry or the BDE configuration file (IDAPI.CFG) related to this driver are used to initialize it. Examples of configurable settings are the default table level and the language driver to be used when the table is created.

Drivers are owned by the client or the system; once a driver is loaded, all other clients registered with BDE have access to it.

The application developer can also inquire about driver capabilities, such as whether or not the driver supports transactions.

dBASE, Paradox, and text drivers

The standard drivers for Paradox, dBASE, and text databases are shipped with BDE.

SQL drivers

For server-based SQL database systems such as InterBase, Oracle, and Sybase separate native BDE SQL drivers are available.

ODBC drivers

Any ODBC driver can be used with BDE, because BDE has an ODBC connectivity socket. The rich features of BDE, such as navigational access to data, bi-directional cursors, and cross-database operations, are also automatically enabled even when an ODBC driver is in use.

{button ,AL("bdeobjects")} [More BDE objects](#)

Databases

A database is an organized collection of related tables. To access data in a table, the session first must gain access to the database with a [DbiOpenDatabase](#) call, which returns a database handle to the database.

Standard databases

BDE classifies file-based databases such as Paradox, dBASE, and text as "standard" databases. Files within a standard database are normally grouped together in the current directory associated with a standard database, although an application can expand its database by referencing, by fully qualified pathname, any accessible file either locally or on the network.

SQL databases

A SQL database usually resides on a server. The client application must first log in, establishing a connection to the database server. This requires supplying the appropriate user name and password. When you call `DbiOpenDatabase`, BDE logs into the server and establishes a connection, just as with standard databases.

Aliases

An alias is a short name referencing a database. Database references within applications can use alias names, making your applications portable.

You can change the definition of an alias at any time by using the BDE configuration utility `BDECFG32.EXE`. All references to the alias within the application automatically refer to the new definition of the alias.

Aliases for standard databases

For standard databases, an alias is a name you assign as a shortcut to a directory containing the files you want to access. You can give a long path name a short alias name. When you open a database with such an alias, tables in that directory can be opened by supplying only the table name without supplying the full path.

Aliases for SQL databases

For SQL databases, properties must be defined for the alias. These properties can vary depending on the SQL driver. Alias properties can include:

- User name
- Server name
- Open mode
- Default SQL query mode
- Schema cache size
- Language driver

After a SQL database alias is established, the client application can use it the same way it uses an alias for a standard database.

{button ,AL("bdeobjects")} [More BDE objects](#)

Cursors

BDE provides access to tables or query results through cursors. A cursor provides addressability to a collection of records one at a time. All data manipulation operations (insert, delete, update, and fetch), as well as positioning the cursor in the table (sometimes referred to as navigation) are performed with a cursor.

When the application opens a table with [DbiOpenTable](#) or executes a query, a cursor handle is returned. After the cursor handle is returned, you can use it to retrieve data stored in a table as well as information about a table. You can also obtain and set properties of this cursor. The application can close a cursor at any time with [DbiCloseCursor](#). When the cursor is closed, the cursor handle becomes invalid. (Multiple cursors can be created on the same table.)

To access data in a table, the application opens the table and obtains a cursor handle. The table can be opened exclusively or shared. The translation mode can be specified as either `xltNONE` or `xltFIELD`. If `xltNONE` is specified, the data is returned from the table as the untranslated physical type (the native data type as stored by the data source). If `xltFIELD` is specified, the data is translated into a generic, logical type by BDE. Logical types are compatible with C language data types.

Ordered and unordered cursors

By default, the records returned by a cursor are not in any particular order. Ordered cursors can be obtained by specifying a current active index for a cursor (using [DbiOpenTable](#) or [DbiSwitchToIndex](#)). A query executed using the ORDER BY clause is also an ordered cursor.

Positioning the cursor

Whenever the application opens a cursor on a table or a query result, the resulting cursor is positioned at the beginning of the result set, before the first row, rather than on the first record of the table. This initial position enables the application to access all the records with the [DbiGetNextRecord](#) function.

At any time, the cursor can be positioned on a record or on a crack. A crack is a position between records at the beginning of the table, at the end of the table, or the place left when a record is deleted.

The possible cursor positions are

- At the beginning of the table or result set (the crack before the first record). [DbiSetToBegin](#) can be used to explicitly position the cursor here; the cursor is always positioned here when the cursor is opened.
- At the end of the table or result set (the crack after the last record). [DbiSetToEnd](#) can be used to explicitly position the cursor here.
- On a record (after a successful call to retrieve, insert, or update a record).
- On a crack between records. [DbiSetToKey](#) positions the cursor on the crack before the record of the specified key.
- The cursor is positioned on a crack if it was previously positioned on a record, and that record was deleted.

Bookmarks

A bookmark can be obtained to save the cursor's current position, so that it can be repositioned to that place later. Bookmarks can remember any position: on the current row, at the beginning or end of the table, or on a crack. A call to [DbiGetBookMark](#) saves the current position of the cursor as a bookmark. A subsequent call to [DbiSetToBookMark](#) positions the cursor to the location saved by [DbiGetBookMark](#). Multiple bookmarks can be placed on a cursor. The positions of two bookmarks can be compared with a call to [DbiCompareBookMarks](#).

Query statements

SQL Queries and QBE Queries can be either directly executed or prepared first and then executed. When a query is prepared, BDE checks its validity; if the query is valid, BDE creates a query object and returns a query statement handle.

For a general exposition about query statements, see Querying databases

Certain properties of a query can be changed once the query handle is obtained. For example, if the query has parameter markers, the values of parameters to be used can be set prior to executing a query. See Getting and setting properties

{button ,AL("bdeobjects")} More BDE objects

Database entities

Database entities are persistent objects, common to most database systems, and include

- [Tables](#)
- [Indexes](#)
- [Fields](#)
- [Queries](#)
- [Transactions](#)
- [Callbacks](#)
- [Cross-database operations](#)

`{button ,AL("concepts")} More basic concepts`

`{button ,AL("databaseentities")} More database entities`

Tables

Data in a database is organized in tables. In BDE, a table name has meaning only within a database. Tables are accessible to the application in rows (records) and columns (fields). The rows can be ordered by an index.

To create a table, the application calls the BDE function [DbiCreateTable](#) passing the completed table descriptor structure [CRTbiDesc](#). Alternatively, tables can be created using SQL Data Definition Language (DDL).

Temporary Tables

Certain database operations create temporary tables that last only until you close them or end the BDE session. Your application can create two types of temporary tables:

- Use [DbiCreateTempTable](#) to create a temporary table, which can later be saved to disk. If the table becomes too large, it is automatically written to disk. The client application can explicitly save the temporary table to disk by calling the function [DbiMakePermanent](#) or [DbiSaveChanges](#). For all practical purposes, these tables behave like regular tables.
- Use [DbiCreateInMemTable](#) to create a temporary table never intended to be written to disk. These tables are created by the application for gathering information that is needed temporarily during processing. These tables can be created only with logical types. These tables do not support indexes.

For detailed information, see:

- [Accessing and updating tables](#)
- [Creating tables](#)
- [Modifying table structure](#)

{button ,AL("databaseentities")} [More database entities](#)

Indexes

An index determines the order of the records in a table. Paradox, dBASE, and SQL database systems all let you create indexes to order records. However, there are differences in the way indexes work and the information required to define indexes in each of the database systems.

BDE supports all the native modes of indexing for Paradox, dBASE, and SQL database systems. To enable your application to create an index, BDE provides a generic index descriptor structure, IDXDesc. IDXDesc is a union of all of the fields required to define an index for all of the supported database systems. To add an index, the application supplies the required data in IDXDesc and calls the function DbiAddIndex.

To create an index for a table, your application need only supply data in the index descriptor fields that are applicable to that particular table's database system. For example, when defining an index on an InterBase table, your application ignores fields such as *szTagName* and *bExpldx*, which are used only in defining dBASE indexes. When required fields are not supplied, an error message is returned by the DbiAddIndex call.

Different types of indexes allowed within the database system may have different requirements. For example, when adding a dBASE maintained index, the field *szTagName* is required. Indexes can also be created using the SQL Data Definition Language.

Types of Indexes

There are three basic types of indexes:

- Traditional indexes on columns. These indexes can be single column indexes or composite indexes on more than one column.
- Expression indexes. These indexes have key values determined by an expression (not necessarily column values). Of the drivers mentioned, only dBASE currently supports expression indexes.
- Pseudo-indexes. For SQL data sources, BDE can create a pseudo-index by using one or more user-specified SQL fields to define the requested order

Characteristics of Indexes

Indexes have three other characteristics:

- Subset indexes do not index every record in a table; instead, they index only those rows that satisfy a given Boolean expression. Of the drivers mentioned, only dBASE uses subset indexes.
- Unique indexes cannot have duplicate key values.
- Indexes can be ascending or descending for drivers that support them.

Driver-Defined Index Requirements

It is important to understand that different drivers support different types and characteristics of indexes. The following sections provide a partial list of rules for the different index types and characteristics supported by each driver:

dBASE

The following rules describe how dBASE supports indexes:

- dBASE supports only expression indexes. (Single-column indexes are treated as a special case of expression indexes.)
- dBASE supports two different physical index formats: .NDX-style and .MDX-style.
- dBASE supports subset indexes in .MDX-style indexes.
- In dBASE, all maintained indexes are .MDX-style indexes.
- dBASE does not support primary indexes (or primary keys).

Expression Indexes

When defining an index, dBASE uses expression indexes. The expression index determines how the key is computed when a record is added. Expression indexes can be simply the name of a field or they can be created from field names, operators, and functions.

Multiple indexes

Multiple indexes are stored in a single file with a .MDX extension. dBASE stores different indexes in the same physical file. Each index in the multiple index file is called a tag. Tags are identified by the *szTagName* you assigned when you created the index.

One of the multiple index files is used to store all the maintained indexes. The name of this file is of the form <Tbl_Name>.MDX. This file is called the production index file; indexes in this file are always maintained.

Single indexes

The dBASE driver also supports the older style dBASE indexes called .NDX indexes. This index is stored in a file with a .NDX extension. Each such file contains only one index; this index is maintained only if the index is explicitly opened.

Paradox

The following rules describe how Paradox supports indexes:

- Paradox supports both single- and multi-column indexes.
- Paradox supports a primary key.
- Paradox supports maintained and non-maintained secondary indexes. Maintained secondary indexes are supported only if the table also has a primary index. If an index is non-maintained, it becomes out of date if any data in the table changes.
- Paradox does not support expression indexes.
- Paradox does not support subset indexes.
- Paradox supports case-sensitive/insensitive secondary indexes.
- Paradox supports descending indexes with level 6 tables.

Primary indexes

A Paradox primary key is defined as a field or group of fields whose values uniquely identify each record of a table. The fields in a key must be contiguous starting with the first field. A primary key requires a unique value for each record (row) of a table. A table's primary key establishes the default sort order for the table. A Paradox table is sorted based on the values in the fields you define as the table's primary key. Only one record's primary key can be blank. All subsequent blanks are considered as duplicates, and records containing them are not accepted.

Secondary indexes

Paradox supports secondary indexes. A table can have more than one secondary index, and a secondary index can be a composite index. Each secondary index can be maintained or non-maintained. If it is maintained, the index is updated automatically every time the table is changed. Secondary indexes can be case-sensitive or insensitive. If it is case-sensitive, BDE differentiates between uppercase and lowercase letters as it sorts fields. **Maintained secondary indexes** are supported only if the table also has a primary key. If an index is non-maintained, it becomes out of date if any data in the table changes.

SQL

The following rules describe how SQL drivers support indexes:

- All SQL indexes are maintained.
- The rules for index creation are based on SQL server support. SQL drivers support the following indexes if they are supported by your server:
 - Single and multi-column indexes
 - Unique and non-unique indexes
 - Ascending and descending indexes
- If an index is added to any SQL table, then any cursors open on that table must be closed and reopened, to allow for possible changes in the buffer size.

{button ,AL("databaseentities")} More database entities

Fields

Fields are columns of a table. The properties of each field in a table are defined in a field descriptor structure [FLDDesc](#). When a table is created with [DbiCreateTable](#), the table descriptor [CRTblDesc](#) points to an array of FLDDesc structures, each of which defines a field in the table.

Physical data types

Physical data types can vary from one data source to another. For example, floating point numbers are stored differently by Paradox, dBASE, and SQL data sources. Physical data types of one data source might not be compatible with the physical data types of other data sources to store the same data.

Logical data types

Logical data types are the generic data types used by BDE. These generic types are made interchangeable between data sources because BDE automatically translates them into the proper physical data types for each target data source.

Automatic field translation

To facilitate cross-database processing, BDE does not require your application to translate data to make it compatible with each different data source. As long as your application uses BDE logical data types, BDE handles the translation to the correct physical format for each target data source. When BDE returns data to your application, it can translate all data types as they are stored by the data source back to the generic logical data types, depending on the translate mode of the cursor, `xitNONE` or `xitFIELD`.

BDE's logical data types are compatible with standard C language data types.

You can make the the application override the translation mechanism when accessing a table, so that it receives data in the physical format used by the data source.

{button ,AL("databaseentities")} [More database entities](#)

Queries

The common query engine allows you to specify queries in either the SQL or QBE language on any available data source. Through queries, BDE allows uniform data retrieval across data sources. The local query manager enables you to join data across servers. For example, you can join Oracle to dBASE, Sybase to Paradox, or InterBase to Oracle on two different servers. To run cross-database queries, the table names in a query must be qualified by alias names. Cross-database queries are supported only with standard database handles, even if the query is targeted for SQL servers.

BDE provides a set of query interface functions so that the application developer can query tables across all accessible databases:

- [DbiQAlloc](#) obtains a new statement handle
- [DbiQGetBaseDescs](#) returns the original database, table, and field names of the fields that make up the result set of a query.
- [DbiSetProp](#) sets properties on the new statement handle, such as making the query result set updateable.
- [DbiQPrepare](#) prepares a SQL or QBE query for execution.
- [DbiQSetParams](#) sets the value of parameter markers in a prepared query before the query executes.
- [DbiQExec](#) executes a previously prepared query.
- [DbiQFree](#) frees resources acquired during preparation and execution of a query.
- [DbiQExecDirect](#) prepares and executes a SQL or QBE query.

BDE allows access to SQL, Paradox, or dBASE data through both [SQL queries](#), a convenient subset of the SQL language, and [QBE queries](#), the Query By Example language defined in Paradox. For both QBE and SQL, a query can be executed as a live result set, resulting in an updatable cursor on the original table.

For detailed information on querying, see:

- [Querying databases](#)
- [Querying Paradox and dBASE tables](#)
- [Querying different databases](#)
- [Executing queries directly](#)
- [Executing queries in stages](#)

{button ,AL("databaseentities")} [More database entities](#)

Transactions

A transaction is a group of related operations that must *all* be performed successfully; otherwise no change to the database takes place.

BDE supports transactions on all servers with three BDE function calls:

- [DbiBeginTran](#)
- [DbiEndTran](#)
- [DbiGetTranInfo](#)

The application calls DbiBeginTran, submits SQL statements and BDE function calls to be included in the transaction, and then calls DbiEndTran. DbiGetTranInfo returns status information about a transaction.

BDE supports local transactions for Paradox and dBASE drivers so that updates to tables can be rolled back (reverted) or committed. Without transaction support, updates would be committed immediately with no way to roll them back and applications might fail to perform updates in a consistent way.

When a local transaction is started on a standard database, updates performed against tables in that database are logged. Each log record contains the old record buffer of the record that is updated. When a transaction is active, the records with updates are locked. These locks are held until the transaction is either committed or rolled back.

- The Commit operation releases all locks that were held when that transaction was active.
- The Rollback operation reapplies the updates to the underlying tables to restore the original state of the database. Once the original state of the database is restored, the locks are released.

Note: For standard transactions there is no automatic crash recovery on DDL-related actions such as table create, restructure, index creation, table/index deletion, and so on.

For more information, see:

- [Transactions on Paradox and dBASE](#) is a guide to specifics.
- [Cached updates](#) offers yet another strategy for dealing with locking.
- [Transactions and cached updates](#) provides a comparative discussion.

{button ,AL("databaseentities")} [More database entities](#)

Callbacks

Sometimes a client application needs information about the progress of a given function. For example, if a table is being restructured, certain conditions can cause records to be written to a "problems" table rather than the destination table. This situation could warrant termination of the operation, or it could require some other action. A callback enables the application to intercede and evaluate such a situation before any action is taken by BDE. The application registers the callback in advance by calling [DbiRegisterCallBack](#).

After a callback is registered, the occurrence of the specified event triggers the database engine to call the callback function, which in turn alerts the application that the event has occurred. The callback then awaits further instructions from the application.

The client responds to the callback by sending an appropriate return code (cbrABORT, cbrCONTINUE, and so on.). The callback mechanism is efficient because BDE can get the application's response without interrupting the normal client process flow.

For detailed information, see [Using callbacks](#)

To inspect the callback structures, see [Data structures](#)

{button ,AL("databaseentities")} [More database entities](#)

Cross-database operations

BDE query and batch functions can operate on heterogenous data sources. The following examples illustrate this feature:

- A single SQL or QBE query, can do a three-table join, for example, between InterBase, Oracle, and Paradox tables, and update a Sybase table with join result. For more information, see "Heterogeneous Joins" in the [Local SQL Guide](#)
- [DbiBatchMove](#) can be used to copy one table type to another; for example, a Paradox table to an Oracle server. All the data types are converted to the appropriate Oracle data types. The table name and all field names are converted to legal Oracle names, and options exist to convert any textual data between the character sets of the two data sources. For more information, see [Adding, updating, and deleting records](#).
- [DbiSortTable](#) can be used, for example, to sort an Oracle table and return the result as a Paradox or a dBASE table. For more information, see [Sorting tables](#).

See [Querying databases](#) for a thorough exposition about cross-database operations.

{button ,AL("databaseentities")} [More database entities](#)

Application development

This chapter describes the fundamental steps of application development with the Borland Database Engine (BDE). The first topic explains how to get started and provides an introductory tutorial. The remaining topics are guides to the basic tasks.

- [Introduction to BDE programming](#)
 - [Project setup](#)
 - [Basic procedure](#)
 - [Chk function](#)
 - [Template program](#)
- [Accessing and updating tables](#)
- [Locking](#)
- [Transactions](#)
- [Querying databases](#)
- [Getting and setting properties](#)
- [Retrieving schema and system information](#)
- [Creating tables](#)
- [Integrity constraints](#)
- [Modifying table structure](#)
- [Using callbacks](#)
- [Data source independence](#)
- [Error handling](#)
- [Debugging](#)
- [Filtering records](#)
- [Database driver characteristics](#)
- [Improving BDE performance](#)

Introduction to BDE programming

This section shows you how to get started programming with the Borland Database Engine (BDE). After following the steps and examples, you will have a simple EasyWin BDE sample application that gets a record from a table and displays the first two fields. You can inspect the completed program, which demonstrates each of the basic steps in context. This program serves as a template for writing your own BDE programs.

- [Project setup](#)
This section covers the basics of what must be done to set up a Borland Database Engine project or makefile.
- [Basic procedure](#)
An overview of the basic steps required to create a simple application that retrieves fields from a table. From each step you can jump to a detailed description of the procedure with code examples or to the sample template program.
- [Chk function](#)
The complete code for the Chk function, which returns more complete error information about BDE functions than would be returned by the standard error string.
- [Template program](#)
A sample BDE program structure you can use as a convenient template for creating your own applications.

{button ,AL("applicationdevelopment")} [Application development](#)

Project setup

Follow these steps when you begin to write a BDE application:

1. Create a Win32 console project or makefile.
 - MAIN.CPP File to contain your code
 - IDAPI32.LIB BDE Import Library
 - MAIN.DEF Module Definition file
2. For this simple application, set the target to be a console application. This way you don't have to deal with any Windows user interface issues.
3. Install the BDE32.TOK file to support syntax highlighting for BDE functions and types. Directions on how to do this are included in the file \BDE32\DOC\BDE32TOK.TXT. You can also incorporate the on-line help files, BDE32.HLP and BDE32.CNT into the BC 4.5 OpenHelp architecture, allowing context sensitive help on BDE types and functions.
4. Use the Debug Layer when developing applications. (See [Using the debug layer.](#)) The debug layer performs much stricter error checking than the regular DLL, resulting in fewer GP faults and less re-booting of your machine. It will also produce a trace output detailing which BDE functions were called by an application. Note that use of the debug layer requires the use of both the Debug DLL (Set using the DLLSwap utility), as well as a call to the BDE function [DbiDebugLayerOptions](#). In addition, you may wish to use the [SQL trace](#) facility to track SQL statements sent to servers when BDE functions are executed.
5. Make certain to compile with "Allocate enums as ints" selected (In the BC 4.5 IDE, Options|Project|Compiler|Code Generation). A number of structures, such as [CURProps](#), make use of Enumerations. This error generally manifests itself with stack corruption problems, such as GP faults when calling or returning from a function.
6. Within a module to contain BDE code, include the following header files:
 - WINDOWS.H
 - IDAPI.H

{button ,AL("applicationdevelopment")} [Application development](#)

Basic procedure

These are the basic steps required to get a record from a table:

- [1. Initialize the Borland Database Engine](#)
- [2. Enable the debug layer](#)
- [3. Open a database object](#)
- [4. Set the database object to point to the directory containing the table](#)
- [5. Set the directory for temporary objects](#)
- [6. Open a table, creating a cursor object](#)
- [7. Get the properties of the table](#)
- [8. Using these properties, allocate memory for a record buffer](#)
- [9. Position the cursor on the desired record](#)
- [10. Get the desired record from the cursor \(table\)](#)
- [11. Get the desired fields from the record](#)
- [12. Free all resources](#)

Click on each numbered step to display a detailed explanation and a specific code sample.

At any time, you can refer to the [Template program](#) which demonstrates, in the context of a fully functional program, each of the steps in the basic procedure. You can copy and paste from this code to build your own BDE programs.

Note that throughout the short examples unfamiliar variable types are used. These are BDE variable types defined in the IDAPI.H header file, such as: BYTE, BOOL, and CHAR. In addition, the examples for the steps make use of the [Chk](#) function, which returns more complete error information about BDE functions than would be returned by the standard error string.

{button ,AL("applicationdevelopment")} [Application development](#)

Step 1: Initialize the Borland Database Engine

Initialize BDE by using the DbInit function:

```
CHK(DbInit(NULL));
```

Chk is a function that handles errors returned from BDE API calls.

{button ,Jl(">example","templateprogram")} Template program

Step 2: Enable the Debug Layer

The debug layer outputs trace information to a text file on disk. Use this code to enable the debug layer:

```
DbiDebugLayerOptions (DEBUGON|OUTPUTTOFILE|FLUSHEVERYOP, "TRACE.TXT");
```

DEBUGON turns on the debug layer.

OUTPUTTOFILE forces debug information to the specified file.

FLUSHEVERYOP forces data to be written to the file after every Dbi operation..

{button ,J(">example","templateprogram")} Template program

Step 3: Connect to a database

Now you are ready to connect to a database.

All table access must be performed within the context of a database. Local databases generally use what is referred to as the "STANDARD" database, which is used in this example.

The preferred method is to create an alias to a local directory and use that as the database. This permits easy future modification if one day it is decided to move the application from using dBASE tables to using InterBase tables.

You use the function DbiOpenDatabase to open a database:

```
hDBIDb   hDb = 0; // Handle to the Database

Chk(DbiOpenDatabase (
    NULL,           // Database name - NULL for standard Database
    NULL,           // Database type - NULL for standard Database
    dbiREADWRITE,  // Open mode - Read/Write or Read only
    dbiOPENSHARED, // Share mode - Shared or Exclusive
    NULL,           // Password - not needed for the STANDARD
    database
    NULL,           // Number of optional parameters
    NULL,           // Field Desc for optional parameters
    NULL,           // Values for the optional parameters
    &hDb));         // Handle to the database
```

{button ,J(">example","templateprogram")} Template program

Step 4: Set the database object to point to the directory containing the table

Now that the database is open, you must set the table directory.

Although the working directory defaults to the directory that contains the application, most applications place data in a different directory. The working directory is the directory where the BDE expects to find tables when a path is not specified.

While it is possible to open a table in other directories by specifying the absolute path, it is preferable to open tables in the working directory, because a number of operations, such as getting a list of available tables, use the current directory. Use the function DbiSetDirectory to set the working directory (using the default location of the BDE sample tables):

```
Chk(DbiSetDirectory(  
    hDb, // Handle to the database being modified  
    "c:\\bde32\\examples\\tables")); // The new working directory
```

Note: You must use the full, absolute path. Relative paths are not supported.

{button ,JI(">example","templateprogram")} Template program

Step 5: Set the directory for temporary objects

You must create a temporary directory for a client.

Not all BDE applications create temporary objects, but larger applications do sometimes create them. For example, the result set from a query of the records that cause a key violation in a restructure will be placed in a temporary table. By default, this temporary, or "private" directory, is the startup directory. This will cause a problem if the application is running on a network or a CD-ROM, because the directory cannot be shared, and it must be writable.

Use the function DbiSetPrivateDir to set the private directory for a client:

```
Chk(DbiSetPrivateDir(  
    "c:\\bdetemp"));    // Select a directory on a local drive  
                      // not used by other applications.
```

Note: You must use the full, absolute path. Relative paths are not supported.

{button ,JI(">example","templateprogram")} Template program

Step 6: Open a table, creating a cursor object

Now you can open the table.

Upon opening a table, a cursor object is created and returned to the calling application. A cursor object is an abstraction that lets you access queries and tables in the same method:

```
hDBICur hCur = 0;          // Handle to the cursor (table)
CHAR  szTblName[DBIMAXNAMELEN];
// Table name - DBIMAXNAMELEN is defined in IDAPI.H
CHAR  szTblType[DBIMAXNAMELEN];
// Table Type

strcpy(szTblName, "customer");
// Name of the table
strcpy(szTblType, szPARADOX);
// Type of the tables - szPARADOX is defined in IDAPI.H

Chk(DbiOpenTable(
    hDb,                // Handle to the standard database
    szTblName,          // Name of the table
    szTblType,          // Type of the table - only used for local
    tables
    NULL,               // Index Name - Optional
    NULL,               // IndexTagName - Optional. Only used by dBASE
    0,                  // IndexId - 0 = Primary.
    dbiREADWRITE,      // Open Mode - Read/Write or Read Only
    dbiOPENSHARED,     // Shared mode - SHARED or EXCL
    xltFIELD,          // Translate mode - Almost always xltFIELD
    FALSE,              // Unidirectional cursor movement.
    NULL,               // Optional parameters.
    &hCur));           // Handle to the cursor
```

{button ,Jl(">example","templateprogram")} Template program

Step 7: Get the properties of the table

To get record information from the table, you need to determine the size of the record buffer. You can obtain this information from the cursor by using the function [DbiGetCursorProps](#). The Cursor properties include information on the table name, size, type, number of fields, and record buffer size. You can find more information on cursor properties in [CURProps](#).

```
CURProps curProps;           // Properties of the cursor

Chk(DbiGetCursorProps(
    hCur,                   // Handle to the cursor
    &curProps));            // Properties of the cursor (table)
```

curProps.iRecBufSize contains the size of the record buffer.

{button ,J(">example","templateprogram")} [Template program](#)

Step 8: Using these properties, allocate memory for a record buffer

You must use the properties you obtained in Step 8 in the following code to allocate memory for a record buffer:

```
pBYTE    pRecBuf;           // Pointer to the record buffer

pRecBuf = (pBYTE) malloc(curProps.iRecBufSize * sizeof(BYTE));
if (pRecBuf == NULL)
{
    // If pRecBuf is NULL, there was not enough memory to allocate
    // a record buffer.
    // Handling of this error is user-determined, but no information
    // from the table can be retrieved.
}
```

{button ,J(">example","templateprogram")} Template program

Step 9: Position the cursor on the desired record

Use the function DbiSetToBegin to position the cursor on the "crack" before the first record in the table.

Crack semantics allow you to set the current cursor position to apoint just before the first record, between records, or after the last record. One advantage of crack semantics is that it lets you use a single function to access all records in a table. For example, rather than using DbiGetRecord the first time, and DbiGetNextRecord each subsequent time, you can use DbiGetNextRecord to get all records in a table.

```
Chk(DbiSetToBegin(hCur));      // Position the specified cursor to the crack
                               // before the first record.
```

{button ,Jl(">example","templateprogram")} Template program

Step 10: Get the desired record from the cursor (table)

To get a record from a table you would normally use the function DbiGetNextRecord. This will set the current record of the cursor to the record returned by this function (the next record in the table):

```
Chk(DbiGetNextRecord(  
    hCur,           // Cursor from which to get the record.  
    dbiNOLOCK,      // Lock type  
    pRecBuf,        // Buffer to store the record  
    NULL));         // Record properties - don't need in this case
```

{button ,Jl(">example","templateprogram")} Template program

Step 11: Get the desired fields from the record

Now you are ready to get the field values out of the record buffer and into some local variables.

In this example, we are making assumptions about which field is at which ordinal position within the table, as well as the size of the field.

The table used by this example is the CUSTOMER.DB included with the BDE SDK.

In general, it is recommended to use DbiGetFieldDescs to get information about a field before retrieving it. Also note that a single function, DbiGetField, is used to get all fields (other than BLOBs) from a table.

```
DFLOAT custNum;
BOOL   isBlank;

Chk(DbiGetField(
    hCur,                // Cursor which contains the record
    1,                    // Field Number of the "Customer" field.
    pRecBuf,              // Buffer containing the record
    (pBYTE)&custNum,      // Variable for the Customer Number
    isBlank));           // Is the field blank?
```

{button ,Jl(">example","templateprogram")} Template program

Step 12: Free all resources

After all desired operations have been performed, you need to clean up the resources allocated on behalf of the application. In addition to any memory explicitly allocated by the application, using malloc or new, all engine objects must also be cleaned up, including the cursor, database, and engine:

```
if (pRecBuf != NULL)
    free(pRecBuf);           // Free the record buffer

if (hCur != 0)
    Chk(DbicloseCursor(&hCur));    // Close the cursor

if (hDb != 0)
    Chk(DbicloseDatabase(&hDb));    // Close the database

DbiExit();                  // Close the BDE.
```

{button ,Jl(">example","templateprogram")} Template program

Chk function

The Chk function is useful for returning more complete error information about BDE functions than would be returned by the standard error string. Here is the complete code for the Chk function:

```
DBIResult Chk(DBIResult ErrorValue)
{
    char          dbi_status[DBIMAXMSGLEN * 5] = {'\0'};
    DBIMSG        dbi_string = {'\0'};
    DBIErrInfo    ErrInfo;

    if (ErrorValue != DBIERR_NONE)
    {
        DbiGetErrorInfo(TRUE, &ErrInfo);

        if (ErrInfo.iError == ErrorValue)
        {
            wsprintf(dbi_status, "  ERROR %s", ErrInfo.szErrCode);

            if (strcmp(ErrInfo.szContext1, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext1);
            if (strcmp(ErrInfo.szContext2, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext2);
            if (strcmp(ErrInfo.szContext3, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext3);
            if (strcmp(ErrInfo.szContext4, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext4);
        }
        else
        {
            DbiGetErrorString(ErrorValue, dbi_string);
            wsprintf(dbi_status, "  ERROR %s", dbi_string);
        }
        MessageBox(NULL, dbi_status, "BDE Error", MB_OK | MB_ICONEXCLAMATION);
    }
    return ErrorValue;
}
```

{button ,AL("applicationdevelopment")} [Application development](#)

Template program

This program demonstrates each of the basic steps described in the "Basic procedure" for BDE application development. You can execute the template program and step through it to see how it works: It opens a BDE sample table and gets two records.

Use this template program as a skeleton on which to build your own BDE programs.

```
#include <idapi.h>
#include <stdio.h>
#include <windows.h>

DBIResult Chk(DBIResult);      // Function Prototype

void main ()
{
    hDBIDb  hDb = 0;           // Handle to the Database
    hDBICur  hCur = 0;       // Handle to the cursor (table)
    CHAR     szTblName[DBIMAXNAMELEN];
    CHAR     szTblType[DBIMAXNAMELEN];
    CURProps curProps;        // Properties of the cursor
    pBYTE    pRecBuf;         // Pointer to the record buffer
    DFLOAT   custNum;
    BOOL     isBlank;

    printf("\nInitialize engine");
    Chk(DbiInit(NULL));       //
    Step 2

    printf("\nSet debug layer options");
    DbiDebugLayerOptions(DEBUGON|OUTPUTTOFILE|FLUSHEVERYOP, "TRACE.TXT");//
    Step 3

    printf("\nOpen database");
    Chk(DbiOpenDatabase(      //
    Step 4
        NULL,                // Database name - NULL for standard database
        NULL,                // Database type - NULL for standard database
        dbiREADWRITE,        // Open mode - Read/Write or Read only
        dbiOPENSERIALIZED,   // Share mode - Shared or Exclusive
        NULL,                // Password - not needed for the STANDARD
        database
        NULL,                // Number of optional parameters
        NULL,                // Field Desc for optional parameters
        NULL,                // Values for the optional parameters
        &hDb));              // Handle to the database

    printf("\nSet table directory");
    Chk(DbiSetDirectory(     //
    Step 5
        hDb,                 // Handle to the database which is being
        modified
        "e:\\bde32\\examples\\tables"));
        // The new working directory
```

```

printf("\nSet private directory");
Chk(DbiSetPrivateDir(                                     //
Step 6
    "c:\\temp"));           // Select a directory on a local drive not used
                             // by other applications.

strcpy(szTblName, "customer");
strcpy(szTblType, szPARADOX);
printf("\nOpen table");
Chk(DbiOpenTable(                                       //
Step 7
    hDb,           // Handle to the standard database
    szTblName,    // Name of the table
    szTblType,    // Type of the table - only used for local
tables
    NULL,         // Index Name - Optional
    NULL,         // IndexTagName - Optional. Only used by dBASE
    0,           // IndexId - 0 = Primary.
    dbiREADWRITE, // Open Mode - Read/Write or Read Only
    dbiOPENSARED, // Shared mode - SHARED or EXCL
    xltFIELD,    // Translate mode - Almost always xltFIELD
    FALSE,       // Unidirectional cursor movement.
    NULL,        // Optional Parameters.
    &hCur));    // Handle to the cursor

printf("\nGet cursor properties");
Chk(DbiGetCursorProps(                                   //
Step 8
    hCur,        // Handle to the cursor
    &curProps));  // Properties of the cursor (table)

printf("\nAllocate a record buffer");
pRecBuf = (pBYTE) malloc(curProps.iRecBufSize * sizeof(BYTE)); //
Step 9
if (pRecBuf == NULL)
{
    // If pRecBuf is NULL, there was not enough memory to allocate a
    // record buffer. Handling this error will be user determined, but
    // no information from the table can be retrieved.
}
else
{
    printf("\nSet cursor to the crack before the first record");
    Chk(DbiSetToBegin(hCur)); //
Step 10
                             // Position the specified cursor to the crack
                             // before the first record

    printf("\nGet the next record");
    Chk(DbiGetNextRecord( //
Step 11
        hCur,           // Cursor from which to get the record.
        dbiNOLOCK,      // Lock Type
        pRecBuf,        // Buffer to store the record
        NULL));         // Record properties - don't need in this case

    printf("\nGet a field out of the record buffer");

```

```

    Chk(DbiGetField(
        hCur,                // Cursor which contains the record
        1,                   // Field Number of the "Customer" field.
        pRecBuf,             // Buffer containing the record
        (pBYTE)&custNum,    // Variable for the Customer Number
        &isBlank));         // Is the field blank?

    printf("\nThe retrieved field value is %f", custNum);
}

printf("\nClean-up");

if (pRecBuf != NULL)
    free(pRecBuf);        // Free the record buffer

if (hCur != 0)
    Chk(DbiCloseCursor(&hCur));
                        // Close the cursor

if (hDb != 0)
    Chk(DbiCloseDatabase(&hDb));
                        // Close the database

DbiExit();              // Close the BDE.
}

DBIResult Chk(DBIResult ErrorValue)
{
    char        dbi_status[DBIMAXMSGLEN * 5] = {'\0'};
    DBIMSG      dbi_string = {'\0'};
    DBIErrInfo  ErrInfo;

    if (ErrorValue != DBIERR_NONE)
    {
        DbiGetErrorInfo(TRUE, &ErrInfo);

        if (ErrInfo.iError == ErrorValue)
        {
            wsprintf(dbi_status, "  ERROR %s", ErrInfo.szErrCode);

            if (strcmp(ErrInfo.szContext1, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext1);
            if (strcmp(ErrInfo.szContext2, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext2);
            if (strcmp(ErrInfo.szContext3, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext3);
            if (strcmp(ErrInfo.szContext4, ""))
                wsprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext4);
        }
        else
        {
            DbiGetErrorString(ErrorValue, dbi_string);
            wsprintf(dbi_status, "  ERROR %s", dbi_string);
        }
    }
}

```



```
    }
    MessageBox(NULL, dbi_status, "BDE Error", MB_OK | MB_ICONEXCLAMATION);
}
return ErrorValue;
}
```

{button ,AL("applicationdevelopment")} Application development

Accessing and updating tables

This table is an overview of the process of accessing and updating tables using BDE:

Phase	Task	BDE function
Preparation	Initialize the database engine	Call DbiInit
Preparation	Open a database	Call DbiOpenDatabase
Preparation	Open a table and get a cursor	Call DbiOpenTable
Preparation	Get the cursor properties	Call DbiGetCursorProps
Preparation	Allocate the record buffer	Responsibility of the application
Preparation	Retrieve field descriptor information into application-supplied memory	Call DbiGetFieldDescs
Preparation	Begin cached updates mode	Call DbiBeginDelayedUpdates
Retrieval	Position the cursor and fetch a record	into the record buffer Call DbiGetNextRecord
Retrieval	Retrieve a field from the record buffer	Call DbiGetField
Update	Update the field and write it to the record buffer	Call DbiPutField
Update	Update the table with the new record	Call DbiModifyRecord
Update	Apply cached updates to the table	Call DbiApplyDelayedUpdates
Exit	End the cached updates mode	Call DbiEndDelayedUpdates
Exit	Close the cursor	Call DbiCloseCursor
Exit	Close the database	Call DbiCloseDatabase
Exit	Exit the database engine	Call DbiExit

{button ,AL("applicationdevelopment")} [Application development topics](#)

{button ,AL("accessingtables")} [Accessing and updating tables](#)

Also See:

- [Transactions](#)
- [Transactions on Paradox and dBASE](#)

Preparing to access a table

The steps for preparing to access a table are described in the following topics:

- [Initializing BDE](#)
- [Opening a database](#)
- [Opening a table](#)
- [Preparing the record buffer and retrieving field descriptors](#)

Initializing BDE

The first call that the application makes to BDE is always DbiInit, to initialize the database engine and start a new session. DbiInit can optionally be supplied with a pointer to the environment information structure DBIEnv. The NULL pointer is normally passed, which forces BDE to search for the Registry entries and the BDE configuration file (IDAPI.CFG), and to use the default settings. When a NULL pointer to the DBIEnv structure is passed, BDE searches in the following order for the configuration file:

- 1 BDE checks the Windows Registry for a configuration file defined by an entry of [BDE] with a subentry of CONFIGFILE01.
- 2 If step 1 is not successful, BDE checks for the configuration file named IDAPI.CFG in the startup directory.
- 3 If step 2 is not successful, BDE initializes with a default set of configuration settings, predefined for each driver. If initialization takes place after the failure of steps 1 and 2, no SQL driver access is possible.

If the pointer is not NULL, and the configuration file is specified in the DBIEnv structure, BDE uses that configuration file.

Here is a sample DbiInit call:

```
// Initialize IDAPI
rslt = DbiInit(NULL);
```

{button ,AL("preparingtoaccess")} Preparing to access a table

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See also: Initialization

Opening a database

A database must be opened with a call to [DbiOpenDatabase](#) before a table in the database can be opened. A successful call to [DbiOpenDatabase](#) returns the database handle, which is then passed in subsequent calls to many other BDE functions.

For SQL databases, a password and user name must be supplied with [DbiOpenDatabase](#) to connect to the server.

Specifying a standard database

The following code sample opens a standard database (used to access Paradox, dBASE, and Text tables) by using a NULL database name and database type:

```
rslt = DbiOpenDatabase(NULL, NULL, dbiREADWRITE,
                      dbiOPENSERIALIZED, NULL, 0, NULL, NULL, &hDb)
```

To change the current directory for a standard database, call [DbiSetDirectory](#)

```
rslt = DbiSetDirectory(hDb, "C:\\DATE");
```

Specifying a SQL database

There are several different methods of specifying a SQL database in the [DbiOpenDatabase](#) call:

- The database name can specify a SQL alias, which defines a SQL database in the configuration file. If a SQL alias is specified, the database type is NULL and optional fields are not required.
- The database name can be NULL if the database type specifies one of the SQL driver names (for example, InterBase or Oracle). If optional parameters are not specified, driver-specific defaults are used.

For example, this code sample opens a named database on a SQL server:

```
rslt = DbiOpenDatabase("myalias", NULL, dbiREADWRITE,
                      dbiOPENSERIALIZED, "mypassword", 0, NULL, NULL,
                      &hDb)
```

Specifying an alias

When calling [DbiOpenDatabase](#) you can supply an alias referencing a database name in the configuration file.

Specifying access rights

The [eOpenMode](#) and [eShareMode](#) parameters of the [DbiOpenDatabase](#) call, in combination with [eOpenMode](#) and [eShareMode](#) parameters of the [DbiOpenTable](#) call, determine the access rights of users to tables within a database.

Note: For SQL data sources, the OPEN MODE parameter for each alias in the BDE configuration file takes precedence over the open mode parameters passed with [DbiOpenDatabase](#).

If the [database open mode](#) is read-only, tables within that database cannot be opened by [DbiOpenTable](#) in read-write mode. If the database open mode is read-write, tables within that database can be opened by [DbiOpenTable](#) either in read-only or read-write mode.

If the database share mode is exclusive, tables within that database cannot be opened by [DbiOpenTable](#) in share mode. If the database was opened in share mode, tables within that database can be opened by [DbiOpenTable](#) in either exclusive or share mode.

Specifying optional parameters

Optional database-specific parameters can be passed to the [DbiOpenDatabase](#) function. To retrieve a list and description of these optional parameters for a database, the application can call [DbiOpenCfgInfoList](#), supplying the path of the database name in the configuration file. This function returns the handle to a virtual table listing optional parameters for this database system and default values for these parameters.

OptFields, *pOptFldDesc* and *pOptParams* are the optional parameters, but may actually be required, depending on which driver is being used, and whether enough information has been supplied with other

parameters to specify the database. For more on these parameters, see [DbiCreateTable](#)

{button ,AL("preparingtoaccess")} [Preparing to access a table](#)

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Opening a table

You can open a table by calling `DbiOpenTable`, and passing appropriate parameters such as table name, driver type, index, type of access, and share mode. After the table is successfully opened, BDE returns a cursor handle to the table.

Specifying the table name and driver type

If the application supplies the fully qualified table name of a Paradox or dBASE table, it need not specify the driver type parameter, because the driver type can be determined from the table name extension. If the table name does not include a path, the path name defaults to that of the current directory of the database associated with the database handle.

Driver type must be specified if the table name has no extension, or to overwrite the default driver associated with the file extension, or to terminate the table name with a period(.). If the table name does not supply the default extension, and driver type parameter is NULL, `DbiOpenTable` attempts to open the table with the default file extension designated for each file-based driver listed in the configuration file, in the order that the drivers are listed.

The driver types and their default extensions for Paradox, dBASE, and Text drivers are listed below:

<u>Driver type</u>	<u>Default extension</u>
PARADOX	.DB
dBASE	.DBF
ASCIIDRV	.TXT

For SQL databases, the table name can be a fully qualified name that includes the owner name, in the form

`<owner>.<tablename>`

If not specified, `<owner>` is inferred from the database handle. Driver type is ignored if the database is a SQL database, since driver binding has already been done at database open time.

Specifying an index

To open a table with an active index, you can use the following parameters, depending on the type of table being opened: `pszIndexName`, `pszIndexTagName`, or `iIndexId`. The active index determines the order of records for this cursor.

Paradox: If all index parameters are NULL, the table is opened in primary key order, if a primary key exists. If a secondary key is specified, the table is opened on that key. Either `pszIndexName` or `iIndexID` can be used to specify a composite or non-composite secondary index.

dBASE: If no index is specified, the table is opened in physical order.

- Use the `pszIndexName` parameter in the form `<tablename>.MDX` if the index is within a production index.
- Use the `pszIndexTagName` parameter to specify the tag name of the index in an MDX file. This parameter is ignored if the index given by `pszIndexName` is an NDX index.

SQL: Use the `pszIndexName` parameter to specify the index name. The index name can be qualified or unqualified. An unqualified index name succeeds only if the owner of the index is the current user. (For servers supporting naming conventions with owner qualification, it is not necessary to qualify the index name with the owner.)

Specifying table open mode

A table can be opened in EXCLUSIVE or SHARED mode. When a table is opened in exclusive mode, no other user can access the table. When a table is opened in share mode, other users can access the table at the same time.

Specifying the data translation mode

The `xltFIELD` translation mode is recommended. This mode ensures that BDE automatically translates data from the database's native physical data format to the common BDE logical data format when a field is read from the record buffer. BDE translates the data back into native format when the field is

written to the record buffer.

When the translation mode is xltNONE, no data translation takes place when a field is read from the record buffer, or when a field is written to the record buffer.

Note: Data translation occurs only during calls to DbiGetField and DbiPutField; not when the record is read.

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Preparing the record buffer and retrieving field descriptors

A successful call to [DbiOpenTable](#) returns a cursor handle to the application. Before it can use the cursor handle to access data in the table, the application must prepare the record buffer. Preparing the record buffer includes allocating memory for it and, in some cases, initializing it.

The application can also set up an array in which to retrieve the field descriptors for each field contained in the table. To determine the required sizes of the record buffer and the array of field descriptors, the application calls [DbiGetCursorProps](#). This call is usually made immediately after the [DbiOpenTable](#) call, and returns the required information in the [CURProps](#) structure.

Example

The following code sample gets the cursor properties, allocates the record buffer, sets up an array for the field descriptors, and gets the field descriptors:

```
DBIResult    rslt;
pCHAR        pRecBuf;
CURProps     curProps;
pFLDDesc     pFldArray;
...
// Get the table properties
rslt = DbiGetCursorProps(hCursor, &curProps);
if (rslt == DBIERR_NONE)
{
    // Allocate the record buffer
    pRecBuf = malloc(curProps.iRecBufSize);
    // Check result of malloc
    ...
// Get an array of field descriptors
pFldArray = (pFLDDesc) malloc(sizeof(FLDDesc) *
                               curProps.iFields);
    // Check result of malloc
    ...
rslt = DbiGetFieldDescs(hCursor, pFldArray);
...
free(pFldArray);
free(pRecBuf);
}
```

Getting the cursor properties

When the application calls [DbiGetCursorProps](#), the cursor properties [CURProps](#) structure is returned with information describing the most commonly used cursor properties. [CURProps](#) contains the following fields:

Type	Name	Description
DBITBLNAME	<i>szName</i>	Table name (no extension, if it can be derived)
UINT16	<i>iFNameSize</i>	Full file name size
DBINAME	<i>szTableType</i>	Table type
UINT16	<i>iFields</i>	Number of fields in table
UINT16	<i>iRecSize</i>	Record size (logical record)
UINT16	<i>iRecBufSize</i>	Record size (physical record)
UINT16	<i>iKeySize</i>	Key size
UINT16	<i>iIndexes</i>	Number of currently available indexes
UINT16	<i>iValChecks</i>	Number of validity checks
UINT16	<i>iRefIntChecks</i>	Number of referential integrity constraints

UINT16	<i>iBookmarkSize</i>	Bookmark size
BOOL	<i>bBookmarkStable</i>	TRUE, if the cursor supports stable bookmarks
DBIOpenMode	<i>eOpenMode</i>	dbiREADWRITE, dbiREADONLY
DBIShareMode	<i>eShareMode</i>	dbiOPENSHARED, dbiOPENEXCL
BOOL	<i>bIndexed</i>	TRUE, if the index is active
INT16	<i>iSeqNums</i>	1: Has sequence numbers (Paradox); 0: Has record numbers (dBASE); < 0 (-1, -2. . .): None (SQL)
BOOL	<i>bSoftDeletes</i>	TRUE, if the cursor supports soft deletes (dBASE only)
BOOL	<i>bDeletedOn</i>	TRUE, if deleted records are seen
UINT16	<i>iRefRange</i>	If > 0, has active refresh
XLTMode	<i>exitMode</i>	Translate mode: xltNONE (physical types), xltFIELD (logical types)
UINT16	<i>iRestrVersion</i>	Restructure version number
BOOL	<i>bUniDirectional</i>	TRUE, if the cursor is unidirectional (SQL only)
PRVType	<i>eprvRights</i>	Table-level rights
UINT16	<i>iFmlRights</i>	Family rights (Paradox only)
UINT16	<i>iPasswords</i>	Number of auxiliary passwords (Paradox only)
UINT16	<i>iCodePage</i>	Code page; if unknown, set to 0
BOOL	<i>bProtected</i>	TRUE, if the table is protected by password
UINT16	<i>iTblLevel</i>	Driver-dependent table level
DBINAME	<i>szLangDriver</i>	Symbolic name of language driver
BOOL	<i>bFieldMap</i>	TRUE, if a field map is active
UINT16	<i>iBlockSize</i>	Data block size in bytes, if any
BOOL	<i>bStrictRefInt</i>	TRUE, if strict referential integrity is in place
UINT16	<i>iFilters</i>	Number of filters
BOOL	<i>bTempTable</i>	TRUE, if the table is temporary

Memory allocation elements

The following elements are significant when allocating memory:

iFields

Specifies the number of fields in the table. Use this number to allocate an array to receive the field descriptors for the table. The size of the array is:

```
iFields * sizeof(FLDDesc)
```

iRecSize

Specifies the record size, depending on the translation mode for the cursor. If the translation mode is *xltFIELD*, *iRecSize* specifies the logical record size. In other words, it is the size of the record if all fields were represented as BDE logical types. If the translation mode is *xltNONE*, *iRecSize* specifies the physical record size, which is the same as *iRecBufSize*.

iRecBufSize

Specifies the physical record size. This is the size of the record buffer that you must allocate in order to retrieve the records by using [DbiGetNextRecord](#), [DbiGetPriorRecord](#), and other functions. For example,

```
pRecBuf = (pBYTE)malloc(curProps.iRecBufSize);
```

Initializing the record buffer

Initialize the record buffer with a call to [DbiInitRecord](#) if a new record is to be inserted. This function initializes each field in the record buffer, including BLOB fields, to blanks based on the data type defined. For Paradox tables, default values are used to initialize the fields if default values are specified in the table.

Getting the field descriptors

After memory has been allocated for the array of field descriptors, the application can retrieve the field descriptors with a call to [DbiGetFieldDescs](#). The field descriptors provide the application with information that it needs to address and manipulate each field within the record buffer. [DbiGetFieldDescs](#) returns an array of [FLDDesc](#) structures, with information describing each field in the table:

Type	Name	Description
UINT16	<i>iFldNum</i>	Field number (1 to n)
DBINAME	<i>szName</i>	Field name
UINT16	<i>iFldType</i>	Field type
UINT16	<i>iSubType</i>	Field subtype (if applicable)
UINT16	<i>iUnits1</i>	Number of characters or units
UINT16	<i>iUnits2</i>	Decimal places
UINT16	<i>iOffset</i>	Offset in the record (computed)
UINT16	<i>iLen</i>	Length in bytes (computed)
UINT16	<i>iNullOffset</i>	For NULL bits (computed)
FLDVchk	<i>efldvVchk</i>	Field has validity checks (computed)
FLDRights	<i>efldrRights</i>	Field rights (computed)
<i>iFldNum</i>		Specifies a driver-specific field ID. For most drivers, this value is from 1 to <code>curProps.iFields</code> , except for Paradox tables, which can use an invariant field ID. For more information about invariant field ID, refer to DbiDoRestructure

Note: For consistency across drivers, use the ordinal position of the field in the descriptor array. Both [DbiGetField](#) and [DbiPutField](#) use an ordinal number from 1 to n.

szName

Specifies the name of the field.

iFldType

Specifies the type of the field. Depending on the translate mode property of this cursor the field type returned could be physical or logical. If the translate mode is `xltFIELD`, the field type returned is a BDE logical type; if the mode is `xltNONE`, the field type returned is the driver's corresponding physical type. For more information about physical and logical data types, see [Using the function reference](#) and [Data structures](#)

iSubType

Specifies the subtype of the field. This could be a BDE logical subtype or a driver physical subtype, depending on the translate mode.

iUnits1

Specifies the number of characters, digits, and so on. For logical field types, this number is consistent across drivers. For physical field types, the interpretation of this field can be dependent on the driver and also on the specific field type. For most drivers, if the field is of the numeric type, *iUnits1* is the precision and *iUnits2* is the scale.

iUnits2

Specifies the number of decimal places, and so on. For logical field types, this number is consistent across drivers. For physical field types, the interpretation of this field can depend on the driver and also on the specific field type. For most drivers, if the field is of the numeric type, *iUnits1* is the

precision and *iUnits2* is the scale.

The following three fields together specify the layout of the record buffer:

iOffset

Specifies the offset of this field in the record buffer. The offset depends on the translation mode. If the mode is xltFIELD, it is the offset of the field within a logical record.

iLen

Specifies the length of this field. The length depends on the translation mode; that is, it could be the length of the logical or physical representation of the field. The application developer uses this value to allocate a buffer in which to retrieve the field value.

iNullOffset

Specifies the offset of the NULL indicator for this field in the record buffer. If zero, there is no NULL indicator. Otherwise, iNullOffset is the offset to an INT16 value, which is -1 if the field is NULL (SQL only).

efldvVchk

Specifies whether or not validity checks are associated with this field (Paradox and SQL drivers only).

efldrRights

Specifies the field level rights for this field.

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Positioning the cursor and fetching records

After the record buffer has been prepared, the application can use the record buffer to fetch records from the table.

To fetch records, the application must position the cursor on the record that it wants to fetch. Some BDE functions serve only to position the cursor. Calls to these functions can be followed by a call to a function that fetches the record into the record buffer. Other BDE functions can simultaneously position the cursor and fetch a record into the record buffer.

Positioning the cursor on a crack

Some BDE functions position the cursor before a record, at the beginning of the file or result set, or at the end of the file. When the cursor is positioned at one of these locations, rather than on a record, the cursor is said to be positioned on a crack. The following calls position the cursor on a crack:

- [DbiSetToBegin](#) positions the cursor to the beginning of the file (just before the first record). When the cursor is opened, it is at this position.
- [DbiSetToEnd](#) positions the cursor to the end of the file (just after the last record).
- [DbiSetToKey](#) positions the cursor just prior to the record of the specified key value.

Positioning the cursor on a crack can simplify programming. For example, calling [DbiSetToBegin](#) positions the cursor on the crack before the first record in the table. Then, you can set up a loop to process all the records in the table with [DbiGetNextRecord](#). (If the cursor had been positioned on the first record in the table to start with, instead of before the first record, the [DbiGetNextRecord](#) loop would have skipped the first record.)

Positioning the cursor on a record and fetching a record

Some BDE functions position the cursor directly on a record. If a record buffer is supplied, these functions can also be used to fetch the record for processing by the application. Most of these calls can optionally lock the record. The record remains locked until it is released explicitly, or the session is closed. For more information about locks, see [Locking](#)

DbiGetRecord

This function fetches the current record, and returns an error if the cursor is positioned on a crack.

DbiGetNextRecord

This function positions the cursor on the next record after the current position of the cursor, and also fetches that record.

DbiGetPriorRecord

This function positions the cursor on the record before the current position of the cursor, and also fetches that record.

DbiGetRelativeRecord

This function positions the cursor on the record whose position is specified as an offset (either a positive or a negative number) from the current position of the cursor, and also fetches that record.

DbiGetRecordForKey

This function positions the cursor on the record whose key matches the specified key, and also fetches that record.

Example

The following example shows how to position the cursor to the beginning of file and step through the table:

```
// Position the cursor at the BOF crack
DbiSetToBegin(hCursor);
// Step through the table. Read the record each time.
while (DbiGetNextRecord(hCursor, dbiNOLOCK, pRecBuf, NULL)
      == DBIERR_NONE)
{
    ...
}
```

}

Repositioning the cursor with bookmarks

Bookmarks provide a convenient way to save the position of the cursor, so that it can be repositioned to that same place later. The bookmark is written to a client-supplied buffer which is allocated by the client.

Note: The size of the bookmark buffer may change after a call to [DbiSwitchToIndex](#).

[DbiGetBookmark](#)

This function saves the current position in the supplied bookmark.

[DbiSetToBookmark](#)

This function repositions the cursor to a previously saved bookmark position.

Fetching multiple records

The application can fetch multiple records with one call by setting up a buffer large enough to hold the records and calling [DbiReadBlock](#). The specified number of records are fetched beginning with the next record after the current cursor position. This function is equivalent to setting up a loop that makes multiple calls to [DbiGetNextRecord](#).

Retrieving limited record sets

Several BDE functions enable you to force the cursor to return only a limited set of records or fields to the application; that is, the application sees only those records in the table that meet a predefined set of conditions.

Note: Queries provide another way of returning a limited record set.

Using ranges

Use [DbiSetRange](#) to force the cursor to return to the application only those records whose keys fall within the defined range. This function can be called only if the cursor has a current active index. (See [DbiOpenTable](#) or [DbiSwitchToIndex](#)). Both inclusive and exclusive ranges can be specified. Subsequent BDE calls treat the set of records within the range as the complete table. For example, [DbiSetToBegin](#) positions the cursor on the crack before the first record in the range, rather than on the first record in the table.

This function is commonly used to find a set of records between two key values by setting both the upper range limit and the lower range limit. Open-ended ranges can be specified, from the beginning of the file to a specified key, or from a specified key to the end of the file.

For an example, refer to the RANGE code sample in the SNIPIT Code Viewer (\BDE\EXAMPLES\SNIPIT).

Creating field maps

Use [DbiSetFieldMap](#) to force the cursor to return fields in a different order from their order in the table, or to drop fields from view. To set up a field map, the application developer builds an array of field descriptors, including only those fields that are to be made visible by the cursor, and in the order that they are to be returned. Only the fields named in the array are made visible.

Note: Creating field maps can change the size of the record buffer.

For an example, refer to the FLDMAP.C code sample in the SNIPIT Code Viewer (\BDE\EXAMPLES\SNIPIT).

Using filters

An active filter forces the cursor to return a limited record set consisting of only those records that meet the filter condition. Records that do not meet the filter condition are skipped, and even though they remain in the table, the records are not visible through the cursor. Deactivating the filter brings those records back into view.

A filter condition is defined as an expression returning TRUE or FALSE. When the filter is activated, the filter expression is applied to each record in the table. Only those records that return TRUE are visible to the application. Multiple filters can be defined for one table.

To define a filter, the application calls DbiAddFilter, passing it an existing cursor handle and a pointer to a *CANExpr* structure that contains the expression. The structure is passed in a flat tree format. (For a detailed explanation and an example of how to use filters, see Filtering records.)

The *CANExpr* structure can include comparison operators, AND, OR, and NOT, and tests for blank fields. Different drivers support different types of expressions, but all drivers support the basic combination of <field> <compare operator> <constant>; for example, "field1 = "CA" and field2 < 30" is supported by all drivers.

When DbiAddFilter completes, it returns a filter handle to the application.

After the filter condition has been defined, it must be activated with DbiActivateFilter in order to take effect. Multiple filters can be activated. Filters can be switched on and off when needed (using DbiActivateFilter and DbiDeactivateFilter). Filters are automatically dropped when the cursor is closed, and can be explicitly dropped with DbiDropFilter. If more than one filter is active, records that fail to meet any active filter condition are filtered out.

Advantages of using filters are that the BDE filtering mechanism is extremely fast, and filters are implemented efficiently by the drivers.

Note: While queries provide a more general way of restricting the result set than filters, filters provide more dynamic control than queries.

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Field-level access

An application usually accesses data in a record at the field level. The BDE functions [DbiGetField](#) and [DbiPutField](#) enable the application to retrieve and update the data within each field in a record buffer. These functions allow field access without the need to know the structure of a record buffer.

Field-level access is done through a record buffer:

Reading a record

--> Table [[DbiGetRecord](#)] --> Record buffer [[DbiGetField](#)] --> Field

Updating a record

--> Field [[DbiPutField](#)] --> Record buffer [[DbiModifyRecord](#)] --> Table

Retrieving field values

To retrieve a field within the record buffer, the application calls the BDE function [DbiGetField](#), supplying the ordinal number of the field and a buffer to hold the data contents of the field. (The ordinal number is the position of the [FLDDesc](#) in the array returned by [DbiGetFieldDescs](#), 1 to n.) Optionally, a Boolean can be returned indicating if the field is blank.

Updating field values

To update a field in the record buffer, the application calls the BDE function [DbiPutField](#), supplying the ordinal number of the field, and a buffer containing the field contents to be written to the record. (The ordinal number is the position of the [FLDDesc](#) in the array returned by [DbiGetFieldDescs](#), 1 to n.)

[DbiPutField](#) can also be used to set a field to blank, by passing a NULL pointer as the field buffer parameter.

Logical types versus physical types

As a general rule, the application should always use field translation mode `xltFIELD`. This parameter is set when the table is opened. If the table has already been opened and the translation mode is not set to `xltFIELD`, it can be changed with the [DbiSetProp](#) call.

When field translation mode is in effect, BDE automatically translates a field's data contents. When the field is retrieved, BDE translates the data in the record buffer from the native data type into a generic logical data type. When the field is written back to the record buffer, BDE translates the data back into the native physical data type.

When field translation mode is not in effect, BDE performs no translation of data to logical types. The application must be prepared to accept data from BDE using the data types native to the database system managing the table.

BDE type	C equivalent	Description
<code>fldZSTRING</code>	<code>char[]</code>	Zero terminated array of chars
<code>fldUINT16</code>	<code>unsigned int</code>	16-bit unsigned integer
<code>fldINT16</code>	<code>int</code>	16-bit integer
<code>fldUINT32</code>	<code>unsigned long</code>	32-bit unsigned long integer
<code>fldINT32</code>	<code>long</code>	32-bit long integer
<code>fldFLOAT</code>	<code>double</code>	64-bit floating point
<code>fldFLOATIEEE</code>	<code>long double</code>	80-bit floating point
<code>fldBOOL</code>	<code>int</code>	16-bit quantity, <code>TRUE==1</code> ; <code>FALSE==0</code>
<code>fldBYTES</code>	<code>unsigned char[]</code>	Fixed size (independent of row) array of bytes
<code>fldVARBYTES</code>	<code>unsigned char[]</code>	Length-prefixed array of bytes

Working with BLOBs

Because BLOB fields are variable-sized and can be very large, BDE treats them differently from other fields; they are treated as byte streams. The application developer follows a similar procedure for accessing and updating records containing BLOB fields as with other records.

The following set of BDE functions is designed to work with BLOB fields:

- [DbiOpenBlob](#)
- [DbiGetBlob](#)
- [DbiGetBlobHeading](#)
- [DbiGetBlobSize](#)
- [DbiFreeBlob](#)
- [DbiPutBlob](#)
- [DbiTruncateBlob](#)

Opening the BLOB

To write to or read from a BLOB, you must open the BLOB first. To open the BLOB, the record buffer must contain a copy of the record to be modified, or an initialized record, if the record is being inserted. The application calls [DbiOpenBlob](#), passing the cursor handle, the pointer to the record buffer, the field number of the BLOB, and the access rights. (If the BLOB is opened in read-write mode, the table must also be opened in read-write mode.) [DbiOpenBlob](#) stores the BLOB handle in the record buffer. [DbiOpenBlob](#) must be called prior to calling any other BLOB functions.

Standard: It is advisable to lock the record before opening the BLOB in read-write mode. This ensures that another application does not change the record or lock the record, preventing the record from being updated.

SQL: For SQL servers that do not support BLOB handles for random reads and writes, full BLOB support requires uniquely identifiable rows. Most SQL servers limit a single sequential BLOB read to less than the maximum size of a BLOB. In cases with no row uniqueness and without BLOB handles, an entire BLOB might not be available.

Retrieving BLOB data

[DbiGetBlob](#) retrieves BLOB data from the specified BLOB. Any portion of the data can be retrieved, starting from the position specified in *iOffset*, and extending to the number of bytes specified in *iLen*. Typically, the application does not know the length of the BLOB, and it makes a series of calls to [DbiGetBlob](#) to retrieve the entire BLOB. [DbiGetBlob](#) returns the number of bytes read when it completes. The application can tell when it has reached the end of the BLOB when the number of bytes specified in *iLen* is greater than the number of bytes read.

Alternatively, the application can determine beforehand the size of the BLOB by calling [DbiGetBlobSize](#), and then specifying the actual length of the BLOB in the call to [DbiGetBlob](#). That way, the entire BLOB can be retrieved with one [DbiGetBlob](#) call, instead of a series of calls.

Updating a BLOB

[DbiPutBlob](#) is the equivalent of [DbiPutField](#) for a BLOB. [DbiPutBlob](#) is used only to write data into a BLOB. The BLOB must be opened in read-write mode. The application passes a pointer to the block of data to be written. The application specifies the length of data to be written, as well as the offset within the BLOB to begin writing the data. The application can make a series of calls to [DbiPutBlob](#) to write the entire BLOB.

Updating or adding a record with a blob

To update or add a record, the application follows these steps:

- 1 Calls [DbiAppendRecord](#) or [DbiInsertRecord](#) to add a new record with a BLOB to the table or the application calls [DbiModifyRecord](#) to modify an existing record containing a BLOB. The pointer to the record buffer containing the new record is passed with the function.
- 2 Calls [DbiFreeBlob](#) to close the BLOB handle and all resources allocated to the BLOB by

DbiOpenBlob. (DbiModifyRecord, DbiInsertRecord or DbiAppendRecord do not automatically release BLOB resources after record modification.)

Note: It is important to free the BLOB after adding or modifying the record. If DbiFreeBlob is called prior to DbiModifyRecord, DbiInsertRecord, or DbiAppendRecord, the changes are lost.

Note: Do not use DbiWriteBlock on tables which contain BLOBs.

This example illustrates BLOB processing:

```
DBIResult  rslt;
    pCHAR      blobBuf;
    UINT32     blobSize, bytesRead;
// Read the current record
DbiGetRecord(hCursor, dbiNOLOCK, pRecBuf, NULL);
// Open the BLOB
rslt = DbiOpenBlob(hCursor, pRecBuf, 3, dbiREADWRITE);
if (rslt == DBIERR_NONE)
{
    // Get the size of the BLOB then read it. Note that this
    // example assumes that the BLOB is less than 64k.
    DbiGetBlobSize(hCursor, pRecBuf, 3, &blobSize);
    blobBuf = malloc(blobSize);
    DbiGetBlob(hCursor, pRecBuf, 3, 0, blobSize,
               (pBYTE) blobBuf, &bytesRead);

    ...
    // Free the blob
    DbiFreeBlob(hCursor, pRecBuf, 3);
    // Clean up
    free(blobBuf);
}
```

{button ,AL("accessingtables")} Accessing and updating tables

Adding, updating, and deleting records

In order to add, modify or delete a record, the cursor must have write access to the table. The table or record must not be locked by another user. If the application intends to update a record, it can lock the record through the BDE function that fetches the record. The record remains locked until the application explicitly releases it, or the session is closed. For more information about locks, see [Locking](#)

Alternatively, you can use the [cached updates](#) cursor layer to allow users to retrieve and modify temporarily cached data without immediately writing to the actual underlying database. This minimizes the amount of resource locking.

Adding a record

To add a new record to a table, the application follows these steps:

- 1 Initializes the client-allocated record buffer with a call to [DbiInitRecord](#).
- 2 Constructs the record one field at a time, using [DbiPutField](#). For information about BLOB fields, see [Working With BLOBs](#)
- 3 Calls [DbiAppendRecord](#) or [DbiInsertRecord](#) to write the record buffer contents to the table. The application specifies whether or not to keep a record lock on the inserted record ([DbiInsertRecord](#)).

Updating a record

To modify an existing record in the table, the application follows these steps:

- 1 Fetches the record to be modified into the client-allocated record buffer (obtaining a lock, if necessary).
- 2 Writes the updated fields to the record buffer with [DbiPutField](#). For information about BLOB fields, see [Working with BLOBs](#)
- 3 Calls [DbiModifyRecord](#) to write the record buffer to the table. The application specifies whether or not to release the record lock on the updated record when [DbiModifyRecord](#) completes.

Deleting a record

To delete a record, the application follows these steps:

- 1 Positions the cursor on the record to be deleted.
- 2 Calls [DbiDeleteRecord](#). If a record buffer is supplied, the deleted record is copied there.
- 3 The cursor is left positioned on the crack where the deleted record was.

dBASE

For dBASE tables, a deleted record is not removed from the table until a call to [DbiPackTable](#) is made.

Paradox

The record cannot be recalled once it is deleted. The record is not deleted if the deletion would cause violation of referential integrity. For example, if the cursor is validly positioned on a record within the master table, and that record has linked values in a detail table, then the call to [DbiDeleteRecord](#) fails, and the position of the cursor remains unchanged.

Deleting a record does not reduce table size. The only way to gain disk space for records that have been deleted is to restructure the table with a call to [DbiDoRestructure](#). Deleted space may be reused by later inserts.

Multiple Record Updating, Adding, And Deleting

BDE provides two functions that enable your application to update, add, or delete multiple records from a table: [DbiBatchMove](#) and [DbiWriteBlock](#).

DbiBatchMove

[DbiBatchMove](#) can be used in different modes to append, update, append and update, or subtract records from a source table to a destination table. Source and destination tables can be

of different driver types. This function supports filters and field maps. It can also copy a table of one driver type to a new table of a different driver type.

This function can be used with the Text driver to import and export data to or from any supported driver type.

This function can optionally create a key violations table, a changed table, and a problems table to store records that fail to meet the specified criteria for record transfer. A callback can be registered that alerts the application to data transfer between source and destination fields that could result in data loss.

For an example, refer to the BATMOVE.C code sample in the SNIPIT Code Viewer (\BDE\EXAMPLES\SNIPIT).

DbiWriteBlock

To write multiple records to a table, the application creates a record buffer containing the records to be written, and calls DbiWriteBlock, passing the cursor handle of the table to be updated. The entire block of records in the record buffer is written to the specified table. This function is similar to calling DbiAppendRecord for multiple records.

Refer to the BLOCK.C code sample in the SNIPIT Code Viewer (\BDE\EXAMPLES\SNIPIT).

{button ,AL("accessingtables")} Accessing and updating tables

Linking tables

Linked cursors allow you to create one-to-many (master-detail) relationships between tables. The cursors on two tables can be linked if the tables share a common field, which must be indexed in the detail table. Linking the cursors on a master table and a detail table forces the cursor on the detail table to make visible only those records containing a key value that matches the key value of the current record in the master table.

For example, a CUSTOMER table (master) and an ORDERS table (detail) share a common field called CUSTOMER_NO. If the current record in the master table has a CUSTOMER_NO of 1221, then the only records visible in the detail table are those that have a CUSTOMER_NO of 1221. In other words, the application sees only the orders that are associated with the current customer.

A master table can be linked to more than one detail table; a detail table can be linked to only one master table. A detail table can also be a master table, linked to other detail tables.

Links apply to all available driver types; they can be established between tables of the same or different driver types.

Setting up the link

To link two tables, the application follows these steps:

- 1 The application opens cursors on both tables. The detail table cursor must have a current active index on the field that will be used to link the cursors.
- 2 The application calls DbiBeginLinkMode for each cursor to be linked. The function returns a new cursor.
- 3 The application calls DbiLinkDetail, passing the cursor handles of both the master and detail tables. The data types of linked fields in master and detail records must match. This function links only on indexes that are applied on fields within the detail table (no expression indexes). For expression links in dBASE tables, call DbiLinkDetailToExp.
- 4 The two cursors are now linked. When the position of the master cursor changes, the corresponding detail cursor changes to show the applicable records.

Breaking the link

To break the link between the cursors, the application follows these steps:

- 1 The application calls DbiUnLinkDetail, passing the cursor handle of the detail table. The detail table is now unlinked to any master table, and its cursor displays the entire record range again.
- 2 The application calls DbiEndLinkMode for each linked cursor, passing it the cursor handle. A standard cursor handle is returned.

For an example, refer to the LNKCRSR.C code sample in the SNIPIT Code Viewer (\BDE\EXAMPLES\SNIPIT).

{button ,AL("accessingtables")} Accessing and updating tables

Sorting tables

The BDE sort function DbiSortTable sorts an opened or closed table, either into itself or into a destination table. There are options to remove duplicates, to enable case-insensitive sorts, to sort on subsets of fields, and to enable special user-supplied comparison functions. The sort can be used with filters and field maps, and it is extremely fast. DbiSortTable is supported by SQL drivers, but a SQL table can serve only as a source table, not as a destination table.

The sort engine uses language driver-defined collating sequences to accommodate the character sets of different languages.

{button ,AL("accessingtables")} Accessing and updating tables

Cached updates

The cached updates feature allows users to retrieve data from a database and make changes to that temporarily cached data without immediately writing to the actual underlying database. Users can make changes over a prolonged period with a minimum amount of resource locking at the actual database. After modifying the data, users call an update function to save their changes in the actual database. The update function sends to the database a batch of all inserts, deletes, and modifications made since the last update function call.

For a distinguishing comparison of the cached updates feature with transaction processing, see [Transactions and cached updates](#)

To support the cached updates feature, a special cursor layer installs on top of any cursor. Implementation and use of the cached updates features is described in subsequent sections

[Cached updates topics](#)

[Accessing and updating tables](#)

The cached updates layer

The cached updates layer keeps track of all the changes that are made by users by intercepting various table methods such as insert record, modify record, and delete record. As users browse through the table, the cached updates layer recognizes which records are modified, deleted, and inserted. The layer presents those records to the users accordingly. The updates are not immediately sent to the underlying table; instead they are cached by the cached updates layer. No record locks are held until the clients decide to commit the updates. Then the locks are held only during the commit process.

Because no record locks are held before the commit operation, there is a risk that some records might be updated by other users. If a record modified by the cached updates layer is modified by other users before the cached updates layer commits its cached updates, an error is returned, indicating that the record has been modified by a different user.

For standard database tables, every non-blob field is used in determining the record modifications.

After making the required changes, the clients call [DbiApplyDelayedUpdates](#) either to commit or rollback the changes. The rollback operation quickly discards the update information from the cache.

If the user decides to commit the changes, the updates are applied to the database. As the updates are applied, referential integrity and data validation checks are made.

A callback mechanism informs the users about data integrity violations. This mechanism can skip a particular failed update or abort the entire commit operation. See [Callback functions](#)

Limitations

The cached updates layer works on one cursor at a time. If clients want to support cached updates on a form operating on more than one cursor, it is the client's responsibility to synchronize the updates on various cursors.

A few BDE calls that perform table operations are not supported by the cached updates layer, including data-ordering BDE calls, such as [DbiSwitchToIndex](#). These can be done before entering the cached updates mode. The cached updates layer depends on bookmarks to keep track of modified records. Because bookmarks change when [DbiSwitchToIndex](#) is called, this BDE function is disabled.

{button ,AL("cachedupdates")} [Cached updates topics](#)

{button ,AL("accessingtables")} [Accessing and updating tables](#)

Using the cached updates mode

Use of the cached updates mode is a two-phase process.

Phase 1

The command `DbiDelayedUpdPrepare` causes all changes in the cache to be applied to the underlying data. Unless being used in a single-user environment, this command should always be used within the context of a transaction to allow for error-recovery in the event of an error during the update. Any errors encountered during this phase should be handled through callback functions.

Phase 2

The command `dbiDelayedUpdateCommit` performs the second phase. After successfully calling `DbiDelayedUpdPrepare` directly, follow it with the `dbiDelayedUpdateCommit` command. The internal cache is updated to reflect the fact that the updates were successfully applied to the underlying database (that is, the successfully applied records are removed from the cache).

Procedure

To start the cached updates mode:

- 1 Create the cached updates layer with a call to [DbiBeginDelayedUpdates](#)

```
DBIResult DBIFN EXPORT DbiBeginDelayedUpdates(phDBICur phDbiCur);
```

Note: The record buffer size will be different in cached updates mode. You should reallocate record buffers once the cached updates layer is installed.

- 2 Apply (commit) changes made to the cached updates cache with a call to [DbiApplyDelayedUpdates](#)

```
DBIResult DBIFN EXPORT DbiApplyDelayedUpdates (hDBICur
hDbiCur, DBIDelayedUpdCmd eUpdCmd);
typedef enum
{
    dbiDelayedUpdCommit = 0,
    dbiDelayedUpdCancel = 1
    dbiDelayedUpdCancelCurrent = 2
    dbiDelayedUpdPrepare = 3
} DBIDelayedUpdCmd;
```

Note: When used on inserted, deleted, or modified records, the command `dbiDelayedUpdCancelCurrent` resets the current record to its original state.

- 3 Once the changes have been applied to the database, users can resume making changes to the database. They don't have to end the cached updates mode. After completing the next batch of modifications, `DbiApplyDelayedUpdates` can be called to apply those changes to the database or perform a rollback.

- 4 End the cached updates mode with a call to [DbiEndDelayedUpdates](#)

```
DBIResult DBIFN EXPORT DbiEndDelayedUpdates(phDBICur phDbiCur);
```

{button ,AL("cachedupdates")} [Cached updates topics](#)

{button ,AL("accessingtables")} [Accessing and updating tables](#)

Callback functions

A callback mechanism is provided when a failure to write a modified record to the database occurs. Because updates are not sent to the underlying table until the commit time, no errors (such as integrity constraint violations) are detected before the commit/prepare operation. If an error occurs at commit time, users are prompted with an error message describing the error. Applications should register a callback function for cached updates by using the [DbiRegisterCallBack](#) function (ecbType for this callback is cbDELAYEDUPD) to be notified of the errors during the commit.

The callback descriptor for cached updates is:

```
// type of delayed update object (cached updates callback)
typedef enum
{
    delayupdNONE           = 0,
    delayupdMODIFY         = 1,
    delayupdINSERT         = 2,
    delayupdDELETE         = 3
} DelayUpdErrOpType;
// cached updates callback descriptor.
typedef struct
{
    DBIResult              iErrCode;
    DelayUpdErrOpType     eDelayUpdErrOpType;
    // Record size (physical record)
    UINT16                 iRecBufSize;
    pBYTE                  pNewRecBuf;
    pBYTE                  pOldRecBuf;
} DELAYUPDCbDesc;
```

In the callback descriptor, the eDelayUpdErrOpType indicates the operation type (such as insert, delete, or modify) and iErrCode indicates what sort of error has occurred during the eDelayUpdErrOpType operation.

Clients should allocate enough memory for *pNewRecBuf* and *pOldRecBuf*. Each record buffer should be at least as large as the cached update cursor's physical record buffer size. The new (after the update) and old (before the update) record buffers are returned to the clients through *pNewRecBuf* and *pOldRecBuf* record buffers.

Clients can respond to this callback function with the following return codes:

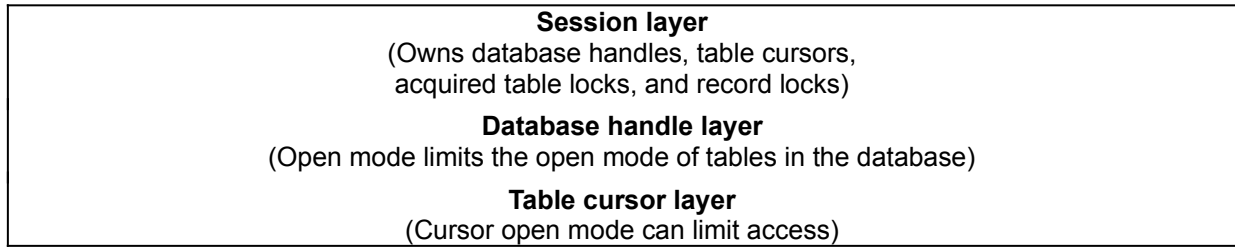
Return code	Resulting action
cbrABORT	The entire commit operation is aborted. cbrABORT is the default return code if no callback function is registered.
cbrSKIP	The failed update operation is skipped and the commit process continues with the remaining updates.
cbrCONTINUE	The failed update operation is skipped and the commit process continues with the remaining updates.
cbrRETRY	The failed update operation is tried again.
cbrPARTIALASSIST	The user-applied changes are kept in the cache. In this case, the user applies the changes to the original table.

{button ,AL("cachedupdates")} [Cached updates topics](#)

{button ,AL("accessingtables")} [Accessing and updating tables](#)

Locking

The Borland Database Engine locking environment is a hierarchy consisting of three layers:



See the following topics on the layers and details about table locking:

{button ,AL("locking")} [Locking topics](#)

Session layer

At the top of BDE's locking hierarchy is the session layer. The session indirectly controls some locks because it controls resources including database handles and table cursors. Multiple database handles can be opened in the same session; this is what gives the application access to different databases at the same time. When a session is closed, all resources attached to the session are closed and all locks owned by those resources are released.

The session directly owns table locks and record locks acquired by an application after the table has been opened. This means that if more than one cursor is open on the same table within a session, one cursor can release a lock that was acquired by another cursor. Sessions provide complete isolation from each other.

{button ,AL("locking")} [Locking topics](#)

Database handle layer

One step down in BDE's locking hierarchy is the database handle layer. Although no locks are explicitly owned by the database handle, the share mode assigned to the database when it is opened determines whether tables within that database can be opened exclusively or shared. If the database is opened in share mode, then tables within that database can be opened either in exclusive or share mode. If the database is opened in exclusive mode, then all tables will be opened in exclusive mode, even if other users attempt to open the table in share mode.

When the database is closed, all resources allocated to the database handle are released, including table cursors and table locks owned by these cursors.

Also see [Native handles](#)

{button ,AL("locking")} [Locking topics](#)

Table cursor layer

At the bottom of the BDE locking hierarchy is the cursor layer. Only locks placed on the table when it is opened with the DbiOpenTable function are owned by the cursor. If the table is opened in exclusive mode, no other user can access that table. An exclusive lock prevents any other user from accessing the table, or placing any type of lock on it. If the table is opened in share mode, other cursors can access the table and they can acquire read or write locks on the table.

When the cursor is closed, any exclusive lock placed on the table when it was opened is released.

{button ,AL("locking")} Locking topics

Acquired locks

All locks acquired after the table is opened are owned by the session, rather than the cursor. There are several types of acquired locks:

- [Acquired Table Locks](#)
- [Acquired Persistent Table Locks](#)
- [Record Locks](#)

Checking a table's lock status

To check the acquired lock status of a table use [DbilsTableLocked](#). The application specifies the type of lock (no lock, read lock, or write lock) and the function returns the number of locks of that type placed on the table.

For dBASE and Paradox tables, to check whether the table is physically shared on a network or local drive and opened in share mode, use [DbilsTableShared](#). For SQL tables, this function can be used to check whether the table was opened in SHARE mode.

{button ,AL("locking")} [Locking topics](#)

Acquired table locks

If an application needs to place a lock on a table that was opened in share mode, it calls the BDE function DbiAcqTableLock. If a lock cannot be obtained, an error is returned.

DbiAcqTableLock can place a read or a write lock on the table.

A write lock prevents other users from updating a table, so that updates can be made cleanly and without interference. Only one write lock can exist on a table at a time.

A read lock prevents anyone from updating the table and prevents other users from placing a write lock on the table, so that table data cannot change while you are reading it. Multiple read locks can co-exist.

If a driver does not support read locks, a read lock is upgraded to a write lock. For example, for dBASE tables, read locks are upgraded to write locks. For SQL tables, a write lock is the same as a read lock and behavior varies according to the server.

More than one lock can be acquired on the table.

Releasing acquired table locks

DbiRelTableLock is used to release a table-level lock placed with DbiAcqTableLock. For each lock acquired, a separate call to DbiRelTableLock is required to release it.

{button ,AL("locking")} Locking topics

Acquired persistent table locks

A persistent lock can be placed even before the table has been created. For Paradox tables, this feature can be used to reserve a table name for future use. For SQL tables, BDE remembers that the lock was placed, and when the table is actually created during that connection, the table is locked (as long as the server supports table locks). These locks are acquired by the [DbiAcqPersistTableLock](#) function.

Releasing acquired persistent table locks

To release an acquired persistent lock, use the [DbiRelPersistTableLock](#) function.

{button ,AL("locking")} [Locking topics](#)

Record locks

Applications can acquire record locks at record retrieval time. Most BDE functions that are capable of fetching a record provide the option of locking; for example, [DbiGetNextRecord](#), [DbiGetPriorRecord](#), and [DbiGetRelativeRecord](#). The [eLock](#) parameter can be used to specify one of the following record locks:

Setting	Description
dbiNOLOCK	No lock; allows other users to read, update, and lock the record
dbiREADLOCK	Upgraded to a write lock
dbiWRITELOCK	Allows other users to read the record, but prevents them from updating the record, or placing a lock on the record

Paradox and dBASE lock managers both upgrade read locks to write locks; so, in effect, a record is either locked or not locked.

Because some BDE record-fetching functions perform operations other than locking, the order in which these operations occur can be significant:

- Cursor movement always occurs first.
- Paradox and dBASE drivers attempt to lock the record before filling the record buffer.
- SQL drivers fill the client's record buffer and then attempt to lock the record.

Note: Cursor movement occurs even if the lock fails. For example, if [DbiGetNextRecord](#) is called with a read lock, the cursor moves to the next record, and the lock is then attempted. If the record is already locked by another user, the lock attempt fails, but the cursor has changed position.

Maximum number of record locks for standard tables

Shared dBase table	100
Shared Paradox table	255

Checking a record's lock status

To check the lock status of a record, use [DbilsRecordLocked](#). This function returns the lock status of the current record; the lock status can be either locked or not locked.

Releasing record locks

The application can call the function [DbiRelRecordLock](#) to release the record lock on the current record or release all the record locks acquired in the current session. In addition, [DbiModifyRecord](#) provides an option to release the lock after the operation has completed.

{button ,AL("locking")} [Locking topics](#)

Table lock coexistence

Each type of table-level lock placed on a table affects to some degree the access that other users have to the table. You can use a lock aggressively to prohibit other users from accessing a table, or you can use a lock defensively to prevent other users from placing locks that would limit your application's access to the table. The chart below shows the results of User 2's attempts to place table locks after User 1 has successfully placed each type of lock:

	User 2:			
	Attempts to open the table in exclusive mode	Attempts to acquire a write lock	Attempts to acquire a read lock	Attempts to open the table in share mode
User 1:				
Opens the table in exclusive mode	Fail	Fail	Fail	Fail
Acquires a write lock	Fail	Fail	Fail	Succeed
Acquires a read lock	Fail	Fail	Succeeds for Paradox Fails for dBASE	Succeed
Opens the table in share mode	Fail	Succeed	Succeed	Succeed

{button ,AL("locking")} [Locking topics](#)

Locking strategy

In choosing a locking strategy, you must consider both the application's need to keep other users from changing data, and the extent to which locking affects other users. You also need to consider the differences in rules used by the lock managers of each database system being accessed. SQL lock managers use a different set of locking rules from those used by dBASE and Paradox lock managers.

Using BDE, an application can update a table as long as it has read-write access to the table, and no other user has a lock on the table or record to prevent the update. However, it is necessary, with dBASE and Paradox systems, to lock the table or record before updating to ensure that the data in the table does not change while the application is in the middle of processing a retrieved record.

Note: With BDE, you can write your application as a multi-user application even if the database resides on a standalone PC, since locking overhead is marginal when data is local. This means that you can write a single application for both single-user and multi-user situations.

{button ,AL("locking")} [Locking topics](#)

SQL-specific locking behavior

With dBASE and Paradox, a record lock prevents another user from updating the record. However, SQL deals with record locking differently than Paradox or dBASE. If a record in a SQL table is not in the record cache, the record is fetched from the server. The client has a local (cached) copy of the record, but that copy can become immediately out-of-date if another client retrieves the same record from the server, and modifies or deletes it before the first client is able to submit changes.

BDE SQL drivers (and some ODBC drivers) use optimistic locking. An optimistic lock actually allows the locked record to be updated by another user, but when the application that placed the lock attempts to update the record, BDE notifies the application that the record has changed and that the requested operation cannot be performed because someone else has modified the data. The application then has the option of inspecting the new record and deciding whether to submit its changes or not.

Optimistic locking avoids the performance and concurrency penalties incurred by a lock that ties up record access for the duration of time that it takes to complete a single user's modifications. At the same time, the application is protected from inadvertently changing data that has never been inspected.

You can use keyed updates to control optimistic locking for improved performance.

{button ,AL("locking")} Locking topics

Transactions

SQL systems use transaction processing with commit and rollback; either the whole series of operations within the transaction is made permanent when the series completes, or the whole series is undone.

Transactions can be executed on all SQL platforms supported by BDE. A transaction is a series of programming commands that access data in the database. When the last of the series of commands has completed, the entire transaction is either committed or canceled. If it is committed, all changes performed within the transaction against the associated database are made permanent. If it is canceled, all changes performed against the associated database are undone.

Only one transaction can be active per connection to a SQL database. Any attempt to start an additional transaction before the first one terminates results in an error.

Also see [SQL transaction control](#)

Default transactions

SQL operations always take place within the context of a transaction. When no explicit transaction occurs, the SQL driver manages the SQL server transactions transparently for the client. Any successful modification of SQL server data is immediately committed to ensure its permanence in the database. Default transaction behavior would apply if you are using BDE with a SQL server, but you are not explicitly using transactions (that is, setting the operations off between `DbiBeginTran` and `DbiEndTran`).

Beginning a transaction

The `DbiBeginTran` function is used to begin a transaction. After a successful `DbiBeginTran` call, the transaction state is active. The application specifies the isolation level to be used for the transaction when `DbiBeginTran` is called. Possible values are:

- `xiIDIRTYREAD`: Uncommitted changes can be read.
- `xiIREADCOMMITTED`: Other transactions' committed changes can be read.
- `xiIREPEATABLEREAD`: Other transactions' changes to previously read data are not seen.

Availability and behavior of isolation and read repeatability capabilities vary by SQL server.

Ending a transaction

`DbiEndTran` ends the transaction. The application specifies the transaction end type. Possible values are

- `xendCOMMIT`: Commit the transaction.
- `xendCOMMITKEEP`: For some SQL drivers, commit the transaction and keep cursors.
- `xendABORT`: Roll back the transaction.

Note: BDE cursors can remain active, even if the underlying SQL cursor is closed. BDE manages the re-opening of server SQL cursors transparently.

`xendCOMMIT` and `xendABORT` keep cursors if the driver and the database support keeping cursors. If the database does not support keeping cursors, four possibilities exist for each server cursor opened on behalf of the BDE user:

- A cursor for an open query with pending results is buffered locally. Other than prematurely reading the data, no visible effect remains.
- A cursor opened on a table supporting direct positioning is closed. No other behavior is affected.
- A cursor opened on a table that does not support direct positioning is opened initially in a different transaction or connection context, if the database supports this. This cursor remains open because it exists in a different context from the requested transaction.
- If none of the previous possibilities apply, the cursor is closed and subsequent access to the BDE objects associated with the server cursor returns an error.

For an example, refer to the `TRANSACT.C` code sample in the SNIPIT Code Viewer (`\BDE\EXAMPLES\SNIPIT`).

{button ,AL("transaction")} Transaction topics

Transactions on Paradox and dBASE

Transactions for standard Paradox and dBASE drivers (local transactions) enable you to roll back (revert) or commit updates to standard tables. This helps ensure that applications will perform updates in a consistent way.

When a local transaction is started on a standard database, updates performed against tables in that database are logged. Each log record contains the old record buffer of the record that is updated. When a transaction is active, the records with updates are locked and these locks are held until the transaction is either committed or rolled back.

- The Commit operation releases all locks that were held when that transaction was active.
- The Rollback operation reapplies the updates to the underlying tables to restore the original state of the database. Once the original state of the database is restored, the locks are released.

Limitations

The following limitations apply to local transactions:

- For standard databases (Paradox, dBASE) there is no automatic crash recovery or DDL-related actions such as table create, restructure, index creation, table/index deletion, and so on.
- To perform transactions on a Paradox table, a valid index must exist. Data cannot be rolled back on Paradox tables lacking an index.
- Inserts rolled back on dBase tables are actually only soft deletes.
- Local transactions do not work for temporary tables.
- Local transactions do not work for the Text driver (ASCII files).

{button ,AL("transaction")} [Transaction topics](#)

Transactions and cached updates

When a transaction is active, updates are immediately sent to the underlying tables. Thus errors (such as integrity constraint violations, and so on) are instantly reported to the clients. Because updates are immediately sent to the underlying tables, the updates are visible to other transactions. And because each modified record is locked, other users cannot interfere.

This behavior differs from that of the cached updates layer (batch or burst updates), where updates are not sent to the underlying table until the commit time. Hence no errors are reported until the commit time. No record locks are held until the user decides to commit the updates. The locks are held only during the commit process. If errors occur during the commit process, clients are given an option to abort the commit process. If clients abort a commit process, the original state of the table is restored.

The main advantage of the cached updates feature is that the locks are held only during the commit time, thereby increasing the access time of SQL servers for other system transactions. Transactions lock out other users after record is changed, and local transactions limit the user to changing only the maximum number of records that can be locked. Cached updates avoid these problems, but permit another user to change data underneath you.

These differences are summarized in the following table:

	Advantages	Disadvantages
Transactions	Updates immediately sent to tables. Modified records instantly visible to other users. Modified records are locked. Errors instantly reported.	Lock out other users once a record is modified. Local transactions limit users to changing only the maximum number of records that can be locked.
Cached updates	Locks are held only during commit time, increasing server access time for other transactions. Cached updates can be used with any cursor on a single table. Not limited to the maximum locks for dBASE (100) and Paradox (255) while modifying records. [When committing more than these maximums, an exclusive lock on the table is required to commit them.]	Permits another user to modify the records you are using without your realizing it. If errors occur during commit process, you may abort, reverting table to its original state, losing all modifications

For more information, see [Cached updates](#).

{button ,AL("transaction")} [Transaction topics](#)

Degree of transaction isolation

The degree of isolation provided by transactions on standard databases is Degree 0. This means that a transaction does not overwrite another transaction's dirty data.

Because only Degree 0 isolation is supported, transactions on standard databases are subject to the following limitations:

- **Possible lost updates**

Two transactions could perform reads without locking records, that is, using dbiNOLOCK protocol. If these two transactions post their updates independently, the final result set might include only one transaction's changes, losing updates of the other transaction.

- **Transaction not isolated from dirty reads**

A transaction T1 could read a record previously updated by another transaction T2 and make further modifications to that record. The record read by T1 might be inconsistent, because it is not the final update produced by T2. Hence the read of transaction T1 was a dirty read.

- **Unrepeatable reads not prevented**

A transaction T1 reads a record twice, once before transaction T2 updates it and once after committed transaction T2 has updated it. The two read operations return different values for the record and the first read is not repeatable.

By using the appropriate locking mechanism during the updates, the clients can provide a higher degree of transaction isolation. For example, lost updates can be prevented if a transaction always gets a read lock on a record it is about to modify. No user-requested locks are promoted, that is, if a user requests to read a record by using DbigetRecord with dbiNOLOCK protocol, that record is not locked and that read operation might be a dirty read. However, in the case of inserts and modifications, records are locked with dbiWRITELOCK and locks are held until that transaction ends.

The function [DbiBeginTran](#) supports several transaction isolation levels:

- xilDIRTYREAD (Uncommitted changes read),
- xilREADCOMMITTED (Committed changes, no phantoms), and
- xilREPEATABLEREAD (full read repeatability).

For SQL tables, appropriate transaction isolation levels can be requested depending on the destination SQL server capabilities. The xilREADCOMMITTED isolation level precludes lost updates and dirty reads. The xilREPEATABLEREAD isolation level prevents unrepeatable reads.

Limitation: Because the transaction feature for local (standard) database tables supports Degree 0 isolation, only the xilDIRTYREAD option is accepted in DbigetTran. If a higher degree of isolation is requested, an error message is returned. For the same reason, xendCOMMITKEEP is not supported by DbigetTran.

Because all updates are atomic, users will be informed about the lock conflicts immediately. No deadlock detection is performed. A deadlock occurs when each of two transactions waits for locks held by the other. If there are any lock conflicts between different transactions, an error message is returned to the clients. When a deadlock occurs, it is up to the clients to decide which transactions to rollback.

Using transactions

BDE provides two API functions: `DbiBeginTran`, to begin transactions and `DbiEndTran`, to end transactions:

```
DBIResult DBIFN DbiBeginTran (          // Begin a transaction
    hDBIDb      hDb,                    // Db handle
    eXILType    eXIL,                   // Transaction isolation level
    phDBIXact   phXact                  // Returned. Xact handle
);
// Commit or rollback a basic transaction. If hXact is
// given, hDb is ignored. If hXact == 0, hDb must be given.

DBIResult DBIFN DbiEndTran (           // End a transaction
    hDBIDb      hDb,                    // Database handle
    hDBIXact    hXact,                 // Xact handle
    eXEnd       eEnd                    // Xact end type
);
// The transaction model being discussed here supports only
// xilDIRTYREAD isolation level.
typedef enum                          // Transaction isolation levels
{
    xilDIRTYREAD,                      // Uncommitted changes read
    xilREADCOMMITTED,                 // Committed changes, no phantoms
    xilREPEATABLEREAD                 // Full read repeatability
} eXILType;
typedef enum                          // Transaction end control
{
    xendCOMMIT,                        // Commit transaction
    xendCOMMITKEEP,                    // Commit transaction, keep cursors
    xendABORT                           // Rollback transaction
} eXEnd;
```

The following results occur when there are active transactions:

1. If there are active transactions in a session, `DbiCloseSession` closes that session and its active transactions are rolled back. Similarly, `DbiExit` rolls back the active transactions present in the system.
2. In the case of standard databases (local transactions), `DbiModifyRecord`, `DbiInsertRecord`, and `DbiDeleteRecord` are intercepted to perform the transaction logging. A separate log is associated with each transaction. The log is maintained as long as the transaction is active. It is destroyed once the transaction commits or rolls back.

{button ,AL("transaction")} [Transaction topics](#)

Querying databases

The BDE API enables the client to use SQL or Query by Example (QBE) to access dBASE and Paradox tables (standard databases) as well as server-based SQL tables.

A group of BDE query interface functions is provided for passing either [SQL Queries](#) or [QBE queries](#) to both server-based and PC-based sources.

{button ,AL("querying")} [Querying topics](#)

SQL queries

The common query engine uses a convenient subset of SQL to access dBASE and Paradox tables. This subset can also be used to join server-based SQL tables with Paradox and/or dBASE tables. The appropriate BDE driver must be installed to allow server-based SQL access.

To exploit the full functionality of the server, you can use your server's dialect of SQL. Use passthrough SQL to send native SQL statements directly to your database server to be executed there. Queries executed in the native dialect might not result in updatable cursors. If the appropriate BDE driver is installed, the BDE query interface functions can also be used to pass SQL statements to the server for processing, in the native dialect of a server-based system, such as Oracle or Sybase.

QBE queries

Query By Example (QBE) allows uniform access to data in Paradox or dBASE tables and tables in server-based databases. BDE supports the full QBE language as defined by Paradox DOS and Paradox for Windows. When QBE is executed with a SQL data source, the QBE query is translated to SQL and sent to the server; the resulting cursor is not updatable.

Querying Paradox and dBASE tables

The common query engine enables BDE application developers to access tables in standard databases using either the SQL or QBE languages. Two categories of SQL statements ("Local SQL") are supported for tables in standard databases:

- Data Definition Language (DDL)
- Data Manipulation Language (DML)

For more information, see the [Local SQL Guide](#).

Naming conventions

When writing SQL statements to be used with dBASE and Paradox tables, observe the following naming conventions:

Table names

Table names that include a period (.) must be placed in either single or double quotation marks. For example:

```
select * from 'c:\sample.dat\table'  
select * from "table.dbf"
```

Table names can include BDE style aliases. For example,

```
select * from ":data:table"
```

Names that are keywords must be placed in quotation marks. For example,

```
select passid from "password"
```

Names that have spaces must be placed in quotation marks. For example,

```
select * from "old table"
```

Field names

Field names that have spaces must be placed in quotation marks. For example,

```
select e."Emp Id" from Employee e
```

Field names that are keywords must be placed in quotation marks. For example,

```
select t."date" from Table t
```

Field names that are placed in quotation marks must have a table reference.

Data Manipulation Language

The following DML clauses are supported:

SELECT, WHERE, ORDER BY, GROUP BY, UNION, and HAVING

The following aggregates are supported:

SUM, AVG, MIN, MAX, COUNT

The following operators are supported:

, -, *, /, =, < >, IS NULL

UPDATE, INSERT, DELETE operations are fully supported to SQL 92 entry level.

For example:

```
Select part_no  
from parts  
where part_no > 543
```

Also supported

- Subqueries are supported in SELECT, WHERE, and HAVING clauses. In addition to scalar comparison operators (=, <, > ...) additional predicates using IN, ANY, ALL, EXISTS are supported.
- Complex aggregate expressions are supported, including scalar expressions with both aggregation and arithmetic. For example:

```
SUM( Field * 10 )
```



```
SUM( Field ) * 10
SUM( Field1 + Field2 )
```

- Constructs such as SUM(MIN(Field)) are supported in projections.
- There are no restrictions requiring projection of all grouping or ordering columns. Expressions are allowed in GROUP BY and ORDER BY. For example:
... GROUP BY MonthOf(DateField) ...
Note: Expressions in this context deviate from the SQL92 standard, but are supported by Oracle, Microsoft Access, and others.
- You can constrain any updateable query by setting the query statement property stmtCONSTRAINED to TRUE before execution. A error will then be returned whenever a modify or insert would cause the new record to disappear from the result set. Refer also to record [integrity constraints](#).

Data Definition Language

The DDL syntax for Paradox and dBASE tables is restricted to CREATE TABLE (or INDEX), DROP TABLE (or INDEX). For example:

```
create table parts ( part_no char(6), part_name char(20) )
```

The following example demonstrates how SQL DDL can be executed through BDE:

```
hDBICur hCur;
pBYTE szQuery ="create table 'c:\\example\\test.dbf' "
               "( fld1 int, fld2 date)";
rslt = DbiQExecDirect(hDb, langSQL, szQuery, &hCur);
```

For data mappings used by CREATE TABLE and more examples, see the [Local SQL Guide](#).

{button ,AL("querying")} [Querying topics](#)

Querying different databases

Through the BDE interface, the application developer can use SQL to join tables from different data sources (for example, a Paradox, InterBase, and Sybase table could all participate in a SQL query). These are called "heterogeneous joins." See [Local SQL Guide](#)

The following SQL statement shows a join of three tables from different platforms, by using aliases:

```
select distinct c.cust_no, c.state, o.order_no, i.price
  from   ':Local_alias:customer.db' c,
        ':IB_alias:order' o,
        ':SYB_alias:lineitem' i
 where   o.cust_no = c.cust_no and
        o.order_no = i.order_no
```

{button ,AL("querying")} [Querying topics](#)

Executing queries directly

Use [DbiQExecDirect](#) for simple queries, where no special preparation is necessary. This function immediately prepares and executes a SQL or QBE query and returns a cursor to the result set, if one is generated. The application passes the database handle, specifies whether the query language is QBE or SQL, and passes the formulated query string.

With SQL query language, if the specified database handle refers to a server database, the SQL dialect native to that server is expected. If the database handle refers to a standard database, the SQL statement is limited to the subset supported by the common query engine.

The following example shows how a SQL query is executed with the function `DbiQExecDirect`:

```
DBIResult  rslt;
hDBICur    hCur;
pBYTE      szQuery =  "Select t.name, t.age "
                      "from EMPLOYEE t "
                      "where t.age > 30 "
                      "and t.salary > 1000000 ";
rslt = DbiQExecDirect(hDb, qrylangSQL, szQuery, &hCur);
```

{button ,AL("querying")} [Querying topics](#)

Executing queries in stages

Some queries require a statement handle and need to be executed in stages. A statement handle is required if the application needs to control the table type of the result set, to express preference over the degree of liveness of data, or to bind parameters for queries. The application uses a separate function call for each stage:

- 1 To obtain a new statement handle, call [DbiQAlloc](#).
- 2 To change properties in the statement handle, call [DbiSetProp](#). At this point you can also indicate whether you want the result set to be "live," that is, modifiable.
- 3 To prepare the query, call [DbiQPrepare](#).
- 4 To execute the prepared query, call [DbiQExec](#).
- 5 To free resources bound to the query, call [DbiQFree](#).

DbiQAlloc

This function allocates a statement handle required for prepared query functions. It specifies the database handle and whether the query language is QBE or SQL, returning a statement handle for the prepared query. `DbiQAlloc` is the necessary first step in all prepared queries.

DbiSetProp

`DbiSetProp` is used to set a property of an object to a specified value. In this case, the object is the statement handle returned by `DbiQAlloc`. The property to be set can be the result table type, degree of liveness, or query mode for binding parameters. The following examples show how values are set for these properties:

```
DbiSetProp(hStmt, stmtANSTYPE, (UINT32) szPARADOX);
DbiSetProp(hStmt, stmtLIVENESS, (UINT32) wantLIVE);
```

DbiQPrepare

This function is used to prepare a SQL or QBE query for subsequent execution. It accepts a handle to a statement containing the prepared query.

Live and canned result sets

The last example above shows how you can specify your preference for live or canned result sets during query execution. A canned result set is like a snapshot or a copy of the original data selected by the query. In contrast, a live result set is a view of the original data; specifically, if you modify a live result set, the changes are reflected in the original data.

When you specify your preference for a live result set, the Query Manager attempts to give you a live result set. However, no guarantee can be made that the resulting result set will indeed be live. After the query has executed and a result set has been returned, you can check to see if it is live by examining the cursor property *bTempTable*. If TRUE, the result set is a temporary table, hence a copy (canned); otherwise, the result set is live.

SQL queries against SQL servers return an error if the result cannot be made live. *bTempTable* is valid for local queries.

The possible values for liveness are:

Value	Description
wantCANNED	Indicates preference for a canned result set (this request is always honored)
wantLIVE	Indicates preference for a live result set
wantSPEED	Directs the query manager to decide, based on which method is probably fastest
wantDEFAULT	Same as wantCANNED

DbiQExec

`DbiQExec` executes the previously prepared query identified by the supplied statement handle and returns a cursor to the result set, if one is generated.

For all queries, remote and local, the same prepared query can be executed several times, but only after any pending results have been read or discarded (by using [DbiCloseCursor](#) on the answer set cursor).

DbiQFree

This function is always used as the final step in executing prepared queries to free all system resources allocated during preparation and use of a query. If cursors are associated with an outstanding result set produced by execution of the statement, the cursors remain valid and the dependent statement resources are not released until the last cursor has been closed or the result set is read to completion, whichever happens first.

{button ,AL("querying")} [Querying topics](#)

Getting and setting properties

Each BDE object is defined by a set of properties. The properties defining an object depend on the object's type. For example, a session is a BDE object, and its properties include `sesMAXPROPS`, `sesSESSIONNAME`, and `sesCFGMODE`. Each type of object has its own set of properties, as listed in [Object Properties](#).

Values are initially assigned to properties when an object is created. For example, the name of the table is assigned to the `curTABLENAME` property of the cursor object when the table is opened with [DbiOpenTable](#).

Values of some properties can be changed with the BDE function [DbiSetProp](#). To reset a property, the application passes the object handle, the name of the property to be changed, and the new value of the property.

To retrieve an object's current property settings, use [DbiGetProp](#).

To retrieve an object's handle, use [DbiGetObjFromName](#).

To retrieve a cursor's database handle, use [DbiGetObjFromObj](#).

This example illustrates a method for getting the table name/type when all that is available is the table cursor:

```
UINT16      iLen;
DBITBLNAME  tblName;
DBINAME     tblType, dbName;
// The table cursor gives you access to the table
// name and the table type.
DbiGetProp(hCursor, curTABLENAME, (pVOID) tblName,
           sizeof(tblName), &iLen);
DbiGetProp(hCursor, curTABLETYPE, (pVOID) tblType,
           sizeof(tblType), &iLen);
// You can also access database properties (such as
// the name of the database associated with the cursor).
DbiGetProp(hCursor, dbDATABASENAME, (pVOID) dbName,
           sizeof(dbName), &iLen);
```

Object properties

Each BDE object is defined by its own set of properties as described in the following table.

Note: Not all drivers support all properties. Also, some properties are valid only at certain times. For example, stmtLIVENESS is valid only before DbiQPrepare.

Properties	System	Session	Database	Driver	Cursor	Statement
sysMAXPROPS	X	X	X	X	X	X
sysLOWMEMUSAGE	X	X	X	X	X	X
sesMAXPROPS		X	X		X	X
sesSESSIONNAME		X	X		X	X
sesNETFILE		X	X		X	X
sesCFGMODE		X	X		X	X
dbBATCHCOUNT			X			
dbMAXPROPS			X		X	X
dbDATABASENAME			X		X	X
dbDATABASETYPE			X		X	X
dbASYNCSUPPORT			X			
dbPROCEDURES			X			
dbDEFAULTTXNISO			X			
dbNATIVEHNDL			X			
dbNATIVEPASSTHRUHNDL				X		
dbUSESCHEMAFILE			X			
dbSERVERVERSION			X	X		
dbTRACEMODE						
drvMAXPROPS			X	X	X	
drvDRIVERTYPE				X	X	
drvDRIVERVERSION				X	X	
curGETEXTENDEDINFO					X	
curMAXPROPS					X	
curMAXROWS			X	X	X	
curTABLENAME					X	
curTABLETYPE					X	
curTABLELEVEL					X	
curFILENAME					X	
curXLTMODE					X	
curSEQREADON					X	
curONEPASSON					X	
curUPDATETS					X	
curSOFTDELETEON					X	
curLANGDRVNAME					X	
curPDXMAXPROPS					X	

curDBMAXPROPS	X	
curINEXACTON	X	
curNATIVEHNDL	X	
curUPDLOCKMODE	X	
stmtMAXPROPS		X
stmtPARAMCOUNT		X
stmtUNIDIRECTIONAL		X
stmtANSTYPE		X
stmtLIVENESS		X
stmtQRYMODE		X
stmtBLANKS		X
stmtDATEFORMAT		X
stmtNUMBERFORMAT		X
stmtAUXTBLS		X
stmtTBLVECTOR		X
stmtALLPROPS		X
stmtALLPROPSSIZE		X
stmtANSNAME		X
stmtNATIVEHNDL		X
stmtCURSORNAME		X
stmtROWCOUNT		X
stmtCONSTRAINED		X
stmtFIELDDESCS		X
stmtCURPROPS		X

Retrieving schema and system information

A set of BDE functions return schema or system information. Some functions, in the format `DbiOpenxxxList`, can be used to return a cursor to an in-memory table whose records contain the requested information. Other functions in the format `DbiGetxxxDescs` return information directly to descriptor structures and arrays supplied by the application. In each of the topics below you will find a chart of record structures of the virtual table returning the information.

- DbiOpenList Functions
Return a cursor handle to an in-memory table listing the requested information. This topic includes an example that illustrates the use of a static structure as the record buffer
- DbiGetDescs Functions
These function calls return descriptive information. Inquiry functionStructures are supplied by the application. This topic includes an example showing how to retrieve all the index descriptors with one function call.

DbiOpenList functions

One series of inquiry function calls, in the form DbiOpenxxxList, return a cursor handle to an in-memory table listing the requested information. The cursor to an in-memory table is read-only, so that the application is prohibited from updating the table. Information can be retrieved from the in-memory table in the normal way, by preparing the record buffer, positioning the cursor, fetching each record into the record buffer, and using [DbiGetField](#). Or each record can be read into the predefined structures assigned to the function. These structures are listed in the IDAPI.H file.

List function	Record structure of the virtual table returning the information
DbiOpenDatabaseList	DBDesc
DbiOpenDriverList	The virtual table contains only one CHAR field.
DbiOpenFamilyList	FMLDesc
DbiOpenFieldList	FLDDesc
DbiOpenFieldTypesList	FLDType
DbiOpenFileList	FILEDesc
DbiOpenFunctionArgList	DBIFUNCArgDesc
DbiOpenFunctionList	DBIFUNCDesc
DbiOpenIndexList	IDXDesc
DbiOpenIndexTypesList	IDXType
DbiOpenLdList	LDDesc
DbiOpenLockList	LOCKDesc
DbiOpenRintList	RINTDesc
DbiOpenSecurityList	SECDesc
DbiOpenTableList	TBLBaseDesc , TBLExtDesc , TBLFullDesc
DbiOpenTableTypesList	TBLType
DbiOpenUserList	USERDesc
DbiOpenVchkList	VCHKDesc

Example

This example illustrates the use of a static structure as the record buffer:

```
DBIResult  rslt;
hDBICur    hListCur;
IDXDesc    idxDesc;
// Open a schema table which will contain 1 record for each
// index currently available for the given table.
```

```
rslt = DbiOpenIndexList(hDb, "Sample", szPARADOX, &hListCur);
if (rslt == DBIERR_NONE)
{
    // Use a loop to retrieve each index descriptor
    while (DbiGetNextRecord(hListCur, dbiNOLOCK,
        (pBYTE) &idxDesc, NULL)
        == DBIERR_NONE)
    {
        ...
    }
    // Close the index list
    DbiCloseCursor(&hListCur);
}
```

DbiGetDescs functions

Inquiry function structures are supplied by the application. These function calls return descriptive information.

List function	Record structure of the virtual table returning the information
<u>DbiGetDatabaseDesc</u>	<u>DBDesc</u> structure
<u>DbiGetDriverDesc</u>	<u>DRVType</u> structure
<u>DbiGetFieldDescs</u>	Array of <u>FLDDesc</u> structures
<u>DbiGetFieldTypeDesc</u>	<u>FLDType</u> structure
<u>DbiGetIndexDesc</u>	<u>IDXDesc</u> structure
<u>DbiGetIndexDescs</u>	Array of <u>IDXDesc</u> structures
<u>DbiGetIndexTypeDesc</u>	<u>IDXType</u> structure
<u>DbiGetTableTypeDesc</u>	<u>TBLType</u> structure
<u>DbiQGetBaseDescs</u>	Returns the original database, table, and field names of the fields that make up the result set of a query.

Example

The following example shows how to retrieve all the index descriptors with one function call:

```
DBIResult  rslt;
    hDBICur   hCursor;
    CURProps  curProps;
    pIDXDesc  pIdxArray;
// Open the table
rslt = DbiOpenTable(hDb, "Sample", szPARADOX, NULL, NULL, 0,
                   dbiREADWRITE, dbiOPENSHARED, xltFIELD,
                   TRUE, NULL, &hCursor);
if (rslt == DBIERR_NONE)
{
    // Get the properties for the cursor
    DbiGetCursorProps(hCursor, &curProps);
    // Allocate the buffer for the index descriptors
    pIdxArray = (pIDXDesc) malloc(sizeof(IDXDesc) *
                                   curProps.iIndexes);

// Get the indexes
    rslt = DbiGetIndexDescs(hCursor, pIdxArray);
    if (rslt == DBIERR_NONE)
    {
        ...
    }
    // Clean up
    free((pCHAR) pIdxArray);
    DbiCloseCursor(&hCursor);
}
```

Creating tables

The application can create permanent tables by using the BDE function [DbiCreateTable](#). It can also create temporary tables with [DbiCreateTempTable](#) and in-memory tables with [DbiCreateInMemTable](#). To see code samples of creating tables, run the SnipIt Code Viewer and select Table: Create dBASE or Table: Create Paradox.

Permanent tables

Permanent tables are named and are saved to disk. To create a permanent table, the application first creates a field descriptor structure [FLDDesc](#) for each field in the table and an index descriptor structure [IDXDesc](#) for each index. For SQL and Paradox tables, the application can also define a descriptor structure for each validity check [VCHKDesc](#). For Paradox and SQL tables, the application can define a descriptor structure for each referential integrity check [RINTDesc](#), and each security check [SECDesc](#) to be enforced.

Next, the application creates a table descriptor structure [CRTblDesc](#) defining general attributes of the table, and supplying pointers to arrays of field, index, validity, referential integrity and security descriptor structures previously created. Finally, the application calls [DbiCreateTable](#), passing the [CRTblDesc](#) structure.

Specifying optional parameters

When creating a Paradox or dBASE table, optional driver-specific parameters may be included in the last three fields of the [CRTblDesc](#) structure. To retrieve a list and description of these optional parameters for a driver, the application can call [DbiOpenCfgInfoList](#), supplying the path of the driver's table create options in the configuration file. This function returns an in-memory table with information about relevant optional parameters, as well as the default values for these parameters. For example, the Table Level is an optional parameter for dBASE and Paradox tables.

Temporary tables

A temporary table is deleted when the cursor is closed. The application can create a temporary table in the same way it creates a permanent table except that it calls [DbiCreateTempTable](#) instead of [DbiCreateTable](#). See "Permanent Tables" above for a description of the descriptor structures used to create a table.

For Paradox and dBASE only, a temporary table can be made into a permanent table by calling [DbiMakePermanent](#) while the cursor is still open and supplying a table name, or calling [DbiSaveChanges](#).

In-memory tables

An in-memory table cannot be saved as a permanent table. The application can create an in-memory table by calling [DbiCreateInMemTable](#), and supplying an array of field descriptor structures [FLDDesc](#). The table descriptor [CRTblDesc](#) is not used. Only BDE logical types are supported.

Integrity constraints

When creating a table by using the BDE function `DbiCreateTable`, you can use integrity constraints to ensure that references in the key fields of secondary tables (in the same database) or foreign tables (in another database) are maintained to key fields in a primary table. For example, if several tables have keys referencing the primary key Customer ID in the Customer table, then this dependency must be checked so that referenced customer IDs cannot be deleted, thereby orphaning records in secondary or foreign tables.

Primary key and foreign key integrity constraints are implemented wherever supported by SQL servers such as:

- Sybase system 10,
- Microsoft SQL server 6.0,
- Interbase 4.0,
- Oracle 6.0 (syntax only, not enforced),
- Oracle 7.x,

Primary key support

1. Decide which fields or set of fields will act as the primary key for the table to be created.
2. Put this information in an `IDXDesc` structure with these columns.
3. Set `IDXDesc.bPrimary = TRUE`;
4. Attach the `IDXDesc` structure to a `CRTBLDesc.pidxDesc` pointer.

Primary key columns must be NOT NULL, which means you should have `VCHKDesc` for each column with `VCHKDesc.bRequired = TRUE`. The exception is Paradox which can have one blank record.

There can be only one primary key per table.

A table with primary key constraint (table level) is created and an unique index (ascending) on these columns is also created. For remote databases, this index can neither be added nor dropped by using `CREATE INDEX` or `DROP INDEX`. The index will be created when table is created and will go away when the table is dropped. (In Local SQL, you can drop the primary index by using this statement: "DropIndex TABLENAME.PRIMARY".)

Foreign key support

1. Decide which table (the *other* Table) is going to be referenced by the table (*this* table) being created. It could be the same table if supported by the server.
2. Decide which columns of *this* table reference the *other* tables columns
3. Decide what should be the referential action for Delete. If cascading is required, set `RINTDesc.eDelOp = rintCASCADE`. (This is supported by ORACLE 7.x and Sybase System 10.)
4. Put this information in the `RINTDesc` structure.
5. Attach the `RINTDesc` to `CRTBLDesc.priIntDesc` pointer

There can be more than one referential (foreign key) integrity constraint.

Note: Some servers, such as InterBase 4.0, create an index on referencing columns of this table.

Schema retrieval/integrity constraints

Primary key: Any of index retrieval functions and check if `pidxDesc->bPrimary = TRUE`.

Foreign Key: Use BDE function `DbiGetRINTDesc`.

Modifying table structure

After a table has been created, the application can modify it using BDE functions in the following ways:

- Add, delete, or regenerate indexes
- Restructure the table

Adding indexes

The application can add an index to a table by calling [DbiAddIndex](#) and supplying the [IDXDesc](#) structure, with the appropriate fields filled in (the fields required vary by driver and index type). For a complete description of these fields by driver and index type, see [DbiAddIndex](#).

Deleting and regenerating indexes

The application can delete an index by calling [DbiDeleteIndex](#). The application can either specify the table by name or by opening a cursor on the table. The index to be deleted cannot be active.

The application can bring dBASE or Paradox indexes up to date by calling either of two BDE functions. [DbiRegenIndex](#) regenerates a single out-of-date index. [DbiRegenIndexes](#) regenerates multiple out-of-date indexes on a table. The application specifies the index name.

Restructuring a table

Currently, for Paradox and dBASE tables only, the application can call [DbiDoRestructure](#) to modify existing field types or sizes, add new fields, delete a field, rearrange fields, change indexes, security passwords, or referential integrity.

The application passes the table descriptor structure, [CRTblDesc](#).

Using callbacks

Sometimes an application needs to be notified of a specific type of database engine event in order to complete an operation or to provide the user with information. The advantage of using callbacks is that BDE can get a user's response without interrupting the normal application process flow.

The following rules must be strictly followed in a callback function:

- No other BDE calls can be made inside the callback function.
- BDE is not re-entrant during the callback function. The application must not yield to Windows within the callback function. For example, if the application displays a dialog box in Windows inside a callback function, the dialog box must be System Modal.

Types of callbacks

The application can choose to be notified of many different types of events, depending on which callback type it registers. The application can specify the following callback types in a call to DbiRegisterCallback.

Callback	Description
<u>cbGENPROGRESS</u>	Informs applications about the progress made during large batch operations.
<u>cbRESTRUCTURE</u>	Supplies information about an impending action and requests a response from the caller.
<u>cbBATCHRESULT</u>	Batch processing results.
<u>cbTABLECHANGED</u>	Notifies user that table has changed.
<u>cbCANCELQRY</u>	Allows user to cancel a query.
<u>cbINPUTREQ</u>	A BDE driver requests input from user.
<u>cbDBASELOGIN</u>	Enables clients to access encrypted dBASE tables.
<u>cbFIELDRECALC</u>	Field(s) recalculation
<u>cbTRACE</u>	Trace
<u>cbDBLOGIN</u>	Database login
<u>cbDELAYEDUPD</u>	Cached updates callback
<u>cbNBROFCBS</u>	Number of callbacks

Callback function declarations and associated parameter lists, function return types, and callback data types are defined in the header file IDAPI.H, which is the application interface to Borland Database Engine.

Return codes

The application responds to a callback by issuing a return code that commands an appropriate action:

Return code	Action description
cbrUSEDEF	Take default action
cbrCONTINUE	Continue
cbrABORT	Abort the operation
cbrCHKINPUT	Input given
cbrYES	Take requested action
cbrNO	Do not take requested action
cbrPARTIALASSIST	Assist in completing the job

Registering a general progress report callback

Suppose that an application must copy a million-record table, and you want to periodically display a progress report on screen indicating the progress of the copy operation. You would use the following procedure:

- 1 Write the body of the of the progress callback function, declaring it with an associated predefined parameter list:

```
typedef CBRTYPE far *pCBRTYPE;
typedef CBRTYPE (DBIFN * pfDBICallBack)
(
    CBType          ecbType,          // Callback type
    UINT32          iClientData,      // Client callback data
    pVOID           pCbInfo          // Call back info/Client
    Input
);
```

- 2 The application allocates memory for the buffer *pCbBuf* to be used for passing data back and forth from the application to the function, and pointing to a CBPROGRESSDesc structure.

```
typedef struct
{
    INT16          iPercentDone;      // Percentage done
    DBIMSG        szMsg;             // Message to display
} CBPROGRESSDesc;
typedef CBPROGRESSDesc far * pCBPROGRESSDesc;
```

- 3 To register a callback, the application calls DbiRegisterCallback passing `cbGENPROGRESS` as the value for `ecbType`.
- 4 The application issues a call to DbiBatchMove.
- 5 BDE returns either a percentage done (in the *iPercentDone* parameter of the `CBPROGRESSDesc` structure), or a message string to display on the status bar. The application can assume that if the *iPercentDone* value is negative, the message string is valid; otherwise, the application needs to consider the value of *iPercentDone*. The message string format is `<Text String><:><Value>` to allow easy international translations. For example: `Records copied: 250`
- 6 To continue processing the application returns the code `cbrUSEDEF`. The application can abort the BDE function call in progress by returning `cbrABORT`.

Data source independence

You can use these techniques to achieve data source independence:

- Qualify tablename through aliases defined in the configuration file (or by supplying fully qualified path names).
- Use only BDE logical data types.
- Use the generic subset of SQL supported by the shared query engine.

The application can determine which aliases are available to it by calling the BDE function DbiOpenDatabaseList. This function lists all of the database aliases in the configuration file (IDAPI.CFG).

Filtering records

This section is an overview of how to create an expression tree used in [DbiAddFilter](#). This is a fairly complex undertaking. You would want to write an expression tree only when you need to efficiently generate a highly constrained view of the data in a table, by qualifying multiple, *unindexed* fields. (If the fields were all indexed, you might be able to use [DbiSetToKey](#) more easily.)

A filter is a mechanism that lets you qualify the data that a cursor displays, relieving the application of the task of testing each record. For a basic example, let's say you want to open a customer table but display only those customers living in California. To use a filter to accomplish this, you can write your application to define a filter for a cursor open on the Customer table, where `customer.state= CA`. When the filter is activated, the BDE retrieves only those records that meet this condition, so your application can view and process only those records. For example, when your application calls [DbiGetNextRecord](#), any records where the customer is not a resident of California are skipped.

To define a filter, the application calls [DbiAddFilter](#), passing the cursor handle and the filter condition specification. The function returns the filter handle to the application. The [DbiAddFilter](#) parameter *pcanExpr* points to an expression tree of type `pBYTE`. The application can use the expression tree to specify the filter condition.

The advantage of using an expression tree to define a filter condition is that BDE can use it to optimize the filtering operation. The level of optimization depends on the driver's level of support for parsing the expression tree.

After defining the filter, the filter must be activated with [DbiActivateFilter](#).

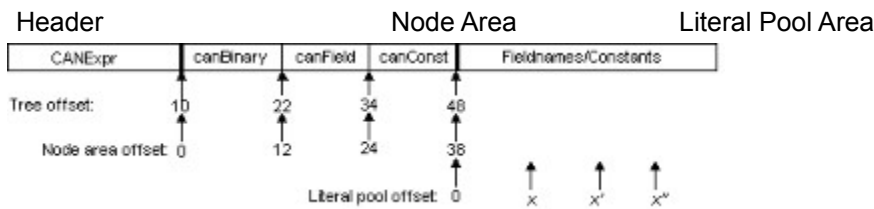
{button ,AL("filtering")} [Filtering topics](#)

Using an expression tree

An expression tree is a filter expression of type pBYTE cast as a pCANExpr. It is a three-part block of memory, consisting of:

- Header
A CANExpr structure defining size, number of nodes, and offsets.
- Node Area
A series of conditional (operator and operand) branches in the tree, "nodes," defining the filter's tree of conditions. Operand nodes point to offset locations of field names or constants stored in the literal pool area.
- Literal Pool Area
Used to store the field names pointed to by each field node and the constant values pointed to by each constant node.

Note that the header consists of a CANExpr structure 10 bytes in length, hence the Node Area begins at offset 10:

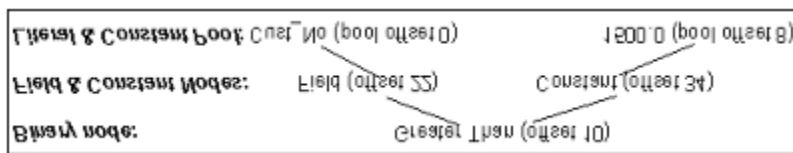


The first node in the node area is the `canBinary` specifying the operand:

- `canExpr.iFirstNode = 10` (where 10 is offset for entire expression tree)
- `canExpr.iLiteralStart = 48` (where 48 is offset for entire expression tree)
- `canBinary.Operand1 = 12` (where 12 is offset into Node Area)
- `canBinary.Operand2 = 24` (where 24 is offset into Node Area)
- `canField.iNameOffset = 0` (where 0 is offset into Literal Pool)
- `canConst.iOffset = strlen(<fieldName>)+1` (where the constant value appears just after the field name in the Literal Pool)

Example

Normally you would use an expression tree to tightly focus a view by using a tree of conditions that could be quite complex. For the sake of clarity, in this example, we want a simple filter to display only those records where "CUST_NO>1500". Our task is to create an expression tree `CUST_NO > 1500.00` to pass to `DbiAddFilter`. The following chart represents this expression tree:



The same expression tree is defined in C as a parameter to be passed to `DbiAddFilter`. The following example assumes that the compiler allocates consecutively declared variables in physically contiguous memory:

```

void
Filter (void)
{
    hDBIDb      hDb = 0;           // Handle to the database.
    hDBICur     hCur = 0;        // Handle to the table.
    DBIResult   rslt;            // Return value from IDAPI
functions.
    pBYTE       pcanExpr;        // Structure containing filter
info.
    hDBIFilter  hFilter;         // Filter handle.
    UINT16      uSizeNodes;      // Size of the nodes in the tree.
    UINT16      uSizeCanExpr;    // Size of the header information.
    UINT32      uSizeLiterals;   // Size of the literals.
    UINT32      uTotalSize;      // Total size of the filter
expression.
    UINT32      uNumRecs = 10;    // Number of records to display.
    CANExpr     canExp;          // Contains the header information.
    struct {
        CANBinary BinaryNode;
        CANField  FieldNode;
        CANConst  ConstantNode;
    }
    Nodes = {                    // Nodes of the filter tree.
    {
        // Offset 0
        nodeBINARY,              // canBinary.nodeClass
        canGT,                   // canBinary.canOp
        sizeof(Nodes.BinaryNode), // canBinary.iOperand1
        sizeof(Nodes.BinaryNode) + sizeof(Nodes.FieldNode), // canBinary.iOperand2
        // Offsets in the Nodes array
    },
    {
        // Offset sizeof(Nodes.BinaryNode)
        nodeFIELD,              // canField.nodeClass
        canFIELD,               // canField.canOp
        1,                       // canField.iFieldNum
        0,                       // canField.iNameOffset: szField is
the
        // literal at offset 0
    },
    {
        // Offset sizeof(Nodes.BinaryNode) + sizeof(Nodes.FieldNode)
        nodeCONST,              // canConst.nodeClass
        canCONST,               // canConst.canOp
        fldFLOAT,               // canConst.iType
        sizeof(fConst),         // canConst.iSize
        8,                       // canConst.iOffset: fconst is the
        // literal at offset
strlen(szField) + 1
    }
};
static const char szTblName[] = "cust"; // Name of the table
static const char szTblType[] = szDBASE; // Type of table
static const char szField[] = "CUST_NO"; // Name of the field for the
// third node of the tree.
static const DFLOAT fConst = 1500.0; // Value of the constant for
// the second node of the

```

tree.

{button ,AL("expressiontree")} Expression tree topics

Expression tree header

The expression tree header defines:

- the version tag of the expression
- the size of the tree structure
- the number of nodes in the node area
- the offset locations of the first node and the beginning of the literal pool.

The header is in this form:

```
#define CANEXPRVERSION 2
typedef struct{
    UINT16 iVer;
    UINIT16 iTotalsize;
    UINT16 iNodes;
    UINT16 iNodeStart;
    UINT16 iLiteralStart;
} CANExpr;
typedef CANExpr far *pCANExpr;
typedef pCANExpr far *ppCANExpr;
```

{button ,AL("expressiontree")} [Expression tree topics](#)

Expression tree node area

Each node forms a branch of the tree and defines a condition. Nodes can define either operators or operands.

Operand nodes store the offset of field names or constants within the Literal Pool Area. The values are stored in the literal pool. A field node points to the offset location of a field name containing a literal, that is, the actual character string of the fieldname, which must be zero-terminated. A constant node points to a constant value within the literal pool.

Operator nodes are of different types:

- Relational
- Logical
- Arithmetic
- Miscellaneous

{button ,AL("expressiontree")} Expression tree topics

Operator nodes, relational

Enumerated type	Description
canISBLANK	Unary; blank operand
canNOTBLANK	Unary; non-blank operand
canEQ	Binary; equal to
canNE	Binary; not equal to
canGT	Binary; greater than
canLT	Binary; less than
canGE	Binary; greater than or equal to
canLE	Binary; less than or equal to

Operator nodes, logical

Enumerated type	Description
canNOT	Unary; NOT
canAND	Binary; AND
canOR	Binary; OR

Operator nodes, arithmetic

Enumerated type	Description	SQL support
canMINUS	Unary; minus	Not supported by all SQL drivers
canADD	Binary; addition	Not supported by all SQL drivers
canSUB	Binary; subtraction	Not supported by all SQL drivers
canMUL	Binary; multiplication	Not supported by all SQL drivers
canDIV	Binary; division	Not supported by all SQL drivers
canMOD	Binary; modulo division	Not supported by all SQL drivers
canREM	Binary; remainder of division	Not supported by all SQL drivers

Operator nodes, miscellaneous

Enumerated type	Description
canCONTINUE	Unary; stops evaluating records when operand evaluates to false (provides a stop at the high range of the filter value)

Operator nodes point to the offsets of their operand nodes. See the sample expression tree in [Literal Pool Area](#) where binary operands cause the tree to branch.

Literal pool area

The literal pool is used to store the field names pointed to by each field node and the constant values pointed to by each constant node. Field names contain literals. Constant values must be represented in BDE logical types only.

For example, the following Boolean condition is represented as an expression tree parameter, and then as a chart:

```
CUST_NO <= 1500 AND CUST_NO >= 1300
```

Expression Tree

The following example assumes that the compiler allocates consecutively declared variables in physically contiguous memory:

```
static const char szTblName[] = "cust";      // Name of the table
static const char szTblType[] = szDBASE;    // Type of table
static const char szField[]   = "CUST_NO";  // Name for the first field
node
static const char szField2[]  = "CUST_NO";  // Name for the second field
node
static const DFLOAT fConst   = 1500.0;     // Value of the first constant
node
static const DFLOAT fConst2  = 1300.0;     // Value of the second constant
node
```


}};

Chart

The chart below represents the same Boolean expression: CUST_NO <= 1500 AND CUST_NO >= 1300
(Note that the offsets are shown in parentheses.)

Header: -----

Binary node:			AND (0)		
Binary nodes:		LE (12)		GE (50)	
Constant & field nodes:	FIELD (24)	CONST (36)		FIELD (62)	CONST (74)
Literal / constant pool:	CUST_NO (0)	1500 (8)		CUST_NO (16)	1300 (24)

{button ,AL("expressiontree")} [Expression tree topics](#)

Database driver characteristics

The Borland Database Engine (BDE) requires a separate driver to support each database format or data source. Standard database drivers for dBASE, Paradox, and Text databases are included with BDE. To extend BDE to support additional SQL database systems, you must install the appropriate Borland SQL Links driver.

These sections provide additional information about specific driver types that you may use.

- [SQL Drivers](#)
- [Paradox Driver](#)
- [Text Driver](#)

SQL drivers

All BDE drivers for SQL servers share common services including record navigation, record caching, record editing, and server query management. Only about twenty percent of the services are driver specific, addressing driver capabilities, data types and data translations, transaction control, server specific query creation and server calls.

All SQL drivers are fully described in [SQL Links Guide](#)

Click here for topics on using BDE with SQL drivers:

`{button ,AL("sqldrivers")}` [SQL driver topics](#)

Passthrough SQL

The native SQL dialect of the SQL server can be passed directly to the server, as long as the appropriate BDE driver is installed. These passthrough SQL queries can be executed directly by using [DbiQExecDirect](#) or in stages. See [Querying Databases](#)

The SQLPASSTHRU MODE parameter of the BDE configuration file allows you to specify whether passthrough and non-passthrough SQL operations can share the same connection. It also allows you to specify whether you want passthrough SQL to be autocommitted or not (if the connection is shared). When passthrough and non-passthrough SQL operations share the same connection, transaction control statements should not be executed in passthrough SQL. Instead, use [DbiBeginTran](#) and [DbiEndTran](#).

Update of Simple Unidirectional SQL Passthrough Queries

Certain SQL servers support these dynamic SQL statements:

```
UPDATE ... WHERE CURRENT of CursorName
DELETE ... WHERE CURRENT of CursorName
```

BDE supports this syntax, provided that it is also supported by the server.

Use the statement property stmtCURSORNAME (defined in the header file IDAPI.H) to set or get the cursor name from the passthrough SELECT statement and use it in the UPDATE statement. For example:

```
...
DbiQPrepare(hDb,
            qrylangSQL,
            "SELECT * FROM FOO FOR UPDATE OF f1",
            &hStmt);

// set the cursor name for the SELECT statement
DbiSetProp(hStmt,
           stmtCURSORNAME,
           pszCursorName);

// set unidirectional cursor
DbiSetProp(hStmt,
           stmtUNIDIRECTIONAL,
           TRUE);

// execute the SELECT stmt
DbiQExec(hStmt,
         &hCur);

// fetch a record
DbiGetNextRecord(hCur,
                 dbiNOLOCK,
                 pRecBuf,
                 NULL);

// Note that we use DbiQExecDirect to execute the UPDATE
// statement in this example.
// DbiQPrepare/DbiQExec/DbiQFree can be used instead of
// DbiQExecDirect to execute the UPDATE

sprintf(pszQuery,
        "UPDATE foo SET f1 = 'X' WHERE CURRENT of %s",
        pszCursorName);
```

```

// update the current record
DbiQExecDirect(hDb,
               qrylangSQL,
               pszQuery,
               NULL);

// free the SELECT stmt
DbiQFree(&hStmt);

// close the SELECT cursor
DbiCloseCursor(&hCur);
...

```

Certain drivers require that you set the cursor name BEFORE the SELECT statement is executed (as in the above example). Other drivers do not require you to explicitly set the cursor name and will generate one for you. If the server generates a cursor name, you can retrieve that name by calling `DbiGetProperty` AFTER the SELECT statement has been executed. As always, when using passthrough SQL, you must know the native syntax supported by the back end server.

Where not supported, the function `DbiSetProp` with `stmtCURSORNAME` will return `DBIERR_NOTSUPPORTED`.

InterBase

The InterBase SQL Link driver must close cursors when transactions end (COMMIT/ABORT occurs). When this happens, the remaining rows are read from the server and cached locally. This means that a COMMIT/ABORT can cause you to lose your current cursor position, and a subsequent UPDATE ... WHERE CURRENT can update the WRONG row. For this reason, you must be certain that a COMMIT/ABORT does not cause SQL Link to prematurely close the server cursor.

There are two ways to guarantee this:

- 1) Set your `SQLPASSTHRU MODE` to `NOT SHARED`. In this mode, all passthrough statements are performed on a separate connection and will NOT be autocommitted.
- 2) If your `SQLPASSTHRU MODE` is either `SHARED AUTOCOMMIT` or `SHARED NOAUTOCOMMIT`, passthrough and non-passthrough statements share the same connection. Operations performed within an explicit transaction (that is, within the `DbiBeginTran/DbiEndTran` block) are never autocommitted.

{button ,AL("sqldrivers")} [SQL driver topics](#)

SQL transaction control

To control explicit transactions, use [DbiBeginTran](#) and [DbiEndTran](#). Except for explicit transactions, the BDE isolation level is Read Committed, with auto-committed modifications. Some SQL drivers support only the server default isolation level inside of an explicit transaction. To verify the actual isolation level used, call [DbiGetTranInfo](#) after a successful call to [DbiBeginTran](#).

Example 1: No explicit transaction

The SQL driver automatically starts a server transaction if necessary:

```
DbiGetNextRecord (hCursor, dbiWRITELOCK, &myRecBuff, NULL);
```

The application changes the record buffer data:

```
DbiModifyRecord (hCursor, &myRecBuff, TRUE);
```

If the record modification succeeds, it is automatically committed to the database.

Example 2: Explicit transaction used

The application uses a transaction:

```
DbiBeginTran (hDb, xilREADCOMMITTED, NULL);
```

The SQL driver starts a server transaction:

```
DbiGetNextRecord (hCursor, dbiWRITELOCK, &myRecBuff, NULL);
```

The application changes the record buffer data:

```
DbiModifyRecord (hCursor, &myRecBuff, TRUE);
```

The application can make more changes in the transaction:

```
DbiEndTran (hDb, NULL, xendCOMMIT);
```

The SQL driver commits the server transaction.

Transaction isolation levels

Extended transaction isolation levels are supported. If an unsupported isolation level is specified in [DbiBeginTran](#), the next-highest supported isolation level is used. If the requested isolation level is higher than any supported isolation level, then an error is returned (DBIERR_NOTSUPPORTED). The highest level (most isolated) level is Repeatable Read, then Read Committed, and finally Dirty Read. As always, you can verify the actual isolation level that was used by calling [DbiGetTranInfo](#).

This database property is used with [DbiGetProp](#) to retrieve the server's default transaction isolation level:

```
dbDEFAULTTXNISO, ro eXILType      Server's default transaction isolation level
```

Compatibility

InterBase

Supports Repeatable Read and Read Committed. The wait mode is set to NO WAIT.

Sybase

Supports only the server default, Read Committed.

Oracle

Supports Read Committed and Repeatable Read. However, a Repeatable Read transaction is always READ ONLY.

The following table shows the changes from previous versions of BDE.

REQUESTED Isolation Level	ACTUAL ISOLATION LEVEL USED	
	pre-BDE 2.5	BDE 2.5
Sybase:		
DirtyRead	ReadCommitted	ReadCommitted
ReadCommitted	ReadCommitted	ReadCommitted
RepeatableRead	ReadCommitted	DBIERR_NOTSUPPORTED

Oracle:

DirtyRead	ReadCommitted	ReadCommitted
ReadCommitted	ReadCommitted	ReadCommitted
RepeatableRead	ReadCommitted	RepeatableRead (READ ONLY)

InterBase:

DirtyRead	RepeatableRead	ReadCommitted
ReadCommitted	RepeatableRead	ReadCommitted
RepeatableRead	RepeatableRead	RepeatableRead

You can maintain compatibility with pre-BDE 2.5 behavior by setting the DRIVER FLAGS parameter in the BDE configuration file. All SQL drivers have a field called DRIVER FLAGS in the DRIVER INIT section. To obtain pre-BDE 2.5 transaction behavior, set the bit corresponding to 0x0200 (512 decimal).

{button ,AL("sqldrivers")} [SQL driver topics](#)

SQL connection

BDE connects to the SQL server database by using the following guidelines:

- BDE uses the server authorization scheme. The password is used in DbiOpenDatabase to connect to the server.
- Most BDE features require an open database, with the exception of retrieving driver capabilities, such as data-types information.
- Transactions and passthrough operations are done in the database context.

SQL record caching

Two caching mechanisms are used:

- Live Caching
Done for a cursor, if possible.
- Dead Caching
Used if live caching cannot be done.

{button ,AL("sqldrivers")} SQL driver topics

Live caching

Live caching provides fuller BDE support than dead caching. It can be fast or slow, depending on other factors. Live caching is used by default if an index or row ID exists, but only for tables, not queries. With `DbiOpenTable`, `iIndexId` can be set to `NODEFAULTINDEX` to force dead caching even though an index or row ID exists.

The following general rules apply to live caching:

- Data tends to be fresh. The fastest index is chosen automatically if none is specified during table open.
- A partial cache is kept, ordered by index. The cache contains the current cursor row, plus the last several rows fetched.
- Live caching allows cache refresh. Refresh can be done manually via `DbiForceReread` and is done automatically if the cursor moves around.
- Live caching allows key-oriented operations, such as `DbiSetRange` and `DbiSetToKey`.

Record caching example: live

A Customer table with unique or non-unique index on ID field.

<u>ID</u>	<u>Name</u>
10000	John
11001	Mary
12321	Harry
12345	Beth
12666	Joe

The SQL driver finds some basic information about the table structure, but no data is retrieved:

```
DbiOpenTable (  
    hDb,  
    "Customer",  
    NULL,  
    "IdIndex",  
    ...,  
    &hCursor ...);
```

The SQL driver sets up for data retrieval:

```
UINT16 myKey = 12321;  
DbiPutField (hCursor,  
    1,  
    &myRecBuff,  
    &myKey);  
DbiSetToKey (hCursor,  
    keySEARCHGEQ,  
    FALSE,  
    1,  
    0,  
    &myRecBuff);
```

The SQL driver query:

```
SELECT Id, Name  
FROM Customer  
WHERE Id >= 12321  
ORDER BY Id  
DbiGetNextRecord (...)
```

The SQL driver caches a row:

<u>ID</u>	<u>Name</u>
-----------	-------------

12321 Harry
 DbiGetNextRecord (...)
 DbiGetNextRecord (...)

The SQL driver caches more rows:

<u>ID</u>	<u>Name</u>
12321	Harry
12345	Beth
12666	Joe

 DbiGetPriorRecord (...)

The SQL driver uses a cache, rather than the server:

 DbiSetToBegin (...)

The SQL driver terminates the query and clears the cache:

<u>ID</u>	<u>Name</u>
-----------	-------------

No data in the cache

Dead caching

Dead caching may be used when live caching is not possible. With dead caching, the data may not be fresh. The following rules apply to dead caching:

- Dead caching is used
 - for passthrough queries; or
 - if no ordering exists; and
 - provided that the statement property stmtLIVENESS is not set to wantLIVE
- Dead caching is used for DbiOpenTable if no index is available and the server does not support row IDs, or if iIndexId is set to NODEFAULTINDEX with DbiOpenTable.
- Dead caching keeps a full client snapshot cache. As records are read from the server, they are stored locally in case they are needed again.
- Dead caching provides no cache refresh. You must close and re-open the table, or re-execute a query to see new data.
- Since there is no key, key operations (such as DbiSetRange and DbiSetToKey) are not supported. Other navigation functions such as DbiSetToBookMark are supported.

Record caching example: dead

The SQL driver finds some basic information about the Customer table structure, but no data is retrieved:

<u>ID</u>	<u>Name</u>
11001	Mary
10000	John
12666	Joe
12321	Harry
12345	Beth

```
DbiOpenTable (  
    hDb,  
    "Customer",  
    NULL,  
    NULL,  
    ...,  
    &hCursor ...);
```

```
DbiGetNextRecord (...)
```

The SQL driver executes a query:

```
SELECT Id, Name  
FROM Customer
```

The SQL driver caches a row:

<u>ID</u>	<u>Name</u>
11001	Mary

```
DbiGetNextRecord (...)
```

The SQL driver caches another row:

```
DbiGetPriorRecord (...)
```

The SQL driver uses a cache:

```
DbiSetToBegin (...)
```

The SQL driver leaves the query and cache alone:

<u>ID</u>	<u>Name</u>
11001	Mary
10000	John
12666	Joe

iIndexId*iIndexId*

Type: UINT16 (Input)

Specifies the index identifier, which is the number of the index to be used. The range for the index identifier is 1 to 511. Used for Paradox tables only and is ignored if pszIndexName is specified.

SQL record modification requirements

The following requirements must be met to modify a record:

- The server must allow each operation. Security and capability are important: server views may not allow changes, and different types of modification are authorized separately.
- Views support insert, modify, and delete if allowed by the server. Queries do not support modifications.
- Record modifications performed within an explicit client transaction may require that a unique index or server ROWID exists on the table. For example, both [DbiSetRange](#) and [DbiGetRecordForKey](#) require a current index. However, BDE supports the ability of SQL data sources to order records by any field without using an index on the server. A current index (for SQL data sources) can be defined as any group of fields from a specific table, whether or not a corresponding index exists on the server. BDE creates a pseudo-index by using one or more user-specified SQL fields to define the requested order.

For information on implementing pseudo-indexes, see [DbiOpenTable](#) or [DbiSwitchToIndex](#).

{button ,AL("sqldrivers")} [SQL driver topics](#)

SQL record modification behavior

The following characteristics describe record modification behavior:

- All current record modifications use optimistic locking. An optimistic lock must be explicitly requested, but the lock request does not attempt to explicitly lock the record on the server.
- Except for an explicit client transaction, all modifications are singleton operations. This means that upon successful completion, each modification is autocommitted.
- Transaction or batch request overrides singleton behavior.

Record Modification Example

The SQL driver saves a copy of the record as an optimistic lock. The application changes the record buffer data:

```
DbiGetNextRecord (hCursor, dbiWRITELOCK, &myRecBuff, NULL);
```

The SQL driver uses the saved record copy to find and modify the data:

```
DbiModifyRecord (hCursor, &myRecBuff, TRUE);  
UPDATE Customer  
SET Name = "Harold"  
WHERE Id = 12321 AND Name = "Harry"
```

Then the SQL driver verifies the resulting rows changed:

- If one row changed, optimism has paid off.
- If no rows changed, the optimistic lock was broken.
- If more than one row changed, there was no unique index and the optimistic lock was broken.

SQL record-locking behavior

SQL servers automatically and transparently lock data as required, although different SQL servers vary in the type of lock used, and how granular the lock is. For example, some servers provide individual record locks, while others can only lock a group, or page, of records. Also, some servers provide automatic record versioning or database snapshots so that other copies of data being modified can be read by clients instead of waiting for a modification to finish.

In addition to the automatic locking that SQL servers provide, SQL drivers provide a particular type of record locking called optimistic locking. Optimistic locking allows a client to make changes to a local copy of the record without the performance and concurrency penalty incurred by asking the server for a lock over the modification duration. When the client modifications are finished, the current SQL server record is first checked to make sure no changes have occurred to the record, then the modifications are completed. The operation is said to be optimistic because it assumes that no other client will change the record, but then makes sure of that as the final change is sent to the SQL server.

If the record was changed, an optimistic lock failure occurs. The client is notified that the requested operation cannot be performed because someone else has changed the data. The client can then inspect the new data and decide whether or not to make changes at that time.

Because server data cached on the client can immediately become out of date at the server, SQL drivers always perform optimistic locking. This protects the client against inadvertently changing data that has never been inspected.

Keyed Updates

Keyed updates give you more control over optimistic record locking for improved performance. You can control which columns are placed in the WHERE clause of an UPDATE or DELETE statement generated by calls to [DbiModifyRecord](#) or [DbiDeleteRecord](#).

You can set and retrieve the SQL-specific cursor property curUPDLOCKMODE by using [DbiGetProp](#) and [DbiSetProp](#). This property is valid for all SQL Link drivers and the ODBC Socket.

The following enumeration defines the options:

```
typedef enum
{
    updWHEREALL,
    updWHEREKEYCHG,
    updWHEREKEY
} UPDLockMode;
```

updWHEREALL

All fields (except blobs) are placed in the WHERE clause of the update or delete statement for [DbiModifyRecord](#) or [DbiDeleteRecord](#). This is the default when a cursor is returned. The behavior is identical to current "optimistic record locking" behavior.

updWHEREKEY

If a unique index exists, only those fields in the key are placed in the WHERE clause of the update or delete statement for [DbiModifyRecord](#) and [DbiDeleteRecord](#). The key that is used is based on the active index. If the active index is a unique index, then it will be used. Otherwise the driver will pick the "best" unique index. (Note: For Oracle, it will pick the special column, ROWID). If there is no unique index, then all fields are placed in the WHERE clause and the behavior is identical to updWHEREALL.

updWHEREKEYCHG

Similar to updWHEREKEY except that changed fields (as well as indexed fields) are placed in the WHERE clause.

WARNING: When using updWHEREKEY or updWHEREKEYCHG, it is possible to overwrite other users' updates. Therefore you should use this feature only when you **know** that overwrites will not be a problem.

{button ,AL("sqldrivers")} SQL driver topics

SQL table-locking behavior

The SQL driver provides a degree of support for table locking if the SQL server supports it. Different SQL servers provide different levels of support for table locking. Some servers provide no table locking support at all. Others only provide support for read-only locking (many clients can share a lock and all can read). Some SQL servers provide support for locking, but require the client to wait until a lock is granted, rather than letting the client know immediately if the lock could not be achieved. For information on locking support provided by your SQL server, see your server documentation.

SQL servers that support table locks maintain a lock within the context of a transaction: a lock can only be acquired within a transaction, and only released by terminating the transaction. This is sometimes referred to as a two-phase locking protocol. When the SQL driver is asked to acquire a table lock, it automatically starts a transaction if necessary. When asked to release a table lock, the SQL driver must commit the transaction in order to release the lock. Because a transaction commit releases all locks, the SQL driver automatically re-acquires any remaining locks.

Note: If a table lock is held when a commit becomes necessary, a time window exists in which the lock is not held and unanticipated changes can occur. For this reason, it is recommended that all table locks be released together when the last lock is needed, or that explicit SQL transactions be used instead of table locking.

{button ,AL("sqldrivers")} [SQL driver topics](#)

SQL asynchronous queries

SQL Links can cancel long-running queries if the server supports asynchronous query submission. Verify that your SQL Link driver currently supports asynchronous query execution on Windows.

Use the dbASYNCSUPPORT database property with [DbiGetProp](#) to inquire whether a driver supports asynchronous queries:

```
dbASYNCSUPPORT , ro BOOL    Does the driver support
                             asynchronous query execution?
```

There are two options to asynchronous query submission/cancel:

- 1) The query cancels because it exceeds the maximum time allowed.
- 2) The query completes normally.

The parameter MAX QUERY TIME in the BDE configuration file (IDAPI.CFG) is a DB OPEN parameter. It is available for SQL Links drivers that support this feature, such as those for Sybase and Microsoft SQL Server.

You can use the BDE Configuration Utility to set MAX QUERY TIME for the maximum amount of time (seconds) you want to wait for a query to finish executing. (The default value is 3600 seconds, or one hour.) If this time limit is exceeded, the query is cancelled. When a query is successfully cancelled, DBIERR_CANCEXCEPT "Query cancelled" is returned.

{button ,AL("sqldrivers")} [SQL driver topics](#)

SQL performance tips

The following tips are suggested to help reduce unnecessary processing, and speed up performance:

- Use passthrough SQL for complex queries or stored procedures.
- You can bypass BDE functions and make direct calls using the native SQL API. Use [DbiGetProp](#) to get [native handles](#).
- Use the server to minimize the size of the returned result set.
- Return results into a local table for processing.
- Use [DbiAddFilter](#), [DbiSetRange](#), and [DbiSetFieldMap](#) before data access to limit the number of records accessed.
- Create a descending index if backwards navigation is done frequently.
- Avoid moving toward the beginning of the table except within a small cache range.
- Avoid using [DbiSetToEnd](#) and [DbiSetToKey](#) in the middle of large tables or when the table is ordered on a composite index.

See also:

[Improving BDE performance](#)

A few general suggestions for maximizing BDE's performance in accessing tables.

{button ,AL("sqldrivers")} [SQL driver topics](#)

Paradox driver

The Paradox driver supports both descending and unique secondary index types and default values ("NOW") for the time stamp and time fields.

Descending and unique secondary index types

You can use composite indexes where some fields are ascending and others are descending.

The descending and unique secondary index types share these characteristics :

- Both index types require Table Level 7.
- At table creation time the table level is automatically upgraded to level 7 if:
 - a) any of these index types are requested, *and*
 - b) no lower table level is specified as an optional parameter (DBIERR_TABLELEVEL).
- If adding the index to a table with a lower table level, the error returned is DBIERR_TABLELEVEL.
- DBIERR_TABLELEVEL error code replaces DBIERR_OLDVERSION whenever a higher table level is required.
- Both index types share the characteristics of "Composite secondary indexes." They require a unique index name and so on.
- The Descending and Unique options can be mixed with each other, as well as with the *bMaintained*, and *bCaseInsensitive* options.
- In case of duplicate fields, the indexes must be distinguished by at least one of these options:
 - bUnique*
 - bCaseInsensitive*
 - bDescending* (not *bMaintained*)

Note: If two indexes are distinguished only by the *bUnique* option, they will in effect be equivalent, but is still accepted.

Descending secondary indexes

The IDXDesc structure includes this boolean array :

```
BOOL16          abDescending [DBIMAXFLDSINKEY] ;
```

The *abDescending* array indicates which fields in a composite secondary index are descending (TRUE). Thus, in a composite key, if *abDescending[i]* is TRUE--where 'i' is the index to *aiKeyFlds[]*--then the *aiKeyFld[i]* is descending.

This array is ignored if:

- The existing boolean *bDescending* is FALSE.
- The index has only one field.

If you have an index with only one field, (and if *bDescending* is TRUE), then you do not need to specify TRUE in *abDescending[0]*. In that case, *bDescending* counts for everything and *abDescending* is ignored. This rule is consistent with previous semantics (for dBASE descending indexes).

There are no other restrictions on how ascending and descending can be mixed. You may improve performance slightly if you do not specify a descending index.

Unique secondary indexes

The *bUnique* option enables the creation of unique secondary indexes.

- At table create time: upgrades the table to level 7
- At add index time: requires the fields in the unique index to be unique already, otherwise it will fail. No error table is generated for the records that contain the non-unique field values.
- At restructure time: If the fields are not unique, restructure will fail, and will *not* generate an error table for records containing non-unique field values.

Valchecks

Valchecks are default values for TIME and TIMESTAMP. Similar to specifying "TODAYVAL" for a default value for a date field. You can specify 'NOW' for the default value for a TIME and TIMESTAMP field.

- This has an effect only at DbInitRecord time, where the 'current' time or timestamp will be substituted.
- This feature is supported only for table level 7 or higher.
- At create table or restructure table time: if the table level is less than 6, the function will fail with DBIERR_TABLELEVEL.
- The table will NOT be automatically upgraded.
- For table level 7 tables, up to 255 VCHKDesc's may be supplied at table create time. For lower table levels, the number is 64. If more are supplied, the function returns DBIERR_TABLELEVEL.

Record locks

The maximum number of record locks on a shared Paradox table is 255.

Text driver

The text driver allows BDE clients to access text files. The text driver allows BDE clients to access text data directly without first importing into a table format. By using this driver, the application developer can build a more efficient import/export utility. Filters can be set on the cursors that are opened on the text files to import/export only those records that satisfy the filter's criteria.

When you open a text table, you can provide the field descriptor information by calling the function `DbiSetFieldMap` to set a field map or you can bind external schema to text tables:

- [Field Maps](#)
- [Binding External Schema to Text Tables](#)

Creating a text file with `DbiCreateTable`

A text file can be created by using `DbiCreateTable`. The developer supplies only table name and driver type values in the `CRTblDesc` descriptor; the rest of the field values are ignored. `DbiCreateTable` creates a file with the given name; no field descriptions are necessary.

Opening, importing and exporting text files

`DbiOpenTable` can be used to open a text file for import/export. The file can be opened as a delimited text file or as a fixed length text file.

Example 1: Opening a delimited text file

In this example, the text file `DBASE.TXT` is opened as a delimited text file. The quotation mark (") is the delimiter character and comma is the field separator character.

```
DbiOpenTable (hDb, "DBASE.TXT", "ASCIIDRV-\\"-," , NULL, NULL, 0,
dbiREADWRITE, dbiOPENEXCL, xltNONE, FALSE, NULL, &hCursor);
```

The `pszDriverType` argument of `DbiOpenTable` is used to indicate the field separator and the delimiter characters. The field separator and delimiter characters are passed through the `pszDriverType` argument as shown below:

```
"ASCIIDRV-<Delimiterchar>-<FieldSeparator>"
```

The field separator character separates the text file field values. The delimited character surrounds the text field types (alphanumeric or character) in the text file.

Example 2: Opening a fixed length text file

In this example, the text file `DBASE.TXT` is opened as a fixed length text file:

```
DbiOpenTable (hDb, "DBASE.TXT", "ASCIIDRV", NULL, NULL, 0,
dbiREADWRITE, dbiOPENEXCL, xltNONE, FALSE, NULL, &hCursor);
```

When opening a fixed-length text file, no delimiter and separator characters are passed along with the `pszDriverType` argument.

Field maps

Because no description of the fields is available when a text file is created, it is a good practice to set a field map on the cursor that is opened on that text file. The text driver uses this field map to interpret the data types of the fields in that text file.

When you open a text table, you can provide the field descriptor information by using the `DbiSetFieldMap` call. dBASE and Paradox go through the following steps in setting the field description information for a text table.

- 1 Obtains the field descriptors of the source/target table by using the function call [DbiGetFieldDescs](#).
- 2 Obtains equivalent physical field descriptors of the text driver by using the call [DbiTranslateRecordStructure](#).
- 3 Sets the field descriptor information on the text table by using the call [DbiSetFieldMap](#).

If no field maps are set, the following behavior is expected:

The text file exists and has records:

<u>Fixed-length Text</u>	<u>Delimited Text</u>
<code>iFlds = 1</code>	<code>iFlds = Calculated using the first record</code>
<code>fldType = CHAR</code>	<code>fldType = CHAR</code>
<code>fldLen = Calculated using first record</code>	<code>fldLen = (4k/iFlds) && less than 255.</code>

The text file does not exist and has no records:

<u>Fixed -length Text</u>	<u>Delimited Text</u>
<code>iFlds = 1</code>	<code>iFlds = 1</code>
<code>fldType = CHAR</code>	<code>fldType = CHAR</code>
<code>fldLen = 255</code>	<code>fldLen = 255</code>

When a field map is set on a cursor that is opened as a text table, the source field descriptors (or destination field descriptors when importing) must be converted into text driver type descriptors. This step is necessary because some data types (for example, `DBIDATE`) have different field lengths in different driver types (for example, in Paradox, a `DATE` field is of four bytes long, while in dBASE a `DATE` field is eight bytes long).

The [DbiTranslateRecordStructure](#) call can be used to convert the logical or physical fields of a given driver type (that is, Paradox or dBASE) to the physical fields of the text driver. Then those physical text fields should be used in the [DbiSetFieldMap](#) call. When a field map is set on a text table, the `iFldType`, `iFldNum`, `iUnits1`, `iUnits2` and `iLen` elements should be set correctly in all the field descriptors.

Note: The Text driver supports files with field names in the first record because many applications export ASCII files with field names in the first line.

After a field map is set on the Text driver, [DbiBatchMove](#) can be used to import and export data to and from the text files. Refer to the online [SnipIt code Import and Export examples](#).

Alternatively, you can bind schema information to a text table by storing the schema information of that text table in another text file. See [Binding External Schema to Text Tables](#)

Binding external schema to text tables

Although you can set the field descriptors on text tables for use with export/import utilities, the BDE text driver can bind an external schema information to text tables. You bind schema information to a text table by storing the schema information of that text table in another text file.

The extension of the text file containing the schema information will be "sch". Thus, the name of the text file containing the schema information of the text table xxx.txt will be xxx.sch. If the text table has an extension other than "txt", extension of the schema file would still be "sch".

Schema File

All information in the schema file is case-insensitive.

Here is a sample schema file:

```
[CUSTOMER]                // File name with no extension.
FILETYPE = VARYING        // Format: VARYING or FIXED
CHARSET = ascii           // Language driver name.
DELIMITER = "             // Delimiter for char fields.
SEPARATOR = ,             // Separator character
Field1 = Name,CHAR,12,0,0 // Field information
Field2 = Salary,FLOAT,8,2,12
```

The schema file has a format similar to Windows INI files. The file begins with the name of the table in brackets. The second line specifies the file format following the keyword FILETYPE: FIXED or VARYING.

FIXED format file

Each field always takes up a fixed number of characters in the file, and the data is padded with blanks as needed.

VARYING format file

Each field takes a variable number of characters, each character field is enclosed by DELIMITER characters, and the fields are separated by a SEPARATOR character. The DELIMITER and SEPARATOR must be specified for a VARYING format file, but not for a FIXED format file.

The CHARSET attribute specifies the name of the language driver to use. This is the base filename of the .LD file used for localization purposes.

The remaining lines specify the attributes of the table's fields (columns). Each line must begin with "Fieldx = ", where x is the field number (that is, Field1, Field2, and so on).

Next appears a comma-delimited list specifying:

- Field name. Same restrictions as Paradox field names.
- Datatype. The field data type. See below.
- Number of characters or units. Must be <= 20 for numeric data types. Total maximum number of characters for date/time datatypes (including / and : separators).
- Number of digits after the decimal (FLOAT only).
- Offset. Number of characters from the beginning of the line that the field begins. Used for FIXED format only.

The following data types are supported:

```
CHAR      - Character
FLOAT     - 64-bit floating point
NUMBER    - 16-bit integer
BOOL      - Boolean (T or F)
LONGINT   - 32-bit long integer
DBIDATE   - Date field. Format specified in Registry
```

TIME - Time field. Format specified in Registry
TIMESTAMP - Date/Time field. Format specified in Registry

Note: You specify date and time formats by using the BDE configuration utility.

Example 1: VARYING format file

CUSTOMER.SCH:

```
[CUSTOMER]
Filetype=VARYING
Delimiter="
Separator=,
CharSet=ascii
Field1=Customer No,Float,20,04,00
Field2=Name,Char,30,00,20
Field3=Phone,Char,15,00,145
Field4=First Contact,Date,11,00,160
```

CUSTOMER.TXT:

```
1221.0000,"Kauai Dive Shoppe","808-555-0269",04/03/1994
1231.0000,"Unisco","809-555-3915",02/28/1994
1351.0000,"Sight Diver","357-6-876708",04/12/1994
1354.0000,"Cayman Divers World Unlimited","809-555-8576",04/17/1994
1356.0000,"Tom Sawyer Diving Centre","809-555-7281",04/20/1994
```

All the BDE API functions work with the text driver. To support external schema binding, the text driver includes the database property dbUSESCHEMAFILE applicable only to the text driver.

If the dbUSESCHEMAFILE property is set to true at the time of an export to a text table, the schema information of that text table is stored in a schema file. The DbiBatchMove function is used in exporting data to a text file. DbiBatchMove automatically stores the schema information while copying the data to a text table.

If the dbUSESCHEMAFILE flag is set to TRUE at the time of an import and a schema file exists for the text table, the text driver gets the field descriptors from the schema text file and sets them as the default fields for that text table. If the dbUSESCHEMAFILE flag is not set, you should define the field descriptions of the text table by using the function DbiSetFieldMap.

{button ,AL("textdriver")} Text driver topics

Error handling

BDE functions return error codes to inform the calling program if the function succeeded or failed. The return value is DBIERR_NONE when the function was successful. If an error occurs during the execution of a BDE call, any of the BDE subsystems may push an error context onto the common BDE error stack. This error context allows the application to examine potentially more detailed information about the cause of any error.

Several BDE functions enable the application to retrieve different levels of information about errors:

Error function	Level of information returned
<u>DbiGetErrorEntry</u>	Allows any entry on the error stack to be returned. This is the only function that returns native server error codes for SQL drivers.
<u>DbiGetErrorString</u>	When the application passes the error code, this function returns a more detailed message; for example, "At end of table."
<u>DbiGetErrorContext</u>	Pass it an error context type, such as "ecTABLENAME," and it returns specific information; in this case, the full path name of the table involved in the error.
<u>DbiGetErrorInfo</u>	Returns the error code, descriptive error message, and error contexts for the first four error messages on the error stack.

For more specific instructions on using error messages, see the following topics:

{button ,AL("errorhandling")} [Error handling topics](#)

Using DbtGetErrorEntry to access the error stack

Every error generated as a result of a BDE function call goes onto an error stack. Error stack entries begin with 1. Each stack entry contains a DBIERR code, and possibly a native server error code and a native server error message. (The only way for the application to get native server errors is to access the error stack.)

The application can access the error stack by calling DbtGetErrorEntry. This function returns the error code and description of a specified error stack entry. The application can optionally pass a pointer to a buffer to receive the native error code and the native error message.

DbtGetErrorEntry returns the error code DBIERR_NONE for stack entries beyond the current error stack, so this successful return can be used as a loop termination. For example, if error entry 1 returns an error code of DBIERR_NONE, there are no errors on the stack. The stack may be traversed multiple times or combined with other error interface calls, but non-error routine BDE calls reset the error stack.

{button ,AL("errorhandling")} Error handling topics

Using DbtGetErrorString to get a detailed error message

DbtGetErrorString returns a more detailed message for the error code returned by DbtGetErrorEntry. The application passes the error code and receives the error message. For example, if DbtGetErrorString is called with the error code DBIERR_EOF, it returns the string "At End of Table." BDE keeps the error strings as Windows string resources in the .DLL file with the IDR prefix. This way the application developer can translate or customize them as needed by using a product such as Resource Workshop.

{button ,AL("errorhandling")} [Error handling topics](#)

Using DbtGetErrorContext to get more specific information

DbtGetErrorContext returns more specific error information about the context of an error, such as the name of the offending table or field. When an error occurs, the error context is logged by the BDE engine. Other error contexts can be logged as well, so rather than force the user to scan each error context individually, DbtGetErrorContext searches for a particular context type. The application inputs the error context type and the function returns a character string.

Error Context Types

Error contexts can be one of the following types:

Type	Description
ecTOKEN	Token (For QBE)
ecTABLENAME	Table name
ecFIELDNAME	Field name
ecIMAGEROW	Image row (For QBE)
ecUSERNAME	For example, in lock conflicts, user involved
ecFILENAME	File name
ecINDEXNAME	Index name
ecDIRNAME	Directory name
ecKEYNAME	Key name
ecALIAS	Alias
ecDRIVENAME	Drive name ('c:')
ecNATIVECODE	Native error code
ecNATIVEMSG	Native error message
ecLINENUMBER	Line number
ecCAPABILITY	Capability

For example, if the application attempts to open a nonexistent table by using DbtOpenTable, it receives an error code of DBIERR_NOSUCHFILE. To determine which table name is associated with the error condition, the application calls DbtGetErrorContext (ecTABLENAME, buffer), which returns the full path name of the table. If there is no table name associated with the error, the buffer is empty.

{button ,AL("errorhandling")} [Error handling topics](#)

Using DbGetErrorInfo to get immediate information

DbGetErrorInfo provides immediate descriptive error information about the last error that occurred. This information consists of the DBIResult error code, an error message in ANSI characters corresponding to the code, and up to four associated error contexts. For example, if the error message is "Table Not Found," the user might want to know the table name. The BDE engine logged the table name with the error context ecTABLENAME, which can be found in one of the contexts contained in the DBIErrInfo structure.

The application calls DbGetErrorInfo which returns relevant error information in the provided DBIErrInfo structure. These structure types are shown in the following table.

DbErrorInfo Structure

Type	Name	Description
DBIResult	<i>iError</i>	Last error code returned
DBIMSG	<i>szErrCode</i>	More descriptive information
DBIMSG	<i>szContext1</i>	Context 1
DBIMSG	<i>szContext2</i>	Context 2
DBIMSG	<i>szContext3</i>	Context 3
DBIMSG	<i>szContext4</i>	Context 4

This function immediately displays up to four error contexts to the user, while the function DbGetErrorContext returns only the specific error context requested by the user.

If all that is required is a formatted error message for the end user, DbGetErrorInfo is a more convenient way to get it.

These examples shows how to get information about an error when a BDE function returns a value other than DBIERR_NONE:

```
hDBIDb      hDb;
    DBIResult  rslt;
    DBIMSG     dbiStatus;
// Open a STANDARD database
rslt = DbOpenDatabase(NULL, NULL, dbiREADWRITE,      dbiOPENSHPARED,
                     NULL, 0, NULL, NULL, &hDb);
if (rslt != DBIERR_NONE)
{
    // An error occurred. Retrieve the error string.
    DbGetErrorString(rslt, dbiStatus);
}
```

{button ,AL("errorhandling")} Error handling topics

Debugging

BDE provides two debugging tools:

Using the Debug Layer Allows you to examine the state of function parameters as you access functions.

SQL Trace Use the SQL Trace facility to track SQL statements sent to the servers when BDE functions execute.

Using the debug layer

BDE provides a debug layer that allows you to examine the state of function parameters as you access functions. Two BDE .DLL files containing all entry points for the BDE functions are shipped with the BDE:

- IDAPI32.DLL does not contain the debug layer; it is recommended that you ship your application with this .DLL file. IDAPI32.DLL is installed by default.
- DBG32.DLL contains the contents of IDAPI32.DLL and also includes the debug layer. It is recommended that you use this .DLL file during your development process.

Preparing to use the debug layer

Before using the debug layer, follow these two steps:

- 1 Use the DLLSWAP utility to rename DBG32.DLL to IDAPI32.DLL (and to rename IDAPI32.DLL to NODBG32.DLL).
- 2 After calling Dbilnit, turn on the debug layer.

Turning the debug layer on and off

Important: The debug layer must be turned on after calling [Dbilnit](#) and turned off before calling [DbiExit](#).

To turn on the debug layer, make the following call:

```
DbiDebugLayerOptions (DEBUGON, NULL);
```

To turn off the debug layer, make the following call:

```
DbiDebugLayerOptions (0, NULL);
```

Specifying debug layer options

The following options can be specified with [DbiDebugLayerOptions](#):

Option	Result
DEBUGON	If specified, the debug layer is activated. (Note: The debug layer .DLL must be in place). If this option is not specified, the debug layer is deactivated.
OUTPUTTOFILE	If specified, debug layer trace information is directed to the file specified by <i>pDebugFile</i> . If <i>pDebugfile</i> is not specified, a default TRACE file is created.
FLUSHEVERYOP	If specified, flushes trace information to the TRACE file every time a BDE function is called. (Note: This option is expensive and markedly slows processing.) If not specified, trace information is flushed periodically.
APPENDTOLOG	If specified, the trace output is appended to the end of the existing <i>pDebugFile</i> file. If not specified, the trace output overwrites the existing <i>pDebugFile</i> .

Methods of using the Debug Layer

To turn on the debug layer and output trace information to a default file, overwriting any existing information in the file:

```
DbiDebugLayerOptions (DEBUGON|OUTPUTTOFILE, NULL);
```

To turn on the debug layer and output trace information to the TRACE.INF file, overwriting any existing information in TRACE.INF:

```
DbiDebugLayerOptions (DEBUGON|OUTPUTTOFILE, "trace.inf");
```

To turn on the debug layer and output trace information to the TRACE.INF file, overwriting trace information after every BDE call:

```
DbiDebugLayerOptions (DEBUGON|OUTPUTTOFILE|FLUSHEVERYOP, "trace.inf");
```

To turn on the debug layer and output trace information to the TRACE.INF file, appending information to TRACE.INF while leaving existing information intact:

```
DbiDebugLayerOptions(DEBUGON|OUTPUTTOFILE|APPENDTOLOG,"trace.inf");
```

To turn off the debug layer:

```
DbiDebugLayerOptions(NULL, NULL);
```

Examining trace files

A sample trace file is shown here:

```
ENTERING ***** DbiOpenDatabase
  variable name = pszDbName      type name = pCHAR
  Pointer = 0000:0000
  String = (null)
  variable name = pszDbType      type name = pCHAR
  Pointer = 2767:2F78
  String = STANDARD
  variable name = eOpenMode      type name = DBIOpenMode
  code name = READWRITE, integer value = 0
  variable name = eShareMode     type name = DBIShareMode
  code name = OPENSHARED, integer value = 0
  variable name = pszPassword    type name = pCHAR
  Pointer = 0000:0000
  String = (null)
  variable name = iOptFlds       type name = UINT16
  Uint = 0
  variable name = pOptFldDesc     type name = pFLDDesc
  Pointer = 0000:0000
  variable name = pOptParams      type name = pBYTE
  Pointer = 0000:0000
  variable name = phDb           type name = phDBIDb
  Pointer = 2767:BC56
```

Trace information output

If the debug layer determines that a parameter you have passed is invalid, the following information is conveyed:

- An "ERROR:" message is echoed to the trace file.
- The return value DBIERR_INVALIDPARAM is returned.

These error messages provide clues for determining the cause of a crash or corruption that occurred while running without the debug layer.

Examples: Error conditions and resulting error messages

The table below shows some possible error conditions and their resulting error messages:

Example of error condition	Resulting trace ERROR message
<i>bDefault</i> == 999	ERROR: NOT BOOLEAN
<i>pszTableName</i> == NULL	ERROR: NULL STRING POINTER
<i>hCursor</i> == <junk value>	ERROR: BAD POINTER OR BAD HANDLE
<i>hCursor</i> == NULL	ERROR: NULL POINTER OR NULL HANDLE

SQL Trace

The SQL Trace facility is a useful debugging tool that opens the SQL "black box," allowing you to track the SQL statements sent to the servers when their BDE function calls are executed. SQL Trace is implemented as the SQL TRACE option in the Windows Registry and as a callback to return trace information.

Configuration option

To set the SQL trace mode, use the SQLTRACE option in the DRIVER\INIT section of the Windows Registry (settings\driver\driver_name\init\TRACE MODE) for the appropriate driver. The option takes a numeric value (actually a bit mask) that determines how much information to log. The Windows OutputDebugString call is used to output the requested information to the debug window. The following table shows which information is logged based on bit settings:

Bit Settings	Logged Information
0x0001	prepared query statement
0x0002	executed query statements
0x0004	vendor errors
0x0008	statement ops (that is: allocate, free)
0x0010	connect / disconnect
0x0020	transaction
0x0040	BLOB I/O
0x0080	miscellaneous
0x0100	vendor calls

Examples

- 1 To trace only prepared and executed query statements, sets bits 0x0001 and 0x0002 (that is, set SQLTRACE to 3)
- 2 To trace only vendor calls, set bit 0x0100 (that is, set SQLTRACE to 256)

Because the value of SQLTRACE is evaluated as an unsigned integer, a value of -1 will turn on all bits, and therefore all of the above events will be traced.

dbTRACEMODE

To programatically override the DRIVER option for any database, use the database property dbTRACEMODE with DbiSetProp. TRACE MODE is a DRIVER option in the Registry that determines the trace behavior for all database operations associated with the driver.

cbTRACE

To retrieve trace information, use the system-level callback cbTRACE. The trace string retrieved through the callback is the same as that which goes to the debug window via OutputDebugString.

The TraceDESC structure is used to return trace information to the callback:

```
typedef struct          // trace callback info
{
    TRACECat           eTraceCat;           // trace category
    UINT16             uTotalMsgLen;        // total message length
    CHAR               pszTrace[];         // trace string
                                        // (recommended size = DBIMAXTRACELEN
(8192))
} TRACEDesc;
```

```

typedef enum          // trace categories
{
    traceUNKNOWN      = 0x0000,
    traceQPREPARE     = 0x0001,    // prepared query statements
    traceQEXECUTE     = 0x0002,    // executed query statements
    traceERROR        = 0x0004,    // vendor errors
    traceSTMT         = 0x0008,    // statement ops (i.e. allocate, free)
    traceCONNECT      = 0x0010,    // connect / disconnect
    traceTRANSACT     = 0x0020,    // transaction
    traceBLOB         = 0x0040,    // blob i/o
    traceMISC         = 0x0080,    // misc.
    traceVENDOR       = 0x0100,    // vendor calls
} TRACECat;

```

The TRACECat enums have the same bit sequence used to set the TRACE MODE configuration option, and can also be used (singularly or piped together) as input to the dbTRACEMODE database property. You can use the uTotalMsgLen field of the TRACEDESC structure to determine whether the returned string (in pszTrace) has been truncated.

Example: Registering a cbTRACE Callback:

Note: Before calling DbiRegisterCallBack() for SQLTRACE, the argument pTraceInfo must be allocated for the size of (TRACEDESC) plus DBIMAXTRACELEN.

```

DbiRegisterCallBack
(
    NULL,
    cbTRACE,
    iClientData,
    sizeof (TRACEDESC) + DBIMAXTRACELEN,
    (pVOID)pTraceInfo,          // ptr to client-allocated TRACEDESC
    (pfDBICallback) lpfnTrace);

```

Improving BDE performance

Here are a few general programming practices to help improve overall BDE performance in accessing tables:

- 1 Keep the number of maintained secondary indexes to a minimum; sometimes it is better to delete the index and recreate it than to perform a number of table operations with the indexes in place.
- 2 If possible, increase the size of the swap buffer and the number of file handles that BDE has available to it. This will decrease BDE's need to swap resources.
Note: Be sure to increase the file handles available to your application by using SetHandleCount. Also, in IDAPI.CFG, increase the number of file handles available to BDE.
- 3 Open the table exclusively.
- 4 Batch as many operations as possible--do not read/ write records one as a time. Use DbBatchMove, DbCopyTable, DbReadBlock, and/or DbWriteBlock.
- 5 When using DbWriteBlock, try to work in multiples of the physical block size, usually 2K or 4K.
- 6 If you are opening and closing one or more tables repeatedly, consider calling DbAcqPersistTableLock on a non-existent file after you initialize the BDE. This will create the .LCK file so that it will not have to be created each time a table is opened, created, and so on. (Note: You'll also want to call DbRelPersistTableLock before calling DbExit). This applies to Paradox tables only.
- 7 Work with in-memory tables when possible.
- 8 When working with remote data sources that support transactions, use explicit transactions. For example, each insert to a table on an SQL server will force a transaction to be started and committed. This adds a lot of overhead when inserting a large group of records. Instead, start a transaction, insert a group of records, and then commit the changes as a group.

See also: [SQL performance tips](#)

{button ,AL("applicationdevelopment")} [Application development](#)

Using the function reference

You can find a complete description of each BDE function by looking in the task-related tables in [Function Reference, Categorical](#).

Alternatively, you can quickly access the topic for any function by searching the complete list in [Function Reference, Alphabetical](#).

Each BDE function name begins with the prefix Dbi. The remainder of the name describes the function's use. For example, DbiGetClientInfo is the name of the BDE function that retrieves information about the client application environment.

Syntax is provided in both C and in Delphi (Pascal) languages.

Next to the title of each function topic you'll see two Examples buttons, one in C code, the other in Delphi (Pascal). Click here to display code examples that you can copy and paste into your applications. At the bottom of each Examples window is a check button for additional standard code required to execute the example.

See the following topics for general conventions and definitions that will assist you in understanding and making effective use of the BDE function reference:

{button ,AL("usingfuncref")} [Using the function reference](#)

Syntax conventions

The C syntax for BDE function calls is:

```
DBIResult DBIFN DbiFunctionName (argument1, argument2, argument3  
    ...);
```

Each function definition includes the elements described in this table:

Element	Description
Function name	Name of function
Examples buttons	Click to display a window of code examples (either C or Delphi) that you can copy and paste into your application.
Description	Summary description of function
Syntax	Diagram of the function and parameters in both C and Delphi coding styles.
Parameters	Descriptions of each parameter
Usage	Detailed information about using the function
Prerequisites	State required before function is called
Completion state	State after the function completes
DBIResult return values	Description of possible values returned after the function completes, if any
See Also	Cross references to other related functions

Each function definition observes these typographical conventions:

Convention	Purpose	Example
<i>Courier font</i>	Keywords that must be typed exactly as they appear when used (case-sensitive).	DBIResult DBIFN DbiInit();
<i>italic</i>	Variables and parameters passed to the function, returned from the function, or both.	(<i>hCursor</i> , <i>piRecords</i> , <i>pBuf</i>)
[]	Brackets enclose optional parameters. Optional parameters can be set to NULL.	<i>iPosOffset</i> , [<i>eLock</i>]

{button ,AL("usingfuncref")} Using the function reference

Variable names

Each variable name used in this reference begins with a standard prefix and appears italicized in text.. These prefixes indicate the variable's type or use, as described in the following table:

Prefix	Variable type or use
a	The declared variable is an array.
b	The declared variable is of the boolean type.
dt	The declared variable is of the datetime type.
e	The content of the declared variable is of the enumerated type.
h	The declared variable is used as a handle.
i	The declared variable is an integer.
p	The declared variable is a pointer.
sz	The declared variable is a null-terminated character string.
tm	The declared variable is of the timestamp type.

Prefixes can be combined to more completely describe the variable's use. For example, the prefix *psz* in the variable name *pszIndexName* indicates that the variable is a pointer to a null-terminated character string, in this case, where the name of the index is stored.

{button ,AL("usingfuncref")} Using the function reference

Constants

The following table lists the constants used to define maximum limits throughout this reference:

Constant	Limit	Description
DBIMAXBOOKMARKLEN	4104	Maximum bookmark length
DBIMAXDRIVELEN	2	Maximum drive length (if Win32 not defined)
DBIMAXDRIVELEN	127	Maximum drive length (if Win32 defined)
DBIMAXDRSQLSTR	8192	Max size of SQL constraint
DBIMAXEXTLEN	3	Maximum file extension length, not including the extension delimiter "."
DBIMAXFLDSINKEY	16	Maximum number of fields in a key
DBIMAXFLDSINSEC	256	Maximum fields in security specification
DBIMAXFUNCNAMELEN	255	Max function name length
DBIMAXKEYEXPLEN	220	Maximum key expression length
DBIMAXMSGLEN	127	Maximum message length (allocate 128)
DBIMAXNAMELEN	31	Maximum object name limit (such as, table, field)
DBIMAXPATHLEN	81	Maximum path plus filename length. Allocate 80. (If Win32 not defined.)
DBIMAXPATHLEN	260	Maximum path plus filename length, excluding zero termination. (If Win32 defined.)
DBIMAXPICTLEN	175	Maximum picture length
DBIMAXSCFIELDS	32	Maximum number of fields in an optional parameter list
DBIMAXSCFLDLEN	128	Maximum field length in an optional parameter list
DBIMAXSCRECSIZE	2048	Maximum record size in an optional parameter list, computed as DBIMAXSCFIELDS*DBIMAXSCFLDLEN.
DBIMAXSPNAMELEN	64	Maximum stored procedure name length
DBIMAXTBLNAMELEN	127	Maximum table name length (if Win32 not defined)
DBIMAXTBLNAMELEN	260	Maximum table name length (if Win32 defined)
DBIMAXTRACELEN	8192	Maximum trace message length
DBIMAXTYPEDESC	127	Maximum type description size
DBIMAXUSERNAMELEN	14	Maximum user name (general)
DBIMAXVCHKLEN	255	Maximum validity check length
DBIMAXXBUSERNAMELEN	12	Maximum user name length for xBASE

{button ,AL("usingfuncref")} [Using the function reference](#)

#defines

The following table lists the #defines used throughout this reference:

#define	Definition
NULL	(0)
VOID	void
INT8	char
CHAR	char
BYTE	unsigned char
UINT8	unsigned char
INT16	int (if defined FLAT); short
UINT16	unsigned short (if defined FLAT); unsigned int
INT32	long
UINT32	unsigned long
BOOL	short (if defined FLAT) int
DFLOAT	double
DBIDATE	long
TIME	long
TIMESTAMP	double
DBIFN	pascal far
UINT16	DBIResult

{button ,AL("usingfuncref")} Using the function reference

Typedefs

The following table lists the typedefs used throughout this reference:

typedefs	Definition
VOID	far *pVOID
pVOID	far *ppVOID
CHAR	far *pCHAR
BYTE	far *pBYTE
INT8	far *pINT8
UINT8	far *pUINT8
INT16	far *pINT16
UINT16	far *pUINT16
INT32	far *pINT32
UINT32	far *pUINT32
DFLOAT	far *pFLOAT
DBIDATE	far *pDATE
TIME	far *pTIME
BOOL	far *pBOOL
TIMESTAMP	far *pTIMESTAMP
pBYTE	far *ppBYTE
pCHAR	far *ppCHAR
pBOOL	far *ppBOOL
DBIResult	far *pDBIResult

{button ,AL("usingfuncref")} Using the function reference

Object definitions

The following objects are defined:

Type	Object	Description
UINT32	hDBIObj	Generic object handle
hDBIObj	hDBIDb	Database handle
hDBIObj	hDBIQry	Query handle
hDBIObj	hDBIStmt	Statement handle ("new query")
hDBIObj	hDBICur	Cursor handle
hDBIObj	hDBISes	Session handle
hDBIObj	hDBIXIt	Translation handle
UINT32	hDBIXact	Transaction handle
hDBIObj	far *phDBIObj	Pointer to generic object handle
hDBICfg	far *phDBICfg	Pointer to configuration handle
hDBIDb	far *phDBIDb	Pointer to database handle
hDBIQry	far *phDBIQry	Pointer to query handle
hDBIStmt	far *phDBIStmt	Pointer to statement handle
hDBICur	far *phDBICur	Pointer to cursor handle
hDBISes	far *phDBISes	Pointer to session handle
hDBIXIt	far *phDBIXIt	Pointer to translation handle
hDBIXact	far *phDBIXact	Pointer to transaction handle

{button ,AL("usingfuncref")} Using the function reference

Buffer Typedefs

The following typedefs for buffers of various common sizes are defined:

Type	typedef	Description
DBIPATH	CHAR[DBIMAXPATHLEN+1]	Holds a DOS path
DBINAME	CHAR[DBIMAXNAMELEN+1]	Holds a name
DBIEXT	CHAR[DBIMAXEXTLEN+1]	Holds a file extension
DBIDOTEXT	CHAR[DBIMAXEXTLEN+2]	Holds a file extension including "."
DBIDRIVE	CHAR[DBIMAXDRIVELEN+1]	Holds a drive name
DBITBLNAME	CHAR[DBIMAXTBLNAMELEN+1]	Holds a table name
DBIUSERNAME	CHAR[DBIMAXUSERNAMELEN+1]	Holds a user name
DBIKEY	UINT16[DBIMAXFLDSINKEY]	Holds a list of fields in a key
DBIKEYEXP	CHAR[DBIMAXKEYEXPLEN+1];	Holds a key expression
DBIVCHK	BYTE[DBIMAXVCHKLEN+1]	Holds a validity check
DBIPICT	CHAR[DBIMAXPICTLEN+1]	Holds a picture clause
DBIMSG	CHAR[DBIMAXMSGLEN+1]	Holds an error message

{button ,AL("usingfuncref")} [Using the function reference](#)

Function reference, categorical

Each of the BDE functions documented in this reference fall into one of the categories listed in the table below:

Function Type	Purpose
<u>Capability or schema</u>	Returns information about database schema.
<u>Cursor</u>	Returns information or affects cursors and bookmarks.
<u>Data access</u>	Performs specific data access operations.
<u>Database</u>	Returns information or performs related tasks.
<u>Date/time/number</u>	Handles formats for the session.
<u>Environment</u>	Returns information or affects the client application environment.
<u>Error handling</u>	Returns information or performs related tasks.
<u>Index</u>	Returns information or affects indexes.
<u>Locking</u>	Returns information or affects locks.
<u>Query</u>	Performs query tasks.
<u>Session</u>	Returns information or affects a session.
<u>Table</u>	Returns information or performs table-wide operations.
<u>Transaction</u>	Returns information or performs related tasks.

Environment functions

Each BDE function listed below returns information about the client application environment such as the supported table, field and index types for the driver type, or the available driver types. Also listed are functions that perform a task that affects the client application environment, such as loading a driver.

Function	Description
<u>DbiAddAlias</u>	Adds an alias to the BDE configuration file (IDAPI.CFG).
<u>DbiAnsiToNative</u>	Multipurpose translate function.
<u>DbiDebugLayerOptions</u>	Activates, deactivates, or sets options for the BDE debug layer.
<u>DbiDeleteAlias</u>	Deletes an alias from the BDE configuration file (IDAPI.CFG).
<u>DbiExit</u>	Disconnects the client application from BDE.
<u>DbiGetClientInfo</u>	Retrieves system-level information about the client application environment.
<u>DbiGetDriverDesc</u>	Retrieves a description of a driver.
<u>DbiGetLdName</u>	Retrieves the name of the language driver associated with the specified object name (table name).
<u>DbiGetLdObj</u>	Retrieves the language driver object associated with the given cursor.
<u>DbiGetNetUserName</u>	Retrieves the user's network login name. User names should be available for all networks supported by Microsoft Windows.
<u>DbiGetProp</u>	Returns a property of an object.
<u>DbiGetSysConfig</u>	Retrieves BDE system configuration information.
<u>DbiGetSysInfo</u>	Retrieves system status and information.
<u>DbiGetSysVersion</u>	Retrieves the system version information, including the BDE version number, date, and time, and the client interface version number.
<u>Dbilnit</u>	Initializes the BDE environment.
<u>DbiLoadDriver</u>	Loads a given driver.
<u>DbiNativeToAnsi</u>	Translates a string in the native language driver to an ANSI string.
<u>DbiOpenCfgInfoList</u>	Returns a handle to an in-memory table listing all the nodes in the configuration file accessible by the specified path.
<u>DbiOpenDriverList</u>	Creates an in-memory table containing a list of driver names available to the client application.
<u>DbiOpenFieldTypesList</u>	Creates an in-memory table containing a list of field types supported by the table type for the driver type.
<u>DbiOpenFunctionArgList</u>	Returns a list of arguments to a data source function.
<u>DbiOpenFunctionList</u>	Returns a description of a data source function.
<u>DbiOpenIndexTypesList</u>	Creates an in-memory table containing a list of all supported index types for the driver type.
<u>DbiOpenLdList</u>	Creates an in-memory table containing a list of available language drivers.
<u>DbiOpenTableList</u>	Creates an in-memory table with information about all the tables accessible to the client application.
<u>DbiOpenTableTypesList</u>	Creates an in-memory table listing table type names for the given driver.
<u>DbiOpenUserList</u>	Creates an in-memory table containing a list of users sharing the same network file.
<u>DbiSetProp</u>	Sets the specified property of an object to a given value.
<u>DbiUseIdleTime</u>	Allows BDE to accomplish background tasks during times when the client

application is idle.

Session functions

Each BDE function listed below returns information about a session, or performs a task that affects the session, such as adding a password.

Function	Description
<u>DbiAddPassword</u>	Adds a password to the current session.
<u>DbiCheckRefresh</u>	Checks for remote updates to tables for all cursors in the current session, and refreshes the cursors if changed.
<u>DbiCloseSession</u>	Closes the session associated with the given session handle.
<u>DbiDropPassword</u>	Removes a password from the current session.
<u>DbiGetCallBack</u>	Returns a pointer to the function previously registered by the client for the given callback type.
<u>DbiGetCurrSession</u>	Returns the handle associated with the current session.
<u>DbiGetDateFormat</u>	Gets the date format for the current session.
<u>DbiGetNumberFormat</u>	Gets the number format for the current session.
<u>DbiGetSesInfo</u>	Retrieves the environment settings for the current session.
<u>DbiGetTimeFormat</u>	Gets the time format for the current session.
<u>DbiRegisterCallBack</u>	Registers a callback function for the client application.
<u>DbiSetCurrSession</u>	Sets the current session of the client application to the session associated with <i>hSes</i> .
<u>DbiSetDateFormat</u>	Sets the date format for the current session.
<u>DbiSetNumberFormat</u>	Sets the number format for the current session.
<u>DbiSetPrivateDir</u>	Sets the private directory for the current session.
<u>DbiSetTimeFormat</u>	Sets the time format for the current session.
<u>DbiStartSession</u>	Starts a new session for the client application.

Error handling functions

Each BDE function listed below returns error handling information, or performs a task that relates to error handling.

Function	Description
<u>DbiGetErrorContext</u>	After receiving an error code back from a call, enables the client to probe BDE for more specific error information.
<u>DbiGetErrorEntry</u>	Returns the error description of a specified error stack entry.
<u>DbiGetErrorInfo</u>	Provides descriptive error information about the last error that occurred.
<u>DbiGetErrorString</u>	Returns the message associated with a given error code.

Locking functions

Each BDE function listed below returns information about lock status, or acquires or releases a lock at the table or record level.

Function	Description
<u>DbiAcqPersistTableLock</u>	Acquires an exclusive persistent lock on the table preventing other users from using the table or creating a table of the same name.
<u>DbiAcqTableLock</u>	Acquires a table-level lock on the table associated with the given cursor.
<u>DbiGetRecord</u>	Record positioning functions have a lock parameter.
<u>DbiIsRecordLocked</u>	Checks the lock status of the current record.
<u>DbiIsTableLocked</u>	Returns the number of locks of a specified type acquired on the table associated with the given session.
<u>DbiIsTableShared</u>	Determines whether the table is physically shared or not.
<u>DbiOpenLockList</u>	Creates an in-memory table containing a list of locks acquired on the table.
<u>DbiOpenUserList</u>	Creates an in-memory table containing a list of users sharing the same network file.
<u>DbiRelPersistTableLock</u>	Releases the persistent table lock on the specified table.
<u>DbiRelRecordLock</u>	Releases the record lock on either the current record of the cursor or only the locks acquired in the current session.
<u>DbiRelTableLock</u>	Releases table locks of the specified type associated with the current session (the session in which the cursor was created).
<u>DbiSetLockRetry</u>	Sets the table and record lock retry time for the current session.

Cursor functions

Each BDE function listed below returns information about a cursor, or performs a task that performs a cursor-related task such as positioning of a cursor, linking of cursors, creating and closing cursors, counting of records associated with a cursor, filtering, setting and comparing bookmarks, and refreshing all buffers associated with a cursor.

Function	Description
<u>DbiActivateFilter</u>	Activates a filter.
<u>DbiAddFilter</u>	Adds a filter to a table, but does not activate the filter (the record set is not yet altered).
<u>DbiApplyDelayedUpdates</u>	When cached updates cursor layer is active, writes all modifications made to cached data to the underlying database.
<u>DbiBeginDelayedUpdates</u>	Creates a cached updates cursor layer so that users can make extended changes to temporarily cached table data without writing to the actual table, thereby minimizing resource locking.
<u>DbiBeginLinkMode</u>	Converts a cursor to a link cursor. Given an open cursor, prepares for linked access. Returns a new cursor.
<u>DbiCloneCursor</u>	Creates a new cursor (clone cursor) which has the same result set as the given cursor (source cursor).
<u>DbiCloseCursor</u>	Closes a previously opened cursor.
<u>DbiCompareBookMarks</u>	Compares the relative positions of two bookmarks in the result set associated with the cursor.
<u>DbiDeactivateFilter</u>	Temporarily stops the specified filter from affecting the record set by turning the filter off.
<u>DbiDropFilter</u>	Deactivates and removes a filter from memory, and frees all resources.
<u>DbiEndDelayedUpdates</u>	Closes a cached updates cursor layer ending the cached updates mode.
<u>DbiEndLinkMode</u>	Ends linked cursor mode, and returns the original cursor.
<u>DbiExtractKey</u>	Retrieves the key value for the current record of the given cursor or from the supplied record buffer.
<u>DbiForceRecordReread</u>	Rereads a single record from the server on demand, refreshing one row only, rather than clearing the cache.
<u>DbiForceReread</u>	Refreshes all buffers associated with the cursor, if necessary.
<u>DbiFormFullName</u>	Returns the fully qualified table name.
<u>DbiGetBookMark</u>	Saves the current position of a cursor to the client-supplied buffer called a bookmark.
<u>DbiGetCursorForTable</u>	Finds the cursor for the given table.
<u>DbiGetCursorProps</u>	Returns the properties of the cursor.
<u>DbiGetFieldDescs</u>	Retrieves a list of descriptors for all the fields in the table associated with the cursor.
<u>DbiGetLinkStatus</u>	Returns the link status of the cursor.
<u>DbiGetNextRecord</u>	Retrieves the next record in the table associated with the cursor.
<u>DbiGetPriorRecord</u>	Retrieves the previous record in the table associated with the given cursor.
<u>DbiGetProp</u>	Returns a property of an object.
<u>DbiGetRecord</u>	Retrieves the current record, if any, in the table associated with the cursor.
<u>DbiGetRecordCount</u>	Retrieves the current number of records associated with the cursor.

<u>DbiGetRecordForKey</u>	Finds and retrieves a record matching a key and positions the cursor on that record.
<u>DbiGetRelativeRecord</u>	Positions the cursor on a record in the table relative to the current position of the cursor.
<u>DbiGetSeqNo</u>	Retrieves the sequence number of the current record in the table associated with the cursor.
<u>DbiLinkDetail</u>	Establishes a link between two tables such that the detail table has its record set limited to the set of records matching the linking key values of the master table cursor.
<u>DbiLinkDetailToExp</u>	Links the detail cursor to the master cursor using an expression.
<u>DbiMakePermanent</u>	Changes a temporary table created by DbiCreateTempTable into a permanent table.
<u>DbiOpenTable</u>	Opens the given table for access and associates a cursor handle with the opened table.
<u>DbiResetRange</u>	Removes the specified table's limited range previously established by the function DbiSetRange.
<u>DbiSaveChanges</u>	Forces all updated records associated with the cursor to disk.
<u>DbiSetFieldMap</u>	Sets a field map of the table associated with the given cursor.
<u>DbiSetProp</u>	Sets the specified property of an object to a given value.
<u>DbiSetRange</u>	Sets a range on the result set associated with the cursor.
<u>DbiSetToBegin</u>	Positions the cursor to BOF (just before the first record).
<u>DbiSetToBookMark</u>	Positions the cursor to the location saved in the specified bookmark.
<u>DbiSetToCursor</u>	Sets the position of one cursor (the destination cursor) to that of another (the source cursor).
<u>DbiSetToEnd</u>	Positions the cursor to EOF (just after the last record).
<u>DbiSetToKey</u>	Positions an index-based cursor on a key value.
<u>DbiSetToRecordNo</u>	Positions the cursor of a dBASE table to the given physical record number.
<u>DbiSetToSeqNo</u>	Positions the cursor to the specified sequence number of a Paradox table.
<u>DbiUnlinkDetail</u>	Removes a link between two cursors.

Index functions

Each BDE function listed below returns information about an index or indexes, or performs a task that affects an index, such as dropping it, deleting it, or adding it.

Function	Description
<u>DbiAddIndex</u>	Creates an index on an existing table.
<u>DbiCloseIndex</u>	Closes the specified index on a cursor.
<u>DbiCompareKeys</u>	Compares two key values based on the current index of the cursor.
<u>DbiDeleteIndex</u>	Drops an index on a table.
<u>DbiExtractKey</u>	Retrieves the key value for the current record of the given cursor or from the supplied record buffer.
<u>DbiGetIndexDesc</u>	Retrieves the properties of the given index associated with the cursor.
<u>DbiGetIndexDescs</u>	Retrieves index properties.
<u>DbiGetIndexForField</u>	Returns the description of any useful index on the specified field.
<u>DbiGetIndexSeqNo</u>	Retrieves the ordinal number of the index in the index list of the specified cursor.
<u>DbiGetIndexTypeDesc</u>	Retrieves a description of the index type.
<u>DbiOpenIndex</u>	Opens the index for the table associated with the cursor.
<u>DbiRegenIndex</u>	Regenerates an index to make sure that it is up-to-date (all records currently in the table are included in the index and are in the index order).
<u>DbiRegenIndexes</u>	Regenerates all out-of-date indexes on a given table.
<u>DbiSwitchToIndex</u>	Allows the user to change the active index order of the given cursor.

Query functions

Each BDE function listed below performs a query task.

Function	Description
<u>DbiGetProp</u>	Returns a property of an object.
<u>DbiQAlloc</u>	Allocates a new statement handle for a prepared query.
<u>DbiQExec</u>	Executes the previously prepared query identified by the supplied statement handle and returns a cursor to the result set, if one is generated.
<u>DbiQExecDirect</u>	Executes a SQL or QBE query and returns a cursor to the result set, if one is generated.
<u>DbiQExecProcDirect</u>	Executes a stored procedure and returns a cursor to the result set, if one is generated.
<u>DbiQFree</u>	Frees the resources associated with a previously prepared query identified by the supplied statement handle.
<u>DbiQGetBaseDescs</u>	Returns the original database, table, and field names of the fields that make up the result set of a query.
<u>DbiQInstantiateAnswer</u>	Creates a permanent table from the cursor to the result set.
<u>DbiQPrepare</u>	Prepares a SQL or QBE query for execution, and returns a handle to a statement containing the prepared query.
<u>DbiQPrepareProc</u>	Prepares and optionally binds parameters for a stored procedure.
<u>DbiQSetParams</u>	Associates data with parameter markers embedded within a prepared query.
<u>DbiQSetProcParams</u>	Binds parameters for a stored procedure prepared with DbiQPrepareProc.
<u>DbiSetProp</u>	Sets the specified property of an object to a given value.
<u>DbiValidateProp</u>	Validates a property.

Database functions

The BDE functions listed below return information about a specific database, available databases, or perform a database-related task.

Function	Description
<u>DbiCloseDatabase</u>	Closes a database and all tables associated with this database handle.
<u>DbiGetDatabaseDesc</u>	Retrieves the description of the specified database from the configuration file.
<u>DbiGetDirectory</u>	Retrieves the current working directory or the default directory.
<u>DbiOpenDatabase</u>	Opens a database in the current session and returns a database handle.
<u>DbiOpenDatabaseList</u>	Creates an in-memory table containing a list of accessible databases and their descriptions.
<u>DbiOpenFileList</u>	Opens a cursor on the virtual table containing all the tables accessible by the client application and their descriptions.
<u>DbiOpenIndexList</u>	Opens a cursor on an in-memory table listing the indexes on a specified table, along with their descriptions.
<u>DbiOpenTableList</u>	Creates an in-memory table with information about all the tables accessible to the client application.

Table functions

Each BDE function listed below returns information about a specific table, such as all the locks acquired on the table, all the referential integrity links on the table, the indexes open on the table, or whether or not the table is shared. Or, it performs a table-wide operation, such as copying and deleting.

Function	Description
<u>DbiBatchMove</u>	Appends, updates, subtracts, and copies records or fields from a source table to a destination table.
<u>DbiCopyTable</u>	Duplicates the specified source table to a destination table.
<u>DbiCreateInMemTable</u>	Creates a temporary, in-memory table.
<u>DbiCreateTable</u>	Creates a table.
<u>DbiCreateTempTable</u>	Creates a temporary table that is deleted when the cursor is closed, unless the call is followed by a call to <u>DbiMakePermanent</u> .
<u>DbiDeleteTable</u>	Deletes a table.
<u>DbiDoRestructure</u>	Changes the properties of a table.
<u>DbiEmptyTable</u>	Deletes all records from the table associated with the specified table cursor handle or table name.
<u>DbiGetTableOpenCount</u>	Returns the total number of cursors that are open on the specified table.
<u>DbiGetTableTypeDesc</u>	Returns a description of the capabilities of the table type for the driver type.
<u>DbilsTableLocked</u>	Returns the number of locks of a specified type acquired on the table associated with the given session.
<u>DbilsTableShared</u>	Determines whether the table is physically shared or not.
<u>DbiMakePermanent</u>	Changes a temporary table created by <u>DbiCreateTempTable</u> into a permanent table.
<u>DbiOpenFamilyList</u>	Creates an in-memory table listing the family members associated with a specified table.
<u>DbiOpenFieldList</u>	Creates an in-memory table listing the fields in a specified table and their descriptions.
<u>DbiOpenIndexList</u>	Opens a cursor on an in-memory table listing the indexes on a specified table, along with their descriptions.
<u>DbiOpenLockList</u>	Creates an in-memory table containing a list of locks acquired on the table associated with the cursor.
<u>DbiOpenRintList</u>	Creates an in-memory table listing the referential integrity links for a specified table, along with their descriptions.
<u>DbiOpenSecurityList</u>	Creates an in-memory table listing record-level security information about a specified table.
<u>DbiOpenTable</u>	Opens the given table for access and associates a cursor handle with the opened table.
<u>DbiPackTable</u>	Optimizes table space by rebuilding the table associated with the cursor and releasing any free space.
<u>DbiQInstantiateAnswer</u>	Creates a permanent table from a cursor handle.
<u>DbiRegenIndexes</u>	Regenerates all out-of-date indexes on a given table.
<u>DbiRenameTable</u>	Renames the table and all of its resources to the new name specified.
<u>DbiSaveChanges</u>	Forces all updated records associated with the table to disk.
<u>DbiSortTable</u>	Sorts an opened or closed table, either into itself or into a destination table.

There are options to remove duplicates, to enable case-insensitive sorts and special sort functions, and to control the number of records sorted.

Data access functions

Each BDE function listed below accesses data in a table.

Function	Description
<u>DbiAppendRecord</u>	Appends a record to the end of the table associated with the given cursor.
<u>DbiDeleteRecord</u>	Deletes the current record of the given cursor.
<u>DbiFreeBlob</u>	Closes the BLOB handle located within the specified record buffer.
<u>DbiGetBlob</u>	Retrieves data from the specified BLOB field.
<u>DbiGetBlobHeading</u>	Retrieves information about a BLOB field from the BLOB heading in the record buffer.
<u>DbiGetBlobSize</u>	Retrieves the size of the specified BLOB field in bytes.
<u>DbiGetField</u>	Retrieves the data contents of the requested field from the record buffer.
<u>DbiGetFieldDescs</u>	Retrieves a list of descriptors for all the fields in the table associated with the cursor.
<u>DbiGetFieldTypeDesc</u>	Retrieves a description of the specified field type.
<u>DbiInitRecord</u>	Initializes the record buffer to a blank record according to the data types of the fields.
<u>DbiInsertRecord</u>	Inserts a new record into the table associated with the given cursor.
<u>DbiModifyRecord</u>	Modifies the current record of table associated with the cursor with the data supplied.
<u>DbiOpenBlob</u>	Prepares the cursor's record buffer to access a BLOB field.
<u>DbiPutBlob</u>	Writes data into an open BLOB field.
<u>DbiPutField</u>	Writes the field value to the correct location in the supplied record buffer.
<u>DbiReadBlock</u>	Reads a specified number of records (starting from the next position of the cursor) into a buffer.
<u>DbiSaveChanges</u>	Forces all updated records associated with the cursor to disk.
<u>DbiSetFieldMap</u>	Sets a field map of the table associated with the given cursor.
<u>DbiTruncateBlob</u>	Shortens the size of the contents of a BLOB field, or deletes the contents of a BLOB field from the record, by shortening it to zero.
<u>DbiUndeleteRecord</u>	Undeletes a dBASE record that has been marked for deletion (a "soft" delete).
<u>DbiVerifyField</u>	Verifies that the data specified is a valid data type for the field specified, and that all validity checks in place for the field are satisfied. It can also be used to check if a field is blank.
<u>DbiWriteBlock</u>	Writes a block of records to the table associated with the cursor.

Capability or schema functions

Each BDE function listed below returns information about a data source's capabilities, or about its schema.

Function	Description
<u>DbiOpenCfgInfoList</u>	Returns a handle to an in-memory table listing all the nodes in the configuration file accessible by the specified path.
<u>DbiOpenDatabaseList</u>	Creates an in-memory table containing a list of accessible databases and their descriptions.
<u>DbiOpenDriverList</u>	Creates an in-memory table containing a list of driver names available to the client application.
<u>DbiOpenFamilyList</u>	Creates an in-memory table listing the family members associated with a specified table.
<u>DbiOpenFieldList</u>	Creates an in-memory table listing the fields in a specified table and their descriptions.
<u>DbiOpenFieldTypesList</u>	Creates an in-memory table containing a list of field types supported by the table type for the driver type.
<u>DbiOpenFunctionArgList</u>	Returns a list of arguments to a data source function.
<u>DbiOpenFunctionList</u>	Returns a description of a data source function.
<u>DbiOpenIndexList</u>	Opens a cursor on an in-memory table listing the indexes on a specified table, along with their descriptions.
<u>DbiOpenIndexTypesList</u>	Creates an in-memory table containing a list of all supported index types for the driver type.
<u>DbiOpenLockList</u>	Creates an in-memory table containing a list of locks acquired on the table.
<u>DbiOpenRintList</u>	Creates an in-memory table listing the referential integrity links for a specified table, along with their descriptions.
<u>DbiOpenSecurityList</u>	Creates an in-memory table listing record-level security information about a specified table.
<u>DbiOpenTableList</u>	Creates an in-memory table with information about all the tables accessible to the client application.
<u>DbiOpenTableTypesList</u>	Creates an in-memory table listing table type names for the given driver.
<u>DbiOpenVchkList</u>	Creates an in-memory table containing records with information about validity checks for fields within the specified table.

Date/time/number functions

Each BDE function listed below sets or retrieves date, time or number formats for the current session, or decodes or encodes date and time into or from a timestamp.

Function	Description
<u>DbiBcdFromFloat</u>	Converts FLOAT data to binary coded decimal (BCD) format.
<u>DbiBcdToFloat</u>	Converts binary coded decimal (BCD) data to FLOAT format.
<u>DbiDateDecode</u>	Decodes DBIDATE into separate month, day and year components.
<u>DbiDateEncode</u>	Encodes separate date components into date for use by DbiPutField and other functions.
<u>DbiGetDateFormat</u>	Gets the date format for the current session.
<u>DbiGetNumberFormat</u>	Gets the number format for the current session.
<u>DbiGetTimeFormat</u>	Gets the time format for the current session.
<u>DbiSetDateFormat</u>	Sets the date format for the current session.
<u>DbiSetNumberFormat</u>	Sets the number format for the current session.
<u>DbiSetTimeFormat</u>	Sets the time format for the current session.
<u>DbiTimeDecode</u>	Decodes time into separate components (hours, minutes, milliseconds).
<u>DbiTimeEncode</u>	Encodes separate time components into time for use by DbiPutField and other functions.
<u>DbiTimeStampDecode</u>	Extracts separate encoded date and time components from the timestamp.
<u>DbiTimeStampEncode</u>	Encodes the encoded date and encoded time into a timestamp.

Transaction functions

The BDE functions listed below begin, end, or return information about a transaction.

Function	Description
<u>DbiBeginTran</u>	Begins a transaction.
<u>DbiEndTran</u>	Ends a transaction.
<u>DbiGetTranInfo</u>	Retrieves the transaction state.

Function reference, alphabetical

Function	Description
<u>DbiAcqPersistTableLock</u>	Acquires an exclusive persistent lock on the table preventing other users from using the table or creating a table of the same name.
<u>DbiAcqTableLock</u>	Acquires a table-level lock on the table associated with the given cursor.
<u>DbiActivateFilter</u>	Activates a filter.
<u>DbiAddAlias</u>	Adds an alias to the BDE configuration file (IDAPI.CFG).
<u>DbiAddFilter</u>	Adds a filter to a table, but does not activate the filter (the record set is not yet altered).
<u>DbiAddIndex</u>	Creates an index on an existing table.
<u>DbiAddPassword</u>	Adds a password to the current session.
<u>DbiAnsiToNative</u>	Multipurpose translate function.
<u>DbiAppendRecord</u>	Appends a record to the end of the table associated with the given cursor.
<u>DbiApplyDelayedUpdates</u>	When cached updates cursor layer is active, writes all modifications made to cached data to the underlying database.
<u>DbiBatchMove</u>	Appends, updates, subtracts, and copies records or fields from a source table to a destination table.
<u>DbiBcdFromFloat</u>	Converts FLOAT data to binary coded decimal (BCD) format.
<u>DbiBcdToFloat</u>	Converts binary coded decimal (BCD) data to FLOAT format.
<u>DbiBeginDelayedUpdates</u>	Creates a cached updates cursor layer so that users can make extended changes to temporarily cached table data without writing to the actual table, thereby minimizing resource locking.
<u>DbiBeginLinkMode</u>	Converts a cursor to a link cursor. Given an open cursor, prepares for linked access. Returns a new cursor.
<u>DbiBeginTran</u>	Begins a transaction.
<u>DbiCheckRefresh</u>	Checks for remote updates to tables for all cursors in the current session, and refreshes the cursors if changed.
<u>DbiCloneCursor</u>	Creates a new cursor (clone cursor) which has the same result set as the given cursor (source cursor).
<u>DbiCloseCursor</u>	Closes a previously opened cursor.
<u>DbiCloseDatabase</u>	Closes a database and all tables associated with this database handle.
<u>DbiCloseFieldXlt</u>	Closes a field translation object.
<u>DbiCloseIndex</u>	Closes the specified index on a cursor.
<u>DbiCloseSession</u>	Closes the session associated with the given session handle.
<u>DbiCompareBookMarks</u>	Compares the relative positions of two bookmarks in the result set associated with the cursor.
<u>DbiCompareKeys</u>	Compares two key values based on the current index of the cursor.
<u>DbiCopyTable</u>	Duplicates the specified source table to a destination table.
<u>DbiCreateInMemTable</u>	Creates a temporary, in-memory table.
<u>DbiCreateTable</u>	Creates a table.
<u>DbiCreateTempTable</u>	Creates a temporary table that is deleted when the cursor is closed, unless the call is followed by a call to DbiMakePermanent.

<u>DbiDateDecode</u>	Decodes DBIDATE into separate month, day and year components.
<u>DbiDateEncode</u>	Encodes separate date components into date for use by DbiPutField and other functions.
<u>DbiDeactivateFilter</u>	Temporarily stops the specified filter from affecting the record set by turning the filter off.
<u>DbiDebugLayerOptions</u>	Activates, deactivates, or sets options for the BDE debug layer.
<u>DbiDeleteAlias</u>	Deletes an alias from the BDE configuration file (IDAPI.CFG).
<u>DbiDeleteIndex</u>	Drops an index on a table.
<u>DbiDeleteRecord</u>	Deletes the current record of the given cursor.
<u>DbiDeleteTable</u>	Deletes a table.
<u>DbiDoRestructure</u>	Changes the properties of a table.
<u>DbiDropFilter</u>	Deactivates and removes a filter from memory, and frees all resources.
<u>DbiDropPassword</u>	Removes a password from the current session.
<u>DbiEmptyTable</u>	Deletes all records from the table associated with the specified table cursor handle or table name.
<u>DbiEndDelayedUpdates</u>	Closes a cached updates cursor layer ending the cached updates mode.
<u>DbiEndLinkMode</u>	Ends linked cursor mode, and returns the original cursor.
<u>DbiEndTran</u>	Ends a transaction.
<u>DbiExit</u>	Disconnects the client application from BDE.
<u>DbiExtractKey</u>	Retrieves the key value for the current record of the given cursor or from the supplied record buffer.
<u>DbiForceRecordReread</u>	Rereads a single record from the server on demand, refreshing one row only, rather than clearing the cache.
<u>DbiForceReread</u>	Refreshes all buffers associated with the cursor, if necessary.
<u>DbiFormFullName</u>	Returns the fully qualified table name.
<u>DbiFreeBlob</u>	Closes the BLOB handle located within the specified record buffer.
<u>DbiGetBlob</u>	Retrieves data from the specified BLOB field.
<u>DbiGetBlobHeading</u>	Retrieves information about a BLOB field from the BLOB heading in the record buffer.
<u>DbiGetBlobSize</u>	Retrieves the size of the specified BLOB field in bytes.
<u>DbiGetBookMark</u>	Saves the current position of a cursor to the client-supplied buffer called a bookmark.
<u>DbiGetCallBack</u>	Returns a pointer to the function previously registered by the client for the given callback type.
<u>DbiGetClientInfo</u>	Retrieves system-level information about the client application environment.
<u>DbiGetCurrSession</u>	Returns the handle associated with the current session.
<u>DbiGetCursorForTable</u>	Finds the cursor for the given table.
<u>DbiGetCursorProps</u>	Returns the properties of the cursor.
<u>DbiGetDatabaseDesc</u>	Retrieves the description of the specified database from the configuration file.
<u>DbiGetDateFormat</u>	Gets the date format for the current session.
<u>DbiGetDirectory</u>	Retrieves the current working directory or the default directory.

<u>DbiGetDriverDesc</u>	Retrieves a description of a driver.
<u>DbiGetErrorContext</u>	After receiving an error code back from a call, enables the client to probe BDE for more specific error information.
<u>DbiGetErrorEntry</u>	Returns the error description of a specified error stack entry.
<u>DbiGetErrorInfo</u>	Provides descriptive error information about the last error that occurred.
<u>DbiGetErrorString</u>	Returns the message associated with a given error code.
<u>DbiGetField</u>	Retrieves the data contents of the requested field from the record buffer.
<u>DbiGetFieldDescs</u>	Retrieves a list of descriptors for all the fields in the table associated with the cursor.
<u>DbiGetFieldTypeDesc</u>	Retrieves a description of the specified field type.
<u>DbiGetFilterInfo</u>	Retrieves information about a specified filter.
<u>DbiGetIndexDesc</u>	Retrieves the properties of the given index associated with the cursor.
<u>DbiGetIndexDescs</u>	Retrieves index properties.
<u>DbiGetIndexForField</u>	Returns the description of any useful index on the specified field.
<u>DbiGetIndexSeqNo</u>	Retrieves the ordinal number of the index in the index list of the specified cursor.
<u>DbiGetIndexTypeDesc</u>	Retrieves a description of the index type.
<u>DbiGetLdName</u>	Retrieves the name of the language driver associated with the specified object name (table name).
<u>DbiGetLdObj</u>	Retrieves the language driver object associated with the given cursor.
<u>DbiGetLinkStatus</u>	Returns the link status of the cursor.
<u>DbiGetNetUserName</u>	Retrieves the user's network login name. User names should be available for all networks supported by Microsoft Windows.
<u>DbiGetNextRecord</u>	Retrieves the next record in the table associated with the cursor.
<u>DbiGetNumberFormat</u>	Gets the number format for the current session.
<u>DbiGetObjFromName</u>	Returns an object handle of the specified type or with the given name, if any.
<u>DbiGetObjFromObj</u>	Returns an object of the specified object type associated with or derived from a given object.
<u>DbiGetPriorRecord</u>	Retrieves the previous record in the table associated with the given cursor.
<u>DbiGetProp</u>	Returns a property of an object.
<u>DbiGetRecord</u>	Retrieves the current record, if any, in the table associated with the cursor.
<u>DbiGetRecordCount</u>	Retrieves the current number of records associated with the cursor.
<u>DbiGetRecordForKey</u>	Finds and retrieves a record matching a key and positions the cursor on that record.
<u>DbiGetRelativeRecord</u>	Positions the cursor on a record in the table relative to the current position of the cursor.
<u>DbiGetRintDesc</u>	Retrieves the referential integrity descriptor identified by the referential integrity sequence number and the cursor.
<u>DbiGetSeqNo</u>	Retrieves the sequence number of the current record in the table associated with the cursor.
<u>DbiGetSesInfo</u>	Retrieves the environment settings for the current session.

<u>DbiGetSysConfig</u>	Retrieves BDE system configuration information.
<u>DbiGetSysInfo</u>	Retrieves system status and information.
<u>DbiGetSysVersion</u>	Retrieves the system version information, including the BDE version number, date, and time, and the client interface version number.
<u>DbiGetTableOpenCount</u>	Returns the total number of cursors that are open on the specified table.
<u>DbiGetTableTypeDesc</u>	Returns a description of the capabilities of the table type for the driver type.
<u>DbiGetTimeFormat</u>	Gets the time format for the current session.
<u>DbiGetTranInfo</u>	Retrieves the transaction state.
<u>DbiGetVchkDesc</u>	Retrieves the validity check descriptor identified by the validity check sequence number and the cursor.
<u>DbiInit</u>	Initializes the BDE environment.
<u>DbiInitRecord</u>	Initializes the record buffer to a blank record according to the data types of the fields.
<u>DbiInsertRecord</u>	Inserts a new record into the table associated with the given cursor.
<u>DbilsRecordLocked</u>	Checks if current record is locked.
<u>DbilsTableLocked</u>	Returns the number of locks of a specified type acquired on the table associated with the given session.
<u>DbilsTableShared</u>	Determines whether the table is physically shared or not.
<u>DbiLinkDetail</u>	Establishes a link between two tables such that the detail table has its record set limited to the set of records matching the linking key values of the master table cursor.
<u>DbiLinkDetailToExp</u>	Links the detail cursor to the master cursor using an expression.
<u>DbiLoadDriver</u>	Loads a given driver.
<u>DbiMakePermanent</u>	Changes a temporary table created by <code>DbiCreateTempTable</code> into a permanent table.
<u>DbiModifyRecord</u>	Modifies the current record of table associated with the cursor with the data supplied.
<u>DbiNativeToAnsi</u>	Translates a string in the native language driver to an ANSI string.
<u>DbiOpenBlob</u>	Prepares the cursor's record buffer to access a BLOB field.
<u>DbiOpenCfgInfoList</u>	Returns a handle to an in-memory table listing all the nodes in the configuration file accessible by the specified path.
<u>DbiOpenDatabase</u>	Opens a database in the current session and returns a database handle.
<u>DbiOpenDatabaseList</u>	Creates an in-memory table containing a list of accessible databases and their descriptions.
<u>DbiOpenDriverList</u>	Creates an in-memory table containing a list of driver names available to the client application.
<u>DbiOpenFamilyList</u>	Creates an in-memory table listing the family members associated with a specified table.
<u>DbiOpenFieldList</u>	Creates an in-memory table listing the fields in a specified table and their descriptions.
<u>DbiOpenFieldTypesList</u>	Creates an in-memory table containing a list of field types supported by the table type for the driver type.
<u>DbiOpenFieldXlt</u>	Builds a field translation object that can be used to translate a logical or physical field type into any other compatible logical or physical field type.

<u>DbiOpenFileList</u>	Opens a cursor on the virtual table containing all the tables accessible by the client application and their descriptions.
<u>DbiOpenFunctionArgList</u>	Returns a list of arguments to a data source function.
<u>DbiOpenFunctionList</u>	Returns a description of a data source function.
<u>DbiOpenIndex</u>	Opens the index for the table associated with the cursor.
<u>DbiOpenIndexList</u>	Opens a cursor on an in-memory table listing the indexes on a specified table, along with their descriptions.
<u>DbiOpenIndexTypesList</u>	Creates an in-memory table containing a list of all supported index types for the driver type.
<u>DbiOpenLockList</u>	Creates an in-memory table containing a list of locks acquired on the table associated with the cursor.
<u>DbiOpenRintList</u>	Creates an in-memory table listing the referential integrity links for a specified table, along with their descriptions.
<u>DbiOpenSecurityList</u>	Creates an in-memory table listing record-level security information about a specified table.
<u>DbiOpenSPList</u>	Creates a table containing information about the stored procedures associated with the database.
<u>DbiOpenSPPParamList</u>	Creates a table listing the parameters associated with a specified stored procedure.
<u>DbiOpenTable</u>	Opens the given table for access and associates a cursor handle with the opened table.
<u>DbiOpenTableList</u>	Creates an in-memory table with information about all the tables accessible to the client application.
<u>DbiOpenTableTypesList</u>	Creates an in-memory table listing table type names for the given driver.
<u>DbiOpenUserList</u>	Creates an in-memory table containing a list of users sharing the same network file.
<u>DbiOpenVchkList</u>	Creates an in-memory table containing records with information about validity checks for fields within the specified table.
<u>DbiPackTable</u>	Optimizes table space by rebuilding the table associated with the cursor and releasing any free space.
<u>DbiPutBlob</u>	Writes data into an open BLOB field.
<u>DbiPutField</u>	Writes the field value to the correct location in the supplied record buffer.
<u>DbiQAlloc</u>	Allocates a new statement handle for a prepared query.
<u>DbiQExec</u>	Executes the previously prepared query identified by the supplied statement handle and returns a cursor to the result set, if one is generated.
<u>DbiQExecDirect</u>	Executes a SQL or QBE query and returns a cursor to the result set, if one is generated.
<u>DbiQExecProcDirect</u>	Executes a stored procedure and returns a cursor to the result set, if one is generated.
<u>DbiQFree</u>	Frees the resources associated with a previously prepared query identified by the supplied statement handle.
<u>DbiQGetBaseDescs</u>	Returns the original database, table, and field names of the fields that make up the result set of a query.
<u>DbiQInstantiateAnswer</u>	Creates a permanent table from a cursor handle.
<u>DbiQPrepare</u>	Prepares a SQL or QBE query for execution, and returns a handle to a

	statement containing the prepared query.
<u>DbiQPrepareProc</u>	Prepares and optionally binds parameters for a stored procedure.
<u>DbiQSetParams</u>	Associates data with parameter markers embedded within a prepared query.
<u>DbiQSetProcParams</u>	Binds parameters for a stored procedure prepared with DbiQPrepareProc.
<u>DbiReadBlock</u>	Reads a specified number of records (starting from the next position of the cursor) into a buffer.
<u>DbiRegenIndex</u>	Regenerates an index to make sure that it is up-to-date (all records currently in the table are included in the index and are in the index order).
<u>DbiRegenIndexes</u>	Regenerates all out-of-date indexes on a given table.
<u>DbiRegisterCallBack</u>	Registers a callback function for the client application.
<u>DbiRelPersistTableLock</u>	Releases the persistent table lock on the specified table.
<u>DbiRelRecordLock</u>	Releases the record lock on either the current record of the cursor or only the locks acquired in the current session.
<u>DbiRelTableLock</u>	Releases table locks of the specified type associated with the current session (the session in which the cursor was created).
<u>DbiRenameTable</u>	Renames the table and all of its resources to the new name specified.
<u>DbiResetRange</u>	Removes the specified table's limited range previously established by the function DbiSetRange.
<u>DbiSaveChanges</u>	Forces all updated records associated with the table to be written to disk.
<u>DbiSetCurrSession</u>	Sets the current session of the client application to the session associated with <i>hSes</i> .
<u>DbiSetDateFormat</u>	Sets the date format for the current session.
<u>DbiSetDirectory</u>	Sets the current directory for a standard database.
<u>DbiSetFieldMap</u>	Sets a field map of the table associated with the given cursor.
<u>DbiSetLockRetry</u>	Sets the table and record lock retry time for the current session.
<u>DbiSetNumberFormat</u>	Sets the number format for the current session.
<u>DbiSetPrivateDir</u>	Sets the private directory for the current session.
<u>DbiSetProp</u>	Sets the specified property of an object to a given value.
<u>DbiSetRange</u>	Sets a range on the result set associated with the cursor.
<u>DbiSetTimeFormat</u>	Sets the time format for the current session.
<u>DbiSetToBegin</u>	Positions the cursor to BOF (just before the first record).
<u>DbiSetToBookMark</u>	Positions the cursor to the location saved in the specified bookmark.
<u>DbiSetToCursor</u>	Sets the position of one cursor (the destination cursor) to that of another (the source cursor).
<u>DbiSetToEnd</u>	Positions the cursor to EOF (just after the last record).
<u>DbiSetToKey</u>	Positions an index-based cursor on a key value.
<u>DbiSetToRecordNo</u>	Positions the cursor of a dBASE table to the given physical record number.
<u>DbiSetToSeqNo</u>	Positions the cursor to the specified sequence number of a Paradox table.

<u>DbiSortTable</u>	Sorts an opened or closed table, either into itself or into a destination table. There are options to remove duplicates, to enable case-insensitive sorts and special sort functions, and to control the number of records sorted.
<u>DbiStartSession</u>	Starts a new session for the client application.
<u>DbiSwitchToIndex</u>	Allows the user to change the active index order of the given cursor.
<u>DbiTimeDecode</u>	Decodes time into separate components (hours, minutes, milliseconds).
<u>DbiTimeEncode</u>	Encodes separate time components into time for use by DbiPutField and other functions.
<u>DbiTimeStampDecode</u>	Extracts separate encoded date and time components from the timestamp.
<u>DbiTimeStampEncode</u>	Encodes the encoded date and encoded time into a timestamp.
<u>DbiTranslateField</u>	Translates a logical or physical field value to any compatible logical or physical field value.
<u>DbiTranslateRecordStructure</u>	Translates the source driver's physical or logical fields to equivalent physical or logical fields of the destination driver.
<u>DbiTruncateBlob</u>	Shortens the size of the contents of a BLOB field, or deletes the contents of a BLOB field from the record, by shortening it to zero.
<u>DbiUndeleteRecord</u>	Undeletes a dBASE record that has been marked for deletion (a "soft" delete).
<u>DbiUnlinkDetail</u>	Removes a link between two cursors.
<u>DbiUseIdleTime</u>	Allows BDE to accomplish background tasks during times when the client application is idle.
<u>DbiValidateProp</u>	Validates a property.
<u>DbiVerifyField</u>	Verifies that the data specified is a valid data type for the field specified, and that all validity checks in place for the field are satisfied. It can also be used to check if a field is blank.
<u>DbiWriteBlock</u>	Writes a block of records to the table associated with the cursor.

DbiAcqPersistTableLock {button C
Examples,JI(">example","exdbiacqpersisttablelock")} {button Delphi
Examples,JI(">example","dexdbiacqpersisttablelock")}

C syntax

```
DBIResult DBIFN DbiAcqPersistTableLock (hDb, pszTableName, [pszDriverType]);
```

Delphi syntax

```
function DbiAcqPersistTableLock (hDb: hDBIDb; pszTableName: PChar;  
    pszDriverType: PChar): DBIResult stdcall;
```

Description

DbiAcqPersistTableLock acquires an exclusive persistent lock on the table that prevents other users from using the table or creating a table of the same name.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

pszTableName Type: pCHAR (Input)

Specifies the pointer to table name. For Paradox, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)

Specifies the pointer to the driver type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database.

For Paradox tables, *pszDriverType* is required if the client application wants to overwrite the default file extension, including the situation where *pszTableName* is terminated with a period(.) *pszDriverType* must be szPARADOX.

If *pszTableName* does not supply the default extension, and *pszTableType* is NULL, DbiOpenTable tries to open the table with the default file extension of all file-based drivers listed in the configuration file in the order that the drivers are listed.

Usage

This function can be used to acquire an exclusive lock on a non-existent table as a way to reserve the table name. The function fails if the table is already in use. You cannot use DbiSetLockRetry to retry persistent locks.

dBASE: This function is not supported for dBASE tables.

SQL: This function depends on the capabilities of the server. Some servers provide non-blocking table locks; others provide blocking table locks only; others don't provide table locking. In no case is table locking truly persistent, however. If table locking is supported for the server but locks are not held across transactions, the lock is automatically reacquired after transaction commit. If the application requires a commit, it is responsible for insuring that the window of exposure between lock release and reacquisition has not impacted its consistency requirements. This function is provided to enable a degree of consistency with other drivers. It is recommended that transactions or transactions combined with explicit locking be used for SQL.

Prerequisites

The client application must have exclusive access to the table; if another user is accessing the table, the attempt to lock the table fails.

Completion state

The acquired persistent lock must be explicitly released by the client application. To release the lock, the client application that placed the lock must call [DbiRelPersistTableLock](#).

DbiResult return values

DBIERR_NONE	The persistent lock was acquired successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDPARAM	Either <i>pszTableName</i> or <i>*pszTableName</i> is NULL.
DBIERR_INVALIDFILENAME	An invalid file name was specified by <i>pszTableName</i> .
DBIERR_NOSUCHTABLE	<i>pszTableName</i> is invalid.
DBIERR_UNKNOWNBLTYPE	The driver type specified by <i>pszTableType</i> is invalid.
DBIERR_LOCKED	The table is already opened by another user, or another session.
DBIERR_NOTSUPPORTED	This function is not supported for dBASE tables.

See also

[DbiOpenLockList](#)

C Examples: DbiAcqPersistTableLock

Place a lock on a non-existent table:

```
DBIResult fDbiAcqPersistTableLock(hDBIDb hDb, char *TableName, char *Driver)
{
    DBIResult rslt;
    rslt = Chk(DbiAcqPersistTableLock(hDb, TableName, Driver));
    return rslt;
}
```


Delphi Examples: DbiAcqPersistTableLock

Place a lock on a non-existent table:

This example places and releases persistent lock on the TTable T. This example uses the following input:

```
AcqAndRelPersistTableLock(Table1);
procedure AcqAndRelPersistTableLock(T: TTable);
var
  Drv: PChar;
begin
  with T do begin
    if TableType = ttParadox then
      Drv := StrNew(szParadox)
    else if TableType = ttdBASE then
      Drv := StrNew(szdBASE)
    else Drv := Nil;
    try
      Check(DbiAcqPersistTableLock(DBHandle, PChar(TableName), Drv));
      Check(DbiRelPersistTableLock(DBHandle, PChar(TableName), Drv));
    finally
      if Assigned(Drv) then StrDispose(Drv);
    end;
  end;
end;
```

DbiAcqTableLock {button C
Examples,JI(">example","exdbiacqtablelock")} {button Delphi
Examples,JI(">example","dexdbiacqtablelock")}

C syntax

```
DBIResult DBIFN DbiAcqTableLock (hCursor, eLockType);
```

Delphi syntax

```
function DbiAcqTableLock (hCursor: hDBICur; eLockType: DBILockType):  
    DBIResult stdcall;
```

Description

DbiAcqTableLock acquires a table-level lock on the table associated with the given cursor.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

eLockType Type: DBILockType (Input)
Specifies the table lock type.

Usage

This function is used to prevent other users from updating a table. It can be used to ensure that the data read by the client application is the same data that is stored in the table at that specific moment.

This function is used to acquire a lock of higher precedence than the lock acquired when the cursor was opened. Locks acquired are owned by the session, not the cursor. If a lock cannot be obtained, an error is returned.

Redundant locks can be acquired on the table. For each lock acquired, a separate call to `DbiRelTableLock` is required to release it.

dBASE: If a READ lock is attempted, it is automatically upgraded to a WRITE lock.

Paradox: Both READ locks and WRITE locks can be acquired.

SQL: This function depends on the capabilities of the server. Some servers provide non-blocking table locks; others provide blocking table locks only; others don't provide table locking. If table locking is supported for the server but locks are not held across transactions, the lock is automatically reacquired after transaction commit. If the application requires a commit, it is responsible for insuring that the window of exposure between lock release and reacquisition has not impacted its consistency requirements. This function is provided to enable a degree of consistency with other drivers. It is recommended that transactions or transactions combined with explicit locking be used for SQL.

Completion state

Any cursor opened on a table can release locks placed by any cursor opened on that table within the same session. When the last cursor on the table is closed, the locks on the table are automatically released.

DbiResult return values

DBIERR_NONE	The lock was acquired successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_LOCKED	The requested lock is not available.
DBIERR_TBLLOCKLIMIT	The lock limit has been reached.

See also

[DbiRelTableLock](#), [DbilsTableLocked](#), [DbiOpenLockList](#), [DbiAcqPersistTableLock](#), [DbiOpenTable](#)

eLockType

eLockType can be one of the following values:

Lock Type	Description
dbiWRITELOCK	When a write lock is placed, it prevents other sessions from placing any locks. For SQL tables, a write lock is the same as a read lock; behavior varies according to the server.
dbiREADLOCK	When a read lock is placed, it prevents other users from placing a write lock. For dBASE tables, a read lock is automatically upgraded to a write lock. For SQL tables, a write lock is the same as a read lock; behavior varies according to the server.

Note: Exclusive locks and NO locks are not considered acquired table locks. They are achieved with the DbiOpenTable function, and are owned by the cursor, rather than the session.

Note: Persistent locks are acquired table locks for Paradox and SQL tables only; acquired by the DbiAcqPersistTableLock function.

C Examples: DbiAcqTableLock

Place a write lock on an existing table:

```
DBIResult fDbiAcqTableLock(hDBICur hTmpCur)
{
    DBIResult rslt;
    rslt = Chk(DbiAcqTableLock(hTmpCur, dbiWRITELOCK));
    return rslt;
}
```

Delphi Examples: DbiAcqTableLock

Place a write lock on an existing table:

Delphi users should use the method TTable.LockTable rather than directly calling DbiAcqTableLock. This method is defined as:

```
procedure TTable.LockTable(LockType: TLockType);
```

The following code places a write lock on a TTable object called Table1:

```
Table1.LockTable(ltWriteLock);
```

Place a write lock on the specified cursor's table:

Delphi users should use TTable.LockTable: This example uses the following input:

```
fDbiAcqTableLock(Table1.Handle);  
procedure fDbiAcqTableLock(hTmpCur: hDBICur);  
begin  
  Check(DbiAcqTableLock(hTmpCur, dbiWRITELOCK));  
end;
```

DbiActivateFilter {button C
Examples,JI(">example","exdbiactivatefilter")} {button Delphi
Examples,JI(">example","dexdbiaddfilter")}

C syntax

```
DBIResult DBIFN DbiActivateFilter (hCursor, [hFilter]);
```

Delphi syntax

```
function DbiActivateFilter (hCursor: hDBICur; hFilter: hDBIFilter): DBIResult  
    stdcall;
```

Description

DbiActivateFilter activates a filter.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle of the cursor for which the filter is to be activated.

hFilter Type: hDBIFilter (Input)
Specifies the filter handle of the filter to be activated.

Usage

A single cursor can have many filters associated with it. If the filter handle is NULL, all filters for this cursor are activated. See [DbiAddFilter](#) for a detailed explanation of filters.

Prerequisites

The filter must have been successfully added with [DbiAddFilter](#), which returns the filter handle.

Completion state

Once the filter is activated, the filter controls the record set and all operations for that cursor are affected. Only those records which meet the criteria defined by the filter will be retrieved. For example, moving to the next record moves the cursor to the next record that passes the filter criteria, not to the next sequential record. The filter provides a restricted view of live data.

DbiResult return values

DBIERR_NONE	The filter was activated successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NOSUCHFILTER	The specified filter handle is invalid.

See also

[DbiAddFilter](#), [DbiDeactivateFilter](#), [DbiDropFilter](#)

C Examples: `DbiActivateFilter`

Limiting the records which are available in the table using a filter.

This example limits records to those with a `CUST_NO` field greater than 1500.


```

canExp.iLiteralStart = (UINT16)(uSizeCanExpr + uSizeNodes);
                                // The offset in the buffer where
the
                                // literals start.

// Allocate contiguous memory space to hold
// 1) Header information i.e. the CANExpr structure
// 2) Binary, field and constant nodes i.e. the Nodes structure
// 3) Literal and constant pool i.e. field names and constant values
pcanExpr = (pBYTE)malloc(uTotalSize * sizeof(BYTE));
if (pcanExpr == NULL)
{
    Screen("    Could not allocate memory...");
    DbtCloseCursor(&hCur);
    CloseDbAndExit(&hDb);
    Screen("\r\n*** End of Example ***");
    return;
}

// Initialize the filter expression by placing header, nodes and
// pool into pcanexpr

// Move header information into pcanexpr. pcanExpr will now look as
follows:
// **canExp**|                |                |
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove(pcanExpr, &canExp, uSizeCanExpr);

// Move node structure into pcanexpr. pcanExpr will now look as
follows:
// **canExp**|**Node Structure**|                |
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove(&pcanExpr[uSizeCanExpr], &Nodes, uSizeNodes);

// Move the literal into pcanexpr. pcanExpr will now look as follows:
// **canExp**|**Node Structure**|**szField                |
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove(&pcanExpr[uSizeCanExpr + uSizeNodes],
            szField, strlen(szField) + 1); // First literal "CUST_NO"

// Move the literal into pcanexpr. pcanExpr will now look as follows:
// **canExp**|**Node Structure**|**szField*****fConst**|
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)

```

```

memmove(&pcanExpr[uSizeCanExpr + uSizeNodes + strlen(szField) + 1],
        &fConst, sizeof(fConst));          // Second literal 1500.00

rslt = DbiSetToBegin(hCur);
ChkRslt(rslt, "SetToBegin");

Screen("\r\n    Add a filter to the %s table which will limit"
      " the records\r\n          which are displayed to those whose"
      " %s field is greater than %.1lf...", szTblName, szField,
fConst);
rslt = DbiAddFilter(hCur, 0L, 1, FALSE, (pCANExpr)pcanExpr, NULL,
                  &hFilter);
if (ChkRslt(rslt, "AddFilter") != DBIERR_NONE)
{
    rslt = DbiCloseCursor(&hCur);
    ChkRslt(rslt, "CloseCursor");
    free(pcanExpr);
    CloseDbAndExit(&hDb);
    Screen("\r\n*** End of Example ***");
    return;
}

// Activate the filter.
Screen("    Activate the filter on the %s table...", szTblName);
rslt = DbiActivateFilter(hCur, hFilter);
ChkRslt(rslt, "ActivateFilter");

rslt = DbiSetToBegin(hCur);
ChkRslt(rslt, "SetToBegin");

Screen("\r\n    Display the %s table with the filter set...",
szTblName);
DisplayTable(hCur, uNumRecs);

Screen("\r\n    Deactivate the filter...");
rslt = DbiDeactivateFilter(hCur, hFilter);
ChkRslt(rslt, "DeactivateFilter");

Screen("\r\n    Drop the filter...");
rslt = DbiDropFilter(hCur, hFilter);
ChkRslt(rslt, "DropFilter");

rslt = DbiCloseCursor(&hCur);
ChkRslt(rslt, "CloseCursor");

free(pcanExpr);

Screen("    Close the database and exit IDAPI...");
CloseDbAndExit(&hDb);

Screen("\r\n*** End of Example ***");
}

```

Limiting the records which are available in the table using a comparison filter.

This example shows how to use filters to limit the result set of a table. This example does a comparison of the first N digits of a character field.

```

static const char szTblName[] = "cust"; // Name of the table
static const char szTblType[] = szDBASE; // Type of table
static const char szField[] = "CUST_NO"; // Name of the field for the
// third node of the tree.
static const DFLOAT fConst = 1500.0; // Value of the constant for
// the second node of the
tree.

void
Filter (void)
{
    hDBIDb hDb = 0; // Handle to the database.
    hDBICur hCur = 0; // Handle to the table.
    DBIResult rslt; // Return value from IDAPI
functions.
    pBYTE pcanExpr; // Structure containing filter
info.
    hDBIFilter hFilter; // Filter handle.
    UINT16 uSizeNodes; // Size of the nodes in the tree.
    UINT16 uSizeCanExpr; // Size of the header information.
    UINT32 uSizeLiterals; // Size of the literals.
    UINT32 uTotalSize; // Total size of the filter
expression.
    UINT32 uNumRecs = 10; // Number of records to display.
    CANExpr canExp; // Contains the header information.
    struct {
        CANBinary BinaryNode;
        CANField FieldNode;
        CANConst ConstantNode;
    }
Nodes = { // Nodes of the filter tree.
{
    // Offset 0
    nodeBINARY, // canBinary.nodeClass
    canGT, // canBinary.canOp
    sizeof(Nodes.BinaryNode), // canBinary.iOperand1
    sizeof(Nodes.BinaryNode) + sizeof(Nodes.FieldNode), // canBinary.iOperand2
    // Offsets in the Nodes array
},
{
    // Offset sizeof(Nodes.BinaryNode)
    nodeFIELD, // canField.nodeClass
    canFIELD, // canField.canOp
    1, // canField.iFieldNum
    0, // canField.iNameOffset: szField is
the // literal at offset 0
},
{
    // Offset sizeof(Nodes.BinaryNode) + sizeof(Nodes.FieldNode)
    nodeCONST, // canConst.nodeClass
    canCONST, // canConst.canOp
    fldFLOAT, // canConst.iType
    sizeof(fConst), // canConst.iSize
    8, // canConst.iOffset: fconst is the

```



```

canExpr.iLiteralStart = (UINT16)(uSizeCanExpr + uSizeNodes);
                                // The offset in the buffer where
the                                // literals start.

// Allocate contiguous memory space to hold
// 1) Header information i.e. the CANExpr structure
// 2) Binary, field and constant nodes i.e. the Nodes structure
// 3) Literal and constant pool i.e. field names and constant values
pcanExpr = (pBYTE)malloc(uTotalSize * sizeof(BYTE));
if (pcanExpr == NULL)
{
    Screen("    Could not allocate memory...");
    DbtCloseCursor(&hCur);
    CloseDbAndExit(&hDb);
    Screen("\r\n*** End of Example ***");
    return;
}

// Initialize the filter expression by placing header, nodes and
// pool into pcanexpr

// Move header information into pcanexpr. pcanExpr will now look as
follows:
// **canExp**|                |                |
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove (pcanExpr, &canExp, uSizeCanExpr);

// Move node structure into pcanexpr. pcanExpr will now look as
follows:
// |**canExp**|**Node Structure**|                |
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove (&pcanExpr[uSizeCanExpr], &Nodes, uSizeNodes);

// Move the literal into pcanexpr. pcanExpr will now look as follows:
// |**canExp**|**Node Structure**|**szField                |
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove (&pcanExpr[uSizeCanExpr + uSizeNodes],
            szField, strlen(szField) + 1); // First literal "CUST_NO"

// Move the literal into pcanexpr. pcanExpr will now look as follows:
// |**canExp**|**Node Structure**|**szField*****fConst**|
// | CANExpr |    All Nodes    | Literal, Constant Pool |
// |-----|-----|-----|
// 0
sizeof(uTotalSize)

```

```

memmove(&pcanExpr[uSizeCanExpr + uSizeNodes + strlen(szField) + 1],
        &fConst, sizeof(fConst));          // Second literal 1500.00

rslt = DbiSetToBegin(hCur);
ChkRslt(rslt, "SetToBegin");

Screen("\r\n    Add a filter to the %s table which will limit"
      " the records\r\n          which are displayed to those whose"
      " %s field is greater than %.1lf...", szTblName, szField,
fConst);
rslt = DbiAddFilter(hCur, 0L, 1, FALSE, (pCANExpr)pcanExpr, NULL,
                  &hFilter);
if (ChkRslt(rslt, "AddFilter") != DBIERR_NONE)
{
    rslt = DbiCloseCursor(&hCur);
    ChkRslt(rslt, "CloseCursor");
    free(pcanExpr);
    CloseDbAndExit(&hDb);
    Screen("\r\n*** End of Example ***");
    return;
}

// Activate the filter.
Screen("    Activate the filter on the %s table...", szTblName);
rslt = DbiActivateFilter(hCur, hFilter);
ChkRslt(rslt, "ActivateFilter");

rslt = DbiSetToBegin(hCur);
ChkRslt(rslt, "SetToBegin");

Screen("\r\n    Display the %s table with the filter set...",
szTblName);
DisplayTable(hCur, uNumRecs);

Screen("\r\n    Deactivate the filter...");
rslt = DbiDeactivateFilter(hCur, hFilter);
ChkRslt(rslt, "DeactivateFilter");

Screen("\r\n    Drop the filter...");
rslt = DbiDropFilter(hCur, hFilter);
ChkRslt(rslt, "DropFilter");

rslt = DbiCloseCursor(&hCur);
ChkRslt(rslt, "CloseCursor");

free(pcanExpr);

Screen("    Close the database and exit IDAPI...");
CloseDbAndExit(&hDb);

Screen("\r\n*** End of Example ***");
}

```

Limiting the records which are available in the table using a continue filter.

This example shows how to use filters to limit the result set of a table. This example shows the use of a canContinue node. A Continue node is used to stop evaluating when a certain condition is false for the first time. This filter will limit the result set to those customers living in Hawaii, you are listed in the table before the customer with ID 1624.

```

static const char szTblName[] = "customer";
static const char szTblType[] = szPARADOX;
static const CHAR szField1[] = "Customer No";
static const CHAR szField2[] = "State/Prov";
static const CHAR szConst[] = "HI";
static const DFLOAT fConst = 1624.0;

void
FiltCont (void)
{
    hDBIDb          hDb = 0;          // Handle to the database.
    hDBICur         hCur = 0;       // Handle to the table.
    DBIResult       rslt;            // Return value from IDAPI functions.
    pBYTE           pcanExpr;        // Structure containing
                                    // filter info.
    hDBIFilter      hFilter;         // Filter handle.
    UINT16          uSizeNodes;      // Size of the nodes in the
                                    // tree.
    UINT16          uSizeCanExpr;    // Size of the header
                                    // information.
    UINT32          uSizeLiterals;   // Size of the literals.
    UINT32          uTotalSize;      // Total size of the filter
                                    // expression.
    UINT32          uNumRecs = 10;    // Number of records to
                                    // display.
    CANExpr         canExp;          // Contains the header
                                    // information.

    struct {
        CANBinary BinaryNode1;
        CANBinary BinaryNode2;
        CANField FieldNode1;
        CANConst ConstantNode1;
        CANUnary UnaryNode1;
        CANBinary BinaryNode3;
        CANField FieldNode2;
        CANConst ConstantNode2;
    } Nodes = {                      // Nodes of the filter tree.
    {
        // Offset 0. Node 1.  sizeof(Nodes.BinaryNode1)
        nodeBINARY,                  // canBinary.nodeClass
        canAND,                      // canBinary.canOp
        sizeof(Nodes.BinaryNode1),   // canBinary.iOperand1 - node 2

        sizeof(Nodes.BinaryNode1) + sizeof(Nodes.BinaryNode2) +
        sizeof(Nodes.FieldNode1) + sizeof(Nodes.ConstantNode1),
                                    // canBinary.iOperand2 - node 5
    },
    {
        // Offset 8. Node 2.  sizeof(Nodes.BinaryNode2)
        nodeBINARY,                  // canBinary.nodeClass
        canEQ ,                      // canBinary.canOp
        sizeof(Nodes.BinaryNode1) + sizeof(Nodes.BinaryNode2),
                                    // canBinary.iOperand1 - node 3

        sizeof(Nodes.BinaryNode1) + sizeof(Nodes.BinaryNode2) +

```

```

sizeof(Nodes.FieldNode1), // canBinary.iOperand2 - node 4
},
{
// Offset 16. Node 3. sizeof(Nodes.FieldNode1)
nodeFIELD, // canField.nodeClass
canFIELD, // canField.canOp
5, // canField.iFieldNum
12, // canField.iNameOffset: szField2
}, // is the literal at offset
{ // strlen(szField1) + 1

// Offset 24. Node 4. sizeof(Nodes.ConstantNode1)
nodeCONST, // canConst.nodeClass
canCONST, // canConst.canOp
fldZSTRING, // canConst.iType
3, // canConst.iSize
31, // canConst.iOffset: fconst is
}, // the literal at offset
{ // strlen(szField1) + 1 +
// sizeof(fConst) +
// strlen(szField2) + 1

// Offset 34. Node 5. sizeof(Nodes.UnaryNode1)
nodeUNARY, // canBinary.nodeClass
canCONTINUE, // canBinary.canOp
sizeof(Nodes.BinaryNode1) + sizeof(Nodes.BinaryNode2) +

sizeof(Nodes.FieldNode1) + sizeof(Nodes.ConstantNode1) +
sizeof(Nodes.UnaryNode1), // canBinary.iOperand1 - node 6
}, // Offsets in the Nodes array
{

// Offset 40. Node 6. sizeof(Nodes.BinaryNode3)
nodeBINARY, // canBinary.nodeClass
canNE , // canBinary.canOp
sizeof(Nodes.BinaryNode1) + sizeof(Nodes.BinaryNode2) +
sizeof(Nodes.FieldNode1) + sizeof(Nodes.ConstantNode1) +
sizeof(Nodes.UnaryNode1) + sizeof(Nodes.BinaryNode3),
// canBinary.iOperand1 - node 7

sizeof(Nodes.BinaryNode1) + sizeof(Nodes.BinaryNode2) +
sizeof(Nodes.FieldNode1) + sizeof(Nodes.ConstantNode1) +
sizeof(Nodes.UnaryNode1) + sizeof(Nodes.BinaryNode3) +
sizeof(Nodes.FieldNode2), // canBinary.iOperand2 - node 8
},
{

// Offset 48. Node 7. sizeof(Nodes.FieldNode2)
nodeFIELD, // canField.nodeClass
canFIELD, // canField.canOp
1, // canField.iFieldNum
0, // canField.iNameOffset:
}, // szField1 is the literal at
{ // offset 0.

// Offset 56. Node 8. Size 14 Bytes
nodeCONST, // canConst.nodeClass
canCONST, // canConst.canOp

```

```

        fldFLOAT,                // canConst.iType
        sizeof(fConst),         // canConst.iSize
        23,                     // canConst.iOffset: fconst is
    });                          // the literal at offset
                                // strlen(szField1) + 1 +
                                // strlen(szField2) + 1

Screen("*** Continue Filter Example ***\r\n");

BREAK_IN_DEBUGGER();

Screen("    Initializing IDAPI...");
if (InitAndConnect(&hDb) != DBIERR_NONE)
{
    Screen("\r\n*** End of Example ***");
    return;
}

Screen("    Setting the database directory...");
rslt = DbiSetDirectory(hDb, (pCHAR)szTblDirectory);
ChkRslt(rslt, "SetDirectory");

Screen("    Open the %s table...", szTblName);
rslt = DbiOpenTable(hDb, (pCHAR)szTblName, (pCHAR)szTblType, NULL,
NULL, 0,
                        dbiREADWRITE, dbiOPENSHARED, xltFIELD, FALSE, NULL,
                        &hCur);
if (ChkRslt(rslt, "OpenTable") != DBIERR_NONE)
{
    CloseDbAndExit(&hDb);
    Screen("\r\n*** End of Example ***");
    return;
}

// Go to the beginning of the table
rslt = DbiSetToBegin(hCur);
ChkRslt(rslt, "SetToBegin");

Screen("\r\n    Display the %s table...", szTblName);
DisplayTable(hCur, uNumRecs);

// Size of the nodes.
uSizeNodes    = sizeof(Nodes);
// Size of the literals.
uSizeLiterals  = strlen(szField1) + 1 + sizeof(fConst) +
                strlen(szField2) + 1 + strlen(szConst)
                + 1;
// Size of the header information.
uSizeCanExpr   = sizeof(CANExpr);
// Total size of the filter.
uTotalSize     = uSizeCanExpr + uSizeNodes + uSizeLiterals;
// Initialize the header information
canExp.iVer    = 1; // Version.
canExp.iTotalSize = (UINT16)uTotalSize; // Total size of the filter.
canExp.iNodes  = 8; // Number of nodes.

```

```

canExp.iNodeStart = uSizeCanExpr; // The offset in the
                                //   buffer where the
                                //   expression nodes
                                //   start.
// The offset in the buffer where the literals start.
canExp.iLiteralStart = (UINT16)(uSizeCanExpr + uSizeNodes);

// Allocate contiguous memory space to hold
// 1) Header information i.e. the CANExpr structure
// 2) Compare, field and constant nodes i.e. the Nodes structure
// 3) Literal and constant pool i.e. field names and constant values
pcanExpr = (pBYTE)malloc(uTotalSize * sizeof(BYTE));
if (pcanExpr == NULL)
{
    Screen("    Could not allocate memory...");
    DbiCloseCursor(&hCur);
    CloseDbAndExit(&hDb);
    Screen("\r\n*** End of Example ***");
    return;
}

// Initialize the filter expression by placing header, nodes and
// pool into pcanexpr

// Move the literal into pcanexpr.  pcanExpr will now look as follows:
// |**canExp*|          |          |          |          |
// | CANExpr |   All Nodes   |   Literal, Constant Pool   |
// |-----|-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove(pcanExpr, &canExp, uSizeCanExpr); // Insert Header Information

// Move the literal into pcanexpr.  pcanExpr will now look as follows:
// |**canExp*|**Node Structure*|          |          |
// | CANExpr |   All Nodes   |   Literal, Constant Pool   |
// |-----|-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove(&pcanExpr[uSizeCanExpr], &Nodes, uSizeNodes); // Insert Nodes

// Move the literal into pcanexpr.  pcanExpr will now look as follows:
// |**canExp*|**Node Structure*|*szField1*          |
// | CANExpr |   All Nodes   |   Literal, Constant Pool   |
// |-----|-----|-----|-----|
// 0
sizeof(uTotalSize)
    memmove(&pcanExpr[uSizeCanExpr + uSizeNodes],
            szField1, strlen(szField1) + 1); // First litteral

// Move the literal into pcanexpr.  pcanExpr will now look as follows:
// |**canExp*|**Node Structure*|*szField1*szField2*          |
// | CANExpr |   All Nodes   |   Literal, Constant Pool   |
// |-----|-----|-----|-----|
// 0
sizeof(uTotalSize)

```

```

memmove(&pcanExpr[(uSizeCanExpr + uSizeNodes +
                  strlen(szField1) + 1)],
        szField2, strlen(szField2) + 1); // Second literal

// Move the literal into pcanexpr. pcanExpr will now look as follows:
// |**canExp*|**Node Structure*|*szField1*szField2*fConst* |
// | CANExpr | All Nodes | Literal, Constant Pool |
// |-----|
// 0
sizeof(uTotalSize)
memmove(&pcanExpr[(uSizeCanExpr + uSizeNodes +
                  strlen(szField1) + 1 +
                  strlen(szField2) + 1)],
        &fConst, sizeof(fConst)); // First Constant

// Move the literal into pcanexpr. pcanExpr will now look as follows:
// |**canExp*|**Node Structure*|*szField1*szField2*fConst*szConst*|
// | CANExpr | All Nodes | Literal, Constant Pool |
// |-----|
// 0
sizeof(uTotalSize)
memmove(&pcanExpr[(uSizeCanExpr + uSizeNodes +
                  strlen(szField1) + 1 +
                  strlen(szField2) + 1 + sizeof(fConst))],
        szConst, strlen(szConst) + 1); // Second Constant

rslt = DbiSetToBegin(hCur);
ChkRslt(rslt, "SetToBegin");

Screen("\r\n Add a filter to the %s table which will"
       " limit the records\r\n in the result set"
       " to those whose %s field is equal to '%s', until\r\n"
       " the first record where the %s field is equal to
%.11f...",
        szTblName, szField2, szConst, szField1, fConst);
rslt = DbiAddFilter(hCur, 0L, 1, FALSE, (pCANExpr)pcanExpr,
                  NULL, &hFilter);
if (ChkRslt(rslt, "AddFilter") != DBIERR_NONE)
{
    rslt = DbiCloseCursor(&hCur);
    ChkRslt(rslt, "CloseCursor");
    free(pcanExpr);
    CloseDbAndExit(&hDb);
    Screen("\r\n*** End of Example ***");
    return;
}

// Activate the filter.
Screen(" Activate the filter on the %s table...",
        szTblName);
rslt = DbiActivateFilter(hCur, hFilter);
ChkRslt(rslt, "ActivateFilter");

rslt = DbiSetToBegin(hCur);
ChkRslt(rslt, "SetToBegin");

```

```
Screen("\r\n    Display the %s table with the filter"
      " set...", szTblName);
DisplayTable(hCur, uNumRecs);

Screen("\r\n    Deactivate the filter...");
rslt = DbiDeactivateFilter(hCur, hFilter);
ChkRslt(rslt, "DeactivateFilter");

Screen("\r\n    Drop the filter...");
rslt = DbiDropFilter(hCur, hFilter);
ChkRslt(rslt, "DropFilter");

rslt = DbiCloseCursor(&hCur);
ChkRslt(rslt, "CloseCursor");

free(pcanExpr);

Screen("    Close the database and exit IDAPI...");
CloseDbAndExit(&hDb);

Screen("\r\n*** End of Example ***");
}
```

Delphi Examples: DbiActivateFilter

An example for this function is under development and will be provided in an upcoming Help release.

DbiAddAlias {button C Examples,JI(">example","exdbiaddalias")} {button Delphi Examples,JI(">example","dexdbiaddalias")}

C syntax

```
DBIResult DbiAddAlias( [hCfg], pszAliasName, pszDriverType, pszParams,
    bPersistent );
```

Delphi syntax

```
function DbiAddAlias (hCfg: hDBICfg; pszAliasName: PChar; pszDriverType:
    PChar; pszParams: PChar; bPersist: Bool): DBIResult stdcall;
```

Description

Adds an alias to the configuration file specified by the parameter *hCfg*.

Parameters

hCfg Type: hDBICfg (Input)

Specifies the configuration file to be used. This parameter is required to be NULL, indicating that the new alias is added to the configuration file for the current session.

pszAliasName Type: pCHAR (Input)

Pointer to the alias name. This is the name of the new alias that is to be added.

pszDriverType Type: pCHAR (Input)

Pointer to the driver type. This is the driver type for the new alias that is to be added. If this parameter is NULL, the alias will be for the STANDARD database. If *szPARADOX*, *szDBASE*, or *szASCII* are passed, this will add an entry in the STANDARD database alias generated to indicate that this will be the preferred driver type. If a driver name is passed in, it must reference a driver name that exists in the configuration file being modified.

pszParams Type: pCHAR (Input)

Pointer to a list of optional parameters. This is a list defined as follows:

```
"AliasOption: Option Data[;AliasOption: Option Data][;...]"
```

AliasOption must correspond to a value retrieved by [DbiOpenCfgInfoList](#). For a STANDARD database alias, the only valid parameter is PATH, all others will be ignored (no errors).

bPersistent Type: BOOL (Input)

This determines the scope of the new alias:

TRUE	Stored in the configuration file for future sessions.
FALSE	For use only in this session.

Examples

To set the path for a STANDARD database use:

```
"PATH:c:\mydata"
```

To set the server name and user name for a SQL driver use:

```
"SERVER NAME: server:/path/database;USER NAME: myname"
```

Usage

The alias added by this function will have whatever default values are associated with the driver specified unless they are specifically mentioned in the *pszParams* parameter. For a standard database alias, all entries in *pszParams* except PATH will be ignored. You can use [DbiOpenCfgInfoList](#) to modify the default values after *DbiAddAlias* has been called.

Prerequisites

[DbiInit](#) must be called prior to calling *DbiAddAlias*.

DbiResult return values

DBIERR_INVALIDPARAM Null alias name. *szASCII*, *szDBASE* and *szPARADOX* are entered as

	a STANDARD alias with the respective default driver.
DBIERR_NONE	The alias was added successfully.
DBIERR_NAMENOTUNIQUE	Another alias with the same name already exists (applicable only when <i>bPersistent</i> is TRUE).
DBIERR_OBJNOTFOUND	One (or more) of the optional parameters passed in through <i>pszParams</i> was not found as a valid type in the driver section of the configuration file.
DBIERR_UNKNOWNDRIVER	No driver name found in configuration file matching <i>pszDriverType</i> .

See Also

[DbiInit](#), [DbiOpenCfgInfoList](#)

C Examples: DbiAddAlias

Example 1: Add a STANDARD database alias to the configuration file.

This example uses the following input:

```
fDbiAddAlias1("TestAlias", "PATH:C:\\BDE32\\EXAMPLES\\TABLES");
DBIResult fDbiAddAlias1(char *AliasName, char *AliasPath)
{
    DBIResult    rslt;
    rslt = Chk(DbiAddAlias(NULL, AliasName, NULL, AliasPath, TRUE));
    return rslt;
}
```

Example 2: Add an InterBase database alias to the configuration file.

This example uses the following input:

```
fDbiAddAlias2("RemoteAlias",
"PATH:frobosrv:d:/interbas;"
"SERVER NAME:frobosrv:d:/interbas/slim.gdb;"
"USER NAME:test;"
"SQLQRYMODE:SERVER;"
"SQLPASSTHRU MODE:SHARED NOAUTOCOMMIT");
```

Note: The last parameter in the string does not have a semicolon (;) at the end.

```
DBIResult fDbiAddAlias2(char *AliasName, char *AliasPath)
{
    DBIResult    rslt;
    rslt = Chk(DbiAddAlias(NULL, AliasName, "INTRBASE", AliasPath, TRUE));
    return rslt;
}
```

Delphi Examples: DbiAddAlias

Example 1: Add a STANDARD database alias to the configuration file.

This example uses the following input:

```
fDbiAddAlias1('TestAlias', 'PATH:C:\BDE32\EXAMPLES\TABLES');
procedure fDbiAddAlias1(AliasName, AliasPath: String);
begin
  Check(DbiAddAlias( Nil, PChar(AliasName), Nil, PChar(AliasPath), True));
end;
```

Example 2: Add an InterBase database alias to the configuration file.

This example uses the following input:

```
fDbiAddAlias2('RemoteAlias', 'PATH:frobosrv:d:/interbas;' +
  'SERVER NAME:frobosrv:d:/interbas/slim.gdb;' +
  'USER NAME:test;' +
  'SQLQRYMODE:SERVER;' +
  'SQLPASSTHRU MODE:SHARED NOAUTOCOMMIT');
```

Note: The last parameter in the string does not have a semicolon (;) at the end.

```
procedure fDbiAddAlias2(AliasName, AliasPath: String);
begin
  Check(DbiAddAlias( Nil, PChar(AliasName), 'INTRBASE', PChar(AliasPath),
    True));
end;
```

DbiAddFilter {button C
Examples,JI(">example","exdbiactivatefilter")} {button Delphi
Examples,JI(">example","dexdbiaddfilter")}

C syntax

```
DBIResult DBIFN DbiAddFilter (hCursor, [iClientData], [iPriority],
    [bCanAbort], pcanExpr, [pfFilter], phFilter);
```

Delphi syntax

```
function DbiAddFilter (hCursor: hDBICur; iClientData: Longint; iPriority:
    Word; bCanAbort: Bool; pcanExpr: pCANExpr; pfFilter: pfGENFilter; var
    hFilter: hDBIFilter): DBIResult stdcall;
```

Description

DbiAddFilter adds a filter to a table. When activated with [DbiActivateFilter](#), only those records in the table that satisfy the filter condition are seen.

Parameters

<i>hCursor</i>	Type: hDBICur	(Input)
Specifies the cursor handle of the table to which the filter is being applied.		
<i>iClientData</i>	Type: UINT32	(Input)
Not currently used. Must be 0.		
<i>iPriority</i>	Type: UINT16	(Input)
Not currently used. Must be 1.		
<i>bCanAbort</i>	Type: BOOL	(Input)
Not currently used. Must be FALSE.		
<i>pcanExpr</i>	Type: pCANExpr	(Input)
Pointer to the CANExpr structure, which describes the filter condition as a Boolean expression in prefix format.		
<i>pfFilter</i>	Type: pfGENFilter	(Input)
Not currently used. Must be NULL.		
<i>phFilter</i>	Type: phDBIFilter	(Output)
Pointer to the filter handle.		

Usage

Filters subset result sets. They are similar to a SQL statement's WHERE clause, but are expressed in prefix format. The filter must be specified by the client as a filter expression returning TRUE or FALSE. Multiple filters are allowed per table, and if more than one filter is active, records that violate any active filter condition are not included in the result set. Filters can be switched on and off when needed (using [DbiActivateFilter](#) and [DbiDeactivateFilter](#)), and are automatically dropped when the table is closed.

DbiGetSeqNo is not influenced by filters; the sequence number returned is that of the record in the original table. DbiGetRecordCount does not guarantee to return an exact count of all records in the filter set. Drivers can return the count of all records (including those not satisfying the filter condition) or can return an estimate.

Note: Passthrough SQL query cursors do not support this function currently.

DbiResult return values

DBIERR_NONE	The filter has been successfully added.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NA	The filter condition described by the filter expression could not be handled by the driver.

See also

[DbiActivateFilter](#), [DbiDeactivateFilter](#), [DbiDropFilter](#)

C Examples: DbiAddFilter

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiParamFilter

Add a filter that only shows records that the specified field is not NULL. This example uses the following input:

```
fDbiParamFilter(Table1, Table1.FieldByName('Addr1'), hFilter);
```

Note: When done with filter, call DbiParamDeactivateFilter and DbiParamDropFilter. If table is connected to data aware controls, call TTable.Refresh.

```
procedure fDbiParamFilter(Table: TTable; Field: TField; var hF: hDBiParamFilter);
type
  // Setup the node structure
  TNodes = record
    UNode: CANUnary;
    FNode: CANField;
  end;

var
  Nodes: TNodes;
  Expression: CANExpr;
  pCan: pByte;

begin
  // Unary Node - set the operator to NOT BLANK or (NOT NULL)
  with Nodes.UNode do
  begin
    nodeClass := nodeUNARY;
    canOp := canNOTBLANK;
    iOperand1 := 12;
  end;
  // Field Node - set the field number and literal pool offset
  with Nodes.FNode do
  begin
    nodeClass := nodeFIELD;
    canOp := canFIELD2;
    iFieldNum := Field.Index + 1;
    iNameOffset := 0;
  end;
  // Expression - set the expression size, nodes and start positions
  with Expression do
  begin
    iVer := 1;
    iTotalSize := sizeof(CANExpr) + sizeof(Nodes) + Length(Field.FieldName) +
1;
    iNodes := 2;
    iNodeStart := sizeof(CANExpr);
    iLiteralStart := sizeof(CANExpr) + sizeof(Nodes);
  end;

  GetMem(pCan, Expression.iTotalSize * sizeof(BYTE));
  try
    // Move expression, nodes and literal pool into a contiguous memory space
    Move(Expression, pCan^, sizeof(CANExpr));
    Inc(pCan, sizeof(CANExpr));
    Move(Nodes, pCan^, sizeof(Nodes));
    Inc(pCan, sizeof(Nodes));
    Move(Field.FieldName, pCan^, Length(Field.FieldName) + 1);
    Dec(pCan, sizeof(Nodes) + sizeof(CANExpr));
  end;
```



```
    // Add and activate the filter
    Check(DbiAddFilter(Table.Handle, 0, 1, False, pCANExpr(pCan), nil, hF));
    Check(DbiActivateFilter(Table.Handle, hF));
finally
    FreeMem(pCan, Expression.iTotalSize * sizeof(BYTE));
end;
end;
```

DbiAddIndex {button C Examples,JI(">example","exdbiaddindex")}{button Delphi Examples,JI(">example","dexdbiaddindex")}

C syntax

```
DBIResult DBIFN DbiAddIndex (hDb, hCursor, pszTableName, [pszDriverType],  
    pIdxDesc, [pszKeyviolName]);
```

Delphi syntax

```
function DbiAddIndex (hDb: hDBIDb; hCursor: hDBICur; pszTableName: PChar;  
    pszDriverType: PChar; var IdxDesc: IDXDesc; pszKeyviolName: PChar):  
    DBIResult stdcall;
```

Description

DbiAddIndex creates an index on an existing table specified by *pszTableName* or associated with the cursor handle specified by *hCursor*.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

hCursor Type: hDBICur (Input)
Specifies the cursor on the table. Optional. If *hCursor* is specified, the operation is performed on the table associated with the cursor. If *hCursor* is NULL, *pszTableName* and *pszTableType* determine the table to be used.

pszTableName Type: pCHAR (Input)
Pointer to the table name. Optional. If *hCursor* is NULL, *pszTableName* and *pszDriverType* determine the table to be used. (If both *pszTableName* and *hCursor* are specified, *pszTableName* is ignored.)

For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)
Pointer to the driver type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

pIdxDesc Type: pIDXDesc (Input)
Pointer to the index descriptor structure (IDXDesc). The IDXDesc elements required vary by database driver.

pszKeyviolName Type: pCHAR (Input/Output)
Optional. Pointer to a key violation table name (a buffer of DBIMAXPATHLEN+1 characters). You can specify a table name or use this parameter to retrieve the name generated by the BDE.

Usage

If a cursor handle is supplied, the function generally does not affect the order or the position of the cursor. However, adding Paradox primary indexes sets the cursor position to the beginning of the file.

Index descriptors vary by driver. For details, see [IDXDesc](#) and [IDXType](#)

dBASE: The client application must have permission to lock the table exclusively.

SQL: The client application must have the appropriate privileges to add indexes. Also, if an index is added to any SQL table, then any cursors open on that table must be closed and reopened, to allow for possible changes in the buffer size.

Paradox: The client application must have permission to lock the table exclusively. If adding a non-maintained Paradox index, only a read lock is required.

Prerequisites

If the table name or cursor handle is used to specify the table, the cursor must be opened exclusively on behalf of the client application, and is closed after the index has been created. If the index is a maintained or primary Paradox index, the cursor also must be opened exclusively.

Completion state

Before the cursor is reordered to reflect the newly added index, the application must use or switch to the index.

DbiResult return values

DBIERR_NONE	The index was successfully added.
DBIERR_INVALIDHNDL	The specified database handle or the cursor handle (if specified) is invalid or NULL.
DBIERR_INVALIDPARAM	Neither hCursor nor pszTableName was specified.
DBIERR_UNKNOWNBLTYPE	The parameter, pszDriverType is invalid.
DBIERR_PRIMARYKEYREDEFINE	The primary index already exists; illegal to define another.
DBIERR_INVALIDINDEXTYPE	The index descriptor is invalid.
DBIERR_INVALIDIDXDESC	The index descriptor is invalid.
DBIERR_INVALIDFLDTYPE	Attempting to index an invalid field type (that is, BLOB field)
DBIERR_INVALIDINDEXNAME	The index name or tag name is invalid (usually for dBASE tables)
DBIERR_NAMEREQUIRED	Index name is required.
DBIERR_NAMENOTUNIQUE	Index name was not unique.
DBIERR_MUSTUSBASEORDER	The default order must be used when adding an index.
DBIERR_NEEDEXCLACCESS	Table is opened in share mode when creating a maintained or primary index.

See also

[DbiOpenIndexList](#), [DbiGetIndexDesc](#), [DbiSetToKey](#), [DbiRegenIndex](#), [DbiRegenIndexes](#), [DbiDeleteIndex](#), [DbiOpenIndex](#), [DbiCloseIndex](#), [DbiSwitchToIndex](#), [DbiCreateTable](#), [DbiDoRestructure](#)

C Examples: DbiAddIndex

Example 1: Add an index to a Paradox 4.0 or 5.0 version table:

Note: This is a primary index.

```
DBIResult fDbiAddIndex1(hDBIDb hTmpDb, hDBICur hTmpCur)
{
    DBIResult    rslt;
    IDXDesc      NewIndex;
    DBIKEY       aiKeys = { 1 };    // Field to put index on

    NewIndex.iIndexId = 0;
    NewIndex.bPrimary = TRUE;
    NewIndex.bUnique = TRUE;
    NewIndex.bDescending = FALSE;
    NewIndex.bMaintained = TRUE;
    NewIndex.bSubset = FALSE;
    NewIndex.bExpIdx = FALSE;
    NewIndex.iFldsInKey = 1;
    memcpy(NewIndex.aiKeyFld, aiKeys, sizeof(DBIKEY));
    NewIndex.bCaseInsensitive = FALSE;
    rslt = Chk(DbiAddIndex(hTmpDb, hTmpCur, NULL, NULL, &NewIndex, NULL));

    return rslt;
}
```

Example 2: Add an index to a Paradox 4.0 or 5.0 version table:

Note: This is a case-insensitive, secondary, maintained index:

```
DBIResult fDbiAddIndex2(hDBIDb hTmpDb, hDBICur hTmpCur)
{
    DBIResult    rslt;
    IDXDesc      NewIndex;
    DBIKEY       aiKeys = { 2 };    // Field to put index on

    strcpy(NewIndex.szName, "TempIndex");
    NewIndex.bPrimary = FALSE;
    NewIndex.bUnique = FALSE;
    NewIndex.bDescending = FALSE;
    NewIndex.bMaintained = TRUE;
    NewIndex.bSubset = FALSE;
    NewIndex.bExpIdx = FALSE;
    NewIndex.iFldsInKey = 1;
    memcpy(NewIndex.aiKeyFld, aiKeys, sizeof(DBIKEY));
    NewIndex.bCaseInsensitive = TRUE;
    rslt = Chk(DbiAddIndex(hTmpDb, hTmpCur, NULL, NULL, &NewIndex, NULL));

    return rslt;
}
```

Example 3: Add an index to a dBASE for Windows version table:

```

DBIResult fDbiAddIndex3(hDBIDb hTmpDb, hDBICur hTmpCur)
{
    DBIResult    rslt;
    IDXDesc      NewIndex;
    DBIKEY       aiKeys = { 2 };    // Field to put index on

    strcpy(NewIndex.szTagName, "TestIndex");
    NewIndex.bPrimary = FALSE;
    NewIndex.bUnique = FALSE;
    NewIndex.bDescending = FALSE;
    NewIndex.bMaintained = TRUE;
    NewIndex.bSubset = FALSE;
    NewIndex.bExpIdx = FALSE;
    NewIndex.iFldsInKey = 1;
    memcpy(NewIndex.aiKeyFld, aiKeys, sizeof(DBIKEY));
    strcpy(NewIndex.szKeyExp, "");    // Although this is not an Expression
index,
    strcpy(NewIndex.szKeyCond, "");    // szKeyExp and szKeyCond must be set
blank
    NewIndex.bCaseInsensitive = FALSE;
    NewIndex.iBlockSize = 0;

    rslt = Chk(DbiAddIndex(hTmpDb, hTmpCur, NULL, NULL, &NewIndex, NULL));
    return rslt;
}

```

Example 4: Add an expression index to a dBASE for Windows version table:

```

DBIResult fDbiAddIndex4(hDBIDb hTmpDb, hDBICur hTmpCur, char *Expression)
{
    DBIResult    rslt;
    IDXDesc      NewIndex;
    DBIKEY       aiKeys = { 0 };    // Field to put index on

    strcpy(NewIndex.szTagName, "ExpIndex");
    NewIndex.bPrimary = FALSE;
    NewIndex.bUnique = FALSE;
    NewIndex.bDescending = FALSE;
    NewIndex.bMaintained = TRUE;
    NewIndex.bSubset = FALSE;
    NewIndex.bExpIdx = TRUE;
    NewIndex.iFldsInKey = 0;
    memcpy(NewIndex.aiKeyFld, aiKeys, sizeof(DBIKEY));
    strcpy(NewIndex.szKeyExp, Expression);
    strcpy(NewIndex.szKeyCond, "");
    NewIndex.bCaseInsensitive = FALSE;
    NewIndex.iBlockSize = 0;

    rslt = Chk(DbiAddIndex(hTmpDb, hTmpCur, NULL, NULL, &NewIndex, NULL));
    return rslt;
}

```

Delphi Examples: DbfAddIndex

Also see TTable.AddIndex in the Delphi online help. TTable.AddIndex will usually handle most of your indexing needs.

Example 1: Add an index to a Paradox 4.0 or 5.0 version table:

This is a primary index. This example uses the following input:

```
fDbfAddIndex1(Table1);
Procedure fDbfAddIndex1(Tbl: TTable);
var
  NewIndex: IDXDesc;
begin
  NewIndex.iIndexId:= 0;
  NewIndex.bPrimary:= TRUE;
  NewIndex.bUnique:= TRUE;
  NewIndex.bDescending:= FALSE;
  NewIndex.bMaintained:= TRUE;
  NewIndex.bSubset:= FALSE;
  NewIndex.bExpIdx:= FALSE;
  NewIndex.iFldsInKey:= 1;
  NewIndex.aiKeyFld[0]:= 1;
  NewIndex.bCaseInsensitive:= FALSE;
  Check(DbAddIndex(Tbl.dbhandle, Tbl.handle, PChar(Tbl.TableName),
    szParadox, NewIndex, nil));
end;
```

Example 2: Add an index to a Paradox 4.0 or 5.0 version table.

This is a case insensitive, secondary, maintained index. This example uses the following input:

```
fDbfAddIndex2(Table1);
Procedure fDbfAddIndex2(Tbl: TTable);
var
  NewIndex: IDXDesc;
  Buffer: pchar;
begin
  NewIndex.szName:= 'NewIndex';
  NewIndex.iIndexId:= 0;
  NewIndex.bPrimary:= FALSE;
  NewIndex.bUnique:= FALSE;
  NewIndex.bDescending:= FALSE;
  NewIndex.bMaintained:= TRUE;
  NewIndex.bSubset:= FALSE;
  NewIndex.bExpIdx:= FALSE;
  NewIndex.iFldsInKey:= 1;
  NewIndex.aiKeyFld[0]:= 2;
  NewIndex.bCaseInsensitive:= TRUE;
  Check(DbAddIndex(Tbl.dbhandle, Tbl.handle, PChar(Tbl.TableName),
    szParadox, NewIndex, nil));
end;
```

Example 3: Add an index to a Paradox 7.0 version table.

This is a secondary unique / descending index. This example uses the following input:

```
fDbfAddIndex3(Table1);
Procedure fDbfAddIndex3(Tbl: TTable);
var
  NewIndex: IDXDesc;
```

```

begin
  NewIndex.szName:= 'NewIndex';
  NewIndex.iIndexId:= 0;
  NewIndex.bPrimary:= FALSE;
  NewIndex.bUnique:= TRUE;
  NewIndex.bDescending:= TRUE;
  NewIndex.bMaintained:= TRUE;
  NewIndex.bSubset:= FALSE;
  NewIndex.bExpIdx:= FALSE;
  NewIndex.iFldsInKey:= 1;
  NewIndex.aiKeyFld[0]:= 2;
  NewIndex.bCaseInsensitive:= TRUE;
  Check(DbAddIndex(Tbl.dbhandle, Tbl.handle, PChar(Tbl.TableName),
    szParadox, NewIndex, nil));
end;

```

Example 4: Add an index to a dBASE for Windows version table.

This example uses the following input:

```

  fDbAddIndex4(Table1);
Procedure fDbAddIndex4(Tbl: TTable);
var
  NewIndex: IDXDesc;
begin
  NewIndex.szTagName:= 'NewIndex1';
  NewIndex.bPrimary:= FALSE;
  NewIndex.bUnique:= FALSE;
  NewIndex.bDescending:= FALSE;
  NewIndex.bMaintained:= TRUE;
  NewIndex.bSubset:= FALSE;
  NewIndex.bExpIdx:= FALSE;
  NewIndex.iFldsInKey:= 1;
  NewIndex.aiKeyFld[0]:= 2;
  NewIndex.szKeyExp:= ''; // Although this is not an Expression index,
  NewIndex.szKeyCond:= ''; // szKeyExp and szKeyCond must be set blank
  NewIndex.bCaseInsensitive:= FALSE;
  NewIndex.iBlockSize:= 0;
  Check(DbAddIndex(Tbl.dbhandle, Tbl.handle, PChar(Tbl.TableName),
    szParadox, NewIndex, nil));
end;

```

Example 5: Add an expression index to a dBASE for Windows version table.

This example uses the following input:

```

  fDbAddIndex5(Table1);
Procedure fDbAddIndex5(Tbl: TTable);
var
  NewIndex: IDXDesc;
begin
  NewIndex.szTagName:= 'EXPINDEX';
  NewIndex.bPrimary:= FALSE;
  NewIndex.bUnique:= FALSE;
  NewIndex.bDescending:= FALSE;
  NewIndex.bMaintained:= TRUE;
  NewIndex.bSubset:= FALSE;
  NewIndex.bExpIdx:= TRUE;
  NewIndex.iFldsInKey:= 1;

```

```
NewIndex.aiKeyFld[0]:= 2;  
NewIndex.szKeyExp:= 'UPPER(FIELD1) + UPPER(FIELD2)';  
NewIndex.szKeyCond:= '';  
NewIndex.bCaseInsensitive:= FALSE;  
NewIndex.iBlockSize:= 0;  
Check(DbiAddIndex(Tbl.dbhandle, Tbl.handle, PChar(Tbl.TableName),  
                szParadox, NewIndex, nil));  
end;
```


DbiAddPassword {button C
Examples,JI(">example","exdbiaddpassword")} {button Delphi
Examples,JI(">example","dexdbiaddpassword")}

C syntax

```
DBIResult DBIFN DbiAddPassword (pszPassword);
```

Delphi syntax

```
function DbiAddPassword (pszPassword: PChar): DBIResult stdcall;
```

Description

DbiAddPassword adds a password to the current session. This function is supported for Paradox tables only.

Parameters

pszPassword Type: pCHAR (Input)
Pointer to the password to be added.

Usage

DbiAddPassword provides users with access to a previously encrypted table (adding a password does not encrypt the table). Examples of operations on an encrypted table include: opening the table, record and field access on the table, and batch functions (copy, delete, empty, or restructure). [DbiCreateTable](#) and [DbiDoRestructure](#) can be used to place or remove table encryption.

Paradox: Table and field level security is supported for the Paradox driver only.

SQL: This function is not supported with SQL tables. Access rights for SQL drivers are controlled when the database is opened.

DbiResult return values

DBIERR_NONE	The password was successfully added.
DBIERR_PASSWORDLIMIT	Maximum number of passwords have already been added.
DBIERR_INVALIDPASSWORD	The specified password is invalid (for example, it is too long or contains invalid characters).

See also

[DbiDropPassword](#), [DbiCreateTable](#), [DbiDoRestructure](#)

C Examples: DbiAddPassword

Create a table with a password and add that password to the current session.

If phCur is not NULL, return an open cursor. This example uses the following input:

```
fDbiAddPassword(hDb, &hTmpCur, "BORLAND C");
```

```
DBIResult fDbiAddPassword(hDBIDb hDb, phDBICur phCur, pCHAR pPWD)
{
    DBIResult    rslt;
    CRTblDesc    TblDesc;
    FLDDesc      fldDesc[] = {{ // Field 1 - ALPHA
                               1, "MyAlpha", fldZSTRING, fldUNKNOWN, 10, 0,
                               0, 0, 0, fldvNOCHECKS, fldrREADWRITE
                               }};

    memset((void *) &TblDesc, 0, sizeof(CRTblDesc));
    lstrcpy(TblDesc.szTblName, "COBRA.DB");
    TblDesc.iFldCount = 1;
    TblDesc.pfldDesc = fldDesc;
    TblDesc.bProtected = TRUE;
    lstrcpy(TblDesc.szPassword, pPWD);

    rslt = Chk(DbiAddPassword(pPWD));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiCreateTable(hDb, TRUE, &TblDesc));
    if (rslt != DBIERR_NONE)
        return rslt;

    if (phCur != NULL)
        rslt = Chk(DbiOpenTable(hDb, TblDesc.szTblName, NULL, NULL, NULL, NULL,
                                dbiREADWRITE, dbiOPENSHARED, xltFIELD, FALSE, NULL, phCur));

    return rslt;
}
```

Delphi Examples: DbiAddPassword

Add a password to the current session.

Delphi users should use TSession.AddPassword rather than directly calling dbiAddPassword. The method TSession.AddPassword is defined as:

```
procedure AddPassword(const Password: string);
```

The following code adds the password "Hip Hop" to TSession Session:

```
Session.AddPassword('Hip Hop');
```

Add a password to the specified handle's session:

Delphi users should use TSession.AddPassword. See DbiGetCurrSession to get the current session's handle. This example uses the following input:

```
fDbiAddPassword(Session3.Handle, 'SPRINT');
```

```
procedure fDbiAddPassword(hSes: hDBISes; Pswd: String);  
begin  
  Check(DbiSetCurrSession(hSes));  
  Check(DbiAddPassword(PChar(Pswd)));  
end;
```

DbiAnsiToNative {button C
Examples,JI(">example","exdbiansitonative")} {button Delphi
Examples,JI(">example","dexdbiansitonative")}

C syntax

```
DBIResult DBIFN DbiAnsiToNative (pLdObj, pOemStr, pAnsiStr, iLen,  
    pbDataLoss);
```

Delphi syntax

```
function DbiAnsiToNative (LdObj: Pointer; pNativeStr: PChar; pAnsiStr: PChar;  
    iLen: Word; var bDataLoss: Bool): DBIResult stdcall;
```

Description

DbiAnsiToNative translates strings from ANSI to the language driver's native character set. If the native character set is ANSI, no translation takes place.

Parameters

pLdObj Type: pVOID (Input)
Pointer to the language driver object returned from DbiGetLdObj.

pOemStr Type: pCHAR (Output)
Pointer to the client buffer where the translation string is placed. If *pOemStr* equals *pAnsiStr*, conversion occurs in place.

pAnsiStr Type: pCHAR (Input)
Pointer to the client buffer containing the ANSI data.

iLen Type: UINT16 (Input)
If *iLen* equals 0, assumes null-terminated string; otherwise *iLen* specifies the length of the buffer to convert.

pbDataLoss Type: pBOOL (Output)
Pointer to a client variable. If set to TRUE, the ANSI string cannot map to a character in the native character set.

Usage

Works on drivers with both ANSI and OEM native character sets. Does not handle multi-byte character sets, such as Japanese ShiftJIS. If the native character set is ANSI, no translation takes place. See [International Compatibility](#)

DBIResult return values

DBIERR_NONE	The translation completed successfully.
DBIERR_INVALIDPARAM	A parameter passed to the function is invalid.
DBIERR_NOTSUPPORTED	A function is not supported by the driver.

See also

[DbiNativeToAnsi](#), [DbiGetLdObj](#)

C Examples: DbiAnsiToNative

Translate the ANSI string into the specified tables's language driver native character set.

This example uses the following input:

```
fDbiAnsiToNative(hPXCur, Buffer, ANSIStr);
```

```
DBIResult fDbiAnsiToNative(hDBICur hTmpCur, pCHAR OemStr, pCHAR AnsiStr)
{
    DBIResult    rslt;
    pVOID        LD;
    BOOL         Loss;

    rslt = Chk(DbiGetLdObj(hTmpCur, &LD));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiAnsiToNative(LD, OemStr, AnsiStr, 0, &Loss));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (Loss == TRUE)
        return DBIERR_INVALIDLANGDRV;

    return rslt;
}
```

Delphi Examples: DbiAnsiToNative

Translate a string from the ANSI character set to the language driver's native character set. This example uses the following input:

```
fDbiAnsiToNative(CustTbl, AnsiString);  
function fDbiAnsiToNative(Table: TTable; AnsiStr: String): String;  
var  
    pDesc: pLDDesc;  
    Len: Word;  
    Done: Bool;  
  
begin  
    Len := Length(AnsiStr);  
    SetLength(Result, Len);  
    Check(DbiGetLDObj(Table.Handle, pointer(pDesc)));  
    Check(DbiAnsiToNative(pointer(pDesc), PChar(Result), PChar(AnsiStr), Len,  
        Done));  
end;
```

DbiAppendRecord {button C
Examples,JI(">example","exdbiappendrecord")} {button Delphi
Examples,JI(">example","dexdbiinsertrecord")}

C syntax

```
DBIResult DBIFN DbiAppendRecord (hCursor, pRecBuf);
```

Delphi syntax

```
function DbiAppendRecord (hCursor: hDBICur; pRecBuff: Pointer): DBIResult  

    stdcall;
```

Description

DbiAppendRecord appends a record to the end of the table associated with the cursor.

Parameters

hCursor Type: hDBICur (Input)
 Specifies the cursor handle to the table to which the record is being appended.

pRecBuf Type: pBYTE (Input)
 Specifies the pointer to the record buffer.

Usage

The contents of the current record buffer are appended. This function is equivalent to calling DbiSetToEnd followed by DbiInsertRecord.

dBASE: This function behaves the same as DbiInsertRecord.

Paradox: For tables with a primary index, where physical reordering of records is forced, DbiAppendRecord is equivalent to DbiInsertRecord. If referential integrity or validity checks are applied to the Paradox table, the data is verified prior to appending the record. If any of the checks fail, an error is returned and the operation is not completed.

SQL: This function behaves the same as DbiInsertRecord.

Prerequisites

A valid cursor handle must be obtained. Other users cannot have a write lock on the table. The record buffer should be initialized with DbiInitRecord, and data filled in using DbiPutField.

Completion state

This function leaves the cursor positioned on the inserted record. If there is an active range and the inserted record falls outside the range, the cursor might be positioned at the beginning or end of the file.

DbiResult return values

DBIERR_NONE	The data was successfully appended.
DBIERR_INVALIDHNDL	The specified cursor is invalid or NULL.
DBIERR_INVALIDPARAM	The record buffer is NULL.
DBIERR_KEYVIOL	The table has a unique index and the inserted key value conflicts with an existing record's key value.
DBIERR_FOREIGNKEYERR	A linking field value does not exist in the corresponding master table (Paradox only).
DBIERR_MINVALERR	The specified data is less than the required minimum value.
DBIERR_MAXVALERR	The specified data is greater than the required maximum value.
DBIERR_LOOKUPTABLEERR	One or more of the fields in the record buffer have failed an existing validity check (Paradox only).
DBIERR_REQDERR	A required field in the record buffer was left blank (not applicable to

	dBASE).
DBIERR_TABLEREADONLY	Table access denied; the cursor does not have write access to the table.
DBIERR_NOTSUFFTABLERIGHTS	Insufficient table rights to append a record (Paradox only).
DBIERR_NOTSUFFSQLRIGHTS	Insufficient SQL rights for operation.
DBIERR_NODISKSPACE	The record cannot be appended because there is insufficient disk space.

See also

[DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRecord](#), [DbiGetCursorProps](#), [DbiGetRelativeRecord](#), [DbiOpenTable](#), [DbiInitRecord](#), [DbiPutBlob](#), [DbiPutField](#), [DbiVerifyField](#)

For SQL-related restrictions, see [DbiInsertRecord](#).

C Examples: DbiAppendRecord

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiAppendRecord

Append a record to the end of the table associated with the cursor.

Delphi users should use TTable.AppendRecord rather than directly calling dbiAppendRecord. The TTable.AppendRecord method is defined as:

```
procedure AppendRecord(const Values: array of const);
```

This statement appends a record to a TTable called Customer. Note that Nulls are entered for some of the values, but are not required for missing values at the end of the array argument, for example, after the Discount field.

```
Customer.AppendRecord([CustNoEdit.Text, CoNameEdit.Text, AddrEdit.Text, Null,  
    Null, Null, Null, Null, Null, DiscountEdit.Text]);
```

DbiApplyDelayedUpdates {button C Examples,JI(">example","exdbiapplydelayedupdates")} {button Delphi Examples,JI(">example","dexdbiapplydelayedupdates")}

C syntax

```
DBIResult DBIFN EXPORT DbiApplyDelayedUpdates (hCursor,eUpdCmd);

typedef enum          // Op types for cached updates cursor
{
    dbiDelayedUpdCommit      = 0 // Commit the updates
    dbiDelayedUpdCancel      = 1 // Rollback the updates
    dbiDelayedUpdCancelCurrent = 2 // Cancel current record change
    dbiDelayedUPDPREPARE     = 3 // Phase 1 of two-phase commit
} DBIDelayedUpdCmd;
```

Delphi syntax

```
function DbiApplyDelayedUpdates (hCursor: hDBICur; eUpdCmd:
    DBIDelayedUpdCmd): DBIResult stdcall;
```

Description

When the cached updates mode is active, `DbiApplyDelayedUpdates` writes any changes made to cached data to the underlying database, or rolls back all modifications made to the cached data. `DbiApplyDelayedUpdates` sends to the database a batch of all inserts, deletes, and modifications made since the last `DbiApplyDelayedUpdates` function call.

Parameters

hCursor Type: `hDBICur` (Input)
Specifies the cached updates cursor handle.

eUpdCmd Type: `DBIDelayedUpdCmd` (Input)
Specifies the operation to be performed on the cached updates cursor.

Usage

After making the changes to table data cached by the cached updates mode, call `DbiApplyDelayedUpdates` either to commit (write to the actual table) or rollback the changes. The rollback operation quickly discards the update information from the cache.

You may continue modifying data in the cached updates mode after calling `DbiApplyDelayedUpdates`. When you are ready to write the modified data permanently, call `DbiApplyDelayedUpdates` to commit changes to the actual database. When finished, `DbiEndDelayedUpdates` closes the cached updates mode.

Use of the cached updates mode is a two-phase process involving the use of the operation types for the cached updates cursor:

Phase 1: The operation `DbiDelayedUpdPrepare` causes all changes in the cache to be applied to the underlying data. Unless being used in a single-user environment, this operation should always be used within the context of a transaction to allow for error-recovery in the event of an error during the update. Any errors encountered during this phase should be handled through callback functions.

Phase 2: The operation `dbiDelayedUpdateCommit` performs the second phase. After successfully calling `DbiDelayedUpdPrepare` directly, follow it with the `dbiDelayedUpdateCommit` operation. The internal cache is updated to reflect the fact that the updates were successfully applied to the underlying database (that is, the successfully applied records are removed from the cache).

There are two ways to cancel changes made while cached updates are enabled:

The operation `dbiDelayedUpdCancel` clears the cache and restores the dataset to the state it was in when:

- the table was opened,
- cached updates were enabled, or
- updates were last successfully applied.

The operation `dbiDelayedUpdCancelCurrent` restores the current record in the dataset to an unmodified state. If the record was not modified this call has no effect. This operation is similar to the `dbiDelayedUpdCancel` operation but operates only on the current record.

Standard: Every non-blob field is used in determining the record modifications

Prerequisites

A call to `DbiBeginDelayedUpdates` must have been made.

DbiResult return values

<code>DBIERR_NONE</code>	The update information in the temporary cache was successfully written to the database.
--------------------------	---

See also

[`DbiBeginDelayedUpdates`](#), [`DbiEndDelayedUpdates`](#), [`Cached updates`](#)

C Examples: DbiApplyDelayedUpdates

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbApplyDelayedUpdates

An example for this function is under development and will be provided in an upcoming Help release.

DbiBatchMove {button C
Examples,JI(">example","exdbibatchmove")} {button Delphi
Examples,JI(">example","dexdbibatchmove")}

C syntax

```
DBIResult DBIFN DbiBatchMove (pSrcTblDesc, hSrcCur, pDstTblDesc, hDstCur,
    ebatMode, iFldCount, pSrcFldMap, pszIndexName, pszIndexTagName, iIndexId,
    [pszKeyviolName], [pszProblemsName], [pszChangedName], p1ProbRecs,
    p1KeyvRecs, p1ChangedRecs, bAbortOnFirstProb, bAbortOnFirstKeyviol,
    p1RecsToMove, bTransliterate);
```

Delphi syntax

```
function DbiBatchMove (pSrcTblDesc: pBATTblDesc; hSrcCur: hDBICur;
    pDstTblDesc: pBATTblDesc; hDstCur: hDBICur; ebatMode: eBATMode; iFldCount:
    Word; pSrcFldMap: PWord; pszIndexName: PChar; pszIndexTagName: PChar;
    iIndexId: Word; pszKeyviolName: PChar; pszProblemsName: PChar;
    pszChangedName: PChar; lProbRecs: PLongint; lKeyvRecs: PLongint;
    lChangedRecs: PLongint; bAbortOnFirstProb: Bool; bAbortOnFirstKeyviol:
    Bool; var lRecsToMove: Longint; bTransliterate: Bool): DBIResult stdcall;
```

Description

DbiBatchMove is used to append, update, or subtract records from a source table to a destination table. It can also be used to copy an entire table to a table of a different driver type.

Parameters

- pSrcTblDesc** Type: pBATTblDesc (Input)
 Optional. Pointer to the source table descriptor (BATTblDesc). If NULL, then *hSrcCur* is used to identify the source table. If not NULL, the specified table is opened, and the entire table is processed.
- hSrcCur** Type: hDBICur (Input)
 Optional. Specifies the cursor handle of the source table; *hSrcCur* is used only if *pSrcTab* is NULL. The source table is processed from the current position of the cursor.
- pDstTblDesc** Type: pBATTblDesc (Input)
 Optional. Pointer to the destination table descriptor (BATTblDesc). If NULL, then *hDstCur* is used to identify the destination table. If not NULL, the specified table is opened, and the entire table is processed. Must be specified if mode is batCOPY.
- hDstCur** Type: hDBICur (Input)
 Optional. Specifies the cursor handle of the destination table; *hDstCur* is used only if *pdstTab* is NULL. The destination table is processed from the current position of the cursor.
- ebatMode** Type: eBATMode (Input)
 Specifies the mode; valid modes are batAPPEND, batUPDATE, batAPPENDUPDATE, batSUBTRACT, or batCOPY. The mode determines how the append operation is used. See the Usage section for details.
- iFldCount** Type: UINT16 (Input)
 Specifies the number of fields in *pSrcFldMap*. Optional. Normally set to 0.
- pSrcFldMap** Type: pUINT16 (Input)
 Pointer to an array of field numbers in the source table to be copied; the number of fields in the array must be equal to *iFldCount*. Optional. If set to NULL, the fields in the source are matched from left to right with the fields in the destination. This array is indexed by the destination field position (0 to n-1) and contains either the source field number (1 to n) to be matched with the destination or zero to leave the destination field blank or unmodified.
- pszIndexName** Type: pCHAR (Input)
 Pointer to the index name. Optional. This parameter is used only when *ebatMode* is batUPDATE, batAPPENDUPDATE, or batSUBTRACT to specify the index used by the destination table to define

matching records.

pszIndexTagName Type: pCHAR (Input)

Pointer to the index tag name. Optional. This parameter is used only when *ebatMode* is batUPDATE, batAPPENDUPDATE, or batSUBTRACT to specify the index used by the destination table to define matching records.

iIndexId Type: UINT16 (Input)

Specifies the index identification number. Optional. This parameter is used only when *ebatMode* is batUPDATE, batAPPENDUPDATE, or batSUBTRACT to specify the index used by the destination table to define matching records.

pszKeyviolName Type: pCHAR (Input)

Optional. Pointer to the Key Violation table name. All records that cause an integrity violation when inserted or updated into the destination table can be placed here. If NULL, no Key Violation table is created. If the user supplies a table name, that name is used. If not NULL and a pointer to a NULL character is specified, BDE generates a name for the auxiliary table and copies the name back to the location specified by the pointer; therefore, this area must be at least DBIMAXPATHLEN+1 bytes. If no auxiliary table is created, this area is set to all NULLs.

pszProblemsName Type: pCHAR (Input)

Optional. Pointer to the Problems table name. Unless the user has overridden the default behavior with a callback, records are placed in a Problems table if they cannot be placed into the destination table without trimming data.

If NULL, no Problems table is created. If the user supplies a table name, that name is used. If not NULL and a pointer to a NULL character is specified, BDE generates a name for the auxiliary table and copies the name back to the location specified by the pointer; therefore, this area must be at least DBIMAXPATHLEN+1 bytes. If no auxiliary table is created, this area is set to all NULLs.

pszChangedName Type: pCHAR (Input)

Optional. Pointer to the Changed table name. All records that are updated or subtracted from the source table are placed here. If NULL, no Changed table is created. If the user supplies a table name, that name is used. If not NULL and a pointer to a NULL character is specified, BDE generates a name for the auxiliary table and copies the name back to the location specified by the pointer; therefore, this area must be at least DBIMAXPATHLEN+1 bytes. If no auxiliary table is created, this area is set to all NULLs.

p1ProbRecs Type: pUINT32 (Output)

Pointer to the client variable that receives the number of records that were added, or would have been added to the Problems table. (When *pszProblemsName* is NULL, the Problems table is not actually created. In that case, *p1ProbRecs* reports the number of records that would have been added to the Problems table.) Optional. If *p1ProbRecs* is NULL, the number of records is not returned.

p1KeyvRecs Type: pUINT32 (Output)

Pointer to the client variable that receives the number of records that were added, or would have been added to the Key Violations table. (If *pszKeyViolName* is NULL, the Key Violations table is not actually created. In that case, *p1KeyvRecs* reports the number of records that would have been added to the Key Violations table.) Optional. If *p1KeyvRecs* is NULL, the number of records is not returned.

p1ChangedRecs Type: pUINT32 (Output)

Pointer to the client variable that receives the number of records that were added, or would have been added to the Changed table. (If *pszChangedName* is NULL, the Changed table is not actually created. In that case, *p1ChangedRecs* reports the number of records that would have been added to the Changed table.) Optional. If *p1ChangedRecs* is NULL, the number of records is not returned.

bAbortOnFirstProb Type: BOOL (Input)

Specifies whether to cancel as soon as a record is encountered that would be written to the Problems table. If TRUE, the operation is canceled and DBIERR_NONE is returned.

bAbortOnFirstKeyviol Type: BOOL (Input)

Specifies whether to cancel as soon as a record is encountered that would be written to the Key Violations table. If TRUE, the operation is canceled and DBIERR_NONE is returned.

p1RecsToMove Type: pUINT32 (Input/Output)

On input, *p1RecsToMove* specifies the number of records to be read from the source table. On output, pointer to the client variable that receives the actual number of records read from the source table. If *p1RecsToMove* contains 0 or *p1RecsToMove* is NULL, all of the records in the table are processed.

bTransliterate Type: BOOL (Input)

Specifies whether to transliterate character data from one character set to another, when the source and destination character sets differ. TRUE causes all data in character fields of the source table to be transliterated into the character set of the destination table.

Usage

Depending on the mode specified in *ebatMode*, *DbiBatchMove* can be used in the following ways:

Mode	Use
batAPPEND	Adds records from the source table to the destination table.
batUPDATE	Overwrites matching records in the destination table. (Records from the source table that don't match are not added.)
batAPPENDUPDATE	Adds non-matching records to the destination table and overwrites matching records.
batSUBTRACT	Deletes matching records from the destination table.
batCOPY	Copies a table to a new table of a different driver type. This creates the destination table with a record structure that minimizes potential data loss. (See the following section for a description of the method by which field types are translated.)

Important: For *batAPPEND* and *batCOPY* no index is required on the destination table. For the other three mode options an index is required.

Where an index is required on the destination table, the index is used to find matching records.

When the source and destination record structures differ in the field size or type, data from the source table is converted to the size or type of the destination table. If the conversion is not allowed, an error is returned and no data is transferred.

As each destination record is constructed, the default behavior is to trim any data that does not fit, possibly producing a NULL value in the destination. To override this default behavior, the client must register a callback of type cbBATCHRESULT with a client-allocated callback buffer CBRESTRCbDesc (the same structure as is used for DbiDoRestructure). Before data transfer begins a callback is made for each pair of source and destination fields that could result in data loss. During this callback, RESTRCbDesc.iErrCode is set to DBIERR_OBJMAYBETRUNCATED, RESTRCbDesc.eRestrObjType is set to restrNEWFLD, RESTRCbDesc.iObjNum is set to the field number of the destination field, and RESTRCbDesc.uObjDesc.fldDesc contains the destination FLDDesc. If the client returns cbrYES from the callback, this field is trimmed. If cbrNO is returned, then any records that would be trimmed are written to the problems table instead of the destination. If any one field is marked for no trimming and the data must be trimmed, the entire record is written to the Problems table.

You can adjust the size of a batch to accommodate server transaction logs that are not big enough to handle the whole batch. Set the database property dbBATCHCOUNT for the number of records you want to include in a batch before an auto-commit occurs. The value you set will override the default and take effect for all subsequent calls of *DbiBatchMove*. You can reset the default (32 Kb) by using the BDE Configuration Utility to change the Database Configuration option BATCH COUNT.

Prerequisites

If cursors are not passed in, this call acquires a read lock on the source and a write lock on the destination. If cursors are passed in, the client is responsible for controlling locking behavior.

Completion state

If the function is called within the context of a transaction on the destination database handle, it does not

modify the transaction.

DbiResult return values

DBIERR_NONE

The operation was performed successfully.

DBIERR_INVALIDPARAM

Either the source or the destination table identification is invalid.

DBIERR_INVALIDFILENAME

The source table name provided is an empty string.

See also

[DbiOpenTable](#), [DbiCreateTable](#), [DbiRegisterCallBack](#), [DbiDoRestructure](#)

C Examples: DbiBatchMove

Create and copy table information from a dBASE table to a Paradox table.

Source table must be a dBASE table. This example uses the following input:

```
fDbiBatchMove(hDb, &hPXCur, hdBASECur);
```

```
DBIResult fDbiBatchMove(hDBIDb hTmpDb, phDBICur phDestCur, hDBICur hSrcCur)
{
    DBIResult    rslt;
    CURProps     CurProps;
    BATTblDesc   TblDesc;

    // Get source cursor properties
    rslt = Chk(DbiGetCursorProps(hSrcCur, &CurProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    TblDesc.hDb = hTmpDb;
    strcpy(TblDesc.szTblName, CurProps.szName);
    strcpy(TblDesc.szTblType, szPARADOX);

    // Delete table if it exists
    rslt = DbiDeleteTable(hTmpDb, CurProps.szName, szPARADOX);
    if ((rslt != DBIERR_NOSUCHFILE) && (rslt != DBIERR_NOSUCHTABLE))
        Chk(rslt);

    // Copy the information from the dBASE table to the Paradox table
    rslt = Chk(DbiBatchMove(NULL, hSrcCur, &TblDesc, NULL, batCOPY,
        0, 0, NULL, NULL, NULL, "KEYVIOL", "PROBLEMS",
"CHANGED",
        NULL, NULL, NULL, FALSE, FALSE, NULL, FALSE));
    if (rslt != DBIERR_NONE)
        return rslt;

    // Open the newly created Paradox table
    rslt = Chk(DbiOpenTable(hTmpDb, CurProps.szName, szPARADOX, NULL, NULL, 0,
        dbiREADWRITE, dbiOPENSHARED, xltFIELD, FALSE, NULL,
phDestCur));

    return rslt;
}
```

Delphi Examples: DbiBatchMove

Create and copy table information from one table to another.

Because the DbiBatchMove function is a complex function that accepts over 20 parameters, Delphi users are often better served by using the VCL component TBatchMove. This component is found on the Data Access page of the Component Palette.

To use the TBatchMove component in your application, set the component's Mode, Mapping, Source, and Destination properties. You can then execute the batch move at design time by right clicking on the component and choosing Execute from the Speed Menu. Or you can execute the function at runtime by calling its Execute method. The following example illustrates using the component at runtime by appending TTables Table1 to Table2:

```
procedure TForm1.Button1Click(Sender : TObject);
begin
    with BatchMove1 do begin
        Mode := batAppend;
        Source := Table1;
        Destination := Table2;
        Execute;
    end;
end;
```

Append the source handle's table records to the destination handle's table:

BatchCount is the amount of records to append before committing the transaction. Most Delphi users should use the TBatchMove component or the TTable.BatchMove method. This example uses the following input:

```
fDbiBatchMove(VendorTbl.Handle, VendorIBTbl.Handle, 500);
procedure fDbiBatchMove(hSrcCur, hDstCur: hDBICur; BatchCount: Longint);
var
    hDb: hDBIDb;
    Count: Longint;
    Length: Word;
    DBType: String;
begin
    Count := 0;
    // Get the database handle from the destination cursor
    Check(DbiGetObjFromObj(hDBIObj(hDstCur), objDATABASE, hDBIObj(hDb)));
    SetLength(DBType, DBIMAXNAMELEN);
    // Get the database type from the database handle
    Check(DbiGetProp(hDBIObj(hDb), dbDATABASETYPE, PChar(DBType),
        DBIMAXNAMELEN,
        Length));
    SetLength(DBType, StrLen(PChar(DbType)));
    if DBType <> 'STANDARD' then
        // If the database is SQL based, set the batch count
        Check(DbiSetProp(hDBIObj(hDb), dbBATCHCOUNT, BatchCount));
    // Append the records
    Check(DbiBatchMove(nil, hSrcCur, nil, hDstCur, batchAPPEND, 0, nil, nil,
        nil, 0, nil, nil, nil, nil, nil, nil,
        True, True, Count, False));
end;
```

dbBATCHCOUNT

The database property, dbBATCHCOUNT, lets you control the number of records to include in a batch before an auto-commit occurs. In this way you can adjust the size of a batch to accommodate server transaction logs that are not big enough to handle the whole batch.

```
dbBATCHCOUNT //rw UINT16, batch mod count (records) before auto-commit
```

The value of the batch count property is obtained from the BDE DB OPEN section of the Windows Registry:

```
BATCH COUNT // UINT16, batch mod count (records) before auto-commit
```

If this option is not present or is zero then the default is the number of records that will fit in 32k bytes. You can override this value by setting dbBATCHCOUNT and the new value will take effect for all subsequent DbiBatchMove calls. When DbiBatchMove is called in an explicit client transaction (inside a DbiBeginTran/DbiEndTran block), the value of batch count is ignored.

DbiBcdFromFloat {button C
Examples,JI(">example","exdbibcdfromfloat")} {button Delphi
Examples,JI(">example","dexdbibcdfromfloat")}

C syntax

```
DBIResult DBIFN DbiBcdFromFloat (piVal, iPrecision, iPlaces, pBcd);
```

Delphi syntax

```
function DbiBcdFromFloat (var iVal: Double; iPrecision: Word; iPlaces: Word;  
    var Bcd: FMTBcd): DBIResult stdcall;
```

Description

DbBcdFromFloat converts a number in the BDE logical FLOAT format into the BDE logical binary coded decimal (BCD) format.

Parameters

piVal Type: pDFLOAT (Input)

Specifies the FLOAT data to convert.

iPrecision Type: UINT16 (Input)

Specifies the precision of the BCD number. This number must be 32 for Paradox fields and usually the *iUnits1* value for other drivers.

iPlaces Type: UINT16 (Input)

Specifies the number of decimals of the BCD number.

pBcd Type: pFMTBcd (Output)

Pointer to the client buffer that receives the BCD number. The BDE logical BCD format has a length which equals (*iPrecision* 2).

See also

[FMTBcd](#)

C Examples: DbiBcdFromFloat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiBcdFromFloat

An example for this function is under development and will be provided in an upcoming Help release.

DbiBcdToFloat {button C
Examples,JI(">example","exdbibcdtofloat")} {button Delphi
Examples,JI(">example","dexdbibcdtofloat")}

C syntax

```
DBIResult DBIFN DbiBcdToFloat (pBcd, piVal);
```

Delphi syntax

```
function DbiBcdToFloat (var Bcd: FMTBcd; var iVal: Double): DBIResult  
    stdcall;
```

Description

DbiBcdToFloat converts a number in the BDE logical binary coded decimal (BCD) format to the BDE FLOAT format.

Parameters

pBcd Type: pFMTBcd (Output)
Specifies the binary coded decimal (BCD) data to convert.

piVal Type: pDFLOAT (Input)
Pointer to the client buffer that receives the FLOAT number.

See also

[FMTBcd](#)

C Examples: DbiBcdToFloat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiBcdToFloat

An example for this function is under development and will be provided in an upcoming Help release.

DbiBeginDelayedUpdates {button C
Examples,JI(">example","exdbibegindelayedupdates")} {button Delphi
Examples,JI(">example","dexdbibegindelayedupdates")}

C syntax

```
DBIResult DBIFN DbiBeginDelayedUpdates (phCursor);
```

Delphi syntax

```
function DbiBeginDelayedUpdates (var hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiBeginDelayedUpdates converts a cursor to a cached updates cursor. Given an open cursor, prepares for cached updates. Returns a new cursor; the old cursor is no longer valid.

Parameters

phCursor Type: phDBICur (Input/Output)

On input, specifies the original cursor. On output, returns the new cursor; the old cursor is no longer valid.

Usage

Use DbiBeginDelayedUpdates to activate the cached updates mode. This feature lets you retrieve data from a table and make changes to that temporarily cached data without immediately writing to the actual underlying table. You can make changes over a prolonged period with a minimum amount of resource locking at the actual database. After modifying the data, call DbiApplyDelayedUpdates to save changes in the actual table.

Prerequisites

None

Completion state

The record buffer (RecBuffsize) and the bookmark (BookMarksize) increase in size upon completion of DbiBeginDelayedUpdates. You should call [DbiGetCursorProps](#) and reallocate memory properties for bookmark and record buffers accordingly.

DbiResult return values

DBIERR_NONE The cached updates mode was initiated and the new cached updates cursor handle was successfully created.

See also

[DbiEndDelayedUpdates](#), [DbiApplyDelayedUpdates](#), [Cached updates](#)

C Examples: DbiBeginDelayedUpdates

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbBeginDelayedUpdates

An example for this function is under development and will be provided in an upcoming Help release.

C Examples: DbiBeginLinkMode

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiBeginLinkMode

Create a master/detail link between two tables. The two hDBICur cursors return linked handles to both tables. Tables must be open on the indexes to link on. This example only supports a 'full index' link; if the link is on a composite index, both tables must link on the complete index. This example uses the following input:

```
fDbiBeginLinkMode(CustomerTbl, OrdersTbl, hMas, hDet);
procedure fDbiBeginLinkMode(MasTbl, DetTbl: TTable; var hMasCur, hDetCur:
    hDBICur);
var
    MasIdxDesc, DetIdxDesc: IDXDesc;
begin
    Check(DbiCloneCursor(MasTbl.Handle, False, False, hMasCur));
    Check(DbiCloneCursor(DetTbl.Handle, False, False, hDetCur));
    Check(DbiGetIndexDesc(hMasCur, 0, MasIdxDesc));
    Check(DbiGetIndexDesc(hDetCur, 0, DetIdxDesc));
    Check(DbiSetToBegin(hMasCur));
    Check(DbiBeginLinkMode(hMasCur));
    Check(DbiBeginLinkMode(hDetCur));
    Check(DbiLinkDetail(hMasCur, hDetCur, MasIdxDesc.iFldsInKey,
        @MasIdxDesc.aiKeyFld, @DetIdxDesc.aiKeyFld));
end;
```

DbiBeginTran {button C
Examples,JI(">example","exdbibegintran")} {button Delphi
Examples,JI(">example","dexdbibegintran")}

C syntax

```
DBIResult DBIFN DbiBeginTran (hDb, eXIL, phXact);
```

Delphi syntax

```
function DbiBeginTran (hDb: hDBIDb; eXIL: eXILType; var hXact: hDBIXact):  
    DBIResult stdcall;
```

Description

DbiBeginTran begins a transaction on SQL server tables or local (Paradox and dBASE) tables.

Parameters

<i>hDb</i>	Type: hDBIDb	(Input)
Specifies the database handle.		
<i>eXIL</i>	Type: eXILType	(Input)
Specifies the transaction isolation level .		
<i>phXact</i>	Type: phDBIXact	(Output)
Pointer to the transaction handle.		

Usage

This function begins a transaction on the given database. Within a transaction, operations are not committed automatically, giving the client control over transaction behavior. The transaction remains active until a call to [DbiEndTran](#) is made to end the transaction.

Some servers do not allow Data Definition Language (DDL) statements within a transaction, or implicitly commit the transaction when a DDL statement is issued. For such servers, DDL operations are not allowed within a transaction. If table lock release requests cause implicit commits, a request for a table lock release is held until the transaction is ended.

Servers vary in the availability and behavior of isolation and read repeatability capabilities. Some SQL drivers support only the server default isolation level. To check the isolation level actually used, call [DbiGetTranInfo](#) after a successful call to DbiBeginTran.

Nested transactions are not supported. If a previously requested transaction is still active, this function returns an error.

For local transactions, only xIDIRTYREAD is supported.

Prerequisites

A valid database handle must be obtained from a server.

DbiResult return values

DBIERR_NONE	The transaction has begun successfully.
DBIERR_ACTIVETRAN	There is already an active transaction.

C Examples: DbiBeginTran

Start a transaction on the specified database.

This example uses the following input:

```
fDbiBeginTran(hDb, xiDIRTYREAD, &xTran);  
DBIResult fDbiBeginTran(hDBIDb hTmpDb, eXILType xType, phDBIXact phXact)  
{  
    DBIResult    rslt;  
    rslt = Chk(DbiBeginTran(hTmpDb, xType, phXact));  
    return rslt;  
}
```

Delphi Examples: DbiBeginTran

Start a transaction on the specified database.

Delphi users should use the TDataBase.StartTransaction method rather than directly calling DbiBeginTran. This method is defined as:

```
procedure TDataBase.StartTransaction;
```

The following code begins a transaction on a TDataBase object called DataBase1 at the isolation level specified by the TransIsolation property:

```
DataBase1.StartTransaction;
```

(Note: If a transaction is currently active, Delphi will raise an exception.)

Start a transaction on a database.

If the database is local, set the transaction isolation level to 'Dirty Read' (the only supported local isolation level). Most Delphi users should use TDatabase.StartTransaction. This example uses the following input:

```
fDbiBeginTran(Database1.Handle, xilREADCOMMITTED, hTran);
```

```
procedure fDbiBeginTran(hTmpDb: hDBIDb; Mode: eXILType; var hXact: hDBIXact);  
var
```

```
    DBType: String;
```

```
    W: Word;
```

```
begin
```

```
    SetLength(DBType, DBIMAXNAMELEN);
```

```
    Check(DbiGetProp(hDBIObj(hTmpDb), dbDATABASESETYPE, PChar(DBType),
```

```
    DBIMAXNAMELEN, W));
```

```
    SetLength(DBType, StrLen(PChar(DBType)));
```

```
    // If the transaction is on a local table, make sure it is set to Dirty  
    Read
```

```
    if DBType = 'STANDARD' then
```

```
        Mode := xilDIRTYREAD;
```

```
    Check(DbiBeginTran(hTmpDb, Mode, hXact));
```

```
end;
```


C Examples: DbCheckRefresh

Refresh all cursors in the current session.

This example uses the following input:

```
fDbCheckRefresh();  
DBIResult fDbCheckRefresh(VOID)  
{  
    DBIResult    rslt;  
    rslt = Chk(DbCheckRefresh());  
    return rslt;  
}
```

Delphi Examples: DbCheckRefresh

Refresh all sessions within the application, if needed. This is a good function to place in a TTimer to refresh data. This example uses the following input:

```
fDbCheckRefresh;  
procedure fDbCheckRefresh;  
var  
  OldSession: TSession;  
  B: Byte;  
  
begin  
  OldSession := Sessions.CurrentSession;  
  for B := 0 to Sessions.Count - 1 do  
  begin  
    Sessions.CurrentSession := Sessions.Sessions[B];  
    Check(DbCheckRefresh);  
  end;  
  Sessions.CurrentSession := OldSession;  
end;
```

DbiCloneCursor {button C
Examples,JI(">example","exdbiclonecursor")} {button Delphi
Examples,JI(">example","dexdbiclonecursor")}

C syntax

```
DBIResult DBIFN DbiCloneCursor (hCurSrc, bReadOnly, bUniDirectional,  
    phCurNew);
```

Delphi syntax

```
function DbiCloneCursor (hCurSrc: hDBICur; bReadOnly: Bool; bUniDirectional:  
    Bool; var hCurNew: hDBICur): DBIResult stdcall;
```

Description

DbiCloneCursor creates a new cursor (cloned cursor) that is similar to the given cursor (source cursor).

Parameters

hCurSrc Type: hDBICur (Input)

Specifies the cursor handle of the source cursor.

bReadOnly Type: BOOL (Input)

Specifies whether the cloned cursor access mode is to be read-only or read-write. TRUE specifies read-only and FALSE specifies read-write.

The client is able to choose the access mode of the cloned cursor only if the access mode of the source cursor is `dbiREADWRITE`. If the access mode of the source cursor is `dbiREADONLY`, then the access mode of the cloned cursor must be read-only.

bUnidirectional Type: BOOL (Input)

Specifies whether the cloned cursor movement is unidirectional or bidirectional (applies to SQL tables only). TRUE specifies unidirectional; FALSE specifies bidirectional.

Generally, bidirectional movement is preferable. However, if the client application knows that the cloned cursor is to access data solely from beginning to end, unidirectional movement might deliver better performance.

The client is able to choose the type of cursor movement for the cloned cursor only if the source cursor's *bUnidirectional* parameter is FALSE (bidirectional). If the source cursor's *bUnidirectional* parameter is TRUE (unidirectional), the cloned cursor can be only unidirectional.

phCurNew Type: phDBICur (Output)

Pointer to the cursor handle for the cloned cursor.

Usage

DbiCloneCursor provides the client a relatively quick way to get a cursor for a table that is already opened. The source cursor can be opened on a table or a query. The cloned cursor can then be used as a regular cursor, inheriting certain properties from the source cursor, but remaining completely independent in terms of position and ordering.

The cloned cursor inherits the following properties from the source cursor:

- Current index
- Range
- Translate mode
- Share mode
- Position
- Field maps
- Filters

Putting a field map or a filter on a cloned cursor does not affect the source cursor. The filters of a cloned cursor do not have the same filter handles as the original cursor, however, the filter ID (obtained with

DbiGetFilterInfo) is invariant to the clone. This can be used to obtain the new filter handle for a given filter.

Positional commands (for example, DbiGetNextRecord) performed on the source cursor have no effect on the cloned cursor and vice versa.

dBASE: All indexes open on the source cursor are open on the clone.

Completion state

The returned cursor inherits certain properties from the source cursor but is completely independent in terms of position and ordering. The cloned cursor must be closed separately.

DbiResult return values

DBIERR_NONE	The cloned cursor was created successfully.
DBIERR_CURSORLIMIT	The maximum number of cursors has been exceeded.
DBIERR_INVALIDHNDL	The specified source cursor handle is invalid or NULL, or the pointer to the new cursor handle is NULL.

See also

DbiOpenTable

bReadOnly

The following table illustrates the effect that the access mode of the source cursor has on the cloned cursor access mode:

Source cursor	<i>bReadOnly</i>	Cloned cursor
Read-only	TRUE	Read-only
Read-only	FALSE	Read-only
Read-write	TRUE	Read-only
Read-write	FALSE	Read-write

bUnidirectional

The following table lists the effect of the source cursor's direction on the cloned cursor's direction:

Source direction	bUniDirectional	Cloned direction
Unidirectional	TRUE	Unidirectional
Unidirectional	FALSE	Unidirectional
Bidirectional	TRUE	Unidirectional
Bidirectional	FALSE	Bidirectional

C Examples: DbiCloneCursor

Clone (copy) a cursor and set the specified index. This example uses the following input:

```
ffDbiCloneCursor(hOrderCur, &hNewCur, "Customer No");
DBIResult fDbiCloneCursor(hDBICur hTmpCurSrc, phDBICur phTmpCurNew, pCHAR
    IndexName)
{
    DBIResult rslt;

    rslt = Chk(DbiCloneCursor(hTmpCurSrc, FALSE, FALSE, phTmpCurNew));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiSwitchToIndex(phTmpCurNew, IndexName, NULL, 0, FALSE));

    return rslt;
}
```

Delphi Examples: DbiCloneCursor

Return a new cursor positioned at the first record.

This example uses the following input:

```
    fDbiCloneCursor(Table1.Handle, MyNewCursor);  
procedure fDbiCloneCursor(hTmpCur: hDBICur; var hNewCur: hDBICur);  
begin  
    Check(DbiCloneCursor(hTmpCur, False, False, hNewCur));  
    Check(DbiSetToBegin(hNewCur));  
    Check(DbiGetNextRecord(hNewCur, dbiNOLOCK, nil, nil));  
end;
```

DbiCloseCursor {button C
Examples,JI(">example","exdbiclosecursor")} {button Delphi
Examples,JI(">example","dexdbiclosecursor")}

C syntax

```
DBIResult DBIFN DbiCloseCursor (phCursor);
```

Delphi syntax

```
function DbiCloseCursor (var hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiCloseCursor closes a cursor.

Parameters

phCursor Type: phDBICur (Input)
Pointer to the cursor handle to be closed.

Usage

This function can be used to close all types of cursors. For temporary tables, DbiCloseCursor removes the table from memory.

If the cursor closed is the last remaining cursor for the table in the current session, then all locks acquired with [DbiAcqTableLock](#) are released.

If the given cursor is valid, the cursor is closed even if an error message is returned. Any error returned is to inform the client of a potential problem (for example, a network problem).

Completion state

All resources associated with the cursor are released, including record locks, filters, and all indexes that have been opened by [DbiOpenIndex](#) for that particular cursor. The cursor handle is invalid after DbiCloseCursor is called (even if an error, such as a network problem, occurs).

DbiResult return values

DBIERR_NONE	The table cursor was successfully closed.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NODISKSPACE	Table could not be saved to disk due to lack of space.

See also

[DbiOpenTable](#), [DbiCreateTempTable](#), [DbiCreateInMemTable](#), [DbiQExec](#), [DbiQExecDirect](#), [DbiOpenTableList](#), [DbiOpenFileList](#), [DbiOpenIndexList](#), [DbiOpenFieldList](#), [DbiOpenVchkList](#), [DbiOpenRintList](#), [DbiOpenSecurityList](#), [DbiOpenFamilyList](#), [DbiCloneCursor](#), [DbiCloseDatabase](#)

C Examples: DbiCloseCursor

Close the specified table cursor:

If the cursor is not an open cursor, the function exits. This example uses the following input:

```
fDbiCloseCursor(&hCur);  
DBIResult fDbiCloseCursor (phDBICur phTmpCur)  
{  
    DBIResult      rslt = DBIERR_NONE;  
    if (*phTmpCur != 0)  
        rslt = Chk(DbiCloseCursor(phTmpCur));  
    return rslt;  
}
```

Delphi Examples: DbICloseCursor

Close the valid cursor passed in:

If you have opened a cursor with a dbi call, then this example applies. Otherwise, use the Close method of a Delphi TDataSet descendent component.

This example uses the following input:

```
fDbiCloseCursor(hCursor);  
procedure fDbiCloseCursor(phTmpCur: phDBICur);  
begin  
    check(DbICloseCursor(phTmpCur));  
end;
```


DbiCloseDatabase {button C
Examples,JI(">example","exdbiclosedatabase")} {button Delphi
Examples,JI(">example","dexdbiclosedatabase")}

C syntax

```
DBIResult DBIFN DbiCloseDatabase (phDb);
```

Delphi syntax

```
function DbiCloseDatabase (var hDb: hDBIDb): DBIResult stdcall;
```

Description

DbiCloseDatabase closes a database and all cursors associated with the database handle.

Parameters

phDb Type: phDBIDb (Input)
Pointer to the database handle returned by DbiOpenDatabase.

Usage

DbiCloseDatabase releases the provided database handle and any associated cursors.

When closing the standard database handle with DbiCloseDatabase, all dBASE, Paradox, and Text tables previously opened within this database are closed and the associated resources released.

SQL: Each database represents one or more connections to a specific SQL server. Closing the database closes those connections as well as releases other client database resources that have been acquired.

Prerequisites

DbiInit and DbiOpenDatabase must be called before a valid database handle is available.

Completion state

The client handle, *phDb*, is set to NULL.

DbiResult return values

DBIERR_NONE	The database specified by <i>phDb</i> was closed successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.

See also

[DbiOpenDatabase](#), [DbiExit](#), [DbiCloseCursor](#)

C Examples: DbiCloseDatabase

Close the database associated with the valid handle passed in:

This example uses the following input:

```
fDbiCloseDatabase(&hDb);  
DBIResult fDbiCloseDatabase(phDBIDb phTmpDb)  
{  
    DBIResult      rslt = DBIERR_NONE;  
    if (*phTmpDb != 0)  
        rslt = Chk(DbiCloseDatabase(phTmpDb));  
    return rslt;  
}
```

Delphi Examples: DbiCloseDatabase

Close the database associated with the valid handle passed in:

Delphi users should call TDatabase.Close rather than directly calling DbiCloseDatabase. This method is defined as:

```
procedure TDatabase.Close;
```

The following code closes a TDatabase component called MyDatabase:

```
MyDatabase.Close;
```

Close the database associated with the handle:

Most Delphi users should use TDatabase.Close. This example uses the following input:

```
fDbiCloseDatabase(hDb);
```

```
procedure fDbiCloseDatabase(var hTmpDb: hDBIDb);  
begin  
    Check(DbiCloseDatabase(hTmpDb));  
end;
```

DbiCloseFieldXlt {button C
Examples,JI(">example","exdbiclosefieldxlt")} {button Delphi
Examples,JI(">example","dexdbiclosefieldxlt")}

C syntax

```
DBIResult DBIFN DbiCloseFieldXlt (hXlt);
```

Delphi syntax

```
function DbiCloseFieldXlt (hXlt: hDBIXlt): DBIResult stdcall;
```

Description

DbiCloseFieldXlt closes a field translation object.

Parameters

hXlt Type: hDBIXlt (Input)
Specifies the field translation handle.

DbiResult return values

DBIERR_NONE	The translation object was closed successfully.
DBIERR_INVALIDHNDL	The specified translation handle is invalid.

See also

[DbiOpenFieldXlt](#), [DbiTranslateField](#)

C Examples: DbiCloseFieldXlt

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbtCloseFieldXIt

An example for this function is under development and will be provided in an upcoming Help release.

DbiCloseIndex {button C
Examples,JI(">example","exdbicloseindex")} {button Delphi
Examples,JI(">example","dexdbicloseindex")}

C syntax

```
DBIResult DBIFN DbiCloseIndex (hCursor, pszIndexName, iIndexId);
```

Delphi syntax

```
function DbiCloseIndex (hCursor: hDBICur; pszIndexName: PChar; iIndexId:  
    Word): DBIResult stdcall;
```

Description

DbiCloseIndex closes the specified index for this cursor.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

pszIndexName Type: pCHAR (Input)

Specifies the pointer to the index name. *pszIndexName* cannot be the name of the current active index of the cursor or a production index.

iIndexId Type: UINT16 (Input)

Currently not used.

Usage

DbiCloseIndex is applicable only with dBASE tables. It is used primarily to manipulate non-production indexes. DbiCloseIndex cannot close a current index, or a production index. To close a current index, DbiSwitchToIndex must be called first, to make another index (or no index) current.

This function does not affect the order of the records or the current position of the cursor.

Prerequisites

The index must be open.

Completion state

Once a production index is closed, it is no longer maintained.

DbiResult return values

DBIERR_NONE	The index was successfully closed.
DBIERR_NA	Operation is not applicable.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_CANNOTCLOSE	The given index is a production index and must stay open.
DBIERR_ACTIVEINDEX	The given index is currently used by the cursor to order the result set.
DBIERR_NOSUCHINDEX	The given index is either not opened or no such index exists for the table.

See also

[DbiSwitchToIndex](#), [DbiOpenTable](#), [DbiOpenIndex](#)

C Examples: DbiCloseIndex

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiCloseIndex

Close the specified index for this cursor.

This example uses the following input:

```
fDbiCloseIndex(Table2.Handle, 'SYMBOL');  
procedure fDbiCloseIndex(hTmpCur: hDBICur; IndexName: String);  
begin  
  Check(DbiCloseIndex(hTmpCur, PChar(IndexName), 0));  
end;
```

DbiCloseSession {button C
Examples,JI(">example","exdbiclosesession")} {button Delphi
Examples,JI(">example","dexdbiclosesession")}

C syntax

```
DBIResult DBIFN DbiCloseSession (hSes);
```

Delphi syntax

```
function DbiCloseSession (hSes: hDBISes): DbiResult stdcall;
```

Description

DbiCloseSession closes the session associated with the given session handle.

Parameters

hSes Type: hDBISes (Input)
Specifies the session handle.

Completion state

When a session is closed, all resources (database handles, cursors, table level locks, and record level locks) attached to the given session are released. Any buffers that BDE has allocated that are specific to the session are also released. If *hSes* is the session handle of the current session, the client application is set to the default session after DbiCloseSession is completed. The client application cannot close the default session without exiting the client.

DbiResult return values

DBIERR_NONE	The session specified by <i>hSes</i> was closed successfully.
DBIERR_INVALIDSESHANDL	The specified session handle is invalid or NULL, or the session has already been closed.

See also

[DbiGetCurrSession](#), [DbiSetCurrSession](#), [DbiStartSession](#), [DbiGetSysInfo](#), [DbiGetSesInfo](#)

C Examples: DbiCloseSession

Close the current session.

DbiCloseSession releases all session resources. This example uses the following input:

```
fDbiCloseSession();
DBIResult fDbiCloseSession(VOID)
{
    DBIResult    rslt;
    hDBISes     hSes;

    rslt = Chk(DbiGetCurrSession(&hSes));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiCloseSession(hSes));

    return rslt;
}
```

Delphi Examples: DbICloseSession

Close the current session.

Delphi users should use TSession.Close rather than directly calling dbiCloseSession. The method TSession.Close is defined as:

```
procedure TSession.Close;
```

The following code closes TSession Session:

```
Session.Close;
```

Close the session associated with the handle.

Most Delphi users should use Session.Close or the TSession component. This example uses the following input:

```
    fDbiCloseSession(hSes);  
procedure fDbiCloseSession(hTmpSes: hDBISes);  
begin  
    Check(DbiCloseSession(hTmpSes));  
end;
```

DbiCompareBookMarks {button C
Examples,JI(">example","exdbicomparebookmarks")} {button Delphi
Examples,JI(">example","dexdbicomparebookmarks")}

C syntax

```
DBIResult DBIFN DbiCompareBookMarks (hCur, pBookMark1, pBookMark2,  
pCmpBkmkResult);
```

Delphi syntax

```
function DbiCompareBookMarks (hCur: hDBICur; pBookMark1: Pointer; pBookMark2:  
Pointer; var CmpBkmkResult: Word): DBIResult stdcall;
```

Description

DbiCompareBookMarks compares the relative positions of two bookmarks associated with the cursor.

Parameters

<i>hCur</i>	Type: hDBICur	(Input)
Specifies the cursor handle.		
<i>pBookMark1</i>	Type: pBYTE	(Input)
Specifies the pointer to the first bookmark.		
<i>pBookMark2</i>	Type: pBYTE	(Input)
Specifies the pointer to the second bookmark.		
<i>pCmpBkmkResult</i>	Type: pCMPBkMkRslt	(Output)
Pointer to the client variable that receives the <u>comparison result</u> .		

Usage

Both bookmarks must be placed on cursors opened on the same table with the same order.

Note: Comparing bookmarks from cursors with different orders or that are unstable can lead to unpredictable results.

Prerequisites

Valid bookmarks must have been obtained with DbiGetBookMark.

DbiResult return values

DBIERR_NONE	Bookmarks were compared successfully.
DBIERR_INVALIDHNDL	The specified cursor is invalid or NULL.
DBIERR_INVALIDPARAM	At least one of the following parameters is NULL: <i>pBookMark1</i> , <i>pBookMark2</i> .
DBIERR_INVALIDBOOKMARK	Bookmarks are incompatible or corrupt.

See also

DbiGetCursorProps, DbiGetBookMark, DbiSetToBookMark

pCmpBkmkResult

Comparison results can be:

Result	Description
CMPLess	Bookmark1 is before Bookmark2 in the result set.
CMPEql	Bookmark1 is the same as Bookmark2.
CMPGtr	Bookmark1 is after Bookmark2 in the result set.
CMPKeyEqI	Bookmark1 and Bookmark2 have the same key value. Used in cases involving non-unique keys when it is uncertain if two bookmarks represent the same record.

C Examples: DbiCompareBookMarks

Compare the relative locations of two different bookmarks in a table.

This example uses the following input:

```
fDbiCompareBookMarks(hPXCurEx, BookMark1, BookMark2);
DBIResult fDbiCompareBookMarks(hDBICur hCur, pBYTE pBk1, pBYTE pBk2)
{
    DBIResult    rslt;
    CMPBkMkRslt CmpRslt;
    Chk(DbiCompareBookMarks(hCur, pBk1, pBk2, &CmpRslt));
    return rslt;
}
```

Delphi Examples: DbiCompareBookMarks

Compare the relative positions of two bookmarks associated with the cursor.

See also the method GetBookmark associated with a TTable, TQuery, and TStoredProc. This example uses the following input:

```
    Compare := fdbiCompareBookMarks(Table1, BookMark25, BookMark50);
function fdBICompareBookMarks(DataSet: TDataSet; Bookmark1, Bookmark2:
    TBookmark): Integer;
var
    Compare: Integer;
begin
    Check(DbiCompareBookMarks(DataSet.Handle, Bookmark1, Bookmark2, Compare));
    Result:= Compare;
end;
```


DbiCompareKeys {button C Examples,JI(">example","exdbcomparekeys")} {button Delphi Examples,JI(">example","dexdbcomparekeys")}

C syntax

```
DBIResult DBIFN DbiCompareKeys (hCursor, pKey1, [pKey2], iFields, iLen,  
    piResult);
```

Delphi syntax

```
function DbiCompareKeys (hCursor: hDBICur; pKey1: Pointer; pKey2: Pointer;  
    iFields: Word; iLen: Word; var iResult: SmallInt): DBIResult stdcall;
```

Description

DbiCompareKeys compares two key values based on the current index of the cursor.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

pKey1 Type: pBYTE (Input)

Pointer to the first key value. The key is assumed to be in physical format.

pKey2 Type: pBYTE (Input)

Pointer to the second key value. Optional. If *pKey2* is NULL, the key value is extracted from the current record. If the key is specified, it is assumed to be in physical format.

iFields Type: UINT16 (Input)

Specifies the number of fields to be used for composite keys. *iFields* and *iLen* together indicate how much of the key is to be used for matching. If both are 0, the entire key is used. If a match is required on a given field of the key, all the key fields preceding it in the composite key must also be supplied for a match. Only character fields can be matched for a partial key; all other field types must be fully matched.

For partial key matches, *iFields* must be equal to the number of key fields preceding (if any) the field being partially matched.

iLen Type: UINT16 (Input)

Specifies a partial length in the last field to be used for composite keys; works in conjunction with *iFields*. The last field of the composite key must be a character type if *iLen* not equal to 0.

piResult Type: pINT16 (Output)

Pointer to the client variable that receives the compared result.

Usage

This function is used to compare two key values. Keys can be obtained by using [DbiExtractKey](#).

Prerequisites

There must be an active index.

DbiResult return values

DBIERR_NONE The key fields were compared successfully.

DBIERR_NOCURREC pKey2 is NULL and the current record is invalid.

See also

[DbiExtractKey](#)

piResult

The result can be one of the following values:

Result	Description
-1	pKey1 < pKey2
0	pKey1 = pKey2
1	pKey1 > pKey2

C Examples: DbiCompareKeys

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbCompareKeys

An example for this function is under development and will be provided in an upcoming Help release.

DbiCopyTable {button C
Examples,JI(">example","exdbcopytable")} {button Delphi
Examples,JI(">example","dexdbcopytable")}

C syntax

```
DBIResult DBIFN DbiCopyTable (hDb, bOverwrite, pszSrcTableName,  
    pszSrcDriverType, pszDestName);
```

Delphi syntax

```
function DbiCopyTable (hDb: hDBIDb; bOverWrite: Bool; pszSrcTableName: PChar;  
    pszSrcDriverType: PChar; pszDestTableName : PChar): DBIResult stdcall;
```

Description

DbiCopyTable duplicates the source table, to a destination table.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

bOverwrite Type: BOOL (Input)

Specifies whether to overwrite an existing destination table or not. If TRUE, the table is overwritten; if FALSE, an error is returned if the destination table already exists.

pszSrcTableName Type: pCHAR (Input)

Pointer to the name of the table to be copied. *pszSrcTblName* can include a file extension, in which case *pszSrcDriverType* is ignored.

pszSrcDriverType Type: pCHAR (Input)

Pointer to the driver type, when *pszTblName* specifies a table name without a file extension. Required with Paradox and dBASE tables if no table extension is specified in *pszSrcTableName*.

pszDestName Type: pCHAR (Input)

Pointer to the name of the destination table.

Usage

This function is used to copy tables of the same driver type. It cannot copy a table across databases or driver types. To transfer data from one database type to another, see [DbiBatchMove](#).

Driver-specific rules must be followed in defining family members:

dBASE: For dBASE tables, default family members include

- The table (usually ends with a .DBF extension)
- BLOB file (usually <tablename>.DBT)
- Production index (usually <tablename>.MDX)

Non-production indexes are not included in the default family.

Paradox: For Paradox tables, default family members include

- The table (<tablename>.DB)
- The BLOB file (<tablename>.MB)
- All indexes
- Any <tablename>.VAL file

If the table is encrypted and the master password is not available, the copy fails. See [DbiAddPassword](#).

SQL: The DbiCopyTable function copies only the table itself. The indexes are not copied.

Prerequisites

A read lock is required on source dBASE and Paradox tables. For SQL tables, at least a READ (SELECT) privilege is required on the source table.

Completion state

The source table is copied to the destination table.

DbiResult return values

DBIERR_NONE	The table was successfully copied.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDPARAM	The source or destination table name was not specified.
DBIERR_INVALIDFILENAME	An empty string or invalid filename was specified for the source or destination table name.
DBIERR_FILEEXISTS	The table already exists, and bOverwrite specifies not to overwrite it.
DBIERR_FAMFILEINVALID	The family file is corrupt.
DBIERR_NOSUCHTABLE	The source table does not exist.
DBIERR_NOTSUFFTABLERIGHTS	The user does not have permission to delete the existing destination table (Paradox only).
DBIERR_NOTSUFFFAMILYRIGHTS	The user does not have rights to family members (Paradox only).
DBIERR_LOCKED	The table is locked by another user.

See also

[DbiBatchMove](#)

C Examples: DbiCopyTable

Copy a source table into a destination table.

If *pNewCur* is not NULL, DbiCopyTable returns a cursor handle from the newly created table. This example uses the following input:

```
fDbiCopyTable(hDb, "STOCK.DB", "NEWSTOCK.DB", &hNewCur);
DBIResult fDbiCopyTable(hDBIDb hTmpDb, pCHAR SourceTbl, pCHAR DestTbl,
    phDBICur pNewCur)
{
    DBIResult rslt;
    rslt = Chk(DbiCopyTable(hTmpDb, TRUE, SourceTbl, NULL, DestTbl));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (pNewCur != NULL)
        rslt = Chk(DbiOpenTable(hTmpDb, DestTbl, NULL, NULL, NULL, 0,
            dbiREADWRITE,
            dbiOPENSHARED, xltFIELD, FALSE, NULL, pNewCur));
    return rslt;
}
```

Delphi Examples: DbiCopyTable

Copy a source table into a destination table.

If the destination table exists, it is overwritten. If the tables are Paradox or dBASE, you must supply a file extension. This example uses the following input:

```
fDbiCopyTable(Table1.dbhandle, 'CUSTOMER.DB', 'CUSTOMER2.DB');  
Procedure fDbiCopyTable(hTmpDb: hDbiDb; SrcTableName: String; DestName:  
  String);  
begin  
  Check(DbiCopyTable(hTmpDb, TRUE, PChar(SrcTableName), nil,  
    PChar(DestName)));  
end;
```


DbiCreateInMemTable {button C
Examples,JI(">example","exdbicreateinmemtable")} {button Delphi
Examples,JI(">example","dexdbicreateinmemtable")}

C syntax

```
DBIResult DBIFN DbiCreateInMemTable (hDb, pszName, iFields, pfldDesc,  
    phCursor);
```

Delphi syntax

```
function DbiCreateInMemTable (hDb: hDBIDb; pszName: PChar; iFields: Word;  
    pfldDesc: pFLDDesc; var hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiCreateInMemTable creates a temporary in-memory table.

Parameters

<i>hDb</i>	Type: hDBIDb	(Input)
Specifies the database handle.		
<i>pszName</i>	Type: pCHAR	(Input)
Pointer to the table name.		
<i>iFields</i>	Type: UINT16	(Input)
Specifies the number of fields in the table.		
<i>pfldDesc</i>	Type: pFLDDesc	(Input)
Pointer to an array of field descriptor (<u>FLDDesc</u>) structures.		
<i>phCursor</i>	Type: phDBICur	(Output)
Pointer to the cursor handle.		

Usage

Only logical BDE field types are supported by the in-memory table. Physical field types are not supported. The table is kept in memory if possible, but it could be swapped to disk if the table becomes too big. Maximum table size is 512M with a maximum record size of 16K with a maximum of 1024 fields. Logical Autoincrement and BLOB fields are not supported.

Completion state

This function returns a cursor on the temporary table in *phCursor*. The table will be deleted when the cursor is closed.

DbiResult return values

DBIERR_NONE	The table was created successfully.
DBIERR_NODISKSPACE	The table could not be saved to disk due to lack of space.

See also

[DbiCreateTempTable](#), [DbiCreateTable](#)

Delphi Examples: DbiCreateInMemTable

Example 1: Create an in-memory table using a custom field descriptor.

```
procedure MakeInMemTable1;
const
  fldDes: array[0..2] of FLDDesc = (
    // Field 1 - ALPHA
    (iFldNum:      1;
     szName:       'ALPHA';
     iFldType:     fldZSTRING;
     iSubType:     fldUNKNOWN;
     iUnits1:     10;
     iUnits2:     0;
     iOffset:     0;
     iLen:        0;
     iNullOffset: 0;
     efldvVchk:   fldvNOCHECKS;
     efldrRights: fldrREADWRITE),
    // Field 2 - NUMERIC
    (iFldNum:      2;
     szName:       'NUMERIC';
     iFldType:     fldFLOAT;
     iSubType:     fldUNKNOWN;
     iUnits1:     0;
     iUnits2:     0;
     iOffset:     0;
     iLen:        0;
     iNullOffset: 0;
     efldvVchk:   fldvNOCHECKS;
     efldrRights: fldrREADWRITE),
    // Field 3 - SHORT
    (iFldNum:      3;
     szName:       'SHORT';
     iFldType:     fldINT16;
     iSubType:     fldUNKNOWN;
     iUnits1:     0;
     iUnits2:     0;
     iOffset:     0;
     iLen:        0;
     iNullOffset: 0;
     efldvVchk:   fldvNOCHECKS;
     efldrRights: fldrREADWRITE));
var
  hIMCur  : hDBICur;
  hNilDB   : hDBIDb;
begin
  Check(dbiOpenDatabase(nil, nil, dbiREADWRITE, dbiOPENSARED, nil, 0, nil,
                       nil, hNilDB));
  Check(dbiCreateInMemTable(hNilDB, 'InMemTbl', 3, @fldDes, hIMCur));
end;
```

Example 2: Create an in-memory table by borrowing the field descriptor from an existing Paradox table.

The existing table is passed in the Tbl parameter.

```
procedure MakeInMemTable2(Tbl: TTable);
var
  TblProps : CurProps;
  PFDesc   : pFldDesc;
  hIMCur  : hDBICur;
  MemSize  : integer;
begin
  Check(dbiGetCursorProps(Tbl.Handle, TblProps));
  MemSize := SizeOf(FldDesc) * (TblProps.iFields);
  PFDesc := AllocMem(MemSize);
  try
    Check(dbiGetFieldDescs(Tbl.Handle, PFDesc));
    Check(dbiCreateInMemTable(Tbl.DBHandle, 'InMemTbl', 3, PFDesc, hIMCur));
  finally
    FreeMem(PFDesc, MemSize);
  end;
end;
```

DbiCreateTable {button C
Examples,JI(">example","exdbicreatetable")} {button Delphi
Examples,JI(">example","dexdbicreatetable")}

C syntax

```
DBIResult DBIFN DbiCreateTable (hDb, bOverWrite, pcrTblDsc);
```

Delphi syntax

```
function DbiCreateTable (hDb: hDBIDb; bOverWrite: Bool; var crTblDsc: CRTblDesc): DBIResult stdcall;
```

Description

DbiCreateTable creates a table in the database associated with the given database handle.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

bOverWrite Type: BOOL (Input)

Specifies whether to overwrite an existing table or not. If TRUE is specified, and there is an existing table, it will be overwritten. If FALSE is specified, and there is an existing table, an error is returned.

pcrTblDsc Type: pCRTblDesc (Input)

Pointer to the table descriptor structure ([CRTblDesc](#)). Refer to [DbiGetFieldTypeDesc](#) and [DbiGetIndexTypeDesc](#) for more information on the legal values for these structures for each Borland Database Engine driver.

Optional parameters

The optional parameter fields *iOptParams*, *pfldOptParams*, and *pOptData* are used to set other driver-specific attributes of the table. These parameters are used to describe a single record that is constructed by the client and contains the null-terminated ASCII strings that specify the values for these driver-specific attributes.

iOptParams is the number of optional parameters. *pfldOptParams* contains a pointer to an array of [FLDDesc](#) of *iOptParams* size. Each of these field descriptors is given a field name equal to the name of the optional parameter (for example, MDXBLOCKSIZE) and has *iLen* and *iOffset* set to the length (including the NULL terminator) and position in the *pOptData* record buffer of the ASCII string containing the value of this parameter (for example, 512). All other elements of the [FLDDesc](#) are ignored. The *pOptData* record buffer need only be large enough to hold all the null-terminated strings for each optional parameter value. This style of setting optional parameters is also used by [DbiOpenDatabase](#). The names of the optional parameters can be obtained using [DbiOpenCfgInfoList](#) with a configuration path of DRIVERS\DRIVERNAME\TABLECREATE.

Usage

The required descriptors are specified in [CRTblDesc](#); different drivers might require different descriptors.

Text: [DbiCreateTable](#) can be used to create a text file to export the data to it. For text file creation, only *szTblName* and *szTblType* values in the [CRTblDesc](#) are used and the rest of the values are ignored (*szTblType* is specified as ASCIIDRV). A text file is created with the given name; no field descriptions are necessary.

Paradox: Referential integrity can be created only when creating or restructuring the detail table. The master table must already exist and must be in the same directory as the table being created. A lookup table may exist in any accessible directory, but must exist at the time this table is created.

SQL: All indexes are maintained; there are no non-maintained indexes.

Integrity Constraints: When creating a table by using [DbiCreateTable](#), you can use [integrity constraints](#) to ensure that references in the key fields of secondary tables (in the same database) or foreign tables (in another database) are maintained to key fields in a primary table. For example, if several tables have

keys referencing primary key Customer ID in the Customer table, then this dependency must be checked so that referenced customer IDs cannot be deleted, thereby orphaning records in secondary or foreign tables.

Prerequisites

If the client chooses to overwrite an existing table; the existing table must be closed. `DbiCreateTable` supports up to 255 val-checks.

Completion state

All files associated with the table are created.

DbiResult return values

DBIERR_NONE	The table was created successfully.
DBIERR_INVALIDFILEEXTN	The driver type or file extension is invalid.
DBIERR_INVALIDOPTION	The index description is invalid.
DBIERR_INVALIDINDEXSTRUCT	Invalid index structure. For SQL servers, all indexes are maintained; verify that <i>bMaintained</i> in <code>pidxDesc</code> specifies TRUE.
DBIERR_FILEEXISTS	The table already exists (returned when <i>bOverWrite</i> is FALSE).
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_UNKNOWNTABLETYPE	The specified driver type is invalid.
DBIERR_MULTILEVELCASCADE	An illegal attempt was made to create a referential integrity link that is already in use as a link to a higher level cascade update (Paradox only).
DBIERR_FLDLIMIT	<i>iFldCount</i> exceeds maximum number of fields.
DBIERR_INVALIDFIELDNAME	An invalid field name was specified.
DBIERR_NAMENOTUNIQUE	The specified field name or index name is not unique.
DBIERR_INVALIDFLDTYPE	The specified field type is unknown or not allowed.
DBIERR_RECTOOBIG	The record size exceeds the maximum allowed.
DBIERR_INVALIDINDEXNAME	The specified index name is invalid.
DBIERR_INVALIDINDEXTYPE	The specified index type is invalid.
DBIERR_INDEXNAMEREQUIRED	No index name was specified.
DBIERR_LOOKUPTBOPENERR	The specified lookup table could not be opened.

See also

[DbiCopyTable](#), [DbiSortTable](#), [DbiDoRestructure](#)

C Examples: DbiCreateTable

Example 1: Create a Paradox table:

This example uses the following input:

```
fDbiCreateTable1(hDb);
```

```
DBIResult fDbiCreateTable1(hDBIDb hTmpDb)
{
    CHAR szTblType[] = szPARADOX;
    CHAR szTblName[] = "PX_Table";
    CRTblDesc TblDesc; // Create Table Descriptor
    DBIResult rslt;
    UINT16 NumFields = 2;
    FLDDesc fldDesc[] = {
        { // Field 1 - TIMESTAMP
            1, "MyAlpha", fldPDXDATETIME, fldUNKNOWN, 0, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        },
        { // FIELD 2 - AUTOINCREMENT
            2, "MyNumber", fldPDXAUTOINC, fldUNKNOWN, 0, 0, 0,
            0, 0, fldvNOCHECKS, fldrREADWRITE
        }
    };
    memset((void *) &TblDesc, 0, sizeof(CRTblDesc));
    lstrcpy(TblDesc.szTblName, szTblName);
    lstrcpy(TblDesc.szTblType, szTblType);
    TblDesc.iFldCount = NumFields;
    TblDesc.pfldDesc = fldDesc;
    //Could add indexes, validity checks, and security descriptors here.
    rslt = Chk(DbiCreateTable(hTmpDb, TRUE, &TblDesc));
    return rslt;
}
```

Example 2: Create a dBASE table:

This example uses the following input:

```
fDbiCreateTable2(hDb);
```

```
DBIResult fDbiCreateTable2(hDBIDb hTmpDb)
{
    CHAR szTblType[] = szDBASE;
    CHAR szTblName[] = "dBASE_TBL";
    CRTblDesc TblDesc; // Create Table Descriptor
    DBIResult rslt;
    UINT16 NumFields = 2;
    FLDDesc fldDesc[] = {
        { // Field 1 - MEMO
            1, "MyAlpha", fldDBMEMO, fldUNKNOWN, 0, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        },
        { // FIELD 2 - BOOLEAN
            2, "MyNumber", fldDBBOOL, fldUNKNOWN, 0, 0, 0,
            0, 0, fldvNOCHECKS, fldrREADWRITE
        }
    };
    memset((void *) &TblDesc, 0, sizeof(CRTblDesc));
    lstrcpy(TblDesc.szTblName, szTblName);
    lstrcpy(TblDesc.szTblType, szTblType);
}
```

```

TblDesc.iFldCount = NumFields;
TblDesc.pfldDesc = fldDesc;
//Could add indexes, validity checks, and security descriptors here.
rslt = Chk(DbiCreateTable(hTmpDb, TRUE, &TblDesc));
return rslt;
}

```

Example 3: Create a InterBase table:

This example uses the following input:

```
fDbiCreateTable3(hDb);
```

```

DBIResult fDbiCreateTable3(hDBIDb hTmpDb)
{
    CHAR szTblName[] = "IB_TBL";
    CRTblDesc  TblDesc; // Create Table Descriptor
    DBIResult rslt;
    UINT16 NumFields = 2;
    FLDDesc fldDesc[] = {
        { // Field 1 - MEMO
            1, "MyAlpha", fldIBCHAR, fldUNKNOWN, 300, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        },
        { // FIELD 2 - BLOB
            2, "MyNumber", fldIBBLOB, fldUNKNOWN, 0, 0, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        }
    };
    memset((void *) &TblDesc, 0, sizeof(CRTblDesc));
    lstrcpy(TblDesc.szTblName, szTblName);
    lstrcpy(TblDesc.szTblType, szTblType);
    TblDesc.iFldCount = NumFields;
    TblDesc.pfldDesc = fldDesc;
    //Could add indexes, validity checks, and security descriptors here.
    rslt = Chk(DbiCreateTable(hTmpDb, TRUE, &TblDesc));
    return rslt;
}

```


Delphi Examples: DbCreateTable

Create a table with a different level, block size, and fill factor than specified in the BDE configuration. Most Delphi users should use TTable.CreateTable. This example uses the following input:

```
fDbiCreateTable(Database1.Handle, 'TableChange', 3, @FDesc, 7, 32768, 95);
procedure fDbiCreateTable(hTmpDb: hDBIDb; TableName: String; Fields: Word;
    pFlds: pFLDDesc; Level, BlockSize, FillFactor: Word);
var
    pOptDesc, pOrigDesc: pFLDDesc;
    pOptData, pOrigData: pBYTE;
    TblDesc: CRTblDesc;
    sLevel, sBlockSize, sFillFactor: String;
begin
    pOptDesc := AllocMem(3 * sizeof(FLDDesc));
    pOrigDesc := pOptDesc;
    pOptData := AllocMem(20);
    pOrigData := pOptData;
    try
        sLevel := IntToStr(Level);
        sBlockSize := IntToStr(BlockSize);
        sFillFactor := IntToStr(FillFactor);
        // Set up first parameter
        pOptDesc.iOffset := 0;
        pOptDesc.iLen := Length(sLevel) + 1;
        StrPCopy(pOptDesc.szName, 'LEVEL');
        StrPCopy(PChar(pOptData), sLevel);
        Inc(pOptData, Length(sLevel) + 1);
        Inc(pOptDesc);
        // Set up second parameter
        pOptDesc.iOffset := Length(sLevel) + 1;
        pOptDesc.iLen := Length(sLevel) + 1 + Length(sBlockSize) + 1;
        StrPCopy(pOptDesc.szName, 'BLOCK SIZE');
        StrPCopy(PChar(pOptData), sBlockSize);
        Inc(pOptData, Length(sBlockSize) + 1);
        Inc(pOptDesc);
        // Set up third parameter
        pOptDesc.iOffset := Length(sLevel) + 1 + Length(sBlockSize) + 1;
        pOptDesc.iLen := Length(sLevel) + 1 + Length(sBlockSize) + 1 +
            Length(sFillFactor) + 1;
        StrPCopy(pOptDesc.szName, 'FILL FACTOR');
        StrPCopy(PChar(pOptData), sFillFactor);
        // Format the table descriptor
        FillChar(TblDesc, sizeof(TblDesc), #0);
        StrPCopy(TblDesc.szTblName, TableName);
        StrCopy(TblDesc.szTblType, szPARADOX);
        TblDesc.iOptParams := 3;
        TblDesc.pFldOptParams := pOrigDesc;
        TblDesc.pOptData := pOrigData;
        TblDesc.iFldCount := Fields;
        TblDesc.pFldDesc := pFlds;
        // Create the table
        Check(DbCreateTable(hTmpDb, True, TblDesc));
    finally
        FreeMem(pOrigDesc, 3 * sizeof(FLDDesc));
        FreeMem(pOrigData, 20);
    end;
end;
```

end;

DbiCreateTempTable {button C
Examples,JI(">example","exdbicreatetemptable")} {button Delphi
Examples,JI(">example","dexdbicreatetemptable")}

C syntax

```
DBIResult DBIFN DbiCreateTempTable (hDb, pcrTblDsc, phCursor);
```

Delphi syntax

```
function DbiCreateTempTable (hDb: hDBIDb; var crTblDsc: CRTblDesc; var  
    hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiCreateTempTable creates a temporary table that is deleted when the cursor is closed, unless the call is followed by a call to [DbiMakePermanent](#) or [DbiSaveChanges](#).

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle. When a NULL *hDb* is specified, all temp tables will be created in the default working directory of the current session (the location of BDE executable or explicitly set by using [DbiSetDir](#))--unless a private directory has been explicitly set on the current session by using [DbiSetPrivateDir](#).

pcrTblDsc Type: pCRTblDesc (Input)

Pointer to the table descriptor structure ([CRTblDesc](#)). Usage is the same as in [DbiCreateTable](#) except that referential integrity cannot be created for a temporary table. Refer to [DbiGetFieldTypeDesc](#) and [DbiGetIndexTypeDesc](#) for more information on the legal values for these structures for each Borland Database Engine driver.

phCursor Type: phDBICur (Output)

Pointer to the cursor handle for the table.

Usage

Physical as well as logical field types are supported by the temporary table.

SQL: This function is not supported with SQL tables.

DbiResult return values

DBIERR_NONE The table was created successfully.

See also

[DbiMakePermanent](#), [DbiCreateTable](#), [DbiCreateInMemTable](#)

C Examples: DbiCreateTempTable

Example 1: Create a temporary table using IDAPI logical types in the field descriptor.

The temporary table can be made permanent later on. This example uses the following input:

```
fDbiCreateTempTable1(hDb, &hTmpCur);
```

```
DBIResult fDbiCreateTempTable1(hDBIDb hTmpDb, phDBICur phTmpCur)
{
    CHAR                szTblName[] = "TempPXTbl";
    CRTblDesc           TblDesc;     // Create Table Descriptor
    DBIResult           rslt;
    UINT16              NumFields = 2;
    FLDDesc             fldDesc[] = {
        {               // Field 1 - ALPHA
            1, "MyAlpha", fldZSTRING, fldUNKNOWN, 10, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        },
        {               // FIELD 2 - NUMERIC
            2, "MyNumber", fldFLOAT, fldUNKNOWN, 0, 0, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        }
    };
    memset((void *) &TblDesc, 0, sizeof(CRTblDesc));
    strcpy(TblDesc.szTblName, szTblName);
    strcpy(TblDesc.szTblType, szPARADOX);
    TblDesc.iFldCount = NumFields;
    TblDesc.pfldDesc = fldDesc;
    //Could add indexes, validity checks, and security descriptors here.
    rslt = Chk(DbiCreateTempTable(hTmpDb, &TblDesc, phTmpCur));
    return rslt;
}
```

Example 2: Create a temporary table using dBASE physical types in the field descriptor.

The temporary table can be made permanent later on. This example uses the following input:

```
fDbiCreateTempTable2(hDb, &hTmpCur);
```

```
DBIResult fDbiCreateTempTable2(hDBIDb hTmpDb, phDBICur phTmpCur)
{
    CHAR                szTblName[] = "TempdBASETbl";
    CRTblDesc           TblDesc;     // Create Table Descriptor
    DBIResult           rslt;
    UINT16              NumFields = 2;
    FLDDesc             fldDesc[] = {
        {               // Field 1 - MEMO
            1, "MyAlpha", fldDBMEMO, fldUNKNOWN, 0, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        },
        {               // FIELD 2 - BOOLEAN
            2, "MyNumber", fldDBBOOL, fldUNKNOWN, 0, 0, 0,
            0, 0, 0, fldvNOCHECKS, fldrREADWRITE
        }
    };
    memset((void *) &TblDesc, 0, sizeof(CRTblDesc));
    strcpy(TblDesc.szTblName, szTblName);
    strcpy(TblDesc.szTblType, szDBASE);
    TblDesc.iFldCount = NumFields;
    TblDesc.pfldDesc = fldDesc;
}
```

```
//Could add indexes, validity checks, and security descriptors here.  
rslt = Chk(DbiCreateTempTable(hTmpDb, &TblDesc, phTmpCur));  
return rslt;  
}
```

Delphi Examples: DbCreateTempTable

Example 1: Create a temporary table using BDE logical types in the field descriptor.

Note: This table can be made permanent later on.

```
procedure fDbiCreateTempTable(var hTmpDb: hDBIDb;var hTmpCur: hDBICur);
const
  fldDes: array[0..1] of FLDDesc = (
    ( // Field 1 - ALPHA
      iFldNum:      1;           { Field Number }
      szName:       'MyAlpha';  { Field Name }
      iFldType:     fldZSTRING;  { Field Type }
      iSubType:     fldUNKNOWN;  { Field Subtype }
      iUnits1:     10;          { Field Size }
      iUnits2:     0;
      iOffset:     0;
      iLen:        0;
      iNullOffset: 0;
      efldvVchk:   fldvNOCHECKS;
      efldrRights: fldrREADWRITE
    ),
    ( // FIELD 2 - NUMERIC
      iFldNum:      2;
      szName:       'MyNumber';
      iFldType:     fldFLOAT;
      iSubType:     fldUNKNOWN;
      iUnits1:     0;
      iUnits2:     0;
      iOffset:     0;
      iLen:        0;
      iNullOffset: 0;
      efldvVchk:   fldvNOCHECKS;
      efldrRights: fldrREADWRITE
    )
  );

var
  szTblName: array[0..DBIMAXTBLNAMELEN] of Char;
  TblDesc: CRTblDesc; // Create Table Descriptor
  NumFields: LongInt;

begin
  StrPCopy(szTblName, 'TempPXTbl');
  NumFields:= 2;

  FillChar(TblDesc, sizeof(CRTblDesc), #0);
  StrCopy(TblDesc.szTblName, szTblName);
  StrCopy(TblDesc.szTblType, szPARADOX);
  TblDesc.iFldCount:= NumFields;
  TblDesc.pfldDesc:= @fldDes;
  //Could add indexes, validity checks, and security descriptors here.

  Check(DbiCreateTempTable(hTmpDb, TblDesc, hTmpCur));
end;
```

Example 2: Create a temporary table using dBASE physical types in the field descriptor.

Note: This table can be made permanent later on.

```
procedure fDbiCreateTempTable(hTmpDb: hDBIDb;hTmpCur: hDBICur);
const
  fldDes: array[0..1] of FLDDesc = (
    ( // Field 1 - MEMO
      iFldNum:      1;           { Field Number }
      szName:       'MyAlpha';  { Field Name }
      iFldType:     fldDBMEMO;   { Field Type }
      iSubType:     fldUNKNOWN;  { Field Subtype }
      iUnits1:      0;           { Field Size }
      iUnits2:      0;
      iOffset:      0;
      iLen:         0;
      iNullOffset:  0;
      eFldvVchk:    fldvNOCHECKS;
      eFldrRights:  fldrREADWRITE
    ),
    ( // FIELD 2 - BOOLEAN
      iFldNum:      2;           { Field Number }
      szName:       'MyNumber';  { Field Name }
      iFldType:     fldDBBOOL;   { Field Type }
      iSubType:     fldUNKNOWN;  { Field Subtype }
      iUnits1:      0;           { Field Size }
      iUnits2:      0;
      iOffset:      0;
      iLen:         0;
      iNullOffset:  0;
      eFldvVchk:    fldvNOCHECKS;
      eFldrRights:  fldrREADWRITE)
  );

var
  szTblName: array[0..DBIMAXTBLNAMELEN] of Char;
  TblDes: CRTblDesc; // Create Table Descriptor
  NumFields: LongInt;

begin
  StrCopy(szTblName, 'TempdBASETbl');
  NumFields:= 2;

  FillChar(TblDes, SizeOf(TblDes), #0);
  StrCopy(TblDes.szTblName, szTblName);
  StrCopy(TblDes.szTblType, szDBASE);
  TblDes.iFldCount := NumFields;
  TblDes.pfldDesc := @fldDes;
  //Could add indexes, validity checks, and security descriptors here.

  Check(DbiCreateTempTable(hTmpDb, TblDes, hTmpCur));
end;
```

DbiDateDecode **{button C**
Examples,JI(">example","exdbidatedecode")} **{button Delphi**
Examples,JI(">example","dexdbidatedecode")}

C syntax

```
DBIResult DBIFN DbiDateDecode (dateD, piMon, piDay, piYear);
```

Delphi syntax

```
function DbiDateDecode (dateD: DbiDate; var iMon: Word; var iDay: Word; var  
    iYear: SmallInt): DBIResult stdcall;
```

Description

DbiDateDecode decodes DBIDATE into separate month, day, and year components.

Parameters

dateD Type: DBIDATE (Input)

Specifies the encoded date.

piMon Type: pUINT16 (Output)

Pointer to the client variable that receives the decoded month component. Valid values range from 1 through 12.

piDay Type: pUINT16 (Output)

Pointer to the client variable that receives the decoded day component. Valid values range from 1 through 31.

piYear Type: pINT16 (Output)

Pointer to the client variable that receives the decoded year component. Valid values range from -9999 to 9999.

Usage

This call enables the client to interpret date information returned from a call to DbiGetField.

DbiResult return values

DBIERR_NONE The date was decoded successfully.

DBIERR_INVALIDHNDL At least one of the following parameters is NULL: piMon, piDay, piYear.

See also

[DbiGetField](#), [DbiDateEncode](#), [DbiTimeEncode](#), [DbiTimeDecode](#), [DbiTimeStampEncode](#),
[DbiTimeStampDecode](#)

C Examples: DbiDateDecode

Decode a DBIDATE structure into month, day, and year numbers.

In this example the input is:

```
fDbiDateDecode(dbDate, &M, &D, &Y);
```

```
DBIResult fDbiDateDecode(DBIDATE DecodeDate, pUINT16 Month, pUINT16 Day,  
    pINT16 Year)  
{  
    DBIResult  rslt;  
    rslt = Chk(DbiDateDecode(DecodeDate, Month, Day, Year));  
    return rslt;  
}
```

Delphi Examples: DbiDateDecode

Decode a DBDATE structure into month, day, and year numbers.

DbiDateDecode returns a string containing the date. Keep in mind that you need to use this function only when you are directly accessing BDE format dates. Otherwise, VCL handles this conversion for you.

This example uses the following input:

```
fDbiDateDecode(MyDate, MyMonth, MyDay, MyYear);  
Function fDbiDateDecode(dateD: DbiDATE; var Month: word; var Day: word; var  
    Year: SmallInt): String;  
begin  
    Check(DbiDateDecode(dateD, Month, Day, Year));  
    Result := Format('%d/%d/%d', [Month, Day, Year]);  
end;
```

DbiDateEncode {button C
Examples,JI(">example","exdbidateencode")} {button Delphi
Examples,JI(">example","dexdbidateencode")}

C syntax

```
DBIResult DBIFN DbiDateEncode (iMon, iDay, iYear, pdateD);
```

Delphi syntax

```
function DbiDateEncode (iMon: Word; iDay: Word; iYear: SmallInt; var dateD:  
  DbiDate): DBIResult stdcall;
```

Description

DbiDateEncode encodes separate date components into DBIDATE for use by [DbiPutField](#) and other functions.

Parameters

iMon Type: UINT16 (Input)
Specifies the month. Valid values range from 1 through 12.

iDay Type: UINT16 (Input)
Specifies the day. Valid values range from 1 through 31.

iYear Type: INT16 (Input)
Specifies the year. Valid values range from -9999 to 9999.

pdateD Type: pDBIDATE (Output)
Pointer to the client buffer that receives the encoded date.

Usage

This function enables the client to construct a logical date value to use with the function [DbiPutField](#).

DbiResult return values

DBIERR_NONE	The date was encoded successfully.
DBIERR_INVALIDHNDL	pDate is NULL.
DBIERR_INVALIDPARAM	The ranges of month and day parameters are wrong, according to the rules of the Gregorian calendar. iMon is zero or iMon is greater than 12 or iDay is zero or iDay is greater than 31.

See also

[DbiDateDecode](#), [DbiTimeEncode](#), [DbiTimeDecode](#), [DbiTimeStampEncode](#), [DbiTimeStampDecode](#)

C Examples: DbiDateEncode

Encode month, day, and year numbers into a DBIDATE structure.

In this example the input is:

```
fDbiDateEncode(2, 24, 67, &dbDate);
```

```
DBIResult fDbiDateEncode(UINT16 Month, UINT16 Day, INT16 Year, pDBIDATE
    EncodeDate)
{
    DBIResult    rslt;
    rslt = Chk(DbiDateEncode(Month, Day, Year, EncodeDate));
    return rslt;
}
```

Delphi Examples: DbiDateEncode

Encode month, day, and year numbers into a DBIDATE structure.

Keep in mind that you need to use this function only when you are directly accessing BDE format dates. Otherwise, VCL handles this conversion for you.

This example uses the following input:

```
fDbiDateEncode(2, 8, 71, MyDate);
```

```
Function fDbiDateEncode(Month : Word, Day : Word, Year : SmallInt, MyDate :  
  DbiDate) : DbiDate;  
begin  
  Check(DbiDateEncode(Month, Day, Year, MyDate));  
  Result := Mydate;  
end;
```

DbiDeactivateFilter {button C
Examples,JI(">example","exdbiactivatefilter")} {button Delphi
Examples,JI(">example","dexdbidropfilter")}

C syntax

```
DBIResult DBIFN DbiDeactivateFilter (hCursor, [hFilter]);
```

Delphi syntax

```
function DbiDeactivateFilter (hCursor: hDBICur; hFilter: hDBIFilter):  
    DBIResult stdcall;
```

Description

DbiDeactivateFilter temporarily disables the specified filter from affecting the record set by turning the filter off.

Parameters

hCursor Type: hDBICur (Input)
Specifies the valid cursor handle from an open table.

hFilter Type: hDBIFilter (Input)
Specifies the filter handle of the filter to deactivate. If NULL, then all filters for this cursor are deactivated.

Usage

Once a filter has been activated, that filter controls what is contained in the record set, and all operations on the associated cursor are affected. Once a filter is deactivated, all the records that were excluded by the filter are now accessible, subject to other active filters.

Prerequisites

The filter must have been previously added and activated. If a non-NULL filter is applied, it must be activated.

DbiResult return values

DBIERR_NONE	The filter specified by <i>hFilter</i> was successfully deactivated. If NULL was passed for the filter handle, all filters were deactivated.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NOSUCHFILTER	The specified filter handle is invalid.
DBIERR_NA	The filter was already deactivated.

See also

[DbiAddFilter](#), [DbiDeactivateFilter](#), [DbiDropFilter](#)

C Examples: DbiDeactivateFilter

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: Dbideactivatefilter

An example for this function is under development and will be provided in an upcoming Help release.

DbiDebugLayerOptions {button C
Examples,JI(">example","exdbidebuglayeroptions")} {button Delphi
Examples,JI(">example","dexdbidebuglayeroptions")}

C syntax

```
DBIResult DBIFN DbiDebugLayerOptions (iOption, pDebugFile);
```

Delphi syntax

```
function DbiDebugLayerOptions (iOption: Word; pDebugFile: PChar): DBIResult  
    stdcall;
```

Description

DbiDebugLayerOptions is used to activate, deactivate, or set options for the BDE debug layer.

Parameters

iOption Type: UINT16 (Input)

Specifies a union of [debug layer options](#).

pDebugFile Type: pCHAR (Input)

Specifies a trace file into which trace information is written. (This parameter is valid only if the option OUTPUTTOFILE is specified.)

Usage

The debug layer has two purposes:

- It provides a more advanced level of parameter checking.
- It enables the application to output trace information, giving a detailed breakdown of the parameters passed into BDE functions. The trace includes error messages that are generated when variables contain invalid data.

The trace file name is specified in *pDebugFile* as *<filename.ext>*. If that file reaches 500K, then the contents are rolled over to a *<filename.old>* file. The trace file capacity is limited to 1MB. When the new trace file reaches 500K, its contents are again rolled over, overwriting the *<filename.old>* file.

Prerequisites

Before calling DbiDebugLayerOptions, the proper dynamic link library must be made available. To do this, run the standalone utility DLLSWP32.EXE, which is used to swap between DBG32.DLL and NODBG32.DLL. DLLSWP32.EXE makes it known which DLL is currently available.

To accomplish the same task without the use of DLLSWP32.EXE, locate the directory where the BDE DLLs are installed. IDAPI32.DLL is the main entry point to BDE.

If DBG32.DLL is listed in the directory, the debug layer is not enabled. To enable the debug layer, rename IDAPI32.DLL to NODBG32.DLL, and rename DBL.DLL to IDAPI32.DLL.

If NODBG32.DLL is listed in the directory, the debug layer is enabled. To disable the debug layer, rename IDAPI32.DLL to DBG32.DLL, and rename NODBG32.DLL to IDAPI32.DLL.

Take special care when using the debug layer in a multi-session environment. Debug layer state is shared by all concurrent sessions. For example, if one session has set the debug layer on for tracing, all sessions are traced.

Tracing imposes a considerable overhead. For this reason, when you are trying to isolate a problem, avoid tracing within long loops.

DbiResult return values

DBIERR_NONE The debug layer options have been successfully specified.

iOption

The possible debug layer options are:

Option	Result
DEBUGON	If specified, the debug layer is activated. (Note: The debug layer .DLL must be in place.) If this option is not specified, the debug layer is deactivated.
OUTPUTTOFILE	If specified, debug layer trace information is directed to the file specified by pDebugFile. If pDebugfile is not specified, a default trace file is created.
FLUSHEVERYOP	If specified, flushes trace information to the trace file every time a BDE function is called. (Note: This option is expensive, and markedly slows processing.) If not specified, trace information is flushed periodically.
APPENDTOLOG	If specified, the trace output is appended to the end of the existing pDebugFile file. If not specified, the trace output overwrites the existing pDebugFile.

C Examples: DbiDebugLayerOptions

Starts and stops debug tracing. Set bOn to TRUE to start the debug layer and set it to FALSE to stop. This example uses the following input:

```
fDbiDebugLayerOptions(TRUE, "BDE Debug File.Txt");
DBIResult fDbiDebugLayerOptions(BOOL bOn, pCHAR pDebugFile)
{
    DBIResult    rslt;
    UINT16       Options = 0;

    if (bOn == TRUE)
        Options = DEBUGON | OUTPUTTOFILE | FLUSHEVERYOP;

    rslt = Chk(DbiDebugLayerOptions(Options, pDebugFile));

    return rslt;
}
```

Delphi Examples: DbiDebugLayerOptions

Turn on the debug options with the DEBUGON option, to activate the debug layer.

This example uses the following input:

```
    InvokeDbiDebugLayerOptions(DEBUGON or OUTPUTTOFILE, 'c:\log.txt');
procedure InvokeDebugLayerOptions(Options: Longint; DebugFile: String);
// Below are the paramters passed into DbiDebugLayerOptions.
//
// iOptions - Specifies a union of debug options. Options are
//           DEBUGON, OUTPUTTOFILE, FLUSHEVERYOP, and APPENDTOLOG.
// DebugFile - Specifies a trace file into which trace information
//            is written. This parameter is valid only if the OUTPUTTOFILE
//            option is specified.
begin
    Check(DbiDebugLayerOptions(Options, PChar(DebugFile)));
end;
```

DbiDeleteAlias {button C
Examples,JI(">example","exdbideletealias")} {button Delphi
Examples,JI(">example","dexdbideletealias")}

C syntax

```
DBIResult DbiDeleteAlias ( [hCfg], pszAliasName );
```

Delphi syntax

```
function DbiDeleteAlias (hCfg: hDBICfg; pszAliasName: PChar): DBIResult  
    stdcall;
```

Description

DbiDeleteAlias deletes an alias from the configuration file specified by the parameter *hCfg*.

Parameters

hCfg Type: hDBICfg (Input)

Specifies the configuration file to be used. This parameter is required to be NULL, indicating that the alias is removed from the configuration file for the current session.

pszAliasName Type: pCHAR (Input)

Pointer to the alias name. This is the name of the new alias that is to be removed.

Usage

This function removes an alias that is either defined for use in the current session or stored in the configuration file. (See the [DbiAddAlias](#) parameter *bPersistent*.)

Prerequisites

[DbiInit](#) must be called prior to calling DbiDeleteAlias.

DbiResult return values

DBIERR_INVALIDPARAM	Null alias name.
DBIERR_NONE	The alias was deleted successfully.
DBIERR_OBJNOTFOUND	No alias was found matching pszAliasName.

See Also

[DbiInit](#), [DbiOpenCfgInfoList](#), [DbiAddAlias](#)

C Examples: DbiDeleteAlias

Delete an existing index from the configuration file:

```
DBIResult fDbiDeleteAlias(char *AliasName)
{
    DBIResult  rslt;
    rslt = Chk(DbiDeleteAlias(NULL, AliasName));
    return rslt;
}
```

Delphi Examples: Db>DeleteAlias

Delete an existing index from the configuration file of the current session:

```
procedure DoDb>DeleteAlias(AliasName: String);
begin
  Check(Db>DeleteAlias(nil, PChar(AliasName)));
end;
// Sample input:
  DoDb>DeleteAlias('SomeAlias');
```

DbiDeleteIndex {button C
Examples,JI(">example","exdbideleteindex")} {button Delphi
Examples,JI(">example","dexdbideleteindex")}

C syntax

```
DBIResult DBIFN DbiDeleteIndex (hDb, hCursor, pszTableName, [pszDriverType],  
    pszIndexName, pszIndexTagName, iIndexId);
```

Delphi syntax

```
function DbiDeleteIndex (hDb: hDBIDb; hCursor: hDBICur; pszTableName: PChar;  
    pszDriverType: PChar; pszIndexName: PChar; pszIndexTagName: PChar;  
    iIndexId: Word): DBIResult stdcall;
```

Description

DbiDeleteIndex drops an index on a table.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

hCursor Type: hDBICur (Input)
Specifies the cursor handle. If *hCursor* is specified, the operation is performed on the table associated with that cursor. If *hCursor* is NULL, *pszTableName* and *pszDriverType* determine the table to be used.

pszTableName Type: pCHAR (Input)
Pointer to the table name. If *hCursor* is NULL, *pszTableName* and *pszDriverType* determine the table to be used. (If both *pszTableName* and *hCursor* are specified, *pszTableName* is ignored.)

For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)
Pointer to the driver type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

pszIndexName Type: pCHAR (Input)
Pointer to the name of the index to be dropped. See [IDXDesc](#) for index naming rules.

pszIndexTagName Type: pCHAR (Input)
Pointer to the index tag name. Used only to identify dBASE .MDX indexes. (See the *pszIndexName* parameter description above.) This parameter is ignored for Paradox and SQL tables.

iIndexId Type: UINT16 (Input)
Specifies the index identifier, which is the number of the index to be used. The range for the index identifier is 1 to 511. Used for Paradox tables only and is ignored if *pszIndexName* is specified.

Usage

Used to drop an index. The client application can either specify the table by name or by opening a cursor on the table. If a cursor is specified, it must not be opened with the index to be deleted.

Prerequisites

If *hCursor* is specified, an exclusive cursor handle must be supplied. The index must exist. See the following driver-specific information for locking requirements. A currently active index cannot be dropped. If the table name is specified, the table must be able to be opened exclusively.

dBASE: The table must be opened exclusively on behalf of the client application.

Paradox: The table must be opened exclusively on behalf of the client application. (The client

application must have permission to lock the table exclusively.)

SQL: The table must be open exclusively where table locking is supported by the driver.

Completion state

If a cursor is specified, `DbiDeleteIndex` does not affect the order or the position of the cursor.

DbiResult return values

<code>DBIERR_NONE</code>	The index was successfully deleted.
<code>DBIERR_INDEXNAMERQUIRED</code>	An index name is required.
<code>DBIERR_INDEXREADONLY</code>	An illegal attempt was made to delete a read-only index.
<code>DBIERR_ACTIVEINDEX</code>	An illegal attempt was made to delete an active, primary index.
<code>DBIERR_MUSTUSEBASEORDER</code>	An illegal attempt was made to delete an active, secondary index.
<code>DBIERR_INVALIDHNDL</code>	Handle was invalid or NULL.
<code>DBIERR_NEEDEXCLACCESS</code>	Exclusive access is required to delete the index.
<code>DBIERR_NOSUCHINDEX</code>	The specified index does not exist.

See also

[`DbiAddIndex`](#), [`DbiCloseIndex`](#), [`DbiOpenIndex`](#), [`DbiSwitchToIndex`](#), [`DbiDoRestructure`](#)

C Examples: DbiDeleteIndex

Remove the specified index from the specified table. This example uses the following input:

```
fDbiDeleteIndex(hDb, "New Customer.db", "Place");
DBIResult fDbiDeleteIndex(hDBIDb hTmpDb, pCHAR szTableName, pCHAR
szIndexName)
{
    DBIResult rslt;

    rslt = Chk(DbiDeleteIndex(hTmpDb, NULL, szTableName, NULL, szIndexName,
        NULL, NULL));

    return rslt;
}
```

Delphi Examples: Db>DeleteIndex

Delete the specified index.

Delphi users should normally call TTable.DeleteIndex rather than directly calling Db>DeleteIndex. The method TTable.DeleteIndex is defined as:

```
procedure DeleteIndex(const Name: string);
```

The following example removes an alias called "ByCompany" from TTable Table1:

```
Table1.DeleteIndex('ByCompany');
```

Delete the active index on a table.

Most Delphi users should use Table.DeleteIndex. This example uses the following input:

```
f>DeleteIndex(CustTemp, False);
```

```
procedure f>DeleteIndex(Table: TTable; Tag: Boolean);
```

```
var
```

```
    ActiveIdx: IDXDesc;
```

```
begin
```

```
    if Table.Exclusive = False then
```

```
        raise EDatabaseError.Create('Table must be opened exclusively to delete index');
```

```
    Check(Db>GetIndexDesc(Table.Handle, 0, ActiveIdx));
```

```
    // Cannot delete the active index, so change to default
```

```
    Table.IndexName := '';
```

```
    Table.IndexFieldNames := '';
```

```
    Check(Db>DeleteIndex(Table.DBHandle, Table.Handle, nil, nil,
```

```
        ActiveIdx.szName,
```

```
        ActiveIdx.szTagName, 0));
```

```
end;
```

DbiDeleteRecord {button C
Examples,JI(">example","exdbideleterecord")} {button Delphi
Examples,JI(">example","dexdbideleterecord")}

C syntax

```
DBIResult DBIFN DbiDeleteRecord (hCursor, [pRecBuf]);
```

Delphi syntax

```
function DbiDeleteRecord (hCursor: hDBICur; pRecBuf: Pointer): DBIResult  

    stdcall;
```

Description

DbiDeleteRecord deletes the current record of the given cursor.

Parameters

hCursor Type: hDBICur (Input)
 Specifies the cursor handle.

pRecBuf Type: pBYTE (Output)
 Pointer to the client buffer that receives the deleted record. Optional.

Usage

dBASE: DbiDeleteRecord marks the record for deletion. The record is not physically removed from the table until the table is packed with [DbiPackTable](#).

Paradox: After a record is deleted and committed, it cannot be recalled. The record is not deleted if the deletion would cause violation of referential integrity. For example, if the cursor is validly positioned on a record within the master table, and that record has linked values in a detail table, then the call to DbiDeleteRecord fails, and the position of the cursor remains unchanged.

Deleting a record does not reduce table size. The only way to gain disk space for records that have been deleted is to restructure the table with a call to [DbiDoRestructure](#).

SQL: Record deletions are done via optimistic locking. Unless a transaction is explicitly started using [DbiBeginTran](#), a successful deletion is immediately committed.

Prerequisites

The cursor must be positioned on a record, not on a crack, beginning of file, or end of file. The user must have read/write access to the table. The record must not be locked by another session.

Completion state

After DbiDeleteRecord has successfully completed, the cursor is positioned on the crack between the records before and after the deleted record. A subsequent call to DbiGetNextRecord returns the record after the deleted record, while a subsequent call to DbiGetPriorRecord returns the record before the deleted record.

DbiResult return values

DBIERR_NONE	The record was successfully deleted.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_BOF	The cursor is not positioned on a record.
DBIERR_EOF	The cursor is not positioned on a record.
DBIERR_KEYORRECDELETED	The cursor is not positioned on a record.
DBIERR_NOCURRREC	The cursor is not positioned on a record.
DBIERR_RECLOCKED	The record or table is locked by another session.
DBIERR_NOTABLESUPPORT	A deletion cannot be made from a view. Some SQL drivers do not support deletions from non-uniquely indexed tables.

DBIERR_TABLEREADONLY	Table access denied; the cursor does not have write access to the table.
DBIERR_DETAILRECORDSEXIST	The table is the master table in a referential integrity link and the record to be deleted has associated detail records (Paradox only).
DBIERR_NOTSUFFTABLERIGHTS	Insufficient table rights to delete a record (Paradox only).
DBIERR_NOTSUFFSQLRIGHTS	Insufficient SQL rights to delete a record (SQL only).
DBIERR_MULTIPLEUNIQURECS	Attempt to delete a record that has a duplicate (SQL only).

See also

[DbiGetRecord](#), [DbiDoRestructure](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRelativeRecord](#), [DbiPackTable](#) (dBASE only), [DbiUndeleteRecord](#) (dBASE only)

C Examples: DbiDeleteRecord

Delete the current record.

If *Pack* is set to true and the cursor is open exclusively on a dBASE table, the table is packed. This example uses the following input:

```
fDbiDeleteRecord(hdBASECur, pRecBuf, TRUE);
DBIResult fDbiDeleteRecord(hDBICur hTmpCur, pBYTE pTmpRecBuf, BOOL Pack)
{
    DBIResult      rslt;
    CURProps       CurProps;
    hDBIDb         hTmpDb;

    rslt = Chk(DbiDeleteRecord(hTmpCur, pTmpRecBuf));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (Pack == TRUE)
    {
        rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
        if (rslt != DBIERR_NONE)
            return rslt;
    if (strcmp(CurProps.szTableType, szDBASE) == 0)
        {
            // Get the database handle from the cursor handle
            rslt = Chk(DbiGetObjFromObj(hTmpCur, objDATABASE, &hTmpDb));
            if (rslt != DBIERR_NONE)
                return rslt;
            rslt = Chk(DbiPackTable(hTmpDb, hTmpCur, NULL, NULL, TRUE));
        }
    }
    return rslt;
}
```

Delphi Examples: Db>DeleteRecord

Delete the current record.

Delphi users should instead use the TTable.Delete method rather than directly calling db>DeleteRecord.

This method is defined as:

```
procedure TTable.Delete;
```

The following code deletes the current record from TTable component Table1:

```
Table1.Delete;
```

DbiDeleteTable {button C
Examples,JI(">example","exdbideletetable")} {button Delphi
Examples,JI(">example","dexdbideletetable")}

C syntax

```
DBIResult DBIFN DbiDeleteTable (hDb, pszTableName, [pszDriverType]);
```

Delphi syntax

```
function DbiDeleteTable (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar): DBIResult stdcall;
```

Description

DbiDeleteTable deletes the table given in *pszTableName*.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

pszTableName Type: pCHAR (Input)

Pointer to the name of the table to delete. For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name. This function cannot be used to delete SQL views.

pszDriverType Type: pCHAR (Input)

Pointer to the driver type of the table being deleted. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

Prerequisites

The client application must have permission to lock the table exclusively.

Paradox: If the table is encrypted, the master password must have been registered (using DbiAddPassword).

Completion state

The table and all associated family members are deleted. Deletes all files with *<tablename>.**

DbiResult return values

DBIERR_NONE	The table was successfully deleted.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_NOSUCHFILE	The table does not exist.
DBIERR_NOSUCHTABLE	The table does not exist.
DBIERR_UNKNOWNBLTYPE	The specified driver type is invalid.
DBIERR_NOTSUFFTABLERIGHTS	The user has insufficient rights to the table (Paradox only).
DBIERR_NOTSUFFFAMILYRIGHTS	The user has insufficient rights to family members (Paradox only).
DBIERR_LOCKED	The table is locked by another user.

See also

[DbiCreateTable](#), [DbiCopyTable](#), [DbiAddPassword](#)

C Examples: DbiDeleteTable

Delete a table.

Must have sufficient rights. This example uses the following input:

```
fDbiDeleteTable(hDb, "dBASE_TBL.DBF");
DBIResult fDbiDeleteTable(hDBIDb hDb, pCHAR TblName)
{
    DBIResult    rslt;
    rslt = Chk(DbiDeleteTable(hDb, TblName, NULL));
    return rslt;
}
```

Delete an opened table.

Once executed, the cursor is closed and the table deleted. This example uses the following input:

```
fDbiDeleteTable(hDb, &hCur);
DBIResult fDbiDeleteTable(hDBIDb hDb, phDBICur phCur)
{
    DBIResult    rslt;
    CURProps     Props;

    rslt = Chk(DbiGetCursorProps(*phCur, &Props));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiCloseCursor(phCur));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiDeleteTable(hDb, Props.szName, Props.szTableType));

    return rslt;
}
```

Delphi Examples: Db>DeleteTable

Delete a table.

Delphi users should use the TTable.DeleteTable method rather than directly calling Db>DeleteTable. This method is defined as:

```
procedure TTable.DeleteTable;
```

The following code deletes the table associated with the TTable object named Table1:

```
Table1.DeleteTable;
```

DbiDoRestructure {button C Examples,JI(">example","exdbidorestructure")} {button Delphi Examples,JI(">example","dexdbidorestructure")}

C syntax

```
DBIResult DBIFN DbiDoRestructure (hDb, iTblDescCount, pTblDesc, pszSaveAs, [pszKeyviolName], [pszProblemsName], bAnalyzeOnly);
```

Delphi syntax

```
function DbiDoRestructure (hDb: hDBIDb; iTblDescCount: Word; pTblDesc: pCRTblDesc; pszSaveAs: PChar; pszKeyviolName: PChar; pszProblemsName: PChar; bAnalyzeOnly: Bool): DBIResult stdcall;
```

Description

DbiDoRestructure changes the properties of a table such as the following: modifying field types or field sizes, adding a field, deleting a field, rearranging fields; or changing indexes, security passwords, or referential integrity.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

iTblDescCount Type: UINT16 (Input)
Specifies the number of table descriptors. Currently, only one table descriptor can be processed per call, so *iTblDescCount* must be set to 1.

pTblDesc Type: pCRTblDesc (Input)
Pointer to the client-allocated CRTblDesc structure, which identifies the source table, describes the new record structure (if modified), and lists all other changes to the table

pszSaveAs Type: pCHAR (Input)
Optional. If not NULL, creates a restructured table with this name and leaves the original unchanged.

pszKeyviolName Type: pCHAR (Input)
Optional. Pointer to the Key Violation table name. All records that cause an integrity violation are placed here. If NULL, no Key Violation table is created. If the user supplies a table name, that name is used. If a pointer to an empty string is specified, the table name created is returned in the user's area (must be at least DBIMAXPATHLEN+1 bytes).

pszProblemsName Type: pCHAR (Input)
Optional. Pointer to the Problems table name. If NULL, no Problems table is created. If the user supplies a table name, that name is used. If the user has overridden the default behavior with a callback, records are placed in a Problems table if they cannot be placed into the destination table without trimming data. If a pointer to an empty string is specified, the table name created is returned in the user's area (must be at least DBIMAXPATHLEN+1 bytes).

bAnalyzeOnly Type: BOOL (Input)
Not currently used.

Usage

Paradox: For Paradox, after a restructure an application can use the invariant field identification numbers to determine how each column of data has been affected by the restructure.

For example, a form on CUST table displays two fields: CUSTOMER and ADDRESS. A user then restructures the CUST table and adds a new field before CUSTOMER called CUSTOMERID and changes the name of the field CUSTOMER to CUSTOMERNAME. Even though the name and position of the original CUSTOMER field has changed, its invariant field ID does not. When the form is reopened on the table, it can check the cursor property called *iRestrVersion*, if this has changed since the last time the form was used, it can fetch the field descriptors and use the *iFldNum* of each field descriptor to fetch the invariant field ID and compare these to the last invariant field IDs fetched before the restructure. This

Delphi Examples: DbiDoRestructure

Add a validity check to the specified field.

The field must be a longint, and the TTable must be open.

This example uses the following input:

```
fDbiDoRestructure(Table4, Table4.Fields[0], @Min, @Max, nil, True);
```

(This input works for the EMPLOYEE.DB table.)

```
procedure fDbiDoRestructure(Tbl: TTable; Field: TField; MinVal, MaxVal,
  DefVal: pLongint; Required: Bool);
var
  hDb: hDbiDb;
  TblDesc: CRTblDesc;
  VChk: pVChkDesc;
  Dir: String;
  NumVChks: Word;
  OpType: CROpType;

begin
  NumVChks := 0;
  SetLength(Dir, dbiMaxNameLen + 1);
  Check(DbiGetDirectory(Tbl.DBHandle, False, PChar(Dir)));
  SetLength(Dir, StrLen(PChar(Dir)));
  VChk := AllocMem(sizeof(VChkDesc));
  try
    FillChar(TblDesc, sizeof(CRTblDesc), #0);
    VChk.iFldNum := Field.Index + 1;
    Tbl.DisableControls;
    Tbl.Close;
    Check(DbiOpenDatabase(nil, nil, dbiReadWrite, dbiOpenExcl, nil, 0, nil,
  nil, hDb));
    Check(DbiSetDirectory(hDb, PChar(Dir)));
    with VChk^ do
      begin
        bRequired := Required;
        if MinVal <> nil then
          begin
            Inc(NumVChks);
            bHasMinVal := True;
            move(MinVal^, aMinVal, sizeof(MinVal^));
          end
        else
          bHasMinVal := False;
        if MaxVal <> nil then
          begin
            Inc(NumVChks);
            bHasMaxVal := True;
            move(MaxVal^, aMaxVal, sizeof(MaxVal^));
          end
        else
          bHasMaxVal := False;
        if DefVal <> nil then
          begin
            Inc(NumVChks);
            bHasDefVal := True;
            move(DefVal^, aDefVal, sizeof(DefVal^));
          end
        end
      end
    end
  end
end;
```

```
    end
    else
        bHasDefVal := False;

    end;
    TblDesc.iValChkCount := NumVChks;
    TblDesc.pVChkDesc := VChk;
    OpType := crADD;
    TblDesc.pcrValChkOp := @OpType;
    StrPCopy(TblDesc.szTblName, Tbl.TableName);
    StrCopy(TblDesc.szTblType, szParadox);
    Check(DbiDoRestructure(hDb, 1, @TblDesc, nil, nil, nil, False));
finally
    Check(DbiCloseDatabase(hDb));
    FreeMem(VChk, sizeof(VChkDesc));
    Tbl.EnableControls;
    Tbl.Open;
end;
end;
```


DbiDropFilter {button C
Examples,JI(">example","exdbiactivatefilter")} {button Delphi
Examples,JI(">example","dexdbiactivatefilter")}

C syntax

```
DBIResult DBIFN DbiDropFilter (hCursor, [hFilter]);
```

Delphi syntax

```
function DbiDropFilter (hCursor: hDBICur; hFilter: hDBIFilter): DBIResult  
    stdcall;
```

Description

DbiDropFilter drops the specified filter and frees all resources associated with the filter.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

hFilter Type: hDBIFilter (Input)
Specifies the filter handle.

Usage

The filter is automatically deactivated before being dropped, and automatically dropped when the cursor is closed. Providing a NULL filter handle drops all filters for this cursor. If no filters are activated and NULL has been specified for the filter handle, no error condition is returned.

Prerequisites

The filter must have been previously added.

DbiResult return values

DBIERR_NONE	The filter specified by the filter handle was successfully dropped. If NULL is passed for the filter handle, all filters, if any, were dropped.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NOSUCHFILTER	The filter handle (<i>hFilter</i>) is invalid.

See also

[DbiActivateFilter](#), [DbiDeactivateFilter](#), [DbiAddFilter](#)

C Examples: DbiDropFilter

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbIDropFilter

Deactivate and drop a filter on the specified table. This example uses the following input:

```
fDbIDropFilter(Table1, hFilter);  
procedure fDbIDropFilter(Table: TTable; var hFilter: hDBIFilter);  
var  
    Props: CURProps;  
  
begin  
    Check(DbIDeactivateFilter(Table.Handle, Props));  
    // Check to see if there are any active filters on the cursor  
    if Props.iFilters = 0 then  
        raise EDatabaseError.Create('There are no active filters on the specified  
cursor');  
    if hFilter <> nil then  
        begin  
            // Deactivate and drop filter  
            Check(DbIDeactivateFilter(Table.Handle, hFilter));  
            Check(DbIDropFilter(Table.Handle, hFilter));  
        end  
    else  
        raise EDatabaseError.Create('Filter handle is invalid or already  
dropped');  
end;
```

DbiDropPassword {button C
Examples,JI(">example","exdbidroppassword")} {button Delphi
Examples,JI(">example","dexdbidroppassword")}

C syntax

```
DBIResult DBIFN DbiDropPassword (pszPassword);
```

Delphi syntax

```
function DbiDropPassword (pszPassword: PChar): DBIResult stdcall;
```

Description

DbiDropPassword removes a password from the current session. This function is used by the Paradox driver only.

Parameters

pszPassword Type: pCHAR (Input)
Pointer to the password to be dropped. If NULL is specified, all passwords for the session are dropped.

Usage

This function removes the rights to access previously encrypted tables with that password; it does not cause tables to become decrypted.

DbiResult return values

DBIERR_NONE	The password specified by pszPassword was successfully dropped.
DBIERR_INVALIDPASSWORD	The specified password is empty or too long.
DBIERR_OBJNOTFOUND	pszPassword was not found.

See also

[DbiAddPassword](#)

C Examples: DbidropPassword

Remove all passwords from the current session. This example uses the following input:

```
fDbidropPassword();  
DBIResult fDbidropPassword(VOID)  
{  
    return Chk(DbidropPassword(NULL));  
}
```

Delphi Examples: DbIDropPassword

Drop a password.

Delphi users should use TSession.RemovePassword method rather than directly calling dbiDropPassword. The method TSession.RemovePassword is defined as:

```
procedure RemovePassword(const Password: string);
```

The following code removes a password called "Hip Hop" from TSession Session:

```
Session.RemovePassword('Hip Hop');
```

DbiEmptyTable {button C
Examples,JI(">example","exdbiemptytable")} {button Delphi
Examples,JI(">example","dexdbiemptytable")}

C syntax

```
DBIResult DBIFN DbiEmptyTable (hDb, hCursor, pszTableName, [pszDriverType]);
```

Delphi syntax

```
function DbiEmptyTable (hDb: hDBIDb; hCursor: hDBICur; pszTableName: PChar;  
    pszDriverType: PChar): DBIResult stdcall;
```

Description

DbiEmptyTable deletes all records from the given table.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

hCursor Type: hDBICur (Input)

Specifies the cursor on the table. Optional. If *hCursor* is specified, the operation is performed on the table associated with the cursor. If *hCursor* is NULL, *pszTableName* and *pszDriverType* determine the table to be used.

pszTableName Type: pCHAR (Input)

Pointer to the table name. Optional. If *hCursor* is NULL, *pszTableName* and *pszDriverType* determine the table to be used. (If both *pszTableName* and *hCursor* are specified, *pszTableName* is ignored.)

For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)

Pointer to the driver type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

Usage

This function is used to remove all records from the specified table.

Paradox: The operation is not performed if there are any conflicting referential integrity constraints on the table.

Prerequisites

If a cursor is passed in, it must have been opened in exclusive mode. For Paradox tables, if the table is encrypted, a table-level password with prvINSDEL or prvFULL rights must have been registered.

Completion state

No records remain in the table. However, all resources (for example, indexes and validity checks) remain. The table and index should now be at their respective minimum sizes.

DbiResult return values

DBIERR_NONE	The table was successfully emptied.
DBIERR_INVALIDHNDL	The specified database handle or the specified cursor handle is invalid or NULL.
DBIERR_NEEDEXCLACCESS	The table was not emptied because the user does not have exclusive access to this table.
DBIERR_NOSUCHTABLE	The table specified in <i>pszTableName</i> and <i>pszDriverType</i> does not exist.

DBIERR_INVALIDPARAM	The pointer to the table name is NULL, or the table name is an empty string.
DBIERR_NOTSUFFTABLERIGHTS	The user does not have permission to perform this operation (Paradox only).
DBIERR_NOTSUFFSQLRIGHTS	Insufficient SQL rights to perform this operation (SQL only).
DBIERR_DETAILRECEXISTEMPTY	There are conflicting referential integrity constraints on the table (Paradox only).

See also

[DbiOpenTable](#), [DbiAddPassword](#)

C Examples: DbiEmptyTable

Creates a copy of a source table, then empties it. Both tables must be of the same type. This example uses the following input:

```
fDbiEmptyTable(hDb, "CUSTOMER.DB", "NEW CUSTOMER.DB");
DBIResult fDbiEmptyTable(hDBIDb hTmpDb, pCHAR szSrcTblName, pCHAR
szDstTblName)
{
    DBIResult rslt;
    hDBICur hCursor = 0;

    // Creating a dummy table to empty.
    rslt = Chk(DbiCopyTable(hTmpDb, TRUE, szSrcTblName, dbiNOLOCK,
szDstTblName));
    if (rslt != DBIERR_NONE)
        return rslt;
    // Open the dummy table so it can be emptied.
    rslt = Chk(DbiOpenTable(hTmpDb, szDstTblName, NULL, NULL, NULL, 0,
dbiREADWRITE,
        dbiOPENEXCL, xltFIELD, FALSE, NULL, &hCursor));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiEmptyTable(hTmpDb, hCursor, NULL, NULL));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiCloseCursor(&hCursor));
    if (rslt != DBIERR_NONE)
        return rslt;

    return rslt;
}
```

Delphi Examples: DbEmptyTable

Delete all records from the given table.

Delphi users should use the TTable.EmptyTable method rather than directly calling dbiEmptyTable. The method TTable.EmptyTable is defined as:

```
procedure TTable.EmptyTable;
```

The following code empties TTable Table1:

```
Table1.EmptyTable;
```

DbiEndDelayedUpdates `{button C`
Examples,`JL(">example","exdbienddelayedupdates")}` `{button Delphi`
Examples,`JL(">example","dexdbienddelayedupdates")}`

C syntax

```
DBIResult DBIFN DbiEndDelayedUpdates(phCursor);
```

Delphi syntax

```
function DbiEndDelayedUpdates (var hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiEndDelayedUpdates takes the cursor out of cached updates mode, and returns a new cursor handle.

Parameters

phCursor Type: phDBICur (Input/Output)
Specifies the cached updates cursor handle and returns a new cursor handle.

Usage

Use DbiEndDelayedUpdates to terminate the cached updates mode.

Prerequisites

A call to DbiBeginDelayedUpdates must have been made.

Completion state

If this function is called while cached updates are pending, all changes are discarded.

DbiResult return values

DBIERR_NONE The cached updates mode was ended and a standard cursor handle was successfully created.

See also

[DbiBeginDelayedUpdates](#), [DbiApplyDelayedUpdates](#), [Cached Updates](#)

C Examples: DbiEndDelayedUpdates

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbtEndDelayedUpdates

An example for this function is under development and will be provided in an upcoming Help release.

DbiEndLinkMode {button C
Examples,JI(">example", "exdbiendlinkmode")} {button Delphi
Examples,JI(">example", "dexdbiendlinkmode")}

C syntax

```
DBIResult DBIFN DbiEndLinkMode (phCursor);
```

Delphi syntax

```
function DbiEndLinkMode (var hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiEndLinkMode takes cursor out of Link mode, and returns a new cursor handle.

Parameters

phCursor Type: phDBICur (Input/Output)
Specifies the linked cursor handle, and returns a new cursor handle.

Prerequisites

A previous call to DbiBeginLinkMode must have been made. DbiUnlinkDetail should be called to unlink the cursor before DbiEndLinkMode is called.

Usage

DbiEndLinkMode takes a cursor out of Link mode. For example, if a detail cursor is taken out of link mode, it is no longer constrained by the master cursor.

Warning: The cursor handle passed in as input can no longer be used.

DbiResult return values

DBIERR_NONE Linked cursor mode was successfully ended.

See also

[DbiBeginLinkMode](#), [DbiLinkDetail](#), [DbiUnlinkDetail](#)

C Examples: DbiEndLinkMode

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiEndLinkMode

End the master/detail link and close the associated cursors. This example uses the following input:

```
fDbiEndLinkMode(hMas, hDet);  
procedure fDbiEndLinkMode(var hMasCur, hDetCur: hDBICur);  
begin  
  Check(DbiUnlinkDetail(hDetCur));  
  Check(DbiEndLinkMode(hMasCur));  
  Check(DbiEndLinkMode(hDetCur));  
  Check(DbiCloseCursor(hMasCur));  
  Check(DbiCloseCursor(hDetCur));  
end;
```


DbiEndTran {button C
Examples,JI(">example","exdbiendtran")} {button Delphi
Examples,JI(">example","dexdbiendtran")}

C syntax

```
DBIResult DBIFN DbiEndTran (hDb, hXact, eEnd);
```

Delphi syntax

```
function DbiEndTran (hDb: hDBIDb; hXact: hDBIXact; eEnd: eXEnd): DBIResult  
    stdcall;
```

Description

DbiEndTran ends a transaction on a SQL server table or a local (Paradox and dBASE) table.

Parameters

<i>hDb</i>	Type: hDBIDb	(Input)
Specifies the database handle.		
<i>hXact</i>	Type: hDBIXact	(Input)
Specifies the transaction handle.		
<i>eEnd</i>	Type: eXEnd	(Input)
Specifies the <u>transaction end type</u> .		

Usage

Ends a transaction that was previously requested. If a commit is done, all changes performed within the transaction against the associated database are made permanent. If an abort is done, all changes performed against the associated database are undone.

xendCOMMIT and xendABORT currently keep cursors if the driver and the database can support it. For xendCOMMIT and xendABORT, if the database cannot support keeping cursors, four possibilities exist for each server cursor opened on behalf of the BDE user:

- A cursor for an open query with pending results is buffered locally. Other than prematurely reading the data, no visible effect remains.
- A cursor opened on a table supporting direct positioning is closed. No other behavior is affected.
- A cursor opened on a table that does not support direct positioning is opened initially in a different transaction or connection context, if the database supports this. This cursor remains open because it exists in a different context from the requested transaction.
- If none of the previous possibilities apply, the cursor is closed and subsequent access to the BDE objects associated with the server cursor returns an error.

For local transactions, xendCOMMITKEEP is not supported by DbiEndTran.

InterBase: For InterBase, it is recommended that after a rollback on a dead table you close all cursors that can be closed, reopening if needed.

Prerequisites

DbiBeginTran must have been called first.

DbiResult return values

DBIERR_NONE	The transaction has ended successfully.
-------------	---

See also

[DbiBeginTran](#)

eEnd

Possible transaction end type values are:

Value	Description
xendCOMMIT	Commit the transaction.
xendCOMMITKEEP	Commit the transaction and keep cursors.
xendABORT	Roll back the transaction.

C Examples: DbiEndTran

End the specified transaction:

This example uses the following input:

```
fDbiEndTran(hDb, xTran, xendCOMMIT);  
DBIResult fDbiEndTran(hDBIDb hTmpDb, hDBIXact hXact, eXEnd XEnd)  
{  
    DBIResult    rslt;  
    rslt = Chk(DbiEndTran(hTmpDb, hXact, XEnd));  
    return rslt;  
}
```

Delphi Examples: DbiEndTran

End the specified transaction:

Delphi users should use the TDataBase.Commit, TDataBase.Rollback methods rather than directly calling DbiEndTran. These methods are defined as:

```
procedure TDataBase.Commit;  
procedure TDataBase.Rollback;
```

The following code ends a transaction on a TDataBase object called DataBase1 and rolls back changes to the pre-transaction state:

```
{ cancels all modifications made to DataBase1 since last call to  
  StartTransaction }  
  DataBase1.Rollback
```

The following code ends a transaction on a TDataBase object called DataBase1 and commits changes to the table:

```
{ commits all modifications made to DataBase1 since last call to  
  StartTransaction. }  
  DataBase1.Commit;
```

end;

End the master/detail link and close the associated cursors. This example uses the following input:

```
  fDbiEndLinkMode(hMas, hDet);
```

```
procedure fDbiEndLinkMode(var hMasCur, hDetCur: hDBICur);
```

```
begin
```

```
  Check(DbiUnlinkDetail(hDetCur));  
  Check(DbiEndLinkMode(hMasCur));  
  Check(DbiEndLinkMode(hDetCur));  
  Check(DbiCloseCursor(hMasCur));  
  Check(DbiCloseCursor(hDetCur));
```

```
end;
```

DbiExit {button C
Examples,JI(">example","exdbiexit")} {button Delphi
Examples,JI(">example","dexdbiexit")}

C syntax

```
DBIResult DBIFN DbiExit (VOID);
```

Delphi syntax

```
function DbiExit: DBIResult stdcall;
```

Description

DbiExit disconnects the client application from BDE.

Usage

DbiExit uninitializes BDE for use by this client and releases all resources allocated by the client application. DbiExit should be the last DBI/BDE call made by the client application.

Completion state

All databases and cursors are closed, and any temporary tables are removed. If the exit is done while in a SQL transaction, the active transaction is usually rolled back. (Some SQL drivers commit.) Since the connection to BDE has been removed, the user must reinitialize BDE before any BDE functions can be called.

DbiResult return values

DBIERR_NONE

The connection to BDE has been successfully removed.

See also

[DbiInit](#)

C Examples: DbiExit

Exit BDE

This example uses the following input:

```
fDbiExit();  
DBIResult fDbiExit(VOID)  
{  
    DBIResult    rslt;  
    rslt = Chk(DbiExit());  
    return rslt;  
}
```

Delphi Examples: DbiExit

Exit BDE

You should not call `dbiExit` in a Delphi application if you have any of the "Data Access" or "Data Controls" VCL components in your project. Those components will automatically call `dbiInit` and `dbiExit`.

If you are not using VCL database controls and have called `dbiInit` yourself, then the following code properly deinitializes the engine:

```
Check (DbiExit) ; .
```

DbiExtractKey {button C
Examples,JI(">example","exdbiextractkey")} {button Delphi
Examples,JI(">example","dexdbiextractkey")}

C syntax

```
DBIResult DBIFN DbiExtractKey (hCursor, [pRecBuf], pKeyBuf);
```

Delphi syntax

```
function DbiExtractKey (hCursor: hDBICur; pRecBuf: Pointer; pKeyBuf:  
    Pointer): DBIResult stdcall;
```

Description

DbiExtractKey retrieves the key value for the current record of the given cursor or from the supplied record buffer.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle. The cursor must be opened with an active index.

pRecBuf Type: pBYTE (Input)

Pointer to the record buffer from which to extract the key. Optional; if NULL, DbiExtractKey extracts the key from the current record.

pKeyBuf Type: pBYTE (Output)

Pointer to the client buffer receiving the key value. The length of the key value can be determined by retrieving the Index Descriptor ([IDXDesc](#)) and using *iKeyLen* or *iKeySize* in the CURProps structure.

Prerequisites

An index must be active. To retrieve the key from the current record, the cursor must be on a valid record.

Completion state

The extracted key value is returned in *pKeyBuf*. The returned key can be used as input to functions such as DbiSetToKey, DbiSetRange, and DbiCompareKey.

Note: In case a field map is active on the cursor, and does not include one or more of the index fields, those index fields become blanks in the extracted key if a record buffer was supplied.

Note: The key length is not affected by a field map.

DbiResult return values

DBIERR_NONE	The key value was retrieved successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NOASSOCINDEX	The cursor does not have an index active.
DBIERR_NOCURRREC	The cursor is not positioned on a record.

See also

[DbiGetCursorProps](#), [DbiSetToKey](#), [DbiSetRange](#), [DbiCompareKeys](#), [DbiGetRecordForKey](#)

C Examples: DbiExtractKey

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiExtractKey

Extract the key value for the current record.

This example assumes the field is of type character and uses the following input:

```
fDbiExtractKey(Table1.Handle, KeyValue);  
Procedure fDbiExtractKey(hTmpCur: hDBICur; var KeyBuff: String);  
var  
  P: PChar;  
  Props: CurProps;  
begin  
  Check(DbiGetCursorProps(hTmpCur, Props));  
  GetMem(P, Props.IkeySize);  
  Check(DbiExtractKey(hTmpCur, nil, P));  
  KeyBuff:= StrPas(P);  
  FreeMem(p, Props.IkeySize);  
end;
```

DbiForceRecordReread {button C
Examples,JI(">example","exdbiforcerecordreread")} {button Delphi
Examples,JI(">example","dexdbiforcerecordreread")}

C syntax

```
DBIResult DBIFN DbiForceRecordReread (hCursor, pRecBuf);
```

Delphi syntax

```
function DbiForceRecordReread (hCursor: hDBICur; pRecBuff: Pointer):  
    DBIResult stdcall;
```

Description

DbiForceRecordReread rereads a single record from the server on demand. It refreshes one row only, rather than clearing the cache.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pRecBuf Type: pBYTE (Output)
Location of record buffer.

Usage

Use DbiForceRecordReread as an alternative to using [DbiForceReread](#), which allows users to refresh their cursor by re-executing the query on the server. DbiForceReread may be an expensive call because the complete contents of the local cache must be updated. Based on the optimistic record locking method, individual records (rows) may be reread from the server if a record lock is requested. However this is based on a number of factors, including record age (how long since the record has been retrieved from the server).

Using DbiForceRecordReread, a valid record is reread from the server, based on the index or record address. The refreshed record value will be placed in *pRecBuf*. The behavior is similar to [DbiGetRecord](#) with a lock, except an optimistic record lock is not obtained, and the record is always reread from the server. Keep in mind that the record is always reread using the current index (or record address), which must be unique.

Prerequisites

A table must be open.

Completion state

A valid record is reread from the server and the refreshed record value is placed in *pRecBuf*.

DbiResult return values

DBIERR_NONE Buffers were refreshed successfully.

DBIERR_INVALIDHNDL The specified cursor handle is invalid or NULL.

See also

[DbiForceReread](#)

C Examples: DbiForceRecordReread

Update the record buffer with current record information:

This example uses the following input:

```
fDbiForceRecordReread(hCur, pRecBuf);
```

```
DBIResult fDbiForceRecordReread(hDBICur hTmpCur, pBYTE pTmpRecBuf)
{
    DBIResult rslt;
    rslt = Chk(DbiForceRecordReread(hTmpCur, pTmpRecBuf));
    return rslt;
}
```

Delphi Examples: DbiForceRecordReread

Update the record buffer with current record information.

This example uses the following input:

```
fDbiForceRecordReread(hCur, pRecBuf);  
Procedure fDbiForceRecordReread(hTmpCur : hDBICur, pTmpRecBuf : pBYTE)  
begin  
    check(DbiForceRecordReread(hTmpCur, pTmpRecBuf));  
end;
```

DbiForceReread {button C
Examples,JI(">example","exdbiforcereread")} {button Delphi
Examples,JI(">example","dexdbiforcereread")}

C syntax

```
DBIResult DBIFN DbiForceReread (hCursor);
```

Delphi syntax

```
function DbiForceReread (hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiForceReread refreshes all buffers for the table associated with the cursor in case remote updates took place.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

Usage

DbiForceReread is used to ensure that the client application is using current data. All subsequent retrieval operations will get new data.

Note: This function ensures only that the buffered data is current at the time of the call. Periodically use DbiForceReread or DbiCheckRefresh to ensure current data. Use record locking to prevent other users from updating records being modified by this cursor.

Note: This function is supported only on cursors for DbiOpenTable and "live" local (Paradox or dBASE) query cursors. "Dead" table cursors, and tables with no unique index are not supported.

Alternatively you can use [DbiForceRecordReread](#) to reread a single record from the server on demand, refreshing one row only, rather than clearing the cache.

In order to notify the client application that the table data was actually changed by a remote user, a callback of the type [cbTABLECHANGED](#) can be installed. This callback will be invoked whenever a change is detected.

Prerequisites

SQL: There must be a unique row identifier such as an index.

DbiResult return values

DBIERR_NONE	Buffers were refreshed successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.

See also

[DbiCheckRefresh](#), [DbiRegisterCallback](#), [DbiForceRecordReread](#)

C Examples: DbiForceReread

Force the cache to be cleared for the specified cursor:

```
DBIResult fDbiForceReread(hDBICur hTmpCur)
{
    DBIResult rslt;
    rslt = Chk(DbiForceReread(hTmpCur));
    return rslt;
}
```

Delphi Examples: DbiForceReread

Refresh all buffers associated with TTable component T:

```
procedure ForceReread(T: TTable);  
begin  
    Check(DbiForceReread(T.Handle));  
end;
```


DbiFormFullName {button C
Examples,JI(">example","exdbiformfullname")} {button Delphi
Examples,JI(">example","dexdbiformfullname")}

C syntax

```
DBIResult DBIFN DbiFormFullName (hDb, pszTableName, pszDriverType,  
    pszFullName);
```

Delphi syntax

```
function DbiFormFullName (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar; pszFullName: PChar): DBIResult stdcall;
```

Description

DbiFormFullName returns the fully qualified table name.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

pszTableName Type: pCHAR (Input)

Pointer to the table name.

pszDriverType Type: pCHAR (Input)

Pointer to the driver type.

pszFullName Type: pCHAR (Output)

Pointer to the client buffer that receives the fully qualified table name. *pszFullName* should be allocated for DBIMAXTBLNAMELEN.

Usage

If the given table name contains a beginning drive letter followed by a colon, this function simply returns the same table name that was passed in without changing it. Otherwise, this function qualifies the table name using the directory associated with the supplied database handle. You can use `DbiSetDirectory` to change this directory. The table name need not be an existing file.

DbiResult return values

DBIERR_NONE The table name has been successfully returned.

DBIERR_INVALIDFILENAME The specified table name is invalid. This might occur if the combined length of the directory and table name are greater than DBIMAXTBLNAMELEN). Output *pszFullname* is left unchanged.

See also

[DbiSetDirectory](#)

C Examples: DbiFormFullName

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiFormFullName

Return the fully qualified table name and path.

This example uses the following input:

```
FullName:=fDbiFormFullName(Table1);
```

```
function fDbiFormFullName(Tbl: TTable): String;
var
  Props: CurProps;
begin
  Check(DbiGetCursorProps(Tbl.Handle, Props));
  SetLength(Result, DBIMAXPATHLEN);
  Check(DbiFormFullName(Tbl.DBHandle, PChar(Tbl.TableName),
    Props.szTableType, PChar(Result)));
end;
```

DbiFreeBlob {button C Examples,JI(">example","exdbigetblob")} {button Delphi Examples,JI(">example","dexdbigetblob")}

C syntax

```
DBIResult DBIFN DbiFreeBlob (hCursor, pRecBuf, iField);
```

Delphi syntax

```
function DbiFreeBlob (hCursor: hDBICur; pRecBuf: Pointer; iField: Word):  
    DBIResult stdcall;
```

Description

DbiFreeBlob closes the BLOB handle obtained by DbiOpenBlob. The BLOB handle is located within the specified record buffer.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle for the table. The table must contain a BLOB field.

pRecBuf Type: pBYTE (Input)

Specifies the pointer to the record buffer containing the BLOB handle. DbiOpenBlob sets the BLOB handle in the record buffer.

iField Type: UINT16 (Input)

Specifies the valid field number of the open BLOB field. If set to 0, the DbiFreeBlob call closes all open BLOBs associated with the record buffer.

Usage

The BLOB handle is closed, and all resources allocated to the BLOB with DbiOpenBlob are released.

This function must be called after calling DbiModifyRecord, DbiInsertRecord, or DbiAppendRecord (only if a BLOB has been opened), in order to free BLOB resources. DbiModifyRecord, DbiInsertRecord, or DbiAppendRecord do not automatically release BLOB resources after record modification. However, if DbiFreeBlob is called prior to calling DbiModifyRecord, DbiInsertRecord, or DbiAppendRecord, then any changes made to the BLOB are lost.

This function does not affect the contents of the BLOB on disk.

Prerequisites

The current record buffer must contain a BLOB field, and the BLOB must have been opened with [DbiOpenBlob](#).

Completion state

After a BLOB handle has been freed, subsequent calls to DbiFreeBlob for the same handle result in an error.

DbiResult return values

DBIERR_NONE	The BLOB field was freed successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified record buffer is NULL.
DBIERR_OUTOFRANGE	The number specified in <i>iField</i> is greater than the number of fields in the table.
DBIERR_BLOBNOTOPENED	The specified BLOB field has not been opened via a call to DbiOpenBlob. This error is returned if the BLOB has already been freed with a previous DbiFreeBlob call.
DBIERR_INVALIDBLOBHANDLE	The logical BLOB handle in the record buffer is invalid.
DBIERR_NOTABLOB	The specified field number does not correspond to a BLOB field.

See also

[DbiOpenTable](#), [DbiOpenBlob](#), [DbiPutBlob](#), [DbiTruncateBlob](#), [DbiGetBlob](#), [DbiGetBlobSize](#),
[DbiInsertRecord](#), [DbiAppendRecord](#), [DbiModifyRecord](#)

DbiGetBlob {button C Examples,JI(">example","exdbigetblob")} {button Delphi Examples,JI(">example","dexdbigetblob")}

C syntax

```
DBIResult DBIFN DbiGetBlob (hCursor, pRecBuf, iField, iOffset, iLen, pDest,  
    piRead);
```

Delphi syntax

```
function DbiGetBlob (hCursor: hDBICur; pRecBuf: Pointer; iField: Word;  
    iOffset: Longint; iLen: Longint; pDest: Pointer; var iRead: Longint):  
    DBIResult stdcall;
```

Description

DbiGetBlob retrieves data from the specified BLOB field.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pRecBuf Type: pBYTE (Input)
Pointer to the record buffer containing the BLOB handle. The record buffer is returned from a call to DbiGetNextRecord, DbiGetPriorRecord, DbiGetRelativeRecord, or DbiGetRecord. DbiOpenBlob sets the BLOB handle in the record buffer.

iField Type: UINT16 (Input)
Specifies the ordinal number of the BLOB field in the record.

iOffset Type: UINT32 (Input)
Specifies the start location for retrieval within the BLOB field. If 0 is specified, retrieval starts from the beginning of the field. If the value exceeds the length of the BLOB field, an error is returned. If any value greater than 0 is specified, then only a portion of the BLOB field is retrieved.

iLen Type: UINT32 (Input)
Specifies the number of bytes to retrieve. *iLen* must be between 0 and the length of the BLOB field. *iLen* may be larger than 64K.

pDest Type: pBYTE (Output)
Pointer to the client buffer that receives the BLOB data.

piRead Type: pUINT32 (Output)
Pointer to the client variable that receives the actual number of bytes read. The actual number can be less than the number of bytes requested if the end of the BLOB is reached.

Usage

Any portion of the data within the BLOB field can be retrieved, starting from the position specified in *iOffset*, and extending to the number of bytes specified in *iLen*. *pRecBuf* should contain a BLOB handle obtained by calling DbiOpenBlob. DbiGetBlob can access data larger than 64Kb, depending on the size you allocate for the buffer.

Prerequisites

The current record buffer must contain a BLOB field which has been opened by a call to DbiOpenBlob.

Completion state

piRead points to the number of bytes of BLOB data retrieved, and *pDest* points to the retrieved BLOB data.

DbiResult return values

DBIERR_NONE	The BLOB field was successfully retrieved.
DBIERR_BLOBNOTOPENED	The specified BLOB field has not been opened via call to DbiOpenBlob.

DBIERR_INVALIDBLOBHANDLE	The logical BLOB handle supplied in the record buffer is invalid.
DBIERR_NOTABLOB	The specified field number does not correspond to a BLOB field.
DBIERR_INVALIDBLOBOFFSET	The start location specified in iOffset is greater than the length of the BLOB field.
DBIERR_ENDOFBLOB	The end of the BLOB has been reached. Check piRead to see if any data was returned.

See also

[DbiOpenBlob](#), [DbiPutBlob](#), [DbiFreeBlob](#), [DbiTruncateBlob](#), [DbiGetBlobSize](#)

C Examples: DbiGetBlob

Display the specified field's memo:

The field specified in uFldNum *must* be a valid memo blob. This example uses the following input:

```
fBlobExample1(hCur, pRecBuf, 7);
```

```
DBIResult fBlobExample1 (hDBICur hTmpCur, pBYTE pTmpRecBuf, UINT16 uFldNum)
{
    DBIResult rslt;
    char      *BlobInfo; // Holds Blob information
    UINT32    BlobSize; // Input / Output Blob size in Bytes

    rslt = Chk(DbiOpenBlob(hTmpCur, pTmpRecBuf, uFldNum, dbiREADONLY));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiGetBlobSize(hTmpCur, pTmpRecBuf, uFldNum, &BlobSize));
    if (rslt != DBIERR_NONE)
        return rslt;

    BlobInfo = (char *)malloc(BlobSize * sizeof(BYTE));

    rslt = Chk(DbiGetBlob(hTmpCur, pTmpRecBuf, uFldNum, 0, BlobSize,
        (pBYTE)BlobInfo, &BlobSize));
    if (rslt == DBIERR_NONE)
        MessageBox(0, BlobInfo, "This is the Blob Information", MB_OK);

    free(BlobInfo);

    rslt = Chk(DbiFreeBlob(hTmpCur, pTmpRecBuf, uFldNum));

    return rslt;
}
```


Delphi Examples: DbiGetBlob

Display the specified field's memo.

The field specified in BlobIndex must be a valid memo blob and the BlobBuffer must be allocated. This example uses the following input:

```
fDbiGetBlob(BIOLIFE_TABLE, BIOLIFE_TABLE.FieldByName('Notes').Index, BlobBuffer);
Procedure fDbiGetBlob(InDataSet: TDataSet; BlobIndex: Word; var BlobInfo:
  String);
var
  NumRead: longint;
begin
  Inc(BlobIndex); // Parameter iField of DbiOpenBlob requires an ordinal
  field number
  InDataSet.UpdateCursorPos;
  Check(DbiOpenBlob(InDataSet.Handle, InDataSet.ActiveBuffer, BlobIndex,
  dbiReadOnly));
  Check(DbiGetBlobSize(InDataSet.Handle, InDataSet.ActiveBuffer, BlobIndex,
  NumRead));
  SetLength(BlobInfo, NumRead);
  Check(DbiGetBlob(InDataSet.Handle, InDataSet.ActiveBuffer, BlobIndex, 0,
  NumRead, PChar(BlobInfo), longint(NumRead)));
  Check(DbiFreeBlob(InDataSet.Handle, InDataSet.ActiveBuffer, BlobIndex));
end;
```

DbiGetBlobHeading {button C Examples,JI(">example","exdbigetblobheading")}{button Delphi Examples,JI(">example","dexdbigetblobheading")}

C syntax

```
DBIResult DBIFN DbiGetBlobHeading (hCursor, iField, pRecBuf, pDest);
```

Delphi syntax

```
function DbiGetBlobHeading (hCursor: hDBICur; iField: Word; pRecBuf: Pointer; pDest: Pointer): DBIResult stdcall;
```

Description

DbiGetBlobHeading retrieves information about a BLOB field from the BLOB heading in the record buffer.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

iField Type: UINT16 (Input)

Specifies the ordinal number of the BLOB field within the record.

pRecBuf Type: pBYTE (Input)

Pointer to the client buffer containing the BLOB heading.

pDest Type: pBYTE (Output)

Pointer to the client buffer that receives the retrieved BLOB heading. The client buffer must be large enough to accommodate the retrieved information.

Usage

This function is valid only for table types that support BLOB headings, that is, Paradox only. When the table is created, the client can specify the number of bytes of the BLOB field information to be stored in the tuple itself. This information is also contained in the normal storage area of the BLOB; it is actually duplicated. The benefit of storing some of the BLOB field in the tuple is that the BLOB field does not have to be opened to retrieve this information. If the BLOB is small, it can be contained fully in the record making access faster.

Paradox: With formatted BLOB fields, the formatting information in the first eight bytes of the field is not stored within the tuple. It is functionally the same as if DbiGetBlob were called with an *iOffSet* of 8 and an *iLen* the length of the tuple area.

dBASE: This function is not supported for dBASE tables.

SQL: This function is not supported for SQL tables.

Prerequisites

This call does not require a prior call to DbiOpenBlob. (This call can be understood as the functional equivalent of a [DbiGetField](#) call for BLOB fields).

Completion state

If the BLOB does not have a heading, DbiGetBlobHeading returns an error.

DbiResult return values

DBIERR_NONE	The BLOB heading was retrieved successfully.
DBIERR_NOTABLOB	The specified field number does not correspond to a BLOB field.
DBIERR_NOTSUFFFIELDRIGHTS	The application does not have sufficient rights to this field.
DBIERR_NOTSUPPORTED	This function is not supported by SQL or dBASE.

See also

DbiPutBlob, DbiTruncateBlob, DbiFreeBlob, DbiGetBlob, DbiGetBlobSize

C Examples: DbiGetBlobHeading

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetBlobHeading

Display the specified field's memo heading.

The field specified in BlobIndex must be a valid memo blob and the BlobBuffer must be allocated. Used only with Paradox memo fields. This example uses the following input:

```
fDbiGetBlobHeading(BIOLIFE_TABLE, BIOLIFE_TABLE.FieldByName('Notes').Index, BlobBuffer);  
procedure fDbiGetBlobHeading(InDataSet: TDataSet; BlobIndex: Word; var P:  
    PChar);  
var  
    NumRead: longint;  
begin  
    Inc(BlobIndex); // Parameter iField of DbiOpenBlob requires an ordinal  
    field number  
    InDataSet.UpdateCursorPos;  
    Check(DbiOpenBlob(InDataSet.Handle, InDataSet.ActiveBuffer, BlobIndex,  
        dbiReadOnly));  
    Check(DbiGetBlobSize(InDataSet.Handle, InDataSet.ActiveBuffer, BlobIndex,  
        NumRead));  
    Check(DbiGetBlobHeading(InDataSet.Handle, BlobIndex,  
        InDataSet.ActiveBuffer, P));  
    Check(DbiFreeBlob(InDataSet.Handle, InDataSet.ActiveBuffer, BlobIndex));  
end;
```

DbiGetBlobSize {button C Examples,JI(">example","exdbigetblob")} {button Delphi Examples,JI(">example","dexdbigetblob")}

C syntax

```
DBIResult DBIFN DbiGetBlobSize (hCursor, pRecBuf, iField, piSize);
```

Delphi syntax

```
function DbiGetBlobSize (hCursor: hDBICur; pRecBuf: Pointer; iField: Word; var iSize: Longint): DBIResult stdcall;
```

Description

DbiGetBlobSize retrieves the size of the specified BLOB field in bytes.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

pRecBuf Type: pBYTE (Input)

Pointer to the record buffer containing the BLOB handle. The client application must first allocate the buffer and fetch a valid record. A call to DbiOpenBlob then obtains the BLOB handle.

iField Type: UINT16 (Input)

Specifies the ordinal number of the BLOB field within the specified record buffer.

piSize Type: pUINT32 (Output)

Pointer to the client variable that receives the BLOB size in bytes.

Usage

This function is used to get the size of a BLOB.

Prerequisites

The current record buffer must contain a BLOB field which has been opened by a call to DbiOpenBlob.

Completion state

piSize points to the retrieved size of the BLOB field.

DbiResult return values

DBIERR_NONE The BLOB size was successfully retrieved.

DBIERR_BLOBNOTOPENED The specified BLOB field has not been opened with a call to DbiOpenBlob.

DBIERR_INVALIDBLOBHANDLE The logical BLOB handle supplied in the record buffer is invalid.

DBIERR_NOTABLOB The specified field number does not correspond to a BLOB field.

See also

[DbiOpenBlob](#), [DbiPutBlob](#), [DbiGetBlob](#), [DbiFreeBlob](#), [DbiTruncateBlob](#)

DbiGetBookMark {button C
Examples,JI(">example","exdbigetbookmark")} {button Delphi
Examples,JI(">example","dexdbigetbookmark")}

C syntax

```
DBIResult DBIFN DbiGetBookMark (hCur, pBookMark);
```

Delphi syntax

```
function DbiGetBookMark (hCur: hDBICur; pBookMark: Pointer): DBIResult  
    stdcall;
```

Description

DbiGetBookMark saves the current position of a cursor in the client-supplied bookmark buffer. This position is called a bookmark.

Parameters

hCur Type: hDBICur (Input)
Specifies the cursor handle.

pBookMark Type: pBYTE (Output)
Pointer to the client-allocated bookmark buffer.

Usage

A bookmark contains internal information about the current position of the cursor. This information can be passed to DbiSetToBookMark to reposition the same or compatible cursor. If a bookmark is stable, it is guaranteed that the cursor can be repositioned there. Whether or not the bookmark is stable can be determined from the *bBookMarkStable* property returned by DbiGetCursorProps.

dBASE: For dBASE tables, the bookmark is always stable.

Paradox: For Paradox tables, the bookmark is stable only if the table has a primary key.

SQL: For SQL tables, the bookmark is stable only if the table has a unique index or unique row identifier.

Prerequisites

DbiGetCursorProps should be called to retrieve the *iBookMarkSize* property and the bookmark buffer should be allocated to accommodate the bookmark.

Note: The size of a bookmark depends on the current index and can change if [DbiSwitchToIndex](#) is called.

Completion state

The bookmark buffer pointed to by *pBookMark* contains the saved cursor position. The bookmark is valid only with a cursor that is using the same table and ordered with the same index.

DbiResult return values

DBIERR_NONE	The bookmark was returned successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL, or the pointer to the bookmark buffer is NULL.

See also

[DbiSetToBookMark](#), [DbiCompareBookMarks](#), [DbiGetCursorProps](#)

C Examples: DbiGetBookMark

Set a bookmark on the current position of a cursor:

Note: The table must have a primary index. This example uses the following input:

```
fDbiGetBookMark(hPXCur, &pBookmark);  
DBIResult fDbiGetBookMark(hDBICur hCur, ppBYTE ppBookMark)  
{  
    DBIResult    rslt;  
    CURProps     CurProps;  
    rslt = Chk(DbiGetCursorProps(hCur, &CurProps));  
    if (rslt != DBIERR_NONE)  
        return rslt;  
    *ppBookMark = (pBYTE)malloc(CurProps.iBookMarkSize);  
    rslt = Chk(DbiGetBookMark(hCur, *ppBookMark));  
    return rslt;  
}
```


Delphi Examples: DbiGetBookMark

Set a bookmark on the current position of a cursor:

Delphi users should use the GetBookmark method associated with descendents of TDataSet including TTable, TQuery, and TStoredProc rather than directly calling DbiGetBookmark. This method is defined as:

```
function GetBookmark: TBookmark;
```

The following saves the current record information of the dataset to allow you to return to that record with a later call to the GotoBookmark method.

```
Table1.GetBookmark;
```

DbiGetCallBack {button C
Examples,JI(">example","exdbigetcallback")} {button Delphi
Examples,JI(">example","dexdbigetcallback")}

C syntax

```
DBIResult DBIFN DbiGetCallBack (hCursor, ecbType, piClientData, piCbBufLen,
    ppCbBuf, ppfCb);
```

Delphi syntax

```
function DbiGetCallBack (hCursor: hDBICur; ecbType: CbType; var iClientData:
    Longint; var iCbBufLen: Word; var pCbBuf: Pointer; ppfCb: ppfDBICallBack):
    DBIResult stdcall;
```

Description

DbiGetCallBack returns a pointer to the function previously registered by the client (using DbiRegisterCallBack) for the given callback type.

Parameters

- hCursor* Type: hDBICur (Input)
Specifies the cursor handle. If NULL, *hCursor* specifies that the callback is session-wide, rather than cursor-level.
- ecbType* Type: CbType (Input)
Specifies the type of callback.
- piClientData* Type: pUINT32 (Input)
Pointer to the passthrough client data (used by the client function).
- piCbBufLen* Type: pUINT16 (Input)
Pointer to the callback buffer length.
- ppCbBuf* Type: ppVOID (Input)
Pointer to the callback buffer pointer.
- ppfCb* Type: ppfDBICallBack (Output)
Pointer to the client variable that receives a pointer to the callback function that was previously registered for this type. The buffer receives a NULL pointer if no function was registered.

Usage

This function is typically used to find out whether the specified callback function was registered for the given cursor handle or the currently active session.

DbiResult return values

DBIERR_NONE	The callback function for the given cursor handle has been successfully retrieved.
-------------	--

See also

DbiRegisterCallBack

C Examples: DbiGetCallback

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetCallback

An example for this function is under development and will be provided in an upcoming Help release.

DbiGetClientInfo {button C
Examples,JI(">example","exdbigetclientinfo")} {button Delphi
Examples,JI(">example","dexdbigetclientinfo")}

Syntaax

```
DBIResult DBIFN DbiGetClientInfo (pclientInfo);
```

Delphi syntax

```
function DbiGetClientInfo (var clientInfo: CLIENTInfo): DBIResult stdcall;
```

Description

DbiGetClientInfo retrieves system-level information about the client application.

Parameters

pclientInfo Type: pCLIENTInfo (Output)
Pointer to the client-allocated CLIENTInfo structure.

Usage

This function can be used to determine if other sessions are present when exclusive access is required to a table. It can also be used to determine the current language driver and to get the working directory.

Completion state

The output buffer pointed to by *pclientInfo* contains client environment information.

DbiResult return values

DBIERR_NONE Client application information was returned successfully.

See also

DbiGetSysVersion, DbiGetSysConfig, DbiGetSysInfo

C Examples: DbiGetClientInfo

Obtain client info:

If *ClientStr* is not null, this function also creates a string with the client information. This example uses the following input:

```
fDbiGetClientInfo(&Client, Buffer);
DBIResult fDbiGetClientInfo(pCLIENTInfo pCInfo, pCHAR ClientStr)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetClientInfo(pCInfo));
    if ((rslt == DBIERR_NONE) && (ClientStr != NULL))
        wsprintf(ClientStr, "Name: %s, Sessions: %d, Working Dir: %s, Language:
%s",
                pCInfo->szName, pCInfo->iSessions, pCInfo->szWorkDir, pCInfo-
>szLang);
    return rslt;
}
```

Delphi Examples: DbiGetClientInfo

Display a message box containing system-level information about client application.

This example uses the following input:

```
ShowClientInfo;

procedure ShowClientInfo;
const
  InfoStr = 'Name: %s'#13#10'Number of sessions: %d'#13#10 +
            'Working directory: %s'#13#10'Language: %s';
var
  ClientInf: ClientInfo;
begin
  Check(DbiGetClientInfo(ClientInf));
  with ClientInf do
    ShowMessage(Format(InfoStr, [szName, iSessions, szWorkDir, szLang]));
end;
```

DbiGetCurrSession **{button C**
Examples,JI(">example","exdbigetcurrsession")} **{button Delphi**
Examples,JI(">example","dexdbigetcurrsession")}

C syntax

```
DBIResult DBIFN DbiGetCurrSession (phSes);
```

Delphi syntax

```
function DbiGetCurrSession (var hSes: hDBISes): DBIResult stdcall;
```

Description

DbiGetCurrSession returns the handle associated with the current session.

Parameters

phSes Type: phDBISes (Output)
Pointer to the current session handle.

Completion state

This function returns returns the handle to current session, that is, the handle identified by the most recent call to DbiSetCurrSession or DbiStartSession. If neither of these calls has been made, DbiGetCurrSession returns the handle to the default session.

DbiResult return values

DBIERR_NONE	The current session handle has been retrieved successfully.
DBIERR_INVALIDHNDL	<i>phSes</i> is NULL.

See also

[DbiSetCurrSession](#), [DbiStartSession](#), [DbiCloseSession](#), [DbiGetSysInfo](#), [DbiGetSesInfo](#)

C Examples: DbiGetCurrSession

Return the handle associated with the current session:

This function returns the handle of the current session. If *pSesInfo* is not null, *DbiGetCurrSession* retrieves session information. This example uses the following input:

```
fDbiGetCurrSession(&hSes, &SesInfo);
```

```
DBIResult fDbiGetCurrSession(phDBISes pTmpSes, pSESInfo pSesInfo)
{
    DBIResult      rslt;
    rslt = Chk(DbiGetCurrSession(pTmpSes));
    if (rslt == DBIERR_NONE)
    {
        if (pSesInfo != NULL)
            rslt= Chk(DbiGetSesInfo(pSesInfo));
    }
    return rslt;
}
```

Delphi Examples: DbiGetCurrSession

Return the handle associated with the current session:

If a call to DbiStartSession has occurred previously, then this function returns a handle to the current session. This example uses the following input:

```
fDbiGetCurrSession(hSes);  
procedure fDbiGetCurrSession(var hTmpSes: hDBISes);  
begin  
    Check(DbiGetCurrSession(hTmpSes));  
end;
```

DbiGetCursorForTable {button C
Examples,JI(">example","exdbigetcursorfortable")} {button Delphi
Examples,JI(">example","dexdbigetcursorfortable")}

C syntax

```
DBIResult DBIFN DbiGetCursorForTable ([hDb], pszTableName, [pszDriverType],  
    phCursor);
```

Delphi syntax

```
function DbiGetCursorForTable (hDb: hDBIDb; pszTableName: PChar;  
    pszDriverType: PChar; var hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiGetCursorForTable returns an existing cursor for the given table within the current session.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle. Optional. If supplied, DbiFormFullName is called to create a fully qualified table name.

pszTableName Type: pCHAR (Input)
Pointer to the table name.

pszDriverType Type: pCHAR (Input)
Pointer to the driver type. Optional. If supplied, used with *hDb* in a call to DbiFormFullName.

phCursor Type: phDBICur (Output)
Pointer to a cursor handle.

Usage

If more than one cursor is opened on the table, the first cursor found on the table is returned. There is no implied ordering of cursors on a table.

DbiResult return values

DBIERR_NONE	The cursor for the table was retrieved successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_NOSUCHTABLE	The specified table name is invalid.
DBIERR_OBJNOTFOUND	A valid cursor could not be found.

See also

[DbiFormFullName](#)

C Examples: DbiGetCursorForTable

Retrieve a cursor for a table.

The table should have at least one open cursor already on it. This example uses the following input:

```
fDbiGetCursorForTable("STOCK.DB", &hSTOCKCur);  
DBIResult fDbiGetCursorForTable(pCHAR TblName, hDBIDb hDb, phDBICur phCur)  
{  
    DBIResult    rslt;  
    rslt = Chk(DbiGetCursorForTable(hDb, TblName, szPARADOX, phCur));  
    return rslt;  
}
```

Delphi Examples: DbiGetCursorForTable

Return an existing cursor for the given table within the current session.

This function also returns the name of the index on which the table is open. This example uses the following input:

```
OutputStr:= fDbiGetCursorForTable(Table1.DBHandle, Table1.TableName, MyNewCursor);
```

```
Function fDbiGetCursorForTable(hTmpDb: hDbiDb; TblName: String; var hNewCur:
  hDBICur): String;
var
  IndexDesc: IdxDesc;
begin
  Check(DbiGetCursorForTable(hTmpDb, PChar(TblName), '', hNewCur));
  Check(DbiGetIndexDesc(hNewCur, 0, IndexDesc));
  Result := StrPas(IndexDesc.szName);
end;
```

DbiGetCursorProps {button C
Examples,JI(">example","exdbigetcursorprops")}{button Delphi
Examples,JI(">example","dexdbigetcursorprops")}

C syntax

```
DBIResult DBIFN DbiGetCursorProps (hCursor, pcurProps);
```

Delphi syntax

```
function DbiGetCursorProps (hCursor: hDBICur; var curProps: CURProps):  
    DBIResult stdcall;
```

Description

DbiGetCursorProps returns the properties of the cursor.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pcurProps Type: pCURProps (Output)
Pointer to the client-allocated CURProps structure.

Usage

This function retrieves the most commonly used cursor properties. Additional properties can be obtained by using DbiGetProp. This function can be called immediately after DbiOpenTable to retrieve information necessary to allocate the record buffer and the array for the field descriptors in the table.

DbiResult return values

DBIERR_NONE	Cursor properties for <i>hCursor</i> were successfully retrieved.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.

See also

DbiGetProp, DbiSetProp, Getting and Setting Properties, CURProps

C Examples: DbiGetCursorProps

Return a string containing cursor properties.

OutName must have sufficient space to hold the return string. This example uses the following input:

```
fDbiGetCursorProps(hCursor, Name);
DBIResult fDbiGetCursorProps(hDBICur hTmpCur, pCHAR OutName)
{
    DBIResult      rslt;
    CURProps      Prop;
    rslt = Chk(DbiGetCursorProps(hTmpCur, &Prop));
    if (rslt != DBIERR_NONE)
        return rslt;
    wsprintf(OutName, "Name: %s, Name Size: %d\r\nTableType: %s"
        ", Fields: %d\r\nRecord Buffer Size: %d, Key Size: %d\r\nIndexes: %d"
        ", Validity Checks: %d\r\nRef Integ Checks: %d, Passwords: %d",
        Prop.szName, Prop.iFNameSize, Prop.szTableType, Prop.iFields,
        Prop.iRecBufSize, Prop.iKeySize, Prop.iIndexes, Prop.iValChecks,
        Prop.iRefIntChecks, Prop.iPasswords);
    return rslt;
}
```

Delphi Examples: DbiGetCursorProps

Example 1: Return the size of the record buffer needed to hold information for one record.

Note: Delphi programs should use TTable.RecordSize.

This example uses the following input:

```
    RecBuf := AllocMem(fDbiGetCursorProps1(Table1.Handle));
Function fDbiGetCursorProps1(hTmpCur: hDbiCur): Word;
var
    Prop : CURProps;
begin
    Check(DbiGetCursorProps(hTmpCur, Prop));
    Result := Prop.iRecBufSize;
end;
```

Example 2: Return information about the table open on the specified cursor.

This example uses the following input:

```
    fDbiGetCursorProps2(Table1.Handle, TmpList);
Procedure fDbiGetCursorProps2(hTmpCur: hDbiCur; CurList: TStringList);
var
    Prop : CURProps;
begin
    Check(DbiGetCursorProps(hTmpCur, Prop));
    with CurList do
    begin
        Add('Table Name: ' + Prop.szName);
        Add('Table Type: ' + Prop.szTableType);
        Add('Fields: ' + IntToStr(Prop.iFields));
        Add('Record Buffer Size: ' + IntToStr(Prop.iRecBufSize));
        Add('Indexes: ' + IntToStr(Prop.iIndexes));
        Add('Validity Checks: ' + IntToStr(Prop.iValChecks));
        Add('Referential Integ Checks: ' + IntToStr(Prop.iRefIntChecks));
        Add('Table Level: ' + IntToStr(Prop.iTblLevel));
        Add('Language Driver: ' + Prop.szLangDriver);
    end;
end;
```


DbiGetDatabaseDesc {button C
Examples,JI(">example","exdbigetdatabasedesc")} {button Delphi
Examples,JI(">example","dexdbigetdatabasedesc")}

C syntax

```
DBIResult DBIFN DbiGetDatabaseDesc (pszName, pdbDesc);
```

Delphi syntax

```
function DbiGetDatabaseDesc (pszName: PChar; pdbDesc: pDBDesc): DBIResult  
    stdcall;
```

Description

DbiGetDatabaseDesc retrieves the description of the specified database from the configuration file.

Parameters

pszName Type: pCHAR (Input)
Pointer to the database name.

pdbDesc Type: pDBDesc (Output)
Pointer to the client-allocated DBDesc structure.

Prerequisites

A valid database (alias) name must be specified.

Completion state

The output buffer contains the database description.

DbiResult return values

DBIERR_NONE	The database description for <i>pszName</i> was retrieved successfully.
DBIERR_OBJNOTFOUND	The database named in <i>pszName</i> was not found.

See also

[DbiOpenDatabaseList](#)

C Examples: DbiGetDatabaseDesc

Get database description.

If *DBStr* is not null, this function also creates a string with the database information. This example uses the following input:

```
fDbiGetDatabaseDesc("BDEDEMOS", &DbDesc, Buffer)
DBIResult fDbiGetDatabaseDesc(pCHAR DBName, pDBDesc pDB, pCHAR DBStr)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetDatabaseDesc(DBName, pDB));
    if ((rslt == DBIERR_NONE) && (DBStr != NULL))
        wprintf(DBStr, "Name: %s, Description: %s, Physical Name: %s, Type:
%s",
                pDB->szName, pDB->szText, pDB->szPhyName, pDB->szDbType);
    return rslt;
}
```

Delphi Examples: DbiGetDatabaseDesc

Retrieve the description of the specified database from the configuration file.

This example uses the following input:

```
ShowDatabaseDesc('IBLOCAL');  
procedure ShowDatabaseDesc(DBName: String);  
const  
  DescStr = 'Driver Name: %s'#13#10'AliasName: %s'#13#10 +  
            'Text: %s'#13#10'Physical Name/Path: %s';  
var  
  dbDes: DBDesc;  
begin  
  Check(DbiGetDatabaseDesc(PChar(DBName), @dbDes));  
  with dbDes do  
    ShowMessage(Format(DescStr, [szDbType, szName, szText, szPhyName]));  
end;
```

DbiGetDateFormat {button C
Examples,JI(">example","exdbigetdateformat")} {button Delphi
Examples,JI(">example","dexdbigetdateformat")}

C syntax

```
DBIResult DBIFN DbiGetDateFormat (pfmtDate);
```

Delphi syntax

```
function DbiGetDateFormat (var fmtDate: FMTDate): DBIResult stdcall;
```

Description

DbiGetDateFormat gets the date format for the current session.

Parameters

pfmtDate Type: pFMTDate (Output)
Pointer to the client-allocated FMTDate structure.

Usage

The date format is used by QBE for input and wildcard character matching. It is also used by batch operations (such as DbiDoRestructure and DbiBatchMove) to handle data type coercion between character and date types. The default date format can be changed by editing the system configuration file. The date format for the current session can be changed using DbiSetDateFormat.

DbiResult return values

DBIERR_NONE	The date format was successfully retrieved.
DBIERR_INVALIDHNDL	<i>pfmtDate</i> is NULL.

See also

DbiGetNumberFormat, DbiGetTimeFormat, DbiSetDateFormat

C Examples: DbiGetDateFormat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetDateFormat

Retrieve the date separator from the current session

The date separator is displayed it in a dialog box.

```
Procedure TForm1.Button3Click(Sender: TObject);
var
  fmt: fmtdate;
  s: string;
begin
  check(dbiGetDateFormat(fmt));
  s:=fmt.szDateSeparator;
  ShowMessage('Date is seperated by a '+s+' Character');
end;
```

DbiGetDirectory {button C
Examples,JI(">example","exdbigetdirectory")} {button Delphi
Examples,JI(">example","dexdbigetdirectory")}

C syntax

```
DBIResult DBIFN DbiGetDirectory (hDb, bDefault, pszDir);
```

Delphi syntax

```
function DbiGetDirectory (hDb: hDBIDb; bDefault: Bool; pszDir: PChar):  
    DBIResult stdcall;
```

Description

DbiGetDirectory retrieves the current directory or the default directory, depending on the value specified in *bDefault*.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle. Must be associated with a standard database.

bDefault Type: BOOL (Input)

The bDefault parameter specifies whether to retrieve the default directory or the current working directory.

pszDir Type: pCHAR (Output)

Pointer to the client-allocated buffer which receives the directory string. The buffer must be large enough to hold the directory string (DBIMAXPATHLEN + 1).

Usage

This function is valid only for a Paradox or dBASE database. The default directory can be set when DbiInit is called as part of the DBIEnv structure. If DbiGetDirectory is not called, then the default directory is the same as the application startup directory.

SQL: DbiGetDirectory is not applicable to SQL databases.

Prerequisites

A valid database handle must be obtained.

Completion state

The output buffer contains the directory string.

DbiResult return values

DBIERR_NONE The directory was returned successfully.

DBIERR_INVALIDHNDL The specified database handle is invalid or NULL.

See also

DbiSetDirectory, DbiInit, DbiOpenDatabase

bDefault

bDefault can be one of the following values:

<i>bDefault</i> value	Directory to retrieve
TRUE	Default directory
FALSE	Current working directory

C Examples: DbiGetDirectory

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetDirectory

Return the current working directory.

This example uses the following input:

```
ReturnString:= fDbiGetDirectory(Table1.DBHandle);  
function fDbiGetDirectory(hDB: hDbiDb): String;  
var  
    Dir: String;  
begin  
    SetLength(Dir, dbiMaxPathLen + 1);  
    Check(DbiGetDirectory(hDB, False, PChar(Dir)));  
    SetLength(Dir, StrLen(PChar(Dir)));  
    Result:= Dir;  
end;
```

DbiGetDriverDesc {button C
Examples,JI(">example","exdbigetdriverdesc")} {button Delphi
Examples,JI(">example","dexdbigetdriverdesc")}

C syntax

```
DBIResult DBIFN DbiGetDriverDesc (pszDriverType, pdrvType);
```

Delphi syntax

```
function DbiGetDriverDesc (pszDriverType: PChar; var drvType: DRVType):  
    DBIResult stdcall;
```

Description

DbiGetDriverDesc retrieves a description of a driver.

Parameters

pszDriverType Type: pCHAR (Input)
Pointer to the driver name string.

pdrvType Type: pDRVType (Output)
Pointer to the client-allocated DRVType structure.

DbiResult return values

DBIERR_NONE	The driver description was retrieved successfully.
DBIERR_INVALIDPARAM	Invalid <i>pszDriverType</i> argument
DBIERR_INVALIDHNDL	Invalid handles to function errors (bad cursors or database handles).

See also

[DbiOpenDriverList](#)

C Examples: DbiGetDriverDesc

Obtain information about a certain driver.

```
DBIResult fDbiGetDriverDesc(pCHAR DrvName)
{
    DBIResult      rslt;
    DRVType        DrvDesc;
    rslt = Chk(DbiGetDriverDesc(DrvName, &DrvDesc));
    return rslt;
}
```

Delphi Examples: DbiGetDriverDesc

Obtain information about a certain driver.

This example uses the following input:

```
fDbiGetDriverDesc('INTRBASE', TmpList);
```

```
Procedure fDbiGetDriverDesc(DrvName: String; DriverList: TStringList);
var
  DrvDesc : DRVType;
begin
  Check(DbiGetDriverDesc(PChar(DrvName), DrvDesc));
  with DriverList do
  begin
    Add('Driver Type: ' + DrvDesc.szType);
    Add('Text: ' + DrvDesc.szText);
    Add('Database Type: ' + DrvDesc.szDbType);
  end;
end;
```


eContext

eContext can be one of the following values:

Value	Description
ecTOKEN	Token (For QBE)
ecTABLENAME	Table name
ecFIELDNAME	Field name
ecIMAGEROW	Image row (For QBE)
ecUSERNAME	For example, in lock conflicts, user involved
ecFILENAME	File name
ecINDEXNAME	Index name
ecDIRNAME	Directory name
ecKEYNAME	Key name
ecALIAS	Alias
ecDRIVENAME	Drive name (C:)
ecNATIVECODE	Native error code
ecNATIVEMSG	Native error message
ecLINENUMBER	Line number
ecCAPABILITY	Capability

C Examples: DbiGetErrorContext

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetErrorContext

Show error context string.

After a dbi function returns an error, you can use this procedure to display the error context string associated with the context type specified in eContext. This example uses the following input:

```
ShowErrorContext(ecTABLENAME);  
procedure ShowErrorContext(eContext: Integer);  
var  
    Ctxt: String;  
begin  
    SetLength(Ctxt, DBIMAXMSGLEN);  
    DbiGetErrorContext(eContext, PChar(Ctxt));  
    SetLength(Ctxt, StrLen(PChar(Ctxt)));  
    if Ctxt <> '' then  
        ShowMessage(format('Error context string: %s',[Ctxt]));  
end;
```

DbiGetErrorEntry {button C
Examples,JI(">example","exdbigeterroreentry")} {button Delphi
Examples,JI(">example","dexdbigeterroreentry")}

C syntax

```
DBIResult DBIFN DbiGetErrorEntry (uEntry, pulNativeError, pszError);
```

Delphi syntax

```
function DbiGetErrorEntry (uEntry: Word; var ulNativeError: Longint;  
    pszError: PChar): DBIResult stdcall;
```

Description

DbiGetErrorEntry returns the error Description (including native server errors returned from SQL systems) of a specified error stack entry.

Parameters

uEntry Type: UINT16 (Input)
Specifies the error stack entry.

pulNativeError Type: pUINT32 (Output)
Pointer to the client variable that receives the native error code (if any).

pszError Type: pCHAR (Output)
Pointer to the client-allocated buffer that receives the error string (if any).

Usage

Error stack entries begin with 1. Each stack entry contains a DBIERR, and possibly a native error code and a native error message. DBIERR_NONE is returned for stack entries beyond the current error stack, so this successful return can be used as a loop termination. For example, if error entry 1 returns DBIERR_NONE, there are no errors on the stack. Both the native error code and the native error message result are optional. The stack can be traversed multiple times, or combined with other error interface calls, but non-error routine BDE calls reset the error stack.

DbiResult return values

DBIERR_NONE The error stack entry is empty.

Any other error return value indicates what the error code is that is contained in the error stack entry.

See also

[DbiGetErrorInfo](#), [DbiGetErrorString](#)

C Examples: DbiGetErrorEntry

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetErrorEntry

Get the error for the specified entry and return the result in a ClientError string. If a native error also exists in the entry, return it as the function result. Raise an EDatabaseError exception if an attempt is made to go beyond the end of the error stack. This example uses the following input:

```
NativeError := fDbiGetErrorEntry(1, ClientStr);
```

```
function fDbiGetErrorEntry(Entry: Word; var ClientError: String): Longint;
var
  L: Longint;
  rslt: DBIResult;

begin
  SetLength(ClientError, DBIMAXMSGLEN + 1);
  rslt := DbiGetErrorEntry(Entry, L, PChar(ClientError));
  SetLength(ClientError, StrLen(PChar(ClientError)));
  Result := L;
  if rslt = DBIERR_NONE then
    raise EDatabaseError.Create('No errors at stack entry ' +
      IntToStr(Entry));
end;
```

DbiGetErrorInfo {button C
Examples,JI(">example","exdbigeterrorinfo")} {button Delphi
Examples,JI(">example","dexdbigeterrorinfo")}

C syntax

```
DBIResult DBIFN DbiGetErrorInfo (bFull, pErrInfo);
```

Delphi syntax

```
function DbiGetErrorInfo (bFull: Bool; var ErrInfo: DBIErrInfo): DBIResult  
    stdcall {$ENDIF};
```

Description

DbiGetErrorInfo provides descriptive error information about the last error that occurred, and error contexts for the first four error messages on the error stack.

Parameters

bFull Type: BOOL (Input)
Not currently used.

pErrInfo Type: pDBIErrInfo (Output)
Pointer to the client [DBIErrInfo](#) structure.

Usage

Error information consists of the DBIResult error code, an error message in ANSI characters corresponding to the code, and up to four associated error contexts. For example, if the error message is "Table Not Found," the user might want to know the table name. The BDE engine logged the table name with the error context ecTABLENAME, which can be found in one of the contexts contained in the DBIErrInfo structure.

Prerequisites

This function is designed for immediate display to the user, so unlike the function DbiGetErrorContext, the client does not need to be concerned about the different types of error contexts. If the client wishes to interpret certain error codes and contexts (for example, the ALIAS error context), DbiGetErrorContext should be used.

DbiResult return values

DBIERR_NONE Error information was retrieved successfully.

See also

[DbiGetErrorContext](#)

C Examples: DbiGetErrorInfo

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetErrorInfo

Get descriptive error information about the last error

In addition to the most recent error, this function displays error contexts for up to four error messages on the error stack. This example uses the following input:

```
fDbiGetErrorInfo(DbiOpenLDList(hCur), ErrorList);  
procedure fDbiGetErrorInfo(ErrorCode: DbiResult; ErrorList: TStringList);  
var  
    ErrorInfo: DBIErrInfo;  
    ErrorString: String;  
  
begin  
    if ErrorCode <> dbiErr_None then  
    begin  
        ErrorList.Clear;  
        Check(DbiGetErrorInfo(True,ErrorInfo));  
        if ErrorCode = ErrorInfo.iError then  
        begin  
            ErrorList.Add('Error Number: ' + inttostr(ErrorInfo.iError));  
            ErrorList.Add('Error Code: ' + StrPas(ErrorInfo.szErrcode));  
            if StrLen(ErrorInfo.szContext[1]) <> 0 then  
                ErrorList.Add('Error Context1: ' + StrPas(ErrorInfo.szContext[1]));  
            if StrLen(ErrorInfo.szContext[2]) <> 0 then  
                ErrorList.Add('Error Context2: ' + StrPas(ErrorInfo.szContext[2]));  
            if StrLen(ErrorInfo.szContext[3]) <> 0 then  
                ErrorList.Add('Error Context3: ' + StrPas(ErrorInfo.szContext[3]));  
            if StrLen(ErrorInfo.szContext[4]) <> 0 then  
                ErrorList.Add('Error Context4: ' + StrPas(ErrorInfo.szContext[4]));  
        end  
        else  
        begin  
            SetLength(ErrorString, dbiMaxMsgLen + 1);  
            Check(DbiGetErrorString(ErrorCode, PChar(ErrorString)));  
            SetLength(ErrorString, StrLen(PChar(ErrorString)));  
            ErrorList.Add(ErrorString);  
        end;  
    end;  
end;  
end;
```

DbiGetErrorString {button C
Examples,JI(">example","exdbigeterrorstring")} {button Delphi
Examples,JI(">example","dexdbigeterrorinfo")}

C syntax

```
DBIResult DBIFN DbiGetErrorString (rslt, pszError);
```

Delphi syntax

```
function DbiGetErrorString (rslt: DBIResult; pszError: PChar): DBIResult  
    stdcall;
```

Description

DbiGetErrorString returns the message associated with a given error code.

Parameters

rslt Type: DBIResult (Input)

Specifies the error code.

pszError Type: pCHAR (Output)

Pointer to the client buffer that receives the message string for the given error code.

Usage

This function maps an error code in *rslt* to the corresponding error string. For example, if DbiGetErrorString is called with the error code DBIERR_EOF, it returns the string "At End of Table." BDE keeps the error strings as Windows string resources, so the client can translate/customize them as needed (using a resource editor such as Resource Workshop).

Note: This function has no context, so it is not limited to error codes that were returned by previous BDE calls. In contrast, DbiGetErrorInfo returns information only on the last error logged by BDE.

Prerequisites

The client must allocate a buffer at least as large as (DBIMAXMSGLEN+1).

DbiResult return values

DBIERR_NONE The error string was retrieved successfully.

See also

[DbiGetErrorInfo](#), [DbiGetErrorEntry](#), [DbiGetErrorContext](#)

C Examples: DbiGetErrorString

Check the BDE error stack for error information:

This example uses the following input:

```
fError(DbiSaveChanges(hCur));
```

```
DBIResult fError(DBIResult ErrorValue)
{
    char          dbi_status[DBIMAXMSGLEN * 5] = {'\0'}; // Error String
    DBIMSG        dbi_string = {'\0'};
    DBIErrInfo    ErrInfo;    // Contains information about the error

    if (ErrorValue != DBIERR_NONE)
    {
        // Note - make certain to call DbiGetErrorInfo() right after
        // the error because it will give information about only the
        // most recent error.
        DbiGetErrorInfo(TRUE, &ErrInfo);

        if (ErrInfo.iError == ErrorValue)
        {
            strcpy(dbi_status, ErrInfo.szErrCode);

            // Need to check how much information was provided -
            // different errors return different amounts of information.
            if (strcmp(ErrInfo.szContext1, ""))
                sprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext1);
            if (strcmp(ErrInfo.szContext2, ""))
                sprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext2);
            if (strcmp(ErrInfo.szContext3, ""))
                sprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext3);
            if (strcmp(ErrInfo.szContext4, ""))
                sprintf(dbi_status, "%s\r\n    %s", dbi_status,
ErrInfo.szContext4);
        }
        else
        {
            DbiGetErrorString(ErrorValue, dbi_string);
            strcpy(dbi_status, dbi_string);
        }
        // Display error in snipit and in a MessageBox
        MessageBox(NULL, dbi_status, "BDE Error - Example Only",
MB_ICONEXCLAMATION);
    }
    return ErrorValue;
}
```

Delphi Examples: DbtGetErrorString

An example for this function is under development and will be provided in an upcoming Help release.

DbiGetField {button C Examples,JI(">example","exdbigetfield")} {button Delphi Examples,JI(">example","dexdbigetfield")}

C syntax

```
DBIResult DBIFN DbiGetField (hCursor, iField, pRecBuf, [pDest], [pbBlank]);
```

Delphi syntax

```
function DbiGetField (hCursor: hDBICur; iField: Word; pRecBuff: Pointer;  
    pDest: Pointer; var bBlank: Bool): DBIResult stdcall;
```

Description

DbiGetField retrieves the data contents of the requested field from the record buffer.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

iField Type: UINT16 (Input)

Specifies the ordinal number of the field within the record. Field numbers start with 1.

pRecBuf Type: pBYTE (Input)

Pointer to the record buffer.

pDest Type: pBYTE (Output)

Pointer to the client buffer that receives the data from the requested field. Optional.

pbBlank Type: pBOOL (Output)

Pointer to the client variable. Set to TRUE if the field is blank; otherwise, FALSE. Optional.

Usage

To determine if a field is blank or if a BLOB is NULL, DbiGetField can be called with *pDest* set to NULL. *pbBlank* is returned indicating whether the field is blank or nonblank.

The data that DbiGetField returns is based on the current translation mode of the cursor. If the record translation is set to xltNONE, DbiGetField returns the raw data in the driver's physical format. This is called a BDE physical type. If the translation mode is set to xltFIELD, the data is returned in a generic form (for example, a Paradox numeric value is returned as an 8-byte double). This is called a BDE logical type.

DbiGetField cannot be used to return the data contents of a BLOB field, although it can be used to determine if the BLOB field is empty.

Completion state

The output buffer pointed to by *pDest* (if supplied) contains the requested field. The output buffer pointed to by *pbBlank* (if supplied) indicates whether the field is blank.

DbiResult return values

DBIERR_NONE Data contents were retrieved successfully.

DBIERR_INVALIDHNDL The specified cursor handle is invalid or NULL.

See also

[DbiPutField](#), [DbiInsertRecord](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRelativeRecord](#), [DbiGetRecord](#)

C Examples: DbiGetField

Example 1: Get the field value by field number.

This example uses the following input:

```
fDbiGetField1(hPXCur, pPXRecBuf, 1, (pBYTE)&DFloat);
DBIResult fDbiGetField1(hDBICur hTmpCur, pBYTE pTmpRecBuf, INT16 FldNum,
pBYTE Info)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetField(hTmpCur, FldNum, pTmpRecBuf, Info, NULL));
    return rslt;
}
```

Example 2: Get the field value specified by a field name.

If *Info* is NULL, this function will check to see if a field exists. If an invalid field name is given, an error is returned. This example uses the following input:

```
fDbiGetField2(hPXCur, pPXRecBuf, "STOCK NO", (pBYTE)&DFloat);
DBIResult fDbiGetField2(hDBICur hTmpCur, pBYTE pTmpRecBuf, pCHAR FldName,
pBYTE Info)
{
    DBIResult    rslt;
    CURProps    CurProps;
    pFLDDesc    pFldDesc;
    UINT16      Field;
    BOOL        Found = FALSE;
    rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    pFldDesc = (pFLDDesc)malloc(CurProps.iFields * sizeof(FLDDesc));
    if (pFldDesc == NULL)
        return DBIERR_NOMEMORY;
    rslt = Chk(DbiGetFieldDescs(hTmpCur, pFldDesc));
    if (rslt != DBIERR_NONE)
    {
        free(pFldDesc);
        return rslt;
    }
    for(Field = 0; Field < CurProps.iFields; Field++)
    {
        if (strncmpi(pFldDesc[Field].szName, FldName) == 0)
        {
            Found = TRUE;
            if (Info != NULL)
                rslt = Chk(DbiGetField(hTmpCur, pFldDesc[Field].iFldNum,
pTmpRecBuf, Info, NULL));
        }
    }
    if (Found == FALSE)
        rslt = DBIERR_INVALIDFIELDNAME;
    free(pFldDesc);
    return rslt;
}
```

Delphi Examples: DbiGetField

Retrieve the data contents of the requested field from the record buffer:

Delphi users should not need to directly call `dbiGetField` because Delphi provides a variety of ways to retrieve the value of a particular field. Use the Delphi online help to browse the Value and As... properties of `TField`. Also see the `FieldValues[]` array property of `TTable`.

Get a field in a table and return it in a Variant type variable.

Some field types are not supported and will cause an exception. Most Delphi users should use `TField` objects to retrieve table information. This example uses the following input:

```
MStr := fDbiGetField(Table1.Handle, Table1.Fields[0].Index + 1);
```

```
function fDbiGetField(hTmpCur: hDBICur; FieldNo: Word): Variant;
var
  Props: CURProps;
  pFlDs, pOldFlDs: pFLDDesc;
  pRecBuf: pBYTE;
  FieldString: String;
  FieldINT16: Smallint;
  FieldINT32: Longint;
  FieldUINT16: Word;
  FieldFLOAT: Double;
  Blank: BOOL;
begin
  if FieldNo < 1 then
    raise EDatabaseError.Create('Field number index is 1 based');

  Check(DbiGetCursorProps(hTmpCur, Props));
  pFlDs := AllocMem(Props.iFields * sizeof(FLDDesc));
  pOldFlDs := pFlDs;
  pRecBuf := AllocMem(Props.iRecBufSize * sizeof(BYTE));
  try
    Check(DbiGetFieldDescs(hTmpCur, pFlDs));
    Inc(pFlDs, FieldNo - 1);
    Check(DbiGetRecord(hTmpCur, dbiNOLOCK, pRecBuf, nil));
    case pFlDs.iFldType of
      fldDATE, fldTIME, fldTIMESTAMP, fldUNKNOWN, fldBLOB, fldBOOL, fldBCD:
        raise EDBEngineError.Create(DBIERR_NOTSUPPORTED);
      fldZSTRING:
        begin
          SetLength(FieldString, pFlDs.iUnits1 + 1);
          Check(DbiGetField(hTmpCur, FieldNo, pRecBuf,
            pBYTE(PChar(FieldString)), Blank));
          SetLength(FieldString, StrLen(PChar(FieldString)));
          Result := FieldString;
        end;
      fldINT16:
        begin
          Check(DbiGetField(hTmpCur, FieldNo, pRecBuf, pBYTE(@FieldINT16),
            Blank));
          Result := FieldINT16;
        end;
      fldUINT16:
        begin
          Check(DbiGetField(hTmpCur, FieldNo, pRecBuf, pBYTE(@FieldUINT16),
            Blank));
        end;
    end;
  except
  end;
end;
```

```
        Result := FieldUINT16;
    end;
    fldFLOAT:
    begin
        Check(DbiGetField(hTmpCur, FieldNo, pRecBuf, pBYTE(@FieldFLOAT),
Blank));
        Result := FieldFLOAT;
    end;
    fldINT32, fldUINT32:
    begin
        Check(DbiGetField(hTmpCur, FieldNo, pRecBuf, pBYTE(@FieldINT32),
Blank));
        Result := FieldINT32;
    end;
end;
end;
finally
    FreeMem(pOldFlds, Props.iFields * sizeof(FLDDesc));
    FreeMem(pRecBuf, Props.iRecBufSize * sizeof(BYTE));
end;
end;
```

DbiGetFieldDescs {button C
Examples,JI(">example","exdbiputfield")} {button Delphi
Examples,JI(">example","dexdbigetfielddescs")}

C syntax

```
DBIResult DBIFN DbiGetFieldDescs (hCursor, pfldDesc);
```

Delphi syntax

```
function DbiGetFieldDescs (hCursor: hDBICur; pfldDesc: pFLDDesc): DBIResult  
    stdcall;
```

Description

DbiGetFieldDescs retrieves a list of descriptors for all the fields in the table associated with *hCursor*. The structure returned is identical in form to the fields contained in DbiOpenFieldList.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

pfldDesc Type: pFLDDesc (Output)

Pointer to the client FLDDesc structures, one for each of the fields in the table associated with the specified cursor.

Usage

The field descriptors returned are in accordance with the translation mode set for the cursor. If the translation mode is xltNONE, the physical field descriptors are returned. If the translation mode is xltFIELD, the logical field descriptors are returned.

Use DbiGetCursorProps to get the number of field in the table.

DbiResult return values

DBIERR_NONE The field Descriptions were returned successfully.

DBIERR_INVALIDHNDL The specified cursor handle is invalid or NULL.

See also

DbiGetCursorProps, DbiOpenFieldList

Delphi Examples: DbiGetFieldDescs

Retrieve a list of descriptors for all fields in the table associated with the given TTable:

This function prints out the field numbers and names of the table. This example uses the following input:

```
fDbiGetFieldDescs(Table1);
procedure ShowFields(T: TTable);
var
  curProp: CURProps;
  pfldDes, pCurFld: pFLDDesc;
  // pfldDes is a pointer to a list of field descriptors.
  // It must be allocated with (iFields * sizeof(FLDDesc))
  // where iFields is a field in the structure curProps
  // from DbiGetCursorProps
  // pCurFld is a pointer the description of one field in the list.
  i: integer;          // counter
  MemSize: integer;
  FieldList: String;
begin
  Check(DbiGetCursorProps(T.Handle, curProp));
  // Get enough memory for one field desc times the # of fields
  MemSize := curProp.iFields * SizeOf(FLDDesc);
  pfldDes := AllocMem(MemSize);
  try
    pCurFld := pfldDes;
    Check(DbiGetFieldDescs(T.Handle, pfldDes));
    i:= 0;
    FieldList := '';
    while (i < curProp.iFields) do begin
      FieldList := FieldList + Format('%d - %s'#13#10, [pCurFld^.iFldNum,
                                                pCurFld^.szName]);

      // increment pointer to the next record
      inc(pCurFld);
      inc(i);
    end;
  finally
    ShowMessage(FieldList);
    FreeMem(pfldDes, MemSize);
  end;
end;
```


DbiGetFieldTypeDesc {button C
Examples,JI(">example","exdbigetfieldtypedesc")} {button Delphi
Examples,JI(">example","dexdbigetfieldtypedesc")}

C syntax

```
DBIResult DBIFN DbiGetFieldTypeDesc (pszDriverType, pszTableType,  
    pszFieldType, pfldType);
```

Delphi syntax

```
function DbiGetFieldTypeDesc (pszDriverType: PChar; pszTableType: PChar;  
    pszFieldType: PChar; var fldType: FLDTypE): DBIResult stdcall;
```

Description

DbiGetFieldTypeDesc retrieves a description of the specified field type.

Parameters

pszDriverType Type: pCHAR (Input)

Pointer to the driver type. Use DbiOpenDriverList to find the valid driver types.

pszTableType Type: pCHAR (Input)

Pointer to the table type. Use DbiOpenTableTypesList to find the valid table types.

pszFieldType Type: pCHAR (Input)

Pointer to the field type. Use DbiOpenFieldTypesList to find the valid field types.

pfldType Type: pFLDTypE (Output)

Pointer to the client [FLDTypE](#) structure.

DbiResult return values

DBIERR_NONE The field type Description was retrieved successfully.

See also

[DbiOpenFieldTypesList](#), [DbiOpenTableTypesList](#), [DbiOpenDriverList](#)

C Examples: DbiGetFieldTypeDesc

Obtain the descriptor for a possible field type.

```
DBIResult fDbiGetFieldTypeDesc(hDBICur hTmpCur)
{
    DBIResult      rslt;
    hDBICur        hTmpListCur;
    FLDType        fldType;
    FLDDesc        fldDesc;
    TBLType        tblType;
    pCHAR          DrvType = szPARADOX;
    pCHAR          info;
    rslt = Chk(DbiOpenTableTypesList(DrvType, &hTmpListCur));
    rslt = DbiSetToBegin(hTmpListCur);
    rslt = Chk(DbiGetNextRecord(hTmpListCur, dbiNOLOCK,
                               (pBYTE)&tblType, NULL));
    info = (pCHAR)malloc(DBIMAXMSGLEN);
    rslt = Chk(DbiSetToBegin(hTmpCur));
    rslt = Chk(DbiGetNextRecord(hTmpCur, dbiNOLOCK,
                               (pBYTE)&fldDesc, NULL));
    rslt = Chk(DbiGetFieldTypeDesc(DrvType, (pCHAR)tblType.szName,
                                   (pCHAR)fldDesc.szName, &fldType));

    info[0] = '\0';
    strcat(info, "\r\n\r\n");
    strcat(info, tblType.szName);
    strcat(info, ":\r\n");
    strcat(info, fldType.szName);
    strcat(info, ": ");
    strcat(info, fldType.szText);
    return rslt;
}
```

Delphi Examples: DbGetFieldTypeDesc

Retrieve a description of the specified field type.

This example uses the following input:

```
fDbGetFieldTypeDesc(szPARADOX, 'PDOX 7.0', 'ALPHA', MyFieldType);
procedure fDbGetFieldTypeDesc(DriverType, TableType, FieldType: PChar;
    var FieldTypeInfo: TStringList);

    Function BoolVal(InBool: Boolean): String;
    begin
        if InBool = True then Result:= 'True'
        else Result:= 'False';
    end;

var
    FieldTypeRec: FLDType;
begin
    Check(DbGetFieldTypeDesc(DriverType, TableType, FieldType, FieldTypeRec));
    FieldTypeInfo.Add
        ('Field ID Type: ' + inttostr(FieldTypeRec.iId));
    FieldTypeInfo.Add
        ('Symbolic Name: ' + StrPas(FieldTypeRec.szName));
    FieldTypeInfo.Add
        ('Descriptive Text: ' + StrPas(FieldTypeRec.szText));
    FieldTypeInfo.Add
        ('Physical / Native Type: ' + inttostr(FieldTypeRec.iPhyType));
    FieldTypeInfo.Add
        ('Default Translated Type: ' + inttostr(FieldTypeRec.iXltType));
    FieldTypeInfo.Add
        ('Default Translated Subtype: ' + inttostr(FieldTypeRec.iXltSubType));
    FieldTypeInfo.Add
        ('Maximum Units Allowed (1): ' + inttostr(FieldTypeRec.iMaxUnits1));
    FieldTypeInfo.Add
        ('Maximum Units Allowed (2): ' + inttostr(FieldTypeRec.iMaxUnits2));
    FieldTypeInfo.Add
        ('Physical Size: ' + inttostr(FieldTypeRec.iPhySize));
    FieldTypeInfo.Add
        ('Field Required: ' + BoolVal(FieldTypeRec.bRequired));
    FieldTypeInfo.Add
        ('Supports user-specified default: ' +
        BoolVal(FieldTypeRec.bDefaultVal));
    FieldTypeInfo.Add
        ('Supports Min Val constraint: ' + BoolVal(FieldTypeRec.bMinVal));
    FieldTypeInfo.Add
        ('Supports Max Val constraint: ' + BoolVal(FieldTypeRec.bMaxVal));
    FieldTypeInfo.Add
        ('Supports Referential Integrity: ' +
        BoolVal(FieldTypeRec.bRefIntegrity));
    FieldTypeInfo.Add
        ('Supports Other Checks: ' + BoolVal(FieldTypeRec.bOtherChecks));
    FieldTypeInfo.Add
        ('Can Be Keyed: ' + BoolVal(FieldTypeRec.bKeyed));
    FieldTypeInfo.Add
        ('Multiple Fields of this Type: ' +
        BoolVal(FieldTypeRec.bMultiplePerTable));
    FieldTypeInfo.Add
```

```
    ('Minimum Units Required (1): ' + inttostr(FieldTypeRec.iMinUnits1));
FieldTypeInfo.Add
    ('Minimum Units Required (2): ' + inttostr(FieldTypeRec.iMinUnits2));
FieldTypeInfo.Add
    ('Field Type Can be Created: ' + BoolVal(FieldTypeRec.bCreateable));
end;
```

DbiGetFilterInfo {button C
Examples,JI(">example","exdbigetfilterinfo")} {button Delphi
Examples,JI(">example","dexdbigetfilterinfo")}

C syntax

```
DBIResult DBIFN DbiGetFilterInfo (hCursor, hFilter, iFilterId, iFilterSeqNo,  
    pFilterinfo);
```

Delphi syntax

```
function DbiGetFilterInfo (hCur: hDBICur; hFilter: hDBIFilter; iFilterId:  
    Word; iFilterSeqNo: Word; var Filterinfo: FilterInfo): DBIResult stdcall;
```

Description

DbiGetFilterInfo retrieves information about a specified filter.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

hFilter Type: hDBIFilter (Input)

Specifies the filter handle. Filter handles are not preserved for cloned cursors. Optional, specify a filter handle, filter identification number, or filter sequence number to identify the filter. The default is NULL.

iFilterId Type: UINT16 (Input)

Specifies the filter identification number. Optional, specify a filter handle, filter identification number, or filter sequence number to identify the filter. The default is 0.

iFilterSeqNo Type: UINT16 (Input)

Specifies the filter sequence number. Optional, specify a filter handle, filter identification number, or filter sequence number to identify the filter. The default is 0.

pFilterinfo Type: pFILTERInfo (Output)

Pointer to the client FILTERInfo structure.

DbiResult return values

DBIERR_NONE Filter information was retrieved successfully.

DBIERR_INVALIDHNDL The specified cursor handle is invalid or NULL.

C Examples: DbiGetFilterInfo

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetFilterInfo

Return the filter information for the specified table and filter handles. This example uses the following input:

```
    FInfo := fDbiGetFilterInfo(CustomerTbl.Handle, hFilter);
function fDbiGetFilterInfo(hTmpCur: hDBICur; hFilter: hDBIFilter):
    FILTERInfo;
var
    Props: CURProps;
begin
    Check(DbiGetCursorProps(hTmpCur, Props));
    if Props.iFilters = 0 then
        raise EDatabaseError.Create('There is not filter associated with the
        cursor');
    Check(DbiGetFilterInfo(hTmpCur, hFilter, 0, 0, Result));
end;
```

DbiGetIndexDesc {button C
Examples,JI(">example","exdbigetindexdesc")} {button Delphi
Examples,JI(">example","dexdbigetindexdesc")}

C syntax

```
DBIResult DBIFN DbiGetIndexDesc (hCursor, iIndexSeqNo, pidxDesc);
```

Delphi syntax

```
Function DbiGetIndexDesc (hCursor: hDBICur; iIndexSeqNo: Word; var idxDesc: IDXDesc): DBIResult stdcall;
```

Description

DbiGetIndexDesc retrieves the properties of the given index associated with *hCursor*.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

iIndexSeqNo Type: UINT16 (Input)
Specifies the ordinal number of the index in the list of open indexes of the cursor. DbiGetIndexSeqNo can be called to obtain this number for a given index. If *iIndexSeqNo* is 0, the properties of the active index are returned.

pidxDesc Type: pIDXDesc (Output)
Pointer to the client-allocated IDXDesc structure.

Usage

This function is used to find the properties of an open index for this cursor. Use DbiGetCursorProps to get the number of open indexes (*iIndexes*). *iIndexSeqNo* must be between zero and *iIndexes*.

Note: If a field map is active, the field numbers in *aiKeyFld* list the mapped field numbers, however, if a key field is not part of the field map, it is a negative number.

Prerequisites

A valid cursor handle must be on one or more open indexes.

DbiResult return values

DBIERR_NONE	The properties of the specified index were returned successfully.
DBIERR_INVALIDHNDL	The specified handle is invalid or NULL.
DBIERR_NOTINDEXED	Table has no associated indexes.
DBIERR_NOSUCHINDEX	<i>iIndexSeqNo</i> is invalid.

See also

[DbiOpenIndex](#), [DbiCloseIndex](#), [DbiGetCursorProps](#), [DbiGetIndexSeqNo](#), [DbiOpenIndexList](#), [DbiGetIndexDescs](#)

C Examples: DbiGetIndexDesc

Get the name and the amount of fields for the index open on the current cursor.

IXDesc must be of sufficient size to hold the index description. This example uses the following input:

```
fDbiGetIndexDesc(hCur, Buffer);
DBIResult fDbiGetIndexDesc(hDBICur hTmpCur, pCHAR IXDesc)
{
    DBIResult    rslt;
    IDXDesc      IdxDesc;
    rslt = Chk(DbiGetIndexDesc(hTmpCur, 0, &IdxDesc));
    wsprintf(IXDesc, "Index name: %s; Fields in Key: %d", IdxDesc.szName,
             IdxDesc.iFldsInKey);
    return rslt;
}
```

Delphi Examples: DbiGetIndexDesc

Get the properties of a specific index associated with a cursor:

This function returns the IDXDesc properties specified by the IndexName parameter of TTable T's index.

```
function GetIndexDesc(T: TTable; IndexName: String): IDXDesc;
var
  hNewCur: hDbiCur;
  iIndexId: LongInt;
  InfoStr: string;
  pInfoStr: array[0..100] of char;
begin
  Check(DbiCloneCursor(T.Handle, False, False, hNewCur));
  try
    iIndexId:= 1;
    Check(DbiSwitchToIndex(hNewCur, PChar(IndexName), Nil, iIndexId, FALSE));
    Check(DbiGetIndexDesc(hNewCur, 0, Result)); //'0' specifies the active
index
  finally
    Check(DbiCloseCursor(hNewCur));
  end;
end;
```

DbiGetIndexDescs {button C
Examples,JI(">example","exdbigetindexdescs")} {button Delphi
Examples,JI(">example","dexdbigetindexdescs")}

C syntax

```
DBIResult DBIFN DbiGetIndexDescs (hCursor, pidxDesc);
```

Delphi syntax

```
function DbiGetIndexDescs (hCursor: hDBICur; var idxDesc: IDXDesc): DBIResult  
    stdcall;
```

Description

DbiGetIndexDescs retrieves index properties for all indexes associated with this cursor.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pidxDesc Type: pIDXDesc (Output)
Pointer to the client-allocated IDXDesc structure.

Usage

The client must allocate a buffer large enough to hold all index descriptors. The number of indexes can be obtained by using DbiGetCursorProps and examining the iIndexes property.

dBASE: DbiGetIndexDescs won't include dBASE non-production indexes if the indexes are not opened.

Prerequisites

A valid cursor handle must be obtained, and at least one index must exist.

DbiResult return values

DBIERR_NONE	Index Descriptions were returned successfully.
DBIERR_INVALIDHNDL	The specified handle is invalid or NULL.

See also

DbiGetIndexDesc, DbiOpenIndex, DbiCloseIndex, DbiGetIndexSeqNo, DbiGetCursorProps,
DbiOpenIndexList, DbiGetIndexForField

C Examples: DbiGetIndexDescs

Get the properties of all the indexes for the table open with the specified cursor

IndexDesc is allocated within the function. This example uses the following input:

```
fDbiGetIndexDescs(hCur, &pIdxDesc);  
DBIResult fDbiGetIndexDescs(hDBICur hTmpCur, pIDXDesc *IndexDesc)  
{  
    DBIResult    rslt;  
    CURProps     CurProps;  
    rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));  
    if (rslt != DBIERR_NONE)  
        return rslt;  
    *IndexDesc = (pIDXDesc)malloc(CurProps.iIndexes * sizeof(IDXDesc));  
    if (IndexDesc == NULL)  
        return DBIERR_NOMEMORY;  
    rslt = Chk(DbiGetIndexDescs(hTmpCur, *IndexDesc));  
    return rslt;  
}
```

Delphi Examples: DbtGetIndexDescs

Get the properties of all indexes for TTable T:

This function loops through all the indexes and shows the names and fields in the key. This example uses the following input:

```
    ShowIndexDescs(Table1);
procedure ShowIndexDescs(T: TTable);
const
    IDXStr = '%sIndex name: %s.  Number of fields in key: %d'#13#10;
var
    CurProp: CURProps;
    pIndexDesc, pTmpMem: pIdxDesc;
    i, MemSize: integer;
    ShowString, IDXName: string;
begin
    Check(DbGetCursorProps(T.Handle, CurProp));
    MemSize := CurProp.iIndexes * sizeof(IDXDesc);
    pIndexDesc := AllocMem(MemSize);
    try
        pTmpMem := pIndexDesc;
        Check(DbGetIndexDescs(T.Handle, pIndexDesc));
        i := 0;
        ShowString := '';
        while (i < curProp.iIndexes) do begin
            with pTmpMem^ do begin
                // primary index does not have a name for PARADOX tables }
                if bPrimary and (StrComp(curProp.szTableType, szParadox) = 0) then
                    IDXName := 'Primary'
                else
                    IDXName := szName;
                ShowString := Format(IDXStr, [ShowString, IDXName, iFldsInKey])
            end;
            // increment pointer to the next record
            inc(pTmpMem);
            inc(i);
        end;
    finally
        FreeMem(pIndexDesc, MemSize);
        ShowMessage(ShowString);
    end;
end;
```

DbiGetIndexForField {button C Examples,JI(">example","exdbigetindexforfield")}{button Delphi Examples,JI(">example","dexdbigetindexforfield")}

C syntax

```
DBIResult DBIFN DbiGetIndexForField (hCursor, iFld, bProdTagOnly, [pidxDesc]);
```

Delphi syntax

```
function DbiGetIndexForField (hCursor: hDBICur; iFld: Word; bProdTagOnly: Bool; var idxDesc: IDXDesc): DBIResult stdcall;
```

Description

DbiGetIndexForField returns the description of any useful index on the specified field. You can also use it just to check if an index exists for the given field.

Parameters

<i>hCursor</i>	Type: hDBICur	(Input)
Specifies the cursor handle.		
<i>iFld</i>	Type: UINT16	(Input)
Specifies the field number.		
<i>bProdTagOnly</i>	Type: BOOL	(Input)
For dBASE tables only. If set to TRUE, only dBASE production tags are searched.		
<i>pidxDesc</i>	Type: pIDXDesc	(Output)
Pointer to the client-allocated <u>IDXDesc</u> structure.		

Usage

Paradox: If multiple indexes exist on the field, the following order of precedence is followed: primary index, secondary index on the specified field only, and secondary composite index with the specified field as the first component.

dBASE: For dBASE tables, only simple indexes are considered because there are no composite indexes. Expression indexes are not considered.

SQL: For SQL tables, if multiple indexes are created for the field, the first useful index is returned. (An attempt is made to return the unique index with the least number of fields in the key. If there is no unique index, an index with the least number of fields in the key is returned.)

Prerequisites

A valid cursor handle must be obtained on a base table, not on a query or in-memory or temporary table.

Completion state

The index Description is returned in the specified IDXDesc structure.

DbiResult return values

DBIERR_NONE	The index descriptors were returned successfully.
DBIERR_INVALIDHNDL	The specified handle is invalid or NULL.
DBIERR_NOSUCHINDEX	No index on this field.

See also

DbiOpenIndex, DbiCloseIndex, DbiDeleteIndex, DbiAddIndex

C Examples: DbiGetIndexForField

Get the Index descriptor for the current field (if any).

If `IdxDesc` is null, this function can be used to check if an index exists. It returns `DBIERR_NOSUCHINDEX` if no index exists. This example uses the following input:

```
fDbiGetIndexForField(hPXCurr, 1, &IdxDesc);  
DBIResult fDbiGetIndexForField(hDBICurr hTmpCur, INT16 Field, pIDXDesc  
    IdxDesc)  
{  
    DBIResult    rslt;  
    rslt = DbiGetIndexForField(hTmpCur, Field, FALSE, IdxDesc);  
    if (rslt == DBIERR_NOSUCHINDEX)  
        return rslt;  
    else  
        Chk(rslt);  
    return rslt;  
}
```

Delphi Examples: DbiGetIndexForField

Return the description of any useful index on the specified field.

You can also use this function just to check if an index exists for the given field. When you pass a handle of the table, a valid field number, and a TStringList, the procedure appends the information accessed from a IdxDesc Record to the TStringList. This example uses the following input:

```
fDbiGetIndexForField(DBASEAnimals.handle, 1, False, MyIndexInfo);
```

```
Procedure fDbiGetIndexForField(hCursor: hDBICur; Field: TField; IndexInfo:
  TStringList);
```

```
Function BoolVal(InBool: Boolean): String;
begin
  if InBool = True then Result:= 'True'
  else Result:= 'False';
end;

var
  KeyArray: String;
  x: word;
  MyidxDesc: IdxDesc;
begin
  Check(DbiGetIndexForField(hCursor, Field.Index + 1, True, MyidxDesc));
  IndexInfo.Add('Index Name: ' + MyidxDesc.szname);
  IndexInfo.Add('Index Number: ' + IntToStr(MyidxDesc.iIndexId));
  IndexInfo.Add('Tag Name (dBASE): ' + MyidxDesc.szTagName);
  IndexInfo.Add('Index Format: ' + MyidxDesc.szformat);
  IndexInfo.Add('Primary: ' + BoolVal(MyidxDesc.bPrimary));
  IndexInfo.Add('Descending: ' + BoolVal(MyidxDesc.bDescending));
  IndexInfo.Add('Maintained: ' + BoolVal(MyidxDesc.bMaintained));
  IndexInfo.Add('Subset: ' + BoolVal(MyidxDesc.bSubset));
  IndexInfo.Add('ExpIdx: ' + BoolVal(MyidxDesc.bExpIdx));
  IndexInfo.Add('Fields In Key: ' + IntToStr(MyidxDesc.iFldsInKey));
  IndexInfo.Add('Key Length: ' + IntToStr(MyidxDesc.iKeyLen));
  IndexInfo.Add('Out of Date: ' + BoolVal(MyidxDesc.bOutofDate));
  IndexInfo.Add('Key Expression Type: ' + IntToStr(MyidxDesc.iKeyExpType));
  for x:= 0 to MyidxDesc.iFldsInKey -1 do
    KeyArray:= KeyArray + IntToStr(MyidxDesc.aiKeyFld[x]) + ', ';
  IndexInfo.Add('Field Numbers used in Key: ' + KeyArray);
  IndexInfo.Add('Key Expression: ' + MyidxDesc.szKeyExp);
  IndexInfo.Add('Key Condition: ' + MyidxDesc.szKeyCond);
  IndexInfo.Add('Case Insensitive: ' + BoolVal(MyidxDesc.bCaseInsensitive));
  IndexInfo.Add('iBlockSize: ' + IntToStr(MyidxDesc.iBlockSize));
  IndexInfo.Add('iRestrNum: ' + IntToStr(MyidxDesc.iRestrNum));
end;
```


DbiGetIndexSeqNo {button C
Examples,JI(">example","exdbigetindexseqno")} {button Delphi
Examples,JI(">example","dexdbigetindexseqno")}

C syntax

```
DBIResult DBIFN DbiGetIndexSeqNo (hCursor, pszIndexName, pszTagName,  
    iIndexId, piIndexSeqNo);
```

Delphi syntax

```
function DbiGetIndexSeqNo (hCursor: hDBICur; pszIndexName: PChar; pszTagName:  
    PChar; iIndexId: Word; var iIndexSeqNo: Word): DBIResult stdcall;
```

Description

DbiGetIndexSeqNo retrieves the ordinal number of the index in the index list of the specified cursor.

Parameters

<i>hCursor</i>	Type: hDBICur	(Input)
Specifies the cursor handle.		
<i>pszIndexName</i>	Type: pCHAR	(Input)
Pointer to the index name.		
<i>pszTagName</i>	Type: pCHAR	(Input)
For dBASE only. Pointer to the index tag name.		
<i>iIndexId</i>	Type: UINT16	(Input)
Specifies the index ID, if required to identify an index.		
<i>piIndexSeqNo</i>	Type: pUINT16	(Output)
Pointer to the client variable which receives the index sequence number.		

Usage

dBASE: For dBASE tables, the ordinal number of the index in the index list can be affected by the opening and closing of indexes on the cursor. *pszIndexName* and *pszTagName* are used to specify the index.

Paradox: The index can be specified by name or ID.

SQL: The index must be specified by name.

Completion state

The sequence number of the specified index is returned. The result of this function can be used as input for DbiGetIndexDesc.

DbiResult return values

DBIERR_NONE	The index sequence number was returned successfully.
DBIERR_INVALIDHNDL	The specified handle is invalid or NULL.
DBIERR_NOSUCHINDEX	The index is not open, or does not exist.

See also

[DbiGetIndexDesc](#)

C Examples: DbiGetIndexSeqNo

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetIndexSeqNo

Return the index sequence number for the current index. This example only works with Paradox and SQL tables and uses the following input:

```
IXNum := fDbiGetIndexSeqNo(InterBaseCustTbl);  
function fDbiGetIndexSeqNo(Table: TTable): Word;  
begin  
  Check(DbiGetIndexSeqNo(Table.Handle, PChar(Table.IndexName), nil, 0,  
    Result));  
end;
```

DbiGetIndexTypeDesc **{button C**
Examples,JI(">example","exdbigetindextypedesc")} **{button Delphi**
Examples,JI(">example","dexdbigetindextypedesc")}

C syntax

```
DBIResult DBIFN DbiGetIndexTypeDesc (pszDriverType, pszIndexType, pidxType);
```

Delphi syntax

```
function DbiGetIndexTypeDesc (pszDriverType: PChar; pszIndexType: PChar; var  
    idxType: IDXType): DBIResult stdcall;
```

Description

DbiGetIndexTypeDesc retrieves a description of the index type.

Parameters

pszDriverType Type: pCHAR (Input)
Pointer to the driver type.

pszIndexType Type: pCHAR (Input)
Pointer to the index type. Use DbiOpenIndexTypesList to find the valid index types.

pidxType Type: pIDXType (Output)
Pointer to the client-allocated IDXType structure.

DbiResult return values

DBIERR_NONE The index type description was returned successfully.

See also

DbiOpenIndexTypesList

C Examples: DbiGetIndexTypeDesc

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbtGetIndexTypeDesc

An example for this function is under development and will be provided in an upcoming Help release.

DbiGetLdName {button C
Examples,JI(">example","exdbigetldname")} {button Delphi
Examples,JI(">example","dexdbigetldname")}

C syntax

```
DBIResult DBIFN DbiGetLdName (pszDriver, pObjName, pLdName);
```

Delphi syntax

```
function DbiGetLdName (pszDriver: PChar; pObjName: PChar; pLdName: PChar):  
    DBIResult stdcall;
```

Description

DbiGetLdName retrieves the name of the language driver associated with the specified object name (table name).

Parameters

pszDriver Type: pCHAR (Input)
Pointer to the driver name.

pObjName Type: pCHAR (Input)
Pointer to the table name.

pLdName Type: pCHAR (Output)
Pointer to the client buffer that receives the language driver name associated with the specified table.
This buffer should be at least (DBIMAXNAMELEN - 1) in size.

Usage

If *pObjName* is NULL, the name of the driver's default language driver is returned.

Standard: The returned language driver name can be used as an optional parameter for `DbiCreateTable` as a way to override the default language driver at create time.

SQL: If *pObjName* is not NULL, it must be of the form `:dbalias:objName`.

DbiResult return values

DBIERR_NONE The name of the language driver was retrieved successfully.

See also

[DbiCreateTable](#)

C Examples: DbiGetLdName

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetLdName

Obtain the current dBASE language driver and display its name in a dialog box.

```
procedure fDbiGetLDName;
var
  S: String;
begin
  SetLength(S, dbiMaxNameLen + 1);
  Check(DbigetLDName(szDBASE, nil, PChar(S)));
  SetLength(S, StrLen(PChar(S)));
  ShowMessage('Current dBase Language driver is '+S);
end;
```

DbiGetLdObj {button C
Examples,JI(">example","exdbigetldobj")} {button Delphi
Examples,JI(">example","dexdbigetldobj")}

C syntax

```
DBIResult DBIFN DbiGetLdObj (hCursor, *ppLdObj);
```

Delphi syntax

```
function DbiGetLdObj (hCursor: hDBICur; var pLdObj: Pointer): DBIResult  
    stdcall;
```

Description

DbiGetLdObj returns the language driver object associated with the given cursor.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

**ppLdObj* Type: pVOID (Output)

Pointer to the client variable that receives the pointer to the language driver.

Usage

The object pointer returned in this function can be used with `DbiNativeToAnsi` and `DbiAnsiToNative`.

Completion state

If a valid cursor is passed to this function, the returned object pointer has a lifetime equivalent to the cursor's lifetime. In other words, if the cursor is closed (and no other cursors are open on the same table), the language driver object is destroyed and can no longer be accessed through this object pointer.

If the *hCursor* parameter is NULL, a pointer to the system language driver is returned. This pointer is valid for the duration of the session and can be used regardless of which cursors are opened or closed.

DbiResult return values

DBIERR_NONE The language driver object was returned successfully.

See also

[DbiNativeToAnsi](#), [DbiAnsiToNative](#)

C Examples: DbiGetLdObj

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetLdObj

Obtain the language driver information for TDataSet descendant D.

TStrings LdObjList is filled with the language driver information. This example uses the following input:

```
fDbiGetLdObj(Table1, Listbox1.Items);

procedure fDbiGetLdObj(D: TDataSet; LdObjList: TStrings);
var
  MypLdObj: pLDDesc;
begin
  Check(DbiGetLdObj(D.Handle, Pointer(MypLdObj)));
  with MypLdObj^, LdObjList do begin
    Add(Format('Name: %s', [szName]));
    Add(Format('Description: %s', [szDesc]));
    Add(Format('Code Page: %d', [iCodePage]));
    case PrimaryCpPlatform of
      1: Add('Primary Platform: DOS (OEM) platform');
      2: Add('Primary Platform: Windows (ANSI) platform');
      6: Add('Primary Platform: HP UNIX (ROMAN8) platform');
    else
      Add(Format('Primary Platform: Other (%d)', [PrimaryCpPlatform]));
    end;
  end;
end;
```

DbiGetLinkStatus {button C
Examples,JI(">example","exdbigetlinkstatus")} {button Delphi
Examples,JI(">example","dexdbigetlinkstatus")}

C syntax

```
DBIResult DBIFN DbiGetLinkStatus (hCursor, phCursorMstr, phCursorDet,  
    phCursorSib);
```

Delphi syntax

```
function DbiGetLinkStatus (hCursor: hDBICur; var hCursorMstr: hDBICur; var  
    hCursorDet: hDBICur; var hCursorSib: hDBICur): DBIResult stdcall;
```

Description

DbiGetLinkStatus returns the master, detail, and sibling cursors, if any, of the specified linked cursor.

Parameters

<i>hCursor</i>	Type: hDBICur	(Input)
Specifies the cursor handle.		
<i>phCursorMstr</i>	Type: phDBICur	(Output)
Pointer to the master cursor, if any.		
<i>phCursorDet</i>	Type: phDBICur	(Output)
Pointer to the first detail cursor, if any.		
<i>phCursorSib</i>	Type: phDBICur	(Output)
Pointer to the next sibling detail cursor.		

Usage

Used to find all links for the given cursor. If the cursor has a master, the master is returned. If the cursor has one or more details, the first detail is returned. If the cursor has siblings, the next sibling is returned. The master, detail, and sibling cursor handle can be used as an input to this function. If handle is not applicable, NULL is returned.

Prerequisites

The cursor must be a linked cursor. A linked cursor is created with [DbiBeginLinkMode](#), [DbiLinkDetail](#), or [DbiLinkDetailToExp](#).

DbiResult return values

DBIERR_NONE	The linked cursor status was returned successfully.
DBIERR_INVALIDHNDL	The specified handle is invalid, not a linked cursor, or NULL.

See also

[DbiBeginLinkMode](#), [DbiLinkDetail](#), [DbiLinkDetailToExp](#)

C Examples: DbiGetLinkStatus

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetLinkStatus

An example for this function is under development and will be provided in an upcoming Help release.

DbiGetNetUserName {button C
Examples,JI(">example","exdbigetnetusername")} {button Delphi
Examples,JI(">example","dexdbigetnetusername")}

C syntax

```
DBIResult DBIFN DbiGetNetUserName (pszNetUserName);
```

Delphi syntax

```
function DbiGetNetUserName (pszNetUserName: PChar): DBIResult stdcall;
```

Description

DbiGetNetUserName returns the user's network login name. User names are available for all networks supported by Microsoft Windows.

Parameters

pszNetUserName Type: pCHAR (Output)
Pointer to the client variable that receives the user network login name string.

DbiResult return values

DBIERR_NONE	The user network login name was successfully retrieved.
DBIERR_INVALIDHNDL	<i>pszNetUserName</i> is NULL.

C Examples: DbiGetNetUserName

Get the network user name.

If there is no network, this function returns NONE as the user. This example uses the following input:

```
fDbiGetNetUserName(UserName);
DBIResult fDbiGetNetUserName(pCHAR NetName)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetNetUserName(NetName));
    if (rslt == DBIERR_INVALIDHNDL)
    {
        strcpy(NetName, "NONE");
        rslt = DBIERR_NONE;
    }
    else
        Chk(rslt);
    return rslt;
}
```

Delphi Examples: DbiGetNetUserName

Return the user's network login name.

User names are available for all networks supported by Microsoft Windows.

This example uses the following input:

```
    MyName := GetMyNetUserName;
function GetMyNetUserName: String;
begin
    SetLength(Result, dbiMaxUserNameLen + 1);
    Check(DbiGetNetUserName(PChar(Result)));
    SetLength(Result, StrLen(PChar(Result)));
end;
```

DbiGetNextRecord {button C Examples,JI(">example","exdbigetnextrecord")} {button Delphi Examples,JI(">example","dexdbigetnextrecord")}

C syntax

```
DBIResult DBIFN DbiGetNextRecord (hCursor, [eLock], [pRecBuf], [precProps]);
```

Delphi syntax

```
function DbiGetNextRecord (hCursor: hDBICur; eLock: DBILockType; pRecBuff: Pointer; precProps: pRECProps): DBIResult stdcall;
```

Description

DbiGetNextRecord retrieves the next record in the table associated with *hCursor*.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

eLock Type: DBILockType (Input)

Specifies the [lock request type](#). Optional.

pRecBuf Type: pBYTE (Output)

Pointer to the client buffer that receives the record data. Optional. If NULL, no data is returned.

precProps Type: pRECProps (Output)

Pointer to the client-allocated [RECProps](#) structure. For dBASE and Paradox drivers only. Optional. If NULL, no record properties are returned.

Usage

If a record buffer is provided, DbiGetNextRecord reads the data for the record into the record buffer. If the *precProps* argument is supplied, record properties are returned (dBASE and Paradox only). If filters are active, the next record that meets the filter criteria is retrieved. The record can be locked if an explicit lock is specified (using *eLock*), and the function call fails if the requested lock cannot be acquired. (Exceptions: see the discussion of SQL-specific locking behavior that follows.)

Field data can be retrieved using [DbiGetField](#) or [DbiOpenBlob](#) or [DbiGetBlob](#) for BLOB fields.

dBASE: If the *precProps* argument is supplied, the record number can be retrieved for the record (via the *iPhyRecNum* field of *precProps*). dBASE does not support the concept of sequence number.

Paradox: If the *precProps* argument is supplied, the sequence number can be retrieved for the record (via the *iSeqNum* field of *RECProps*). Paradox does not support the concept of record number.

SQL: Record properties are not supported for SQL drivers. If *precProps* is supplied, no properties are returned. For more information on locking, see [Locking Strategy](#)

Completion state

If the cursor is at the beginning of a table (after a opening a table or calling [DbiSetToBegin](#)), DbiGetNextRecord positions the cursor on the first record of the table. If the cursor is currently positioned on the last record in the table, DbiGetNextRecord returns an EOF error.

DbiResult return values

DBIERR_NONE	The next record was successfully retrieved.
DBIERR_EOF	The cursor was positioned at the crack at the end of the file or on the last record. It is now positioned at the crack at the end of the file.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_ALREADYLOCKED	The record is already locked by the same user in the same session.
DBIERR_FILELOCKED	The table is already locked by another user (Paradox and dBASE only).

See also

DbiGetRecord, DbiGetPriorRecord, DbiGetRelativeRecord

eLock

eLock can be one of the following values:

Value	Description
dbiNOLOCK	No lock
dbiREADLOCK	Read lock
dbiWRITELOCK	Write lock

C Examples: DbiGetNextRecord

Retrieve the next record for the specified cursor.

In the case of local tables only, if *pRecNum* is not null, the corresponding record number is returned.

This example uses the following input:

```
fDbiGetNextRecord(hCursor, pRecBuf, &RecNum);
DBIResult fDbiGetNextRecord(hDBICur hTmpCur, pBYTE pTmpRecBuf, pUINT32
pRecNum)
{
    DBIResult      rslt;
    CURProps      CurProps;
    RECProps      RecProps;
    rslt = Chk(DbiGetNextRecord(hTmpCur, dbiNOLOCK, pTmpRecBuf, &RecProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (pRecNum != NULL)
    {
        rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
        if (rslt != DBIERR_NONE)
            return rslt;
        if (strcmp(CurProps.szTableType, szPARADOX) == 0)
            *pRecNum = RecProps.iSeqNum;
        else
        {
            if (strcmp(CurProps.szTableType, szDBASE) ==0)
                *pRecNum = RecProps.iPhyRecNum;
            else
                *pRecNum =0;
        }
    }
    return rslt;
}
```

Delphi Examples: DbiGetNextRecord

Retrieve the next record in the table associated with the cursor:

Use Delphi's TTable methods to get records from a table (Next, Prior, First, Last, MoveBy, and so on.)

For information about retrieving record numbers from a Paradox or dBASE table, see [DbiGetRecord](#).

DbiGetNumberFormat {button C
Examples,[JI\(">example", "exdbigetnumberformat"\)](#) {button Delphi
Examples,[JI\(">example", "dexdbigetnumberformat"\)](#)

C syntax

```
DBIResult DBIFN DbiGetNumberFormat (pfmtNumber);
```

Delphi syntax

```
function DbiGetNumberFormat (var fmtNumber: FMTNumber): DBIResult stdcall;
```

Description

DbiGetNumberFormat returns the number format for the current session.

Parameters

pfmtNumber Type: pFMTNumber (Output)
Pointer to the client-allocated [FMTNumber](#) structure.

Usage

The number format is used by QBE for input and wildcard character matching. It is also used by batch operations (such as [DbiDoRestructure](#) and [DbiBatchMove](#)) to handle data type coercion between character and numeric types.

DbiResult return values

DBIERR_NONE	The number format was successfully retrieved.
DBIERR_INVALIDHNDL	<i>pfmtNumber</i> is NULL.

See also

[DbiGetDateFormat](#), [DbiGetTimeFormat](#), [DbiSetNumberFormat](#)

C Examples: DbiGetNumberFormat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbGetNumberFormat

Return the number format for the current session.

The number format is appended to the TStringList passed in. This example uses the following input:

```
fDbGetNumberFormat(MyNumberFormat);  
Procedure fDbGetNumberFormat(var NumberFormat: TStringList);  
var  
    FormatNumber: fmtNumber;  
begin  
    Check(DbGetNumberFormat(FormatNumber));  
    NumberFormat.Add('Decimal Separator: ' + FormatNumber.cDecimalSeparator);  
    NumberFormat.Add('Thousand Separator: ' + FormatNumber.cThousandSeparator);  
    NumberFormat.Add('Decimal Digits: ' +  
    Inttostr(FormatNumber.iDecimalDigits));  
    if FormatNumber.bLeadingZero = True then  
        NumberFormat.Add('Leading Zero: True')  
    else  
        NumberFormat.Add('Leading Zero: False');  
end;
```

DbiGetObjFromName {button C
Examples,JI(">example","exdbigetobjfromname")} {button Delphi
Examples,JI(">example","dexdbigetobjfromname")}

C syntax

```
DBIResult DBIFN DbiGetObjFromName (eObjType, [pszObjName], phObj);
```

Delphi syntax

```
function DbiGetObjFromName (eObjType: DBIOBJType; pszObjName: PChar; var  
    hObj: hDBIObj): DBIResult stdcall;
```

Description

DbiGetObjFromName returns an object handle of the specified type or with the given name, if any.

Parameters

eObjType Type: DBIOBJType (Input)
Specifies the type of object.

pszObjName Type: pCHAR (Input)
Pointer to the name of the object. Optional.

phObj Type: phDBIObj (Output)
Pointer to the object handle.

Usage

Some handles can be retrieved only by name, such as handles associated with cursors. For those, *pszObjName* is not optional. There can be more than one cursor open for a given table name; DbiGetObjFromName returns the handle to one of those cursors. To get a session handle, the session name need not be specified; by default, a handle to the currently active session is returned.

DbiResult return values

DBIERR_NONE	The object handle was returned successfully.
DBIERR_NOTSUPPORTED	Object is not supported for this function.
DBIERR_OBJNOTFOUND	Named object was not found.

pszObjName

The following chart lists the supported object types and whether or not the object name is required:

<i>eObjType</i>	Name
objSYSTEM	not needed
objSESSION	optional
objDRIVER	required
objDATABASE	optional
objCURSOR	required
objCLIENT	not needed

C Examples: DbiGetObjFromName

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbtGetObjFromName

An example for this function is under development and will be provided in an upcoming Help release.

DbiGetObjFromObj {button C
Examples,JI(">example","exdbigetobjfromobj")} {button Delphi
Examples,JI(">example","dexdbigetobjfromobj")}

C syntax

```
DBIResult DBIFN DbiGetObjFromObj (hObj, eObjType, phObj);
```

Delphi syntax

```
function DbiGetObjFromObj (hObj: hDBIObj; eObjType: DBIOBJType; var hObj:
    hDBIObj): DBIResult stdcall;
```

Description

DbiGetObjFromObj returns an object of the specified object type associated with or derived from a given object.

Parameters

hObj Type: hDBIObj (Input)
Specifies the object.

eObjType Type: DBIOBJType (Input)
Specifies the type of object.

phObj Type: phDBIObj (Output)
Pointer to the object handle.

Usage

The following table summarizes the relationship between *eObjType* and *hObj*:

<i>eObjType</i>	Type of <i>hObj</i> allowed
objCURSOR	None
objDRIVER	objCURSOR, objDATABASE
objDATABASE	objCURSOR
objSESSION	objCURSOR, objDATABASE, NULL (active)
objCLIENT	Any or NULL
objSYSTEM	Any or NULL
objSTATEMENT	None

DbiResult return values

DBIERR_NONE The object handle was returned successfully.

DBIERR_INVALIDPARAM *phObj* is NULL or *hObj* is invalid.

DBIERR_NA No associated object.

C Examples: DbiGetObjFromObj

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetObjFromObj

Show the driver name associated with the given parameters.

Delphi users will rarely need to call this function because most of this information is available through methods and properties of the TTable object.

```
// Arguments:
//   hTmpDb:           Database handle
//   pszTableName:    Name of an existing table in the specified database
//   fDbiGetObjFromObj(hTmpDb, 'Employee.DB');
procedure fDbiGetObjFromObj(hTmpDb: hDBIDb; TblName: String);
var
  hCursor: hDBICur;
  szName: array[0..DBIMAXPATHLEN] of char;
  nLen: word;
  hObj: hDBIObj;
  rslt: DBIResult;

begin
  // Open the specified table
  Check(DbiOpenTable(hTmpDb, PChar(TblName), nil, nil, nil, 0,
    dbiREADONLY, dbiOPENSHEARED, xltFIELD, true, nil, hCursor));

  // Retrieve driver handle given cursor handle
  Check(DbiGetObjFromObj(hDBIObj(hCursor), DBIOBJType(objDRIVER), hObj));

  // Display driver name associated with the object handle
  rslt:= DbiGetProp(hObj, drvDRIVERTYPE, @szName, sizeof(DBIPATH), nLen);
  if (rslt <> DBIERR_NONE) then
    Check(DbiCloseCursor(hCursor))
  else
    ShowMessage('Drive type: '+szName);
  // Close table
  Check(DbiCloseCursor(hCursor));
end;
```

Return the driver name for the specified table

Return the driver name for the specified table. This example uses the following input:

```
DriverStr := fDbiGetObjFromObj(hTmpDb, CustomerTbl);
```

```
function fDbiGetObjFromObj(Table: TTable): String;
var
  nLen: word;
  hObj: hDBIObj;

begin
  // Retrieve driver handle given cursor handle
  Check(DbiGetObjFromObj(hDBIObj(Table.Handle), objDRIVER, hObj));
  SetLength(Result, DBIMAXDRIVELEN);
  // Get driver name associated with the driver handle
  Check(DbiGetProp(hObj, drvDRIVERTYPE, PChar(Result), DBIMAXDRIVELEN,
    nLen));
  SetLength(Result, StrLen(PChar(Result)));
end;
```

DbiGetPriorRecord {button C Examples,JI(">example","exdbigetpriorrecord")} {button Delphi Examples,JI(">example","dexdbigetpriorrecord")}

C syntax

```
DBIResult DBIFN DbiGetPriorRecord (hCursor, [eLock], [pRecBuf], [precProps]);
```

Delphi syntax

```
function DbiGetPriorRecord (hCursor: hDBICur; eLock: DBILockType; pRecBuff: Pointer; precProps: pRECProps): DBIResult stdcall;
```

Description

DbiGetPriorRecord retrieves the previous record in the table associated with the given cursor.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

eLock Type: DBILockType (Input)

Specifies the lock request type Optional.

pRecBuf Type: pBYTE (Output)

Pointer to the client buffer that receives the record data. Optional. If NULL, no data is returned.

precProps Type: pRECProps (Output)

Pointer to the client-allocated RECProps structure. For dBASE and Paradox drivers only. Optional. If NULL, no record properties are returned.

Usage

If a record buffer is provided, DbiGetPriorRecord reads the data for the record into the record buffer. If the *precProps* argument is supplied, record properties are returned (for dBASE and Paradox only). If filters are active, only records that meet the filter's criteria are retrieved. The record can be locked if an explicit lock is specified (using eLock), and the function call fails if the requested lock cannot be acquired. (Exceptions: see the discussion of SQL-specific locking behavior that follows.)

dBASE: If the *precProps* argument is supplied, the record number can be retrieved for the prior record (the *iPhyRecNum* field of the RECProps structure). dBASE does not support the concept of sequence numbers.

Paradox: If the *precProps* argument is supplied, the sequence number can be retrieved for the prior record (via the *iSeqNum* field of *precProps*). Paradox does not support the concept of record numbers.

SQL: Record properties are not supported for SQL drivers (*precProps* is NULL). If *precProps* is supplied, no properties are returned.

Prerequisites

A valid cursor handle must be obtained. If a lock is requested, the call returns DBIERR_NONE only if the lock is granted. For SQL, an error is returned if the cursor is not bidirectional.

Completion state

If the cursor is currently positioned on the first record in the table and the user calls DbiGetPriorRecord, then a BOF error is returned.

DbiResult return values

DBIERR_NONE	The prior record was retrieved successfully.
DBIERR_BOF	The cursor was positioned in the crack before the beginning of the file or on the first record after the crack. The cursor is now positioned in the crack at the beginning of the file.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.

DBIERR_ALREADYLOCKED	The record is already locked by the same user in the same session.
DBIERR_FILELOCKED	The table is already locked by another user (Paradox and dBASE only).
DBIERR_NA	Cursor is unidirectional.

See also

[DbiGetRecord](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRelativeRecord](#), [DbiGetField](#),
[DbiModifyRecord](#)

C Examples: DbiGetPriorRecord

Retrieve the prior record for the specified cursor.

For local tables only, if *pRecNum* is not null, the corresponding record number is returned. This example uses the following input:

```
fDbiGetPriorRecord(hCursor, pRecBuf, &RecNum);
DBIResult fDbiGetPriorRecord(hDBICur hTmpCur, pBYTE pTmpRecBuf, pUINT32
pRecNum)
{
    DBIResult      rslt;
    CURProps       CurProps;
    RECProps       RecProps;
    rslt = Chk(DbiGetPriorRecord(hTmpCur, dbiNOLOCK, pTmpRecBuf, &RecProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (pRecNum != NULL)
    {
        rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
        if (rslt != DBIERR_NONE)
            return rslt;
        if (strcmp(CurProps.szTableType, szPARADOX) == 0)
            *pRecNum = RecProps.iSeqNum;
        else
        {
            if (strcmp(CurProps.szTableType, szDBASE) ==0)
                *pRecNum = RecProps.iPhyRecNum;
            else
                *pRecNum =0;
        }
    }
    return rslt;
}
```

Delphi Examples: DbiGetPriorRecord

Retrieve the previous record in the table associated with the cursor:

Use Delphi's TTable methods to get records from a table (Next, Prior, First, Last, MoveBy, and so on.)
For information about retrieving record numbers from a Paradox or dBASE table, see [DbiGetRecord](#).

DbiGetProp {button C Examples,JI(">example","exdbigetprop")} {button Delphi Examples,JI(">example","dexdbigetprop")}

C syntax

```
DBIResult DBIFN DbiGetProp (hObj, iProp, pPropValue, iMaxLen, piLen);
```

Delphi syntax

```
function DbiGetProp (hObj: hDBIObj; iProp: Longint; PropValue: Pointer;  
    iMaxLen: Word; var iLen: Word): DBIResult stdcall;
```

Description

DbiGetProp retrieves the properties of an object. See [Getting and Setting Properties](#)

Parameters

hObj Type: hDBIObj (Input)

Specifies the system, session, client, driver, database, cursor, or statement object.

iProp Type: UINT32 (Input)

Specifies the property to retrieve.

pPropValue Type: pVOID (Output)

Pointer to the client variable that receives the value of the property. Optional. If NULL, validates *iProp* for retrieval.

iMaxLen Type: UINT16 (Input)

Specifies the length of the *pPropValue* buffer.

piLen Type: pUINT16 (Output)

Pointer to the client variable that receives the buffer length.

Usage

The specified object does not necessarily have to match the type of property as long as the object is associated with the object type of the property. For example, the property `drvDRIVERTYPE` assumes an object of type `objDRIVER`, but because a cursor is derived from a driver, a cursor handle (`objCURSOR`) could also be specified. See [DbiGetObjFromObj](#) for details about associated objects.

You can access the native connection, statement, and cursor handles by using `DbiGetProp` with the properties: `dbNATIVEHNDL`, `dbNATIVEPASSTHRUHNDL`, `stmtNATIVEHNDL`, and `curNATIVEHNDL`. This feature for retrieving [native handles](#) is useful for making direct native API calls when the necessary functionality is not available through BDE or in order to improve performance.

To inquire whether a driver supports stored procedures, use the property `dbPROCEDURES`.

To retrieve the server's default transaction isolation level use the property `dbDEFAULTTXNISO`.

Example

```
DBIPATH filename;  
result=DbiGetProp (hCursor, curFILENAME, &filename, sizeof (DBIPATH),  
    &length);
```

returns the file name associated with the cursor handle *hCursor* in *filename* and its length in *length*.

DbiResult return values

DBIERR_NONE The properties were retrieved successfully.

DBIERR_BUFFTOOSMALL Required buffer length is bigger than *iMaxLen*.

DBIERR_NOTSUPPORTED Property is not supported for this object.

See also

[DbiSetProp](#), [DbiGetCursorProps](#), [DbiGetObjFromObj](#)

C Examples: DbiGetProp

Example 1: Get the native database handle from a remote database:

This example uses the following input:

```
fDbiGetProp1(hDb, &hBDb);
DBIResult fDbiGetProp1(hDBIDb hTmpDb, pUINT32 hRemoteDb)
{
    DBIResult    rslt;

    rslt = Chk(DbiGetProp((hDBIObj)hTmpDb, dbNATIVEHNDL, (pBYTE)hRemoteDb,
        sizeof(dbNATIVEHNDL), NULL));
    return rslt;
}
```

Example 2: Return a string containing information about the specified table:

Note: *pCursorInfo* must be large enough to hold data. This example uses the following input:

```
char    Buffer[500];
fDbiGetProp2(hCur, Buffer);
DBIResult fDbiGetProp2(hDBICur hTmpCur, pCHAR pCursorInfo)
{
    DBIResult    rslt;
    CHAR        Buffer[500];
    INT16        Level;

    strcpy(pCursorInfo, "\0");
    // Get the table name.
    rslt = Chk(DbiGetProp((hDBIObj)hTmpCur, curTABLENAME, (pBYTE)Buffer,
        DBIMAXTBLNAMELEN, NULL));
    if (rslt != DBIERR_NONE)
        return rslt;
    sprintf(pCursorInfo, "%s\r\nTable Name: %s", pCursorInfo, Buffer);

    // Get the table type.
    rslt = Chk(DbiGetProp((hDBIObj)hTmpCur, curTABLETYPE, (pBYTE)Buffer,
        DBIMAXNAMELEN, NULL));
    if (rslt != DBIERR_NONE)
        return rslt;
    sprintf(pCursorInfo, "%s\r\nTable Type: %s", pCursorInfo, Buffer);

    // Get the full file name.
    rslt = Chk(DbiGetProp((hDBIObj)hTmpCur, curFILENAME, (pBYTE)Buffer,
        DBIMAXPATHLEN, NULL));
    if (rslt != DBIERR_NONE)
        return rslt;
    sprintf(pCursorInfo, "%s\r\nFile Name: %s", pCursorInfo, Buffer);

    // Get the table level.
    rslt = Chk(DbiGetProp((hDBIObj)hTmpCur, curTABLELEVEL, (pBYTE)&Level,
        sizeof(curTABLELEVEL), NULL));
    if (rslt != DBIERR_NONE)
        return rslt;
    sprintf(pCursorInfo, "%s\r\nTable Level: %d", pCursorInfo, Level);

    return rslt;
}
```


Example 3: Return a string containing information about the specified SQL database:

Note: *pCursorInfo* must be large enough to hold data. This example uses the following input:

```
char Buffer[500];
fDbiGetProp3(hCur, Buffer);
DBIResult fDbiGetProp3(hDBIDb hTmpDb, pCHAR pDBInfo)
{
    DBIResult    rslt;
    BOOL         b;
    UINT16       i;

    strcpy(pDBInfo, "\\0");

    // Does the Database support Asynchronous Query Execution support?
    rslt = Chk(DbiGetProp((hDBIObj)hTmpDb, dbASYNCSUPPORT, (pBYTE)&b,
        sizeof(b), NULL));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (b == TRUE)
        sprintf(pDBInfo, "%s\r\nAsync. query exec support: TRUE", pDBInfo);
    else
        sprintf(pDBInfo, "%s\r\nAsync. query exec support: FALSE", pDBInfo);

    // Does the Database support Stored Procedures?
    rslt = Chk(DbiGetProp((hDBIObj)hTmpDb, dbPROCEDURES, (pBYTE)&b,
        sizeof(b), NULL));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (b == TRUE)
        sprintf(pDBInfo, "%s\r\nStored Procedure support: TRUE", pDBInfo);
    else
        sprintf(pDBInfo, "%s\r\nStored Procedure support: FALSE", pDBInfo);

    // What is the major server version?
    rslt = Chk(DbiGetProp((hDBIObj)hTmpDb, dbSERVERVERSION, (pBYTE)&i,
        sizeof(i), NULL));
    if (rslt != DBIERR_NONE)
        return rslt;
    sprintf(pDBInfo, "%s\r\nMajor server version: %d", pDBInfo, i);

    return rslt;
}
```

Delphi Examples: DbtGetProp

An example for this function is under development and will be provided in an upcoming Help release.

Native Handles

Native handles allow you to bypass BDE functions to use native SQL database APIs to create and manipulate tables. This approach can deliver substantial performance improvement.

For example, to get a native database handle from a SQL database, you would use this code (assuming you have already obtained a valid handle *hDb* to an existing SQL database):

```
-----  
UINT16      Size;  
hDBIDb     hDb;  
UINT32      hNativeDb  
  
DbiGetProp(hDb, dbNATIVEHNDL, &hNativeDb, sizeof(hNativeDb), &Size);
```

A native handle to the SQL database is returned in *&hNativeDb* and the size in bytes in *&Size*. Now you can execute native API calls for the SQL database.

The following table shows the information that is available for each driver when using *dbNATIVEHNDL*, *dbNATIVEPASSTHRUHNDL*, *stmtNATIVEHNDL*, or *curNATIVEHNDL* with [DbiGetProp](#).

dbNATIVEHNDL, dbNATIVEPASSTHRUHNDL		
	*ppropValue	*pilen
InterBase	gds_db_handle	4
Sybase	DBPROCESS NEAR *	2
Oracle	LDA	64
ODBC Socket	HDBC	4
stmtNATIVEHNDL, curNATIVEHNDL		
	*ppropValue	*pilen
InterBase	gds_stmt_handle	4
Sybase	DBIERR_NOTSUPPORTED	--
Oracle	CDA	64
ODBC Socket	HSTMT	4

When *SQLPASSTHRU MODE* is *NOT SHARED*, the native handles returned from *DbiGetProp* with *dbNATIVEHNDL* and *dbNATIVEPASSTHRUHNDL* will be different. Certain drivers (for example, Sybase) may open multiple connections for one call to [DbiOpenDatabase](#). Only the main native connection handle is available.

Although the native connection and statement handles are always available when there is an active connection or statement, the native cursor handle may not always be available. For example: When working with a "dead" (snapshot) cursor, SQL Links caches each record as it is fetched from the server cursor. When all the records have been fetched, the server cursor is closed and it is no longer available. An attempt to retrieve the native cursor handle by using *DbiGetProp* with *curNATIVEHNDL* will return the error, *DBIERR_OBJNOTFOUND*.

Additional information on the native handle and its use is available from the SQL server vendors.

DbiGetRecord {button C
Examples,JI(">example","exdbigetrecord")} {button Delphi
Examples,JI(">example","dexdbigetrecord")}

C syntax

```
DBIResult DBIFN DbiGetRecord (hCursor, [eLock], [pRecBuf], [precProps]);
```

Delphi syntax

```
function DbiGetRecord (hCursor: hDBICur; eLock: DBILockType; pRecBuff:
  Pointer; precProps: pRECProps): DBIResult stdcall;
```

Description

DbiGetRecord retrieves the current record, if any, in the table associated with *hCursor*.

Parameters

hCursor Type: hDBICur (Input)
 Specifies the cursor handle.

eLock Type: DBILockType (Input)
 Specifies the lock request type Optional.

pRecBuf Type: pBYTE (Output)
 Pointer to the client buffer that receives the record data. Optional. If NULL, no data is returned.

precProps Type: pRECProps (Output)
 Pointer to the client-allocated RECProps structure. For dBASE and Paradox drivers only. Optional. If NULL, no record properties are returned.

Usage

If NULL pointers are supplied for *pRecBuf* and *pRecProps*, DbiGetRecord can be used to validate the current cursor position (on a current record, or on a crack).

If filters are active, the record is retrieved only if it meets the filter's criteria. The record can be locked if an explicit lock is specified (using *eLock*), and the function call fails if the requested lock cannot be acquired. (Exceptions: see the discussion of SQL-specific locking behavior that follows. Also see Locking.)

If the cursor is currently positioned on a record, and that record is subsequently deleted or the record's key value is changed, then the cursor is left on a crack between records. At this point, a call to DbiGetRecord returns the DBIERR_KEYORRECDELETED error.

dBASE: If *precProps* is supplied, the record number can be retrieved for the current record (via the *iPhyRecNum* field of *precProps*). dBASE does not support the concept of sequence numbers.

Paradox: If *precProps* is supplied, the sequence number can be retrieved for the current record (via the *iSeqNum* field of *precProps*). Paradox does not support the concept of record numbers.

SQL: Record properties are not supported for SQL drivers (*precProps* is NULL). If *precProps* is supplied, no properties are returned.

DbiResult return values

DBIERR_NONE	The record was successfully retrieved.
DBIERR_BOF	At beginning of file.
DBIERR_EOF	At end of file.
DBIERR_NOCURRREC	No current record.
DBIERR_KEYORRECDELETED	The cursor is positioned on a record that has been deleted, or the key value was changed.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_ALREADYLOCKED	The record is already locked by the same user in the same session.

DBIERR_LOCKED

The table is already locked by another user (Paradox and dBASE only).

See also

[DbiGetField](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRelativeRecord](#)

C Examples: DbiGetRecord

Retrieve the current record for the specified cursor.

For local tables only, if *pRecNum* is not null, the corresponding record number is returned. This example uses the following input:

```
fDbiGetRecord(hCursor, pRecBuf, &RecNum);
DBIResult fDbiGetRecord(hDBICur hTmpCur, pBYTE pTmpRecBuf, pUINT32 pRecNum)
{
    DBIResult      rslt;
    CURProps      CurProps;
    RECProps      RecProps;
    rslt = Chk(DbiGetRecord(hTmpCur, dbiNOLOCK, pTmpRecBuf, &RecProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (pRecNum != NULL)
    {
        rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
        if (rslt != DBIERR_NONE)
            return rslt;
        if (strcmp(CurProps.szTableType, szPARADOX) == 0)
            *pRecNum = RecProps.iSeqNum;
        else
        {
            if (strcmp(CurProps.szTableType, szDBASE) ==0)
                *pRecNum = RecProps.iPhyRecNum;
            else
                *pRecNum =0;
        }
    }
    return rslt;
}
```

Delphi Examples: DbiGetRecord

Get the record ID of the current record in the specified TTable.

This example uses the following input:

```
fDbiGetRecord(Table1, Num);  
procedure fDbiGetRecord(ATable: TTable; var RecID: Longint);  
var  
  CP: CurProps;  
  RP: RecProps;  
begin  
  with ATable do begin  
    // Make sure it is a Paradox table!  
    UpdateCursorPos;           // sync BDE with Delphi  
    // Find out if table support Seq nums or Physical Rec nums  
    Check(dbiGetCursorProps(Handle, CP));  
    Check(DbiGetRecord(Handle, dbiNOLOCK, nil, @RP));  
    if StrComp(CP.szTableType, szDBASE) = 0 then  
      RecID := RP.iPhyRecNum  
    else  
      if StrComp(CP.szTableType, szPARADOX) = 0 then  
        RecID := RP.iSeqNum  
      else  
        // raise exception if it's not a Paradox or dBASE table  
        raise EDatabaseError.Create('Not a Paradox or dBASE table');  
    end;  
  end;  
end;
```

DbiGetRecordCount {button C
Examples,JI(">example","exdbigetrecordcount")} {button Delphi
Examples,JI(">example","dexdbigetrecordcount")}

C syntax

```
DBIResult DBIFN DbiGetRecordCount (hCursor, piRecCount);
```

Delphi syntax

```
function DbiGetRecordCount (hCursor: hDBICur; var iRecCount: Longint):  
    DBIResult stdcall;
```

Description

DbiGetRecordCount is used to get the current number of records associated with the cursor.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

piRecCount Type: pUINT32 (Output)
Pointer to the client variable which receives the number of records associated with the cursor. This number may be approximate.

Usage

This function is meant to get the number of records associated with the cursor. The count is approximate in some cases, rather than exact. (If there are any active filters associated with the cursor, or if there are any active ranges declared on it, the results are approximate; they are normally the upper limits.)

Paradox: If a range is active, the record count returned is the number of records in the range.

DbiResult return values

DBIERR_NONE	The record count was retrieved successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.

C Examples: DbiGetRecordCount

Example 1: Get the record count for the specified table

This example uses the following input:

```
fDbiGetRecordCount1(hCursor, &RecCount);
DBIResult fDbiGetRecordCount1(hDBICur hTmpCur, pUINT32 piRecCount)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetRecordCount(hTmpCur, piRecCount));
    return rslt;
}
```

Example 2 (for local tables only): Get the amount of records after the current location of the cursor.

This example uses the following input:

```
fDbiGetRecordCount2(hCursor, &RecLeft);
DBIResult fDbiGetRecordCount2(hDBICur hTmpCur, pUINT32 piRecLeft)
{
    DBIResult    rslt;
    UINT32       RecNum, CurrRec;
    CURProps     Props;
    RECProps     RecProps;
    rslt = Chk(DbiGetRecordCount(hTmpCur, &RecNum));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (piRecLeft != NULL)
    {
        rslt = Chk(DbiGetCursorProps(hTmpCur, &Props));
        if (rslt != DBIERR_NONE)
            return rslt;
        if (strcmp(Props.szTableType, szPARADOX) == 0)
        {
            rslt = Chk(DbiGetSeqNo(hTmpCur, &CurrRec));
            if (rslt != DBIERR_NONE)
                return rslt;
        }
        else
        {
            if (strcmp(Props.szTableType, szDBASE) == 0)
            {
                rslt = Chk(DbiGetRecord(hTmpCur, dbiNOLOCK, NULL, &RecProps));
                if (rslt != DBIERR_NONE)
                    return rslt;
                CurrRec = RecProps.iPhyRecNum;
            }
            else
                return DBIERR_NA;
        }
        *piRecLeft = RecNum - CurrRec;
    }
    return rslt;
}
```

Delphi Examples: DbiGetRecordCount

Return the record count of the TDataSet descendant (TTable, TQuery, TStoredProc) passed in parameter D.

This example uses the following input:

```
      ShowMessage(IntToStr(fDbiGetRecordCount(Table1)));  
function fDbiGetRecordCount(D: TDataSet): LongInt;  
begin  
    Check(DbiGetRecordCount(D.Handle, Result));  
end;
```

DbiGetRecordForKey {button C
Examples,JI(">example","exdbigetrecordforkey")} {button Delphi
Examples,JI(">example","dexdbigetrecordforkey")}

C syntax

```
DBIResult DBIFN DbiGetRecordForKey (hCursor, bDirectKey, iFields, iLen, pKey,
    [pRecBuf]);
```

Delphi syntax

```
function DbiGetRecordForKey (hCursor: hDBICur; bDirectKey: Bool; iFields:
    Word; iLen: Word; pKey: Pointer; pRecBuff: Pointer): DBIResult stdcall;
```

Description

DbiGetRecordForKey finds a record matching *pKey* and positions the cursor on that record.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

bDirectKey Type: BOOL (Input)

Determines whether *pKey* is used to specify the key directly or not. If TRUE, the value in *pKey* is used to specify the key directly. If FALSE, *pKey* specifies the record buffer.

iFields Type: UINT16 (Input)

Specifies the number of fields to be used for composite keys. If *iFields* and *iLen* are both 0, the entire key is used.

iLen Type: UINT16 (Input)

Specifies the length into the last field to be used for composite keys. If not 0, the last field to be used must be a character type.

pKey Type: pBYTE (Output)

If *bDirectKey* is TRUE, the *pKey* specifies the pointer to the record key; otherwise, *pKey* specifies the pointer to the record buffer. DbiExtractKey can be used to construct the record key when *bDirectKey* is TRUE. The *iFields* and *iLen* Parameters together indicate how much of the key should be used for matching. If both are 0, the entire key is used. If a match is required on a given field of the key, all the key fields preceding it in the composite key must also be supplied for a match. Only character fields can be matched for a partial key; all other field types must be fully matched.

For partial key matches, *iFields* must be equal to the number of keyfields preceding the field being partially matched. *iLen* specifies the number of characters in the (*iFields*+1) field.

pRecBuf Type: pBYTE (Output)

Pointer to the record buffer where the new current record is returned.

Usage

SQL: For SQL tables, if the active index is not unique, DbiGetRecordForKey may return different records with the same key value.

Prerequisites

A valid cursor handle must be obtained.

Completion state

The cursor is positioned on the found record. If *pRecBuf* is supplied, the new current record is retrieved. If there is no key in the index that matches the given key, an error is returned.

DbiResult return values

DBIERR_NOCURRREC	The cursor is not positioned on a record.
DBIERR_RECNOTFOUND	No record with the specified key value was found.

See also

[DbiSetToKey](#), [DbiExtractKey](#)

C Examples: DbiGetRecordForKey

Position the cursor and return the record buffer containing the specified key

This examples works with the STOCK.DB table and uses the following input:

```
fDbiGetRecordForKey(hCur, pRecBuf);
```

```
DBIResult fDbiGetRecordForKey(hDBICur hTmpCur, pBYTE pTmpRecBuf)
{
    DBIResult  rslt;
    DFLOAT     key = 1330.00;
    rslt = Chk(DbiInitRecord(hTmpCur, pTmpRecBuf));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiPutField(hTmpCur, 1, pTmpRecBuf, (pBYTE)&key));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiGetRecordForKey(hTmpCur, FALSE, 0, 0, pTmpRecBuf,
pTmpRecBuf));
    return rslt;
}
```

Delphi Examples: DbiGetRecordForKey

Position the cursor and return the record buffer containing the specified key

Delphi users should use `TDataSet.Locate`, `TTable.FindKey`, or `TTable.GotoKey` rather than directly calling `dbiGetRecordForKey`. These methods are described in the Delphi online help.

DbiGetRelativeRecord {button C
Examples,JI(">example","exdbigetrelativerecord")} {button Delphi
Examples,JI(">example","dexdbigetrelativerecord")}

C syntax

```
DBIResult DBIFN DbiGetRelativeRecord (hCursor, iPosOffset, [eLock],  
[pRecBuf], [precProps]);
```

Delphi syntax

```
function DbiGetRelativeRecord (hCursor: hDBICur; iPosOffset: Longint; eLock:  
DBILockType; pRecBuff: Pointer; precProps: pRECProps): DBIResult stdcall;
```

Description

DbiGetRelativeRecord positions the cursor on a record in the table relative to the current position of the cursor.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

iPosOffset Type: INT32 (Input)
Specifies the (signed) offset from current record.

eLock Type: DBILockType (Input)
Specifies the lock request type. Optional.

pRecBuf Type: pBYTE (Output)
Pointer to the client buffer that receives the record data. Optional. If NULL, no data is returned.

precProps Type: pRECProps (Output)
Pointer to the client-allocated RECProps structure.

Usage

This function positions the cursor relative to the current position. The record offset (*iPosOffset*) can be positive or negative. If the cursor is currently positioned between records, the next or prior (depending on the direction) record is counted as 1. If the filter is active, only those records that meet the filter condition are included. For dBASE if Soft Delete is off, only undeleted records are included.

If a record buffer is provided, DbiGetRelativeRecord reads the data for the record into the record buffer. If the *precProps* argument is supplied, record properties are returned (for dBASE and Paradox only). If filters are active, only records that meet the filter's criteria are retrieved. The record can be locked if an explicit lock is specified (using *eLock*), and the function call returns an error if the requested lock cannot be acquired. See the following section for SQL-specific locking behavior information.

dBASE: If the *precProps* argument is supplied, the record number can be retrieved for the record (the *iPhyRecNum* field of the RECProps structure). dBASE does not support the concept of sequence numbers.

Paradox: If the *precProps* argument is supplied, the sequence number can be retrieved for the record (via the *iSeqNum* field of *precProps*). Paradox does not support the concept of record numbers.

SQL: Record properties are not supported for SQL drivers (*precProps* is NULL). If *precProps* is supplied, no properties are returned.

Completion state

If not enough records exist in the result set to move to the relative record location, a beginning of file/end of file (BOF/EOF) error is returned. An error is returned if the cursor is not bidirectional, and the cursor is moving backwards.

DbiResult return values

DBIERR_NONE The record was retrieved successfully.

DBIERR_BOF	The beginning of the file was reached.
DBIERR_EOF	The end of the file was reached.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_KEYORRECDELETED	The cursor is positioned in a crack other than BOF or EOF.
DBIERR_ALREADYLOCKED	The record is already locked by the same user in the same session.
DBIERR_FILELOCKED	The table is already locked by another user.

See also

[DbiGetField](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#)

C Examples: DbiGetRelativeRecord

Retrieve the relative record for the specified cursor.

For local tables only, if *pRecNum* is not null, the corresponding record number is returned. This example use the following input:

```
fDbiGetRelativeRecord(hPXCur, 10, pPXRecBuf, &FldNum);
```

```
DBIResult fDbiGetRelativeRecord(hDBICur hTmpCur, INT32 iOffset, pBYTE
    pTmpRecBuf, pUINT32 pRecNum)
{
    DBIResult      rslt;
    CURProps       CurProps;
    RECProps       RecProps;
    rslt = Chk(DbiGetRelativeRecord(hTmpCur, iOffset, dbiNOLOCK, pTmpRecBuf,
&RecProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (pRecNum != NULL)
    {
        rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
        if (rslt != DBIERR_NONE)
            return rslt;
        if (strcmp(CurProps.szTableType, szPARADOX) == 0)
            *pRecNum = RecProps.iSeqNum;
        else
        {
            if (strcmp(CurProps.szTableType, szDBASE) ==0)
                *pRecNum = RecProps.iPhyRecNum;
            else
                *pRecNum =0;
        }
    }
    return rslt;
}
```

Delphi Examples: DbiGetRelativeRecord

Retrieve the relative record for the specified cursor.

Use Delphi's TTable methods to get records from a table (Next, Prior, First, Last, MoveBy, and so on.)
For information about retrieving record numbers from a Paradox or dBASE table, see [DbiGetRecord](#).

C Examples: DbiGetRintDesc

Get the first referential integrity constraint for the specified cursor.

If *RIDesc* is not null, a string is also formulated with RI information. This example uses the following input:

```
fDbiGetRintDesc(hCur, &RintDesc, Buffer);
DBIResult fDbiGetRintDesc(hDBICur hTmpCur, pRINTDesc pRintDesc, pCHAR RIDesc)
{
    DBIResult    rslt;
    CURProps     CurProps;
    rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
    if(CurProps.iRefIntChecks > 0)
    {
        rslt = Chk(DbiGetRintDesc(hTmpCur, 1, pRintDesc));
        if (rslt != DBIERR_NONE)
            return rslt;
        if (RIDesc != NULL)
            wsprintf(RIDesc, "RI Number: %i, IR Name: %s, RI Tbl Name: %s, RI
Fields: %d",
                    pRintDesc->iRintNum, pRintDesc->szRintName, pRintDesc->szTblName,
                    pRintDesc->iFldCount);
    }
    else
        MessageBox(0, "No Referential Integrity Links", "Warning", MB_OK);
    return rslt;
}
```

Delphi Examples: DbiGetRIntDesc

Return and fill a TStringList with information on the referential integrity. This example uses the following input:

```
fDbiGetRIntDesc(OrdersTbl, 1, MyList);
function fDbiGetRIntDesc(Table: TTable; SeqNo: Word; RIntList: TStringList):
  RINTDesc;
var
  ThisTable, OtherTable: String;
  Props: CURProps;
  B: Byte;
begin
  ThisTable := ''; OtherTable := '';
  FillChar(Result, sizeof(Result), #0);
  Check(DbiGetCursorProps(Table.Handle, Props));
  if Props.iRefIntChecks = 0 then
    raise EDatabaseError.Create('There are no referential integrity checks on
this table');
  Check(DbiGetRIntDesc(Table.Handle, SeqNo, @Result));
  if RIntList <> nil then
    begin
      with RIntList do
        begin
          Add(Format('NUMBER=%d', [Result.iRintNum]));
          Add(Format('NAME=%s', [Result.szRintName]));
          case Result.eType of
            rintMASTER: Add('TYPE=MASTER');
            rintDEPENDENT: Add('TYPE=DEPENDENT');
          else
            Add('TYPE=UNKNOWN');
          end;
          Add(Format('OTHER TABLE=%s', [Result.szTblName]));
          case Result.eModOp of
            rintRESTRICT: Add('MODIFY=RESTRICT');
            rintCASCADE: Add('MODIFY=CASCADE');
          else
            Add('MODIFY=UNKNOWN');
          end;
          case Result.eDelOp of
            rintRESTRICT: Add('DELETE=RESTRICT');
            rintCASCADE: Add('DELETE=CASCADE');
          else
            Add('DELETE=UNKNOWN');
          end;
          Add(Format('FIELD COUNT=%d', [Result.iFldCount]));
          for B := 0 to DBIMAXFLDSINKEY do
            begin
              if Result.aiThisTabFld[B] <> 0 then
                begin
                  if B <> 0 then
                    ThisTable := Format('%s, %d', [ThisTable,
Result.aiThisTabFld[B]])
                  else
                    ThisTable := IntToStr(Result.aiThisTabFld[B]);
                end
              else
                else

```

```
        Break;
    end;
    Add('FIELDS=' + ThisTable);
    for B := 0 to DBIMAXFLDSINKEY do
    begin
        if Result.aiOthTabFld[B] <> 0 then
        begin
            if B <> 0 then
                OtherTable := Format('%s, %d', [OtherTable,
Result.aiOthTabFld[B]])
            else
                OtherTable := IntToStr(Result.aiOthTabFld[B]);
            end
            else
                Break;
            end;
        Add('FIELDS OTHER=' + OtherTable);
    end;
end;
end;
```

DbiGetSeqNo {button C Examples,JI(">example","exdbigetrecordcount")} {button Delphi Examples,JI(">example","dexdbigetseqno")}

C syntax

```
DBIResult DBIFN DbiGetSeqNo (hCursor, piSeqNo);
```

Delphi syntax

```
function DbiGetSeqNo (hCursor: hDBICur; var iSeqNo: Longint): DBIResult  
    stdcall;
```

Description

DbiGetSeqNo retrieves the sequence number of the current record in the table associated with the *cursor*.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

piSeqNo Type: pUINT32 (Output)

Pointer to the client variable that receives the logical sequence number of the current record in the table associated with *hCursor*.

Usage

Paradox: This function is supported for all Paradox tables.

SQL: This function is not supported by SQL drivers.

dBASE: This function is not supported by the dBASE driver.

Prerequisites

The cursor should be positioned on a record.

Completion state

The sequence number is the relative position of a record with respect to the beginning of the file. A sequence number for a given record therefore depends on the current index in use. An active range also affects the sequence numbers, the sequence number is relative to the beginning of the range. Filters do not affect sequence numbers, so there might seem to be gaps in the sequence numbers.

DbiResult return values

DBIERR_NOTSUPPORTED	This call is not supported for the given table.
DBIERR_NONE	The sequence number was returned successfully.
DBIERR_BOF	The cursor must be positioned on a record; it is positioned at the beginning of the file.
DBIERR_EOF	The cursor must be positioned on a record; it is positioned at the end of the file.
DBIERR_KEYORRECDELETED	The cursor is positioned on a deleted record.
DBIERR_NOCURRREC	No record is current.

See also

[DbiSetToSeqNo](#), [DbiGetCursorProps](#)

Delphi Examples: DbiGetSeqNo

Retrieve the sequence number of the current record associated with a cursor:

The following procedure returns the record ID of the current record in ATable. If ATable is a Paradox table, it uses DbiGetSeqNo() to obtain the sequence number. If ATable is a dBASE table, it uses record properties provided by DbiGetRecord to obtain the physical record number. If the table is SQL or text, an exception is raised. The record ID is returned in the RecID parameter, which is passed by reference.

```
procedure GetRecordID(ATable: TTable; var RecID: Longint);
var
  CP: CURProps;
  RP: RECProps;
begin
  with ATable do begin
    { Make sure it is a Paradox table! }
    UpdateCursorPos;           // sync BDE with Delphi
    { Find out if table support Seq nums or Physical Rec nums }
    Check(dbiGetCursorProps(Handle, CP));
    case CP.iSeqNums of
      0 : begin                // dBASE tables support Phy Rec Num
          Check(DbiGetRecord(Handle, dbiNOLOCK, Nil, @RP));
          RecID := RP.iPhyRecNum;
        end;
      1 : Check(DbiGetSeqNo(Handle, RecID)); // Paradox tables support Seq
      Nums
    else
      { raise exception if it's not a Paradox or dBASE table }
      raise EDatabaseError.Create('Not a Paradox or dBASE table');
    end;
    CursorPosChanged;         // sync Delphi with BDE
  end;
end;
```


DbiGetSesInfo {button C
Examples,JI(">example","exdbigetsesinfo")} {button Delphi
Examples,JI(">example","dexdbigetsesinfo")}

C syntax

```
DBIResult DBIFN DbiGetSesInfo (psesInfo);
```

Delphi syntax

```
function DbiGetSesInfo (var sesInfo: SESInfo): DBIResult stdcall;
```

Description

DbiGetSesInfo retrieves the environment settings for the current session.

Parameters

psesInfo Type: pSESInfo (Output)
Pointer to the client-allocated SESInfo structure.

Usage

This function provides the client with information about the resources attached to the current session, including the number of database handles and open cursors (when the session is closed, these resources are released). This function also returns the session ID and name, the current private directory, and the lock retry time for repeated attempts to lock a table. The lock retry time is specified by DbiSetLockRetry.

Completion state

The session information is returned in the specified SESInfo structure.

DbiResult return values

DBIERR_NONE	The session information was returned successfully.
DBIERR_INVALIDHNDL	<i>psesInfo</i> is NULL.

See also

DbiSetLockRetry, DbiStartSession, DbiCloseSession, DbiGetCurrSession, DbiSetCurrSession

C Examples: DbiGetSesInfo

Get session information.

If *SesInfo* is not NULL, a string is also returned containing session information. This example uses the following input:

```
fDbiGetSesInfo(&Sesinfo, Buffer);
DBIResult fDbiGetSesInfo(pSESInfo pSesInfo, pCHAR SesInfo)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetSesInfo(pSesInfo));
    if (rslt == DBIERR_NONE)
    {
        if (SesInfo != NULL)
            wsprintf(SesInfo, "ID: %d, Name: %s, Open DB: %d, Open Cursors: %d,
"
                "Lock Wait: %d, Net Dir: %s, Private Dir: %s", pSesInfo->
>iSession,
                pSesInfo->szName, pSesInfo->iDatabases, pSesInfo->iCursors,
                pSesInfo->iLockWait, pSesInfo->szNetDir, pSesInfo->szPrivDir);
    }
    return rslt;
}
```

Delphi Examples: DbiGetSesInfo

Get BDE session information. This function can return the SESInfo structure or clear and add the information to the SesInfoList TStringList. If nil is passed in, only the SESInfo structure is returned. This example uses the following input:

```
Ses := fDbiGetSesInfo(MyList);  
function fDbiGetSesInfo(SesInfoList: TStringList): SESInfo;  
begin  
  Check(DbiGetSesInfo(Result));  
  if SesInfoList <> nil then  
  begin  
    with SesInfoList do  
    begin  
      Clear;  
      Add(Format('SESSION ID=%d', [Result.iSession]));  
      Add(Format('SESSION NAME=%s', [Result.szName]));  
      Add(Format('DATABASES=%d', [Result.iDatabases]));  
      Add(Format('CURSORS=%d', [Result.iCursors]));  
      Add(Format('LOCK WAIT=%d', [Result.iLockWait]));  
      Add(Format('NET DIR=%s', [Result.szNetDir]));  
      Add(Format('PRIVATE DIR=%s', [Result.szPrivDir]));  
    end;  
  end;  
end;
```

DbiGetSysConfig {button C
Examples,JI(">example","exdbigetsysconfig")} {button Delphi
Examples,JI(">example","dexdbigetsysconfig")}

C syntax

```
DBIResult DBIFN DbiGetSysConfig (psysConfig);
```

Delphi syntax

```
function DbiGetSysConfig (var sysConfig: SYSConfig): DBIResult stdcall;
```

Description

DbiGetSysConfig retrieves BDE system configuration information.

Parameters

psysConfig Type: pSYSConfig (Output)
Pointer to the client-allocated SYSConfig structure.

Completion state

The SYSConfig structure pointed to by *psysConfig* contains the retrieved system configuration information.

DbiResult return values

DBIERR_NONE System configuration information was returned successfully.

See also

DbiGetSysVersion, DbiGetClientInfo, DbiGetSysInfo

C Examples: DbiGetSysConfig

Get system configuration information.

If *SysCfg* is not NULL, a string is also returned containing system configuration. This example uses the following input:

```
fDbiGetSysConfig(&SysConfig, Buffer);
DBIResult fDbiGetSysConfig(pSYSConfig pSysConfig, pCHAR SysCfg)
{
    DBIResult    rslt;
    CHAR        szLocal[] = {"False"};
    rslt = Chk(DbiGetSysConfig(pSysConfig));
    if (rslt == DBIERR_NONE)
    {
        if (SysCfg != NULL)
        {
            if (pSysConfig->bLocalShare == TRUE)
                strcpy(szLocal, "True");
            wsprintf(SysCfg, "Local Share: %s, Net Type: %s, User Name: %s, "
                ".CFG File: %s, Lang Driver: %s", szLocal, pSysConfig->szNetType,
                pSysConfig->szUserName, pSysConfig->szIniFile, pSysConfig->szLangDriver);
        }
    }
    return rslt;
}
```

Delphi Examples: DbGetSysConfig

Get system configuration information:

DbGetSysConfig retrieves the BDE system configuration information and appends it to the TStringList passed in. This example uses the following input:

```
fDbGetSysConfig(MySysInfo);
```

```
procedure fDbGetSysConfig(var IdapiSysConfig: TStringList);
var
  SysConfigInfo: SYSConfig;
begin
  Check(DbGetSysConfig(SysConfigInfo));
  if SysConfigInfo.bLocalShare = True then
    IdapiSysConfig.Add('Local Share: ON')
  else
    IdapiSysConfig.Add('Local Share: OFF');
  IdapiSysConfig.Add('Net Protocol: ' +
    IntToStr(SysConfigInfo.iNetProtocol));
  if SysConfigInfo.bNetShare = True then
    IdapiSysConfig.Add('Net Share: ON')
  else
    IdapiSysConfig.Add('Net Share: OFF');
  IdapiSysConfig.Add('Network Type: ' + StrPas(SysConfigInfo.szNetType));
  IdapiSysConfig.Add('User Name: ' + StrPas(SysConfigInfo.szUserName));
  IdapiSysConfig.Add('Ini File: ' + StrPas(SysConfigInfo.szIniFile));
  IdapiSysConfig.Add('Language Driver: ' +
    StrPas(SysConfigInfo.szLangDriver));
end;
```


C Examples: DbiGetSysInfo

Get system information.

If SysCfg is not NULL, a string is also returned containing system information. This example uses the following input:

```
fDbiGetSysConfig(&SysInfo, Buffer);
DBIResult fDbiGetSysInfo(pSYSInfo pSysInfo, pCHAR SysInfo)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetSysInfo(pSysInfo));
    if (rslt == DBIERR_NONE)
    {
        if (SysInfo != NULL)
            wsprintf(SysInfo, "Buffer Space: %d, Heap: %d, Drivers: %d, Clients:
%d, "
                    "Sessions: %d, Databases: %d, Cursors: %d", pSysInfo->
>iBufferSize,
                    pSysInfo->iHeapSpace, pSysInfo->iDrivers, pSysInfo->iClients,
                    pSysInfo->iSessions, pSysInfo->iDatabases, pSysInfo->iCursors);
    }
    return rslt;
}
```


Delphi Examples: DbiGetSysInfo

Get BDE system status information. This function can return the SYSInfo structure or clear and add the information to the SysInfoList TStringList. If nil is passed in, only the SYSInfo structure is returned. This example uses the following input:

```
    Sys := fDbiGetSysInfo(MyList);  
function fDbiGetSysInfo(SysInfoList: TStringList): SYSInfo;  
begin  
    Check(DbiGetSysInfo(Result));  
    if SysInfoList <> nil then  
    begin  
        with SysInfoList do  
        begin  
            Clear;  
            Add(Format('BUFFER SPACE=%d', [Result.iBufferSize]));  
            Add(Format('HEAP SPACE=%d', [Result.iHeapSpace]));  
            Add(Format('DRIVERS=%d', [Result.iDrivers]));  
            Add(Format('CLIENTS=%d', [Result.iClients]));  
            Add(Format('SESSIONS=%d', [Result.iSessions]));  
            Add(Format('DATABASES=%d', [Result.iDatabases]));  
            Add(Format('CURSORS=%d', [Result.iCursors]));  
        end;  
    end;  
end;
```

DbiGetSysVersion {button C
Examples,JI(">example","exdbigetsysversion")} {button Delphi
Examples,JI(">example","dexdbigetsysversion")}

C syntax

```
DBIResult DBIFN DbiGetSysVersion (psysVersion);
```

Delphi syntax

```
function DbiGetSysVersion (var sysVersion: SYSVersion): DBIResult stdcall;
```

Description

DbiGetSysVersion retrieves the system version information, including the BDE version number, date, and time; and the client interface version number.

Parameters

psysVersion Type: pSYSVersion (Output)
Pointer to the client-allocated SYSVersion structure.

Completion state

The SYSVersion structure returned in *psysVersion* contains the retrieved system version information.

DbiResult return values

DBIERR_NONE The system version information was returned successfully.

See also

DbiGetSysConfig, DbiGetClientInfo, DbiGetSysInfo

C Examples: DbiGetSysVersion

Get system version information:

If `SysVer` is not NULL, a string is also returned containing system version information. This example uses the following input:

```
fDbiGetSysVersion(&SysVersion, Buffer);
```

```
DBIResult fDbiGetSysVersion(pSYSVersion pSysVersion, pCHAR SysVer)
{
    DBIResult    rslt;
    UINT16       Mo, Da, H, M, Ms;
    INT16        Yr;
    rslt = Chk(DbiGetSysVersion(pSysVersion));
    if (rslt == DBIERR_NONE)
    {
        if (SysVer != NULL)
        {
            rslt = Chk(DbiDateDecode(pSysVersion->dateVer, &Da, &Mo, &Yr));
            if (rslt != DBIERR_NONE)
                return rslt;
            rslt = Chk(DbiTimeDecode(pSysVersion->timeVer, &H, &M, &Ms));
            if (rslt != DBIERR_NONE)
                return rslt;
            wsprintf(SysVer, "Engine: %d, Interface Level: %d, Date: %d/%d/%d, "
                    "Time: %d:%d:%d", pSysVersion->iVersion, pSysVersion->iIntfLevel,
                    Mo, Da, Yr, H, M, (Ms / 1000));
        }
    }
    return rslt;
}
```

Delphi Examples: DbiGetSysVersion

Get BDE system version information. This function can return the SYSVersion structure or clear and add the information to the SysVerList TStringList. If nil is passed in, only the SYSVersion structure is returned. This example uses the following input:

```
Ver := fDbiGetSysVersion(MyList);  
function fDbiGetSysVersion(SysVerList: TStringList): SYSVersion;  
begin  
  Check(DbiGetSysVersion(Result));  
  if SysVerList <> nil then  
  begin  
    with SysVerList do  
    begin  
      Clear;  
      Add(Format('ENGINE VERSION=%d', [Result.iVersion]));  
      Add(Format('INTERFACE LEVEL=%d', [Result.iIntfLevel]));  
      Add(Format('VERSION DATE=%s', [DateToStr(Result.dateVer)]));  
      Add(Format('VERSION TIME=%s', [TimeToStr(Result.timeVer)]));  
    end;  
  end;  
end;
```

DbiGetTableOpenCount {button C
Examples,JI(">example","exdbigetableopencount")} {button Delphi
Examples,JI(">example","dexdbigetableopencount")}

C syntax

```
DBIResult DBIFN DbiGetTableOpenCount (hDb, pszTableName, [pszDriverType],  
    piOpenCount);
```

Delphi syntax

```
function DbiGetTableOpenCount (hDb: hDBIDb; pszTableName: PChar;  
    pszDriverType: PChar; var iOpenCount: Word): DBIResult stdcall;
```

Description

DbiGetTableOpenCount returns the total number of cursors that are open on the specified table.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

pszTableName Type: pCHAR (Input)
Pointer to the name of the table. For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)
Pointer to the table type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

piOpenCount Type: pUINT16 (Output)
Pointer to the client variable that receives the number of cursors opened on the table.

Usage

This function returns the total number of cursors open on this table by this instance of BDE, irrespective of database and current session.

Most of the functions that operate on tables require a cursor, which is obtained by calling [DbiOpenTable](#). A table can be opened more than once, resulting in more than one cursor for that table. Some functions, such as [DbiDoRestructure](#), require that no cursors be opened on the table. Use this function to check for this requirement.

The name of the table (not the cursor) is input to [DbiGetTableOpenCount](#), which returns a count of how many cursors are opened on the table. This function is useful for determining whether a table is in use.

Paradox: For Paradox, the number of open cursors includes any cursors opened implicitly by referential integrity or look up tables.

DbiResult return values

DBIERR_NONE	The table open count was returned successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_NOSUCHTABLE	The specified table name is invalid.
DBIERR_UNKNOWNBLTYPE	The specified driver type is invalid or NULL, or the pointer to the driver type is NULL.

See also

[DbiOpenTable](#)

C Examples: DbiGetTableOpenCount

Obtain the number of cursors open on a table.

```
DBIResult fDbiGetTableOpenCount(hDBIDb hDb, pCHAR TblName, pUINT16
    piOpenCount)
{
    DBIResult    rslt;
    rslt = Chk(DbiGetTableOpenCount(hDb, TblName, NULL, piOpenCount));
    return rslt;
}
```

Delphi Examples: DbiGetTableOpenCount

Return the number of open cursors on the specified table. This example uses the following input:

```
    NumCursors := fDbiGetTableOpenCount(InterBaseTable);  
function fDbiGetTableOpenCount(Table: TTable): Word;  
var  
    Props: CURProps;  
  
begin  
    Check(DbiGetCursorProps(Table.Handle, Props));  
    Check(DbiGetTableOpenCount(Table.DBHandle, PChar(Table.TableName),  
        Props.szTableType, Result));  
end;
```


DbiGetTableTypeDesc {button C
Examples,JI(">example","exdbiggettabletypedesc")} {button Delphi
Examples,JI(">example","dexdbiggettabletypedesc")}

C syntax

```
DBIResult DBIFN DbiGetTableTypeDesc (pszDriverType, pszTableType, ptblType);
```

Delphi syntax

```
function DbiGetTableTypeDesc (pszDriverType: PChar; pszTableType: PChar; var  
    tblType: TBLType): DBIResult stdcall;
```

Description

DbiGetTableTypeDesc returns a description of the capabilities of the table type given in *pszTableType* for the driver type given in *pszDriverType*.

Parameters

pszDriverType Type: pCHAR (Input)
Pointer to the driver type.

pszTableType Type: pCHAR (Input)
Pointer to the table type. Use [DbiOpenTableTypesList](#) to get a list of valid table types.

ptblType Type: pTBLType (Output)
Pointer to the client-allocated [TBLType](#) structure.

Usage

SQL: The table type distinguishes between views, queries, and tables. It does not identify the driver type.

DbiResult return values

DBIERR_NONE	The table type Description was returned successfully.
DBIERR_INVALIDHNDL	The pointer to the driver type is NULL, or the pointer to the table type is NULL, or <i>pTblType</i> is NULL.
DBIERR_UNKNOWNDRVTYPE	The specified driver type is invalid or NULL, or the specified table type is invalid or NULL.

See also

[DbiOpenTableTypesList](#)

C Examples: DbiGetTableTypeDesc

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbGetTableTypeDesc

Retrieve a description of the capabilities of the table type

The description is appended to the TStringList passed in. This example uses the following input:

```
fDbGetTableTypeDesc(szPARADOX, 'PDOX 7.0', MyTableInfo);
fDbGetTableTypeDesc(szDBASE, 'DBASE5', MyTableInfo);
fDbGetTableTypeDesc('INTRBASE', 'INTERBASE', MyTableInfo);
procedure fDbGetTableTypeDesc(DriverType, TableType: PChar;
    var TableTypeInfo: TStringList);

    Function BoolVal(InBool: Boolean): String;
    begin
        if InBool = True then Result:= 'True'
        else Result:= 'False';
    end;

var
    TableTypeRec: TBLType;
begin
    Check(DbGetTableTypeDesc(DriverType, TableType, TableTypeRec));
    TableTypeInfo.Add
        ('Table ID: ' + IntToStr(TableTypeRec.iId));
    TableTypeInfo.Add
        ('Name: ' + StrPas(TableTypeRec.szName));
    TableTypeInfo.Add
        ('Text: ' + StrPas(TableTypeRec.szText));
    TableTypeInfo.Add
        ('Format: ' + StrPas(TableTypeRec.szFormat));
    TableTypeInfo.Add
        ('User can Read/Write: ' + BoolVal(TableTypeRec.bReadWrite));
    TableTypeInfo.Add
        ('Can create new tables: ' + BoolVal(TableTypeRec.bCreate));
    TableTypeInfo.Add
        ('Can restructure: ' + BoolVal(TableTypeRec.bRestructure));
    TableTypeInfo.Add
        ('Val Checks can be specified: ' + BoolVal(TableTypeRec.bValChecks));
    TableTypeInfo.Add
        ('Can be protected: ' + BoolVal(TableTypeRec.bSecurity));
    TableTypeInfo.Add
        ('Can participate in ref integrity: ' +
        BoolVal(TableTypeRec.bRefIntegrity));
    TableTypeInfo.Add
        ('Supports primary key concept: ' + BoolVal(TableTypeRec.bPrimaryKey));
    TableTypeInfo.Add
        ('Can have other indexes: ' + BoolVal(TableTypeRec.bIndexing));
    TableTypeInfo.Add
        ('Number of Phy Field types supported: ' +
        IntToStr(TableTypeRec.iFldTypes));
    TableTypeInfo.Add
        ('Max record size: ' + IntToStr(TableTypeRec.iMaxRecSize));
    TableTypeInfo.Add
        ('Max fields in a table: ' + IntToStr(TableTypeRec.iMaxFldsInTable));
    TableTypeInfo.Add
        ('Maximum field name length: ' + IntToStr(TableTypeRec.iMaxFldNameLen));
    TableTypeInfo.Add
```

```
    ('Driver dependent table level (version): ' +  
    IntToStr(TableTypeRec.iTblLevel));  
end;
```

DbiGetTimeFormat {button C
Examples,JI(">example","exdbiggettimeformat")} {button Delphi
Examples,JI(">example","dexdbiggettimeformat")}

C syntax

```
DBIResult DBIFN DbiGetTimeFormat (pfmtTime);
```

Delphi syntax

```
function DbiGetTimeFormat (var fmtTime: FMTTime): DBIResult stdcall;
```

Description

DbiGetTimeFormat gets the time format for the current session.

Parameters

pfmtTime Type: pFMTTime (Output)
Pointer to the client-allocated FMTTime structure.

Usage

The time format is used by QBE for input and wildcard character matching. It is also used by batch operations (such as DbiDoRestructure and DbiBatchMove) to handle data type coercion between character and datetime or time types.

DbiResult return values

DBIERR_NONE	The time format was successfully retrieved.
DBIERR_INVALIDHNDL	<i>pfmtTime</i> is NULL.

See also

DbiGetNumberFormat, DbiGetDateFormat, DbiSetTimeFormat

C Examples: DbiGetTimeFormat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiGetTimeFormat

Obtain information about the Time Format on your system.

This example uses the following input:

```
    Memo1.Lines.Add(fDbiGetTimeFormat);
Function fDbiGetTimeFormat: String;
var
    MyTimeFormat : FMTime;
begin
    Check(DbiGetTimeFormat(MyTimeFormat));
    SetLength(Result, 100);
    with MyTimeFormat do
        Result := Format('Separator: %s, AM: %s, PM: %s', [cTimeSeparator,
        szAmString, szPmString]);
    SetLength(Result, StrLen(PChar(Result)));
end;
```

DbiGetTranInfo {button C
Examples,JI(">example","exdbigettraninfo")} {button Delphi
Examples,JI(">example","dexdbigettraninfo")}

C syntax

```
DBIResult DBIFN DbiGetTranInfo (hDb, hXact, pxInfo);
```

Delphi syntax

```
function DbiGetTranInfo (hDb: hDBIDb; hXact: hDBIXact; pxInfo: pXInfo):  
    DBIResult stdcall;
```

Description

DbiGetTranInfo retrieves transaction information.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

hXact Type: hDBIXact (Input)

Specifies the transaction handle. If NULL, *hDb* is used; if not NULL, *hDb* is ignored.

pxInfo Type: XInfo (Output)

Pointer to the client-allocated XInfo structure.

Usage

After a successful DbiBeginTran request, the transaction state is active. The state remains active until DbiEndTran is called. While the transaction is active, the actual isolation level being used can be retrieved with this function. Since transaction nesting is currently not supported, the *uNests* value is unused.

Prerequisites

A valid database handle must be obtained on a database.

Completion state

Information function only; does not affect transaction processing.

DbiResult return values

DBIERR_NONE

C Examples: DbiGetTranInfo

Gets the specified transaction information.

This example uses the following input:

```
fDbiGetTranInfo(hDb, xTran, Buffer);
```

```
DBIResult fDbiGetTranInfo(hDBIDb hTmpDb, hDBIXact hXact, pCHAR XactInfo)
{
    DBIResult    rslt;
    XInfo        xinfo;
    CHAR         XState[10] = {"Unknown"};
    CHAR         XType[20] = {"Unknown"};

    rslt = Chk(DbiGetTranInfo(hTmpDb, hXact, &xinfo));
    if (rslt == DBIERR_NONE)
    {
        switch (xinfo.exState)
        {
            case xsACTIVE:
                strcpy(XState, "Active");
                break;
            case xsINACTIVE:
                strcpy(XState, "Inactive");
                break;
        }
        switch (xinfo.eXIL)
        {
            case xilDIRTYREAD:
                strcpy(XType, "Dirty Read");
                break;
            case xilREADCOMMITTED:
                strcpy(XType, "Read Committed");
                break;
            case xilREPEATABLEREAD:
                strcpy(XType, "Repeatable Read");
                break;
        }
    }
    wsprintf(XactInfo, "Transaction State: %s, Isolation Level: %s, Nests:
%d",
            XState, XType, xinfo.uNests);
    return rslt;
}
```

Delphi Examples: DbiGetTranInfo

Get transaction information on the database handle.

This example uses the following input:

```
    fDbiGetTranInfo(Database1.Handle);
procedure fDbiGetTranInfo(hTmpDb: HDBIDb);
var
    xInfoVar: XInfo;
begin
    Check(DbiGetTranInfo(hTmpDb, nil, @xInfoVar));
    case XInfoVar.eXIL of
        xilDIRTYREAD: ShowMessage('Isolation level is Uncommitted changes');
        xilREADCOMMITTED: ShowMessage('Isolation level is Committed changes');
        xilREPEATABLEREAD: ShowMessage('Isolation level is Full read
repeatability');
    end;
end;
```


C Examples: DbiGetVchkDesc

Get the first Validity Check Descriptor for the specified cursor.

This example uses the following input:

```
fDbiGetVchkDesc(hCur, &VchkDesc);
```

```
DBIResult fDbiGetVchkDesc(hDBICur hCur, pVCHKDesc pVchkDesc)
{
    DBIResult    rslt;
    CURProps     CurProps;
    rslt = Chk(DbiGetCursorProps(hCur, &CurProps));
    if(CurProps.iValChecks > 0)
        rslt = Chk(DbiGetVchkDesc(hCur, 1, pVchkDesc));
    else
        MessageBox(0, "No validity checks on this table", "Validity Check
Warning", MB_OK);
    return rslt;
}
```

Delphi Examples: DbiGetVchkDesc

Obtain the first validity check descriptor for the specified cursor.

This example uses the following input:

```
fDbiGetVchkDesc(hCur, VchkDesc);
procedure fDbiGetVchkDesc(hCur: hDBICur; var VchkDes: VCHKDesc);
var
  CurProp: CURProps;

begin
  Check(DbiGetCursorProps(hCur, CurProp));

  if(CurProp.iValChecks > 0) then begin
    Check(DbiGetVchkDesc(hCur, 1, @VchkDes));
    ShowMessage('Field #' + IntToStr(VchkDes.iFldNum) + ' has Validity
Checks.');
```

end

```
  else
    MessageDlg(' Validity Check Warning: No validity checks on this
table.',
mtError, [MBOK], 0);
end;
```

DbiInit {button C
Examples,[JI\(">example", "exdbiinit"\)](#)}{button Delphi
Examples,[JI\(">example", "dexdbiinit"\)](#)}

C syntax

```
DBIResult DBIFN DbiInit (pEnv);
```

Delphi syntax

```
function DbiInit (pEnv: PDbiEnv): DBIResult stdcall;
```

Description

DbiInit initializes the BDE environment.

Parameters

pEnv Type: pDBIEnv (Input)

Pointer to the [DBIEnv](#) structure. Optional. Can be used to change the working directory and the location of the configuration file, to set up the language driver, and to supply BDE with the client name.

Usage

Initializes the BDE environment. Default settings can be overwritten by supplying the appropriate settings. If *pEnv* is NULL, then BDE assumes that the start-up directory is the working directory. In this case, *szClientName* is empty and *bForceLocalInit* is FALSE.

Prerequisites

DbiInit must be called once by each client application before any other calls (DbiOpenDatabase, DbiOpenTable, and so on.) are made. The client should be familiar with the environment Parameters such as working directory, BDE configuration file path, and so on.

DbiResult return values

DBIERR_NONE	The BDE environment was initialized successfully.
DBIERR_MULTIPLEINIT	Illegal attempt to initialize BDE more than once.
DBIERR_OSACCESS	Attempting to run a BDE application from a Windows NT directory without write access; create a Windows NT TEMP directory to avoid this

See also

[DbiExit](#)

C Examples: Dbinit

Example 1: Initialize BDE with default settings.

It is strongly recommended to use this method. This example uses the following input:

```
fDbiInit1();
DBIResult fDbiInit1()
{
    DBIResult    rslt;
    rslt = Chk(DbiInit(NULL));
    return rslt;
}
```

Example 2: Initialize BDE with a different working directory.

It is not recommended to use this method for most cases. This example uses the following input:

```
fDbiInit2("c:\\program\\tables");
DBIResult fDbiInit2(pCHAR WorkDir)
{
    DBIResult    rslt;
    DBIEnv       Env;
    memset(&Env, 0, sizeof(DBIEnv));
    strcpy(Env.szWorkDir, WorkDir);
    rslt = Chk(DbiInit(&Env));
    return rslt;
}
```

Example 3: Initialize BDE with a different configuration file.

It is not recommended to use this method for most cases. This example uses the following input:

```
fDbiInit3("c:\\myidapi\\idapi32.cfg");
DBIResult fDbiInit3(pCHAR ConfigDir)
{
    DBIResult    rslt;
    DBIEnv       Env;
    memset(&Env, 0, sizeof(DBIEnv));
    strcpy(Env.szIniFile, ConfigDir);
    rslt = Chk(DbiInit(&Env));
    return rslt;
}
```

Delphi Examples: DbInit

Initialize BDE with default values.

If you have any of the "Data Access" or "Data Controls" VCL components in your project, you should not directly call DbInit in a Delphi application. Those components will automatically call DbInit.

If you are not using VCL database components, then the following code shows how to initialize the BDE with default values:

```
Check (dbiInit (Nil) );
```


DbiInitRecord {button C
Examples,JI(">example","exdbiinitrecord")} {button Delphi
Examples,JI(">example","dexdbiinitrecord")}

C syntax

```
DBIResult DBIFN DbiInitRecord (hCursor, pRecBuf);
```

Delphi syntax

```
function DbiInitRecord (hCursor: hDBICur; pRecBuff: Pointer): DBIResult  
    stdcall;
```

Description

DbiInitRecord initializes a record buffer. This operation is required before composing a new record for insertion.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pRecBuf Type: pBYTE (Output)
Pointer to the client buffer that receives the initialized record buffer.

Usage

DbiInitRecord initializes the record buffer to a blank record according to the data types of the fields.

Paradox: If the table has associated default values with any of the fields, the default values are used to initialize the fields.

Completion state

The record buffer contains blank fields or default values. The position of the given cursor is not affected. The client application can use the BDE field-level functions to fill the record buffer with the appropriate values.

DbiResult return values

DBIERR_NONE	The initialization was successful.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified record buffer is NULL.

See also

[DbiAppendRecord](#), [DbiGetRecord](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiModifyRecord](#),
[DbiInsertRecord](#), [DbiPutField](#), [DbiSetToKey](#), [DbiGetBlob](#), [DbiPutBlob](#), [DbiOpenBlob](#), [DbiFreeBlob](#),
[DbiGetField](#)

C Examples: DbiInitRecord

Initialize the specified record buffer.

This example uses the following input:

```
fDbiInitRecord(hCursor, RecBuf);  
DBIResult fDbiInitRecord(hDBICur hTmpCur, pBYTE pTmpRecBuf)  
{  
    DBIResult    rslt;  
    rslt = Chk(DbiInitRecord(hTmpCur, pTmpRecBuf));  
    return rslt;  
}
```

Delphi Examples: DbInitRecord

An example for this function is under development and will be provided in an upcoming Help release.

DbiInsertRecord {button C
Examples,JI(">example","exdbiinsertrecord")} {button Delphi
Examples,JI(">example","dexdbiinsertrecord")}

C syntax

```
DBIResult DBIFN DbiInsertRecord (hCursor, [eLock], pRecBuf);
```

Delphi syntax

```
function DbiInsertRecord (hCursor: hDBICur; eLock: DBILockType; pRecBuff:
  Pointer): DBIResult stdcall;
```

Description

DbiInsertRecord inserts a new record, contained in *pRecBuf*, into the table associated with the given cursor.

Parameters

hCursor Type: hDBICur (Input)
 Specifies the cursor handle.

eLock Type: DBILockType (Input)
 Specifies the lock request type. Optional.

pRecBuf Type: pBYTE (Input)
 Pointer to the record buffer.

Usage

The client application can optionally acquire a lock on the newly inserted record by specifying the lock type in *eLock*.

dBASE: For dBASE there is no difference between DbiAppendRecord and DbiInsertRecord. The record is inserted at the end of the table. The cursor is positioned at the inserted record. If an active range exists, the cursor might be positioned at the beginning or end of the file.

Paradox: Before inserting the record, the function verifies any referential integrity requirements or validity checks that may be in place. If either fails, an error is returned and the insert operation is canceled. If a primary index is in place, the record is physically placed at a location that conforms to the primary index order. With non-indexed tables, the record is inserted before the current position.

SQL: The table must be opened for write access. After the insert, the cursor is always positioned on the inserted record.

Prerequisites

Other users cannot have a write lock, or greater, on the table. The record buffer should be initialized with DbiInitRecord, and data filled in using DbiPutField or DbiOpenBlob, and DbiPutBlob.

Completion state

After successful completion, the cursor is positioned on the new record. If the function fails, the record is not inserted and the current position of the cursor is not affected.

If the cursor has a filter or a range associated with it, the cursor might be positioned on a crack or BOF/EOF and the operation will fail if a record lock was requested.

DbiResult return values

DBIERR_NONE	The record was successfully inserted.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified record buffer is NULL.
DBIERR_FOREIGNKEYERR	The target table is a detail table in a referential integrity link, and the linking value cannot be found in the master table.
DBIERR_MINVALERR	The specified data is less than the required minimum value.

DBIERR_MAXVALERR	The specified data is greater than the required maximum value.
DBIERR_REQDERR	The field cannot be blank.
DBIERR_LOOKUPTABLEERR	The specified value was not found in the assigned lookup table.
DBIERR_KEYVIOL	The table has a unique index and the inserted key value conflicts with an existing record's key value.
DBIERR_FILELOCKED	The table is locked by another user.
DBIERR_TABLEREADONLY	Table access denied; the specified cursor handle is read-only.
DBIERR_NOTSUFFTABLERIGHTS	Insufficient table rights to insert a record (Paradox only).
DBIERR_NODISKSPACE	Insert failed due to insufficient disk space.
DBIERR_RECLOCKFAILED	Insert failed because the record could not be locked due to range or filter constraint.

See also

[DbiPutField](#), [DbiGetNextRecord](#), [DbiGetRecord](#), [DbiGetRelativeRecord](#), [DbiAppendRecord](#), [DbiModifyRecord](#)

C Examples: DbiInsertRecord

Append or insert a record on the specified table.

If the table has an index, insert the record; otherwise, append the record. This example uses the following input:

```
fAddRecord(hCur, pRecBuf);
DBIResult fAddRecord(hDBICur hTmpCur, pBYTE pTmpRecBuf)
{
    DBIResult      rslt;
    CURProps      CurProps;
    rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (CurProps.iIndexes == 0)
        rslt = Chk(DbiAppendRecord(hTmpCur, pTmpRecBuf));
    else
        rslt = Chk(DbiInsertRecord(hTmpCur, dbiNOLOCK, pTmpRecBuf));
    return rslt;
}
```

Delphi Examples: DbInsertRecord

Append or insert a record on the specified table.

Use the Insert and Post methods on a dataset to insert records. This inserts a new record, contained in *pTmpRecBuf*, into the table associated with the given cursor. This example uses the following input:

```
fDbInsertRecord(hCursor, RecBuf);
```

```
Procedure fDbInsertRecord(hTmpCur: hDBICur; pTmpRecBuf: pByte);
begin
  Check(DbInsertRecord(hTmpCur, dbiNOLOCK, pTmpRecBuf));
end;
```

Insert or append a record to a table.

If the table has an index, insert the record. Most Delphi users should use: TTable.Insert, TTable.Append, TTable.InsertRecord, or TTable.AppendRecord. This example uses the following input:

```
fDbInsertRecord(Table1.Handle, pRecBuf: pBYTE);
```

```
procedure fDbInsertRecord(hTmpCur: hDBICur; pRec: pBYTE);
var
  Props: CURProps;

begin
  Check(DbGetCursorProps(hTmpCur, Props));
  // Check to see if there are any active indexes on the table
  if Props.iIndexes > 0 then
    // Insert the record
    Check(DbInsertRecord(hTmpCur, dbiNOLOCK, pRec))
  else
    // Append the record
    Check(DbAppendRecord(hTmpCur, pRec));
end;
```

DbilsRecordLocked {button C Examples,JI(">example","exdbiisrecordlocked")} {button Delphi Examples,JI(">example","dexdbiisrecordlocked")}

C syntax

```
DBIResult DBIFN DbilsRecordLocked (hCursor, pbLocked);
```

Delphi syntax

```
function DbilsRecordLocked (hCursor: hDBICur; var bLocked: Bool): DBIResult  
    stdcall;
```

Description

DbilsRecordLocked is used to check if current record is locked.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

pbLocked Type: pBOOL (Output)

Pointer to the client variable. Set to TRUE if the record is locked; otherwise, FALSE.

Usage

Record locks differ from table locks in that they only have two states: locked or not locked. Table locks have four states: no lock, read lock, write lock, or exclusive lock.

Prerequisites

The cursor must be positioned on a record.

Completion state

The lock status is returned in *pLocked*, and indicates whether the record is locked by anybody.

SQL: For SQL, the lock status returned in *pLocked* indicates whether the record is locked by you.

DbiResult return values

DBIERR_NONE	The lock status was returned successfully.
DBIERR_NOCURRREC	There is no current record.
DBIERR_BOF	There is no current record at the beginning of the file.
DBIERR_EOF	There is no current record at the end of the file.
DBIERR_KEYORRECDELETED	There is no current record.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	pbLocked is NULL.

See also

[DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRecord](#), [DbiGetRelativeRecord](#), [DbiRelRecordLock](#), [DbilsTableLocked](#), [DbiAcqTableLock](#), [DbiRelTableLock](#)

C Examples: DbilsRecordLocked

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbilsRecordLocked

An example for this function is under development and will be provided in an upcoming Help release.

DbilsTableLocked {button C Examples,JI(">example","exdbiistablelocked")} {button Delphi Examples,JI(">example","dexdbiistablelocked")}

C syntax

```
DBIResult DBIFN DbiIsTableLocked (hCursor, edbiLock, piLocks);
```

Delphi syntax

```
function DbiIsTableLocked (hCursor: hDBICur; epdxLock: DBILockType; var  
  iLocks: Word): DBIResult stdcall;
```

Description

DbilsTableLocked returns the number of locks of type *edbiLock* acquired on the table associated with the given session.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

edbiLock Type: DBILockType (Input)

Specifies the lock type to verify.

piLocks Type: pUINT16 (Output)

Pointer to the client variable that receives the number of locks of the given lock type.

Usage

dBASE: For dBASE tables, dbiREADLOCKS are upgraded to dbiWRITELOCKS. If the value of *edbiLock* is dbiREADLOCK, then the number of write locks are returned in *piLocks*.

DbiResult return values

DBIERR_NONE	The number of locks was returned successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	<i>piLocks</i> is NULL.

See also

[DbiAcqTableLock](#), [DbiRelTableLock](#), [DbiOpenLockList](#)

edbiLock

edbiLock can be one of the following values:

Value	Description
dbiNOLOCK	Dirty read
dbiREADLOCK	Read lock
dbiWRITELOCK	Write lock

C Examples: DbilsTableLocked

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbilsTableLocked

Return the number of locks of type edbiLock aquired on the table passed to the function.

You can obtain table locks by calling the LockTable and UnLockTable methods of the TTable component.

This example uses the following input:

```
LockTotal:= fDbilsTableLocked(Table1, dbiWRITELOCK);  
function fDbiIsTableLocked(Tbl: TTable; Lock: DBILockType): Word;  
var  
    NumLocks: Word;  
begin  
    Check(DbiIsTableLocked(Tbl.Handle, Lock, NumLocks));  
    Result:= NumLocks;  
end;
```

DbilsTableShared {button C
Examples,JI(">example","exdbiistableshared")} {button Delphi
Examples,JI(">example","dexdbiistableshared")}

C syntax

```
DBIResult DBIFN DbIsTableShared (hCursor, pbShared);
```

Delphi syntax

```
function DbIsTableShared (hCursor: hDBICur; var bShared: Bool): DBIResult  
    stdcall;
```

Description

DbilsTableShared determines whether the table is physically shared or not.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pbShared Type: pBOOL (Output)
Pointer to the client variable. Set to TRUE if the table is physically shared.

Usage

Standard: The table is physically shared if it is placed on a shared drive (network, or local drive when LOCALSHARE in the configuration is TRUE), and the table is not opened exclusively. If a table is shared, dirty data is not buffered. The table is available to all users in the session, unless acquired table or record locks have been placed since the table was opened.

DbiResult return values

DBIERR_NONE	The table shared status was returned successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	<i>pbShared</i> is NULL.

See also

[DbiOpenTable](#), [DbiAcqTableLock](#), [DbiAcqPersistTableLock](#), [DbiRelTableLock](#), [DbiRelPersistTableLock](#), [DbiForceReread](#), [DbiCheckRefresh](#)

C Examples: DbilsTableShared

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbilsTableShared

An example for this function is under development and will be provided in an upcoming Help release.

DbiLinkDetail {button C Examples,JI(">example","exdbilinkdetail")} {button Delphi Examples,JI(">example","dexdbibeginlinkmode")}

C syntax

```
DBIResult DBIFN DbiLinkDetail (hMstrCursor, hDetlCursor, iLnkFields, piMstrFields, piDetlFields);
```

Delphi syntax

```
function DbiLinkDetail (hMstrCursor: hDBICur; hDetlCursor: hDBICur; iLnkFields: Word; piMstrFields: PWord; piDetlFields: PWord): DBIResult stdcall;
```

Description

DbiLinkDetail establishes a link between two cursors such that the detail cursor has its record set limited to the set of records matching the linking key values of the master cursor.

Parameters

hMstrCursor Type: hDBICur (Input)

Specifies the cursor handle associated with the master table. The cursor does not have to be opened on an index.

hDetlCursor Type: hDBICur (Input)

Specifies the cursor handle associated with the detail table. The cursor must be opened on an index corresponding to all the link fields.

iLnkFields Type: UINT16 (Input)

Specifies the number of link fields.

piMstrFields Type: pUINT16 (Input)

Pointer to the array of field numbers of link fields in the master table.

piDetlFields Type: pUINT16 (Input)

Pointer to the array of field numbers of link fields in the detail table.

Usage

This function is useful for establishing one-to-one or one-to-many relationships between tables. A master cursor can have more than one detail cursor; a detail cursor can have only one master cursor. A detail cursor can also be a master cursor. Links apply to all available driver types; they can be established between cursors of the same or different driver types. The effect is equivalent to setting a range using `DbiSetRange` on the detail table and using the linking fields of the master table.

Prerequisites

For the cursors to be linked, both cursors must be enabled with `DbiBeginLinkMode`. The data types of linked fields in master and detail records must be compatible. The detail cursor must be opened on an index corresponding to all of the linking fields. For expression links, see [DbiLinkDetailToExp](#).

Completion state

The linked cursors are modified so that the detail cursor allows access only to the records that match the linking value of the master record. If the position of the master cursor changes so that a different linking value is obtained for the linking fields, the detail cursor is set to a new range of records and is positioned to the beginning of this range.

DbiResult return values

DBIERR_NONE	The link between the detail cursor (<code>hDetlCursor</code>) and the master cursor (<code>hMstrCursor</code>) was successfully established.
DBIERR_INVALIDHNDL	One or more of the specified cursor handles is invalid or NULL.

See also

DbiLinkDetailToExp, DbiUnlinkDetail, DbiSetRange

C Examples: DbLinkDetail

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbLinkDetail

An example for this function is under development and will be provided in an upcoming Help release.

DbiLinkDetailToExp {button C
Examples,JI(">example","exdbilinkdetailtoexp")} {button Delphi
Examples,JI(">example","dexdbilinkdetailtoexp")}

C syntax

```
DBIResult DBIFN DbiLinkDetailToExp (hCursorMstr, hCursorDetl, iKeyLen,  
    pszMstrExp);
```

Delphi syntax

```
function DbiLinkDetailToExp (hCursorMstr: hDBICur; hCursorDetl: hDBICur;  
    iKeyLen: Word; pszMstrExp: PChar): DBIResult stdcall;
```

Description

DbiLinkDetailToExp links the detail cursor to the master cursor using a dBASE expression.

Parameters

hCursorMstr Type: hDBICur (Input)

Specifies the cursor handle associated with the master table. Must be a cursor on a dBASE table. The cursor does not have to be opened on an index.

hCursorDetl Type: hDBICur (Input)

Specifies the cursor handle associated with the detail table. The cursor must be ordered on an index corresponding to the provided expression, and the cursor must be open on a dBASE table.

iKeyLen Type: UINT16 (Input)

Specifies the length of the key to match.

pszMstrExp Type: pCHAR (Input)

Pointer to the expression string. Must be a valid dBASE expression whose key type is the same as the active index of the detail table.

Usage

This function is supported by the dBASE driver only.

dBASE: This function is used to establish one-to-many or one-to-one relationships, using expressions. This function is used to create linked cursors so that the master cursor is on a dBASE table and the link is a dBASE-style expression, not a set of fields.

Prerequisites

hCursorMstr and *hCursorDetl* must be link cursors. This is done by calling *DbiBeginLinkMode* for both master and detail cursor. For the tables to be linked, both cursor handles must be obtained on a dBASE table.

Completion state

The linked cursors are set up such that the detail cursor shows only records that match the linking value of the master record.

DbiResult return values

DBIERR_NONE The specified detail cursor was successfully linked to the specified master cursor.

DBIERR_INVALIDHNDL One or more of the specified cursor handles is invalid or NULL.

DBIERR_INVALIDLINKEXPR The expression used was invalid.

See also

[DbiLinkDetail](#), [DbiUnlinkDetail](#)

C Examples: DbilinkDetailToExp

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbLinkDetailToExp

An example for this function is under development and will be provided in an upcoming Help release.

DbiLoadDriver {button C
Examples,JI(">example","exdbiloaddriver")} {button Delphi
Examples,JI(">example","dexdbiloaddriver")}

C syntax

```
DBIResult DBIFN DbiLoadDriver (pszDriverType);
```

Delphi syntax

```
function DbiLoadDriver (pszDriverType: PChar): DBIResult stdcall;
```

Description

DbiLoadDriver loads a given driver. Use DbiOpenDriverList to get list of valid drivers.

Parameters

pszDriverType Type: pCHAR (Input)
Pointer to the driver name.

DbiResult return values

DBIERR_NONE The driver has been loaded successfully.

See also

[DbiOpenDriverList](#)

C Examples: DbiloadDriver

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiLoadDriver

Load a given driver.

This example uses the following input:

```
fDbiLoadDriver('PARADOX')
```

```
Procedure fDbiLoadDriver(DriverType: string);  
begin  
  Check(DbiLoadDriver(PChar(DriverType)));  
end;
```


C Examples: DbiMakePermanent

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiMakePermanent

An example for this function is under development and will be provided in an upcoming Help release.

DbiModifyRecord {button C
Examples,JI(">example","exdbimodifyrecord")} {button Delphi
Examples,JI(">example","dexdbimodifyrecord")}

C syntax

```
DBIResult DBIFN DbiModifyRecord (hCursor, pRecBuf, bFreeLock);
```

Delphi syntax

```
function DbiModifyRecord (hCursor: hDBICur; pRecBuf: Pointer; bFreeLock:  
    Bool): DBIResult stdcall;
```

Description

DbiModifyRecord modifies the current record of the table associated with *hCursor* with the data supplied in *pRecBuf*.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle for the table. The cursor must be positioned on a valid record.

pRecBuf Type: pBYTE (Input)

Pointer to the client buffer where the modified record is stored.

bFreeLock Type: BOOL (Input)

Specifies whether to release locks on completion. If set to TRUE, the lock is released on the updated record when DbiModifyRecord completes. If set to FALSE, the lock is not released.

Usage

Paradox: Before the table is updated, any referential integrity requirements or validity checks in place are verified. If any fail, an error is returned and the operation is canceled.

SQL: Tables must be opened with write access. If the table has no unique index or server row ID (this includes views), DbiModifyRecord can be used to modify records if the server supports it. However, if you attempt to modify a record that has a duplicate, you will receive an error.

If the record is locked (using dbiREADLOCK or dbiWRITELOCK), and the user tries to modify the record after another user has deleted the record or changed the key value for the record, DbiModifyRecord returns a DBIERR_KEYORRECDELETED error.

Prerequisites

The cursor must be positioned on a record, not on a crack, beginning of file, or end of file. The user must have read-write access to the table. The record must not be locked by another session.

Completion state

The cursor is positioned on the updated record. An error is returned if there is no current record for the cursor. If the key has changed, DbiModifyRecord is equivalent to calling first DbiDeleteRecord then DbiInsertRecord. When a record is modified in a table that has an active index, the position of the modified record may change if the key value was modified.

If the client requests to keep a lock on a modified record, and the record flies outside a current range or filter condition, the function returns DBIERR_RECLOCKFAILED and the operation fails.

DbiResult return values

DBIERR_NONE	The record was modified successfully.
DBIERR_KEYVIOL	The table has a unique index and the modified key value conflicts with another record's key value.
DBIERR_BOF/EOF	The cursor is not positioned on a valid record; it is positioned at the beginning or the end of the table.
DBIERR_FILELOCKED	The table is locked by another user.

DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified record buffer is NULL.
DBIERR_KEYORRECDELETED	The specified cursor is not positioned on a valid record.
DBIERR_FOREIEGNKEYERR	The target table is a detail table in a referential integrity link and the linking value cannot be found in the master table (Paradox only).
DBIERR_MINVALERR	The specified data is less than the required minimum value.
DBIERR_MAXVALERR	The specified data is greater than the required maximum value.
DBIERR_REQDERR	The field cannot be blank.
DBIERR_LOOKUPTABLEERR	The specified value cannot be located in the assigned lookup table.
DBIERR_NOTSUFFTABLERIGHTS	Insufficient table rights to update table.
DBIERR_TABLEREADONLY	The specified cursor is read-only.
DBIERR_RECLOCKFAILED	The record lock failed.
DBIERR_MULTIPLEUNIQRECS	Attempt to modify a record that has a duplicate (SQL).

See also

[DbiDeleteRecord](#), [DbiInitRecord](#), [DbiPutField](#), [DbiGetNextRecord](#), [DbiGetRecord](#), [DbiGetField](#), [DbiAppendRecord](#), [DbiInsertRecord](#), [DbiGetBlob](#), [DbiPutBlob](#), [DbiOpenBlob](#), [DbiFreeBlob](#)

C Examples: DbiModifyRecord

Modify the current record and remove the record lock (if one exists)

This example uses the following input:

```
fDbiModifyRecord(hCur, pRecBuf);  
DBIResult fDbiModifyRecord(hDBICur hTmpCur, pBYTE pTmpRecBuf)  
{  
    DBIResult    rslt;  
    rslt = Chk(DbiModifyRecord(hTmpCur, pTmpRecBuf, TRUE));  
    return rslt;  
}
```

Delphi Examples: DbiModifyRecord

Modify the current record and remove the record lock (if one exists)

Delphi programs should use the Post and Edit methods on a dataset to modify a record. This procedure modifies the current record with the contents of the given record buffer.

```
procedure fDbiModifyRecord(hCur: hDbiCur; pRecBufModify: pByte);
begin
    Check(DbiModifyRecord(hCur, pRecBufModify, True));
end;
```

DbiNativeToAnsi {button C
Examples,JI(">example","exdbinativetoansi")} {button Delphi
Examples,JI(">example","dexdbinativetoansi")}

C syntax

```
DBIResult DBIFN DbiNativeToAnsi (pLdObj, pAnsiStr, pOemStr, iLen,  
    pbDataLoss);
```

Delphi syntax

```
function DbiNativeToAnsi (LdObj: Pointer; pAnsiStr: PChar; pNativeStr: PChar;  
    iLen: Word; var bDataLoss: Bool): DBIResult stdcall;
```

Description

DbiNativeToAnsi translates strings from the language driver's native character set to ANSI. If the native character set is ANSI, no translation takes place.

Parameters

pLdObj Type: pVOID (Input)
Pointer to the language driver object returned from DbiGetLdObj.

pAnsiStr Type: pCHAR (Output)
Pointer to the client buffer that returns the ANSI data. If *pAnsiStr* equals *pOemStr*, conversion occurs in place.

pOemStr Type: pCHAR (Input)
Pointer to the buffer containing data to be translated.

iLen Type: UINT16 (Input)
If *iLen* equals 0, assumes null-terminated string; otherwise, *iLen* specifies the length of the buffer to convert.

pbDataLoss Type: pBOOL (Output)
Pointer to a client variable. Set to TRUE if a character cannot map to an ANSI character.

Usage

This function works on drivers having both ANSI and OEM native character sets, but it does not deal with multi-byte character sets such as Japanese ShiftJIS. If the native character set is ANSI, no translation takes place.

DbiResult return values

DBIERR_NONE Translation completed successfully.

See also

[DbiAnsiToNative](#), [DbiGetLdObj](#)

C Examples: DbiNativeToAnsi

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiNativeToAnsi

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenBlob {button C Examples,JI(">example","exdbigetblob")} {button Delphi Examples,JI(">example","dexdbigetblob")}

C syntax

```
DBIResult DBIFN DbiOpenBlob (hCursor, pRecBuf, iField, eOpenMode);
```

Delphi syntax

```
function DbiOpenBlob (hCursor: hDBICur; pRecBuf: Pointer; iField: Word; eOpenMode: DBIOpenMode): DBIResult stdcall;
```

Description

DbiOpenBlob prepares the cursor's record buffer to access a BLOB field. The BLOB is opened and the BLOB handle is stored in the record buffer, which can then be passed to DbiGetBlob, DbiPutBlob, and other BLOB functions.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pRecBuf Type: pBYTE (Input)
Pointer to the record buffer.

iField Type: UINT16 (Input)
Specifies the ordinal number of the BLOB field within the record.

eOpenMode Type: DBIOpenMode (Input)
Specifies the BLOB open mode.

If dbiREADWRITE is specified, both the database and the table must be opened in dbiREADWRITE mode.

Usage

DbiOpenBlob opens the BLOB and stores the supplied BLOB handle in *pRecBuf* so that all or portions of the BLOB field can be retrieved, modified, deleted, or inserted, and the size of the field can be determined. The BLOB field can be opened in either read-only or read-write mode, depending on the value specified in *eOpenMode*.

DbiOpenBlob must be called prior to calling the BLOB functions DbiGetBlobSize, DbiGetBlob, DbiPutBlob, DbiTruncateBlob, or DbiFreeBlob.

Standard: It is advisable to lock the record before opening the BLOB in read-write mode. This ensures that another client application does not lock the record or update the BLOB, preventing the record from being updated.

SQL: This function is supported by SQL drivers. However, for SQL servers that do not support BLOB handles for random reads and writes, full BLOB support requires uniquely identifiable rows. Most SQL servers limit a single sequential BLOB read to less than the maximum size of a BLOB. In cases with no row uniqueness and without BLOB handles, an entire BLOB may not be available.

Completion state

DbiOpenBlob fails if the client application does not have sufficient rights to access the BLOB field. To close a BLOB field after it has been opened with DbiOpenBlob, a call to DbiFreeBlob must be made.

DbiResult return values

DBIERR_NONE	The BLOB field was successfully opened.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified record buffer is NULL.
DBIERR_OUTOFRANGE	The specified field number is equal to zero, or is greater than the number of fields in the table.

DBIERR_BLOBOPENED	The specified BLOB field is already open.
DBIERR_NOTABLOB	The specified field number does not correspond to a BLOB field.
DBIERR_OPENBLOBLIMIT	The allowed number of open BLOB handles for the current driver has been exceeded.
DBIERR_TABLEREADONLY	The BLOB cannot be opened in read-write mode; the table is read-only.

See also

[DbiGetBlob](#), [DbiPutBlob](#), [DbiTruncateBlob](#), [DbiFreeBlob](#), [DbiGetBlobSize](#)

DbiOpenCfgInfoList {button C Examples,JI(">example","exdbiopencfginfolist")} {button Delphi Examples,JI(">example","dexdbiopencfginfolist")}

C syntax

```
DBIResult DBIFN DbiOpenCfgInfoList (hCfg, eOpenMode, eConfigMode, pszCfgPath, phCur);
```

Delphi syntax

```
function DbiOpenCfgInfoList (hCfg: hDBICfg; eOpenMode: DBIOpenMode; eConfigMode: CFGMode; pszCfgPath: PChar; var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenCfgInfoList returns a handle to a list of all the nodes in the BDE configuration file accessible by the specified path.

Parameters

hCfg Type: hDBICfg (Input)
Specifies the configuration file handle; must be NULL.

eOpenMode Type: DBIOpenMode (Input)
Specifies the open mode; choose dbiREADWRITE or dbiREADONLY.

eConfigMode Type: CFGMode (Input)
Specifies the configuration mode; only cfgPersistent is supported.

pszCfgPath Type: pCHAR (Input)
Pointer to the configuration file path name used to locate a piece of information within the configuration file. The path name starts at the root, denoted by a backslash (\). As many levels as necessary to locate the target piece of information may be specified. Each node specified in the path name must have at least one subnode or an error results. The path name must be NULL-terminated. See the Usage section for an example.

phCur Type: phDBICur (Output)
Pointer to a cursor handle.

Usage

This function can be used to retrieve information from the configuration file about BDE drivers, internal buffers, and aliases by supplying a known path in *pszConfigPath*.

DbiOpenCfgInfoList accesses the same configuration file that was used when BDE was initialized. If no configuration file was used during Dbilnit, an empty table is returned.

The full path name is supplied by *pszConfigPath*, starting at the root, and then subsequently specifying the name of a node, a backslash (\), one of the node's subnodes, and so on until the desired level is reached. For example, to retrieve the values used to initialize BDE, the *pszConfigPath* passed in would be:

```
\system\init
```

phCur then receives the handle to a table containing a list of records, each representing a node accessible by the specified path name. The cursor is used by subsequent record manipulation calls such as DbiGetNextRecord and DbiGetPriorRecord. DbiGetCursorProps can be used to allocate the proper record size or the client application can allocate the size of the CFGDesc structure. After the record is retrieved it can be cast with the CFGDesc type definition and used as if it is a CFGDesc C language structure.

DbiModifyRecord can also be used with the cursor with the following restrictions:

- *szValue* is the only field that can be updated.
- Only leaf nodes can be modified.

This function can also be used to build a path name to a target piece of information within the configuration file, when the path name is not known. In that case, the first call to `DbiOpenCfgInfoList` is passed with `pszConfigPath` set to backslash (\). The table returned lists all the nodes accessible to the root. If these nodes do not contain the target information (in `szText[MAXSCFDLEN]`), subsequent calls to `DbiOpenCfgInfoList` can be made, each one extending the path name to access one level deeper in the configuration file.

Prerequisites

The database engine must be initialized with a configuration file.

DbiResult return values

<code>DBIERR_NONE</code>	The handle to the table listing configuration file information was returned successfully.
<code>DBIERR_INVALIDHNDL</code>	The specified cursor handle is invalid or NULL.
<code>DBIERR_INVALIDPARAM</code>	The specified record buffer is NULL.

See also

[DbiInit](#), [DbiOpenDatabaseList](#), [DbiOpenDriverList](#)

C Examples: DbiOpenCfgInfoList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenCfgInfoList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenDatabase {button C Examples,JI(">example","exdbiopendatabase")} {button Delphi Examples,JI(">example","dexdbiopendatabase")}

C syntax

```
DBIResult DBIFN DbiOpenDatabase (pszDbName, pszDbType, eOpenMode, eShareMode, [pszPassword], iOptFlds, pOptFldDesc, pOptParams, phDb);
```

Delphi syntax

```
function DbiOpenDatabase (pszDbName: PChar; pszDbType: PChar; eOpenMode: DBIOpenMode; eShareMode: DBIShareMode; pszPassword: PChar; iOptFlds: Word; pOptFldDesc: pFLDDesc; pOptParams: Pointer; var hDb: hDBIDb): DBIResult stdcall;
```

Description

DbiOpenDatabase is called to open a database in the current session. On success, a database handle is returned.

Parameters

pszDbName Type: pCHAR (Input)

Pointer to the alias name string defined in the configuration file. Optional. If NULL, the standard database is opened. If *pszDbName* specifies a SQL database, *pszDbType* can be NULL.

pszDbType Type: pCHAR (Input)

Pointer to the database type string. Optional. If both *pszDbName* and *pszDbType* are NULL, a standard database is opened.

eOpenMode Type: DBIOpenMode (Input)

Specifies the open mode.

eShareMode Type: DBIShareMode (Input)

Specifies the share mode.

pszPassword Type: pCHAR (Input)

Pointer to the password string. Optional. SQL only.

iOptFlds Type: UINT16 (Input)

Specifies the number of optional parameters. Refer to DbiCreateTable for use of optional parameters.

pOptFldDesc Type: pFLDDesc (Input)

Pointer to an array of field descriptors for the optional parameters. Refer to DbiCreateTable for use of optional parameters.

pOptParams Type: pBYTE (Input)

Pointer to the optional parameters required by the database. Refer to DbiCreateTable for use of optional parameters.

phDb Type: phDBIDb (Output)

Pointer to the database handle.

Usage

The database must be opened before a table can be opened in the database.

The database handle is passed into several functions. The values in *pszDbName* and *pszDbType* determine which database is opened. The *eOpenMode* and *eShareMode* parameters determine the access modes of the cursors within each database. For example, if *eOpenMode* is set to dbiREADONLY, its associated cursors are also READONLY.

SQL: SQL configuration file settings might override the *eOpenMode* setting.

OptFields, *pOptFldDesc* and *pOptParams* are the optional parameters. The optional parameters passed by this function vary depending on the driver. They can be identified by calling the DbiOpenCfgInfoList function.

Standard: Connecting to a standard database:

- If *pszDbName* and *pszDbType* are both set to NULL, the unnamed standard database is opened.
- If *pszDbName* specifies an alias for a standard database in the configuration file, this database is opened.

SQL: Connecting to a SQL database:

- If *pszDbName* specifies a SQL ALIAS from the configuration file, *pszDbType* is NULL, and *iOptFids* is 0, a SQL database is opened. (Supply the password if required.)
- If *pszDbName* is NULL, and *pszDbType* is one of the SQL driver names (for example, Oracle, Sybase), a SQL database is opened. If optional parameters are not specified, driver-specific defaults are used.

Prerequisites

DbiInit must be called prior to calling DbiOpenDatabase. The database must be successfully opened before any other calls can be made to access or manipulate data. If the database requires login, a password must be supplied.

DbiResult return values

DBIERR_NONE	The database was successfully opened.
DBIERR_UNKNOWNDB	The specified database or database type is invalid.
DBIERR_NOCONFIGFILE	The configuration file was not found.
DBIERR_INVALIDDBSPEC	When using an alias from the configuration file, the specification is invalid.
DBIERR_DBLIMIT	The maximum number of databases have been opened.

See also

DbiOpenTableList, DbiGetDatabaseDesc

Database Types

Examples of database types include:

- STANDARD
- ORACLE
- SYBASE
- INTRBASE

C Examples: DbiOpenDatabase

Example 1: Open a standard database using an alias name.

This example uses the following input:

```
fDbiOpenDatabase1(&hDb, "MyAlias");
DBIResult fDbiOpenDatabase1(phDBIDb phDb, pCHAR alias)
{
    DBIResult    rslt;
    rslt = Chk(DbiOpenDatabase(alias, NULL, dbiREADWRITE, dbiOPENSHARED,
        NULL, 0, NULL, NULL, phDb));
    return rslt;
}
```

Example 2: Open a standard database with no alias name.

To access tables in a directory other than the current, you must call DbiSetDirectory. This example uses the following input:

```
fDbiOpenDatabase2(&hDb, "C:\\MyDir\\Tables");
DBIResult fDbiOpenDatabase2(phDBIDb phDb, pCHAR Directory)
{
    DBIResult    rslt;
    rslt = Chk(DbiOpenDatabase(NULL, NULL, dbiREADWRITE, dbiOPENSHARED,
        NULL, 0, NULL, NULL, phDb));

    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiSetDirectory(*phDb, Directory));
    return rslt;
}
```

Example 3: Open a remote database with alias and password..

This example uses the following input:

```
fDbiOpenDatabase3(&hDb, "MyAlias", "MyPswd");
DBIResult fDbiOpenDatabase3(phDBIDb phDb, pCHAR alias, pCHAR password)
{
    DBIResult    rslt;
    rslt = Chk(DbiOpenDatabase(alias, NULL, dbiREADWRITE, dbiOPENSHARED,
        password, 0, NULL, NULL, phDb));
    return rslt;
}
```

Example 4: Open a remote database with a different user name than what is specified on the alias.

This example uses the following input:

```
fDbiOpenDatabase4(&hDb, "IBPerfect", "USER1", "password1");
DBIResult fDbiOpenDatabase4(phDBIDb phDb, pCHAR alias, pCHAR UserName, pCHAR
    password)
{
    FLDDesc      UserNameDesc;

    memset(&UserNameDesc, 0, sizeof(UserNameDesc));
    UserNameDesc.iOffset = 0;
    UserNameDesc.iLen = (UINT16)(strlen(UserName) + 1);
    strcpy(UserNameDesc.szName, "USER NAME");
    return Chk(DbiOpenDatabase(alias, NULL, dbiREADWRITE, dbiOPENSHARED,
        password, 1, &UserNameDesc, (pBYTE)UserName, phDb));
}
```


Delphi Examples: DbOpenDatabase

Example 1: Open a local database:

```
procedure fDbOpenDatabase1(var hDb: hDbiDb; Alias: String);
begin
    Check(DbOpenDatabase(PChar(Alias), nil, dbiReadWrite, dbiOpenShared,
        nil, 0, nil, nil, hDb));
end;
```

Example 2: Open a NULL database (for in-memory or temp tables)

Set the directory for the tables (temp tables only).

```
procedure fDbOpenDatabase2(var hDb: hDbiDb; Directory: String);
begin
    Check(DbOpenDatabase(nil, nil, dbiREADWRITE, dbiOPENSHARED,
        nil, 0, nil, nil, hDb));
    Check(DbSetDirectory(hDb, PChar(Directory)));
end;
```

Example 3: Open a remote database with alias and password.

```
procedure fDbOpenDatabase3(var hDb: hDbiDb; Alias, Password: String);
begin
    Check(DbOpenDatabase(PChar(Alias), nil, dbiREADWRITE, dbiOPENSHARED,
        PChar(Password), 0, nil, nil, hDb));
end;
```

Example 4: Open a database with a user name other than the one specified in the BDE configuration.

This example uses the following input:

```
fDbOpenDatabase3(hDb, 'IBLOCAL', 'sysdba', 'speedy');
procedure fDbOpenDatabase3(var hTmpDb: hDbiDb; Alias, UserName, Password:
    String);
var
    Options: FLDDesc;

begin
    FillChar(Options, sizeof(Options), #0);
    Options.iOffset := 0;
    Options.iLen := Length(UserName) + 1;
    StrPCopy(Options.szName, 'USER NAME');
    Check(DbOpenDatabase(PChar(Alias), nil, dbiREADWRITE, dbiOPENSHARED,
        PChar(Password), 1, @Options, PChar(UserName), hTmpDb));
end;
```

DbiOpenDatabaseList {button C
Examples,JI(">example","exdbiopendatabaselist")} {button Delphi
Examples,JI(">example","dexdbiopendatabaselist")}

C syntax

```
DBIResult DBIFN DbiOpenDatabaseList (phCur);
```

Delphi syntax

```
function DbiOpenDatabaseList (var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenDatabaseList returns a cursor on a list of accessible databases (and all aliases) found in the configuration file.

Parameters

phCur Type: phDBIcur (Output)
Pointer to an in-memory table.

Usage

Accessible databases are those that are defined within the configuration file. The cursor should be closed after information retrieval is complete. Each of the database records can be retrieved by using [DbiGetNextRecord](#). [DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can be cast with the [DBDesc](#) type definition, and used like an DBDesc C language structure.

Completion state

A cursor on a list of accessible databases is returned. The cursor is positioned before the first record.

DbiResult return values

DBIERR_NONE	The table was created successfully.
DBIERR_INVALIDHNDL	<i>phCur</i> is NULL.

See also

[DbiGetDatabaseDesc](#)

C Examples: DbiOpenDatabaseList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenDatabaseList

Return a list of accessible databases and all aliases found in the configuration file.

This example uses the following input:

```
fDbOpenDatabaseList(DatabaseList);
procedure fDbOpenDatabaseList(DatabaseList: TStringList);
var
  TmpCursor: hDbiCur;
  Database: DBDesc;
  rslt: DbiResult;
begin
  DatabaseList.Clear;
  Check(DbiOpenDatabaseList(TmpCursor));
  repeat
    rslt:= DbiGetNextRecord(TmpCursor, dbiNOLOCK, @Database, nil);
    if (rslt <> DBIERR_EOF) then
      begin
        DatabaseList.Add(StrPas(Database.szName)
          + ' - ' + StrPas(Database.szPhyName)
          + ' - ' + StrPas(Database.szDbType))
        end;
  until rslt <> DBIERR_NONE;
  Check(DbiCloseCursor(TmpCursor));
end;
```

DbiOpenDriverList {button C
Examples,JI(">example","exdbiopendriverlist")} {button Delphi
Examples,JI(">example","dexdbiopendriverlist")}

C syntax

```
DBIResult DBIFN DbiOpenDriverList (phCur);
```

Delphi syntax

```
function DbiOpenDriverList (var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenDriverList creates a list of driver names available to the client application.

Parameters

phCur Type: phDBICur (Output)
Pointer to the cursor handle.

Usage

The list of drivers is obtained from the Registry and can be used as input to other functions. If no no drivers were configured, an error is returned. The table contains only one CHAR field (of size DBINAME), the name of the driver. It does *not* contain all the information contained in DRVType structure.

DbiResult return values

DBIERR_NONE	The table containing a list of the available drivers was successfully created.
DBIERR_INVALIDHNDL	<i>phCur</i> is NULL.
DBIERR_NOCONFIGFILE	No configuration file was available at initialization time.
DBIERR_OBJNOTFOUND	No drivers were configured at initialization time.

See also

[DbiGetDriverDesc](#)

C Examples: DbiOpenDriverList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiOpenDriverList

Return a list of driver names available to the client application.

This example uses the following input:

```
fDbiOpenDriverList(DriverList);
```

```
procedure fDbiOpenDriverList(var DriverList: TStringList);
var
  TmpCursor: hdbicur;
  Driver: DRVType;
  rslt: dbiResult;
begin
  Check(DbiOpenDriverList(TmpCursor));
  DriverList.Clear;
  repeat
    rslt:= DbiGetNextRecord(TmpCursor, dbiNOLOCK, @Driver, nil);
    if (rslt <> DBIERR_EOF) then
      begin
        DriverList.Add(StrPas(Driver.szType))
      end;
  until rslt <> DBIERR_NONE;
  Check(DbiCloseCursor(TmpCursor));
end;
```

DbiOpenFamilyList {button C Examples,JI(">example","exdbiopenfamilylist")} {button Delphi Examples,JI(">example","dexdbiopenfamilylist")}

C syntax

```
DBIResult DBIFN DbiOpenFamilyList (hDb, pszTableName, [pszDriverType],  
    phFmlCur);
```

Delphi syntax

```
function DbiOpenFamilyList (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar; var hFmlCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenFamilyList creates a table listing the family members associated with a specified table. Each of the family records can be retrieved by using [DbiGetNextRecord](#). [DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can be cast with the [FMLDesc](#) type definition, and used like an FMLDesc C language structure.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

pszTableName Type: pCHAR (Input)
Pointer to the table name. If *pszTableName* is a fully qualified name of a table, the *pszTableType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

pszDriverType Type: pCHAR (Input)
Pointer to the table type. Optional. This parameter is required if *pszTableName* has no extension. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

phFmlCur Type: phDBICur (Output)
Pointer to the family list table.

Usage

Family members include default members, as specified by the driver, and registered family members.

dBASE: For dBASE tables, the table can include maintained index files (.MDX files), BLOBs (.DBT files), and tables (.DBF files).

Paradox: For Paradox tables, the table can include index files (.PX, .X??, .Y?? files), BLOBs (.MB files), and validity check and referential integrity files (.VAL files).

SQL: This function is not supported with SQL tables. With SQL databases, this function returns an empty table.

Prerequisites

The user must have full password rights to the table; that is, any required passwords to get prvFULL rights must have been added to the current session prior to calling this function.

DbiResult return values

DBIERR_NONE	The table of family members was successfully created.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL, or phFmlCur is NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_NOSUCHTABLE	The specified table is invalid.
DBIERR_UNKNOWNDRIVER	The table type or the pointer to the table type is NULL, or the table type is invalid.

See also

DbiOpenFileList, DbiOpenFieldList, DbiOpenIndexList, DbiOpenRintList, DbiOpenSecurityList

C Examples: DbiOpenFamilyList

Create a table listing all family members associated with a table.

```
DBIResult fDbiOpenFamilyList(hDBIDb hDb, pCHAR TblName)
{
    DBIResult      rslt;
    hDBICur        hFmlCur;
    FMLDesc        FmlDesc;
    rslt = Chk(DbiOpenFamilyList(hDb, TblName, NULL, &hFmlCur));
    rslt = Chk(DbiGetNextRecord(hFmlCur, dbiNOLOCK,
                               (pBYTE)&FmlDesc, NULL));
    return rslt;
}
```

Delphi Examples: DbOpenFamilyList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenFieldList {button C
Examples,JI(">example","exdbiopenfieldlist")} {button Delphi
Examples,JI(">example","dexdbiopenfieldlist")}

C syntax

```
DBIResult DBIFN DbiOpenFieldList (hDb, pszTableName, [pszDriverType],  
    bPhyTypes, phCur);
```

Delphi syntax

```
function DbiOpenFieldList (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar; bPhyTypes: Bool; var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenFieldList creates a table listing of fields in a specified table and their descriptions.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

pszTableName Type: pCHAR (Input)

Pointer to the table name. For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)

Pointer to the table type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

bPhyTypes Type: BOOL (Input)

Specifies whether physical or logical field types are returned. Physical types represent the data in its native state, specific to each driver. Logical types are the generic, derived BDE translations of the native data types. *bPhyTypes* can be set to TRUE or FALSE. TRUE indicates that native physical types are returned; FALSE indicates that BDE logical types are returned.

phCur Type: phDBICur (Output)

Pointer to the field list table.

Usage

This function retrieves field information from a closed table, as opposed to `DbiGetFldDescs` which uses an opened table. After the record is retrieved, it can be cast with the `FLDDesc` type definition, and used like a `FLDDesc` C language structure.

DbiResult return values

DBIERR_NONE	The cursor to the table was returned successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_UNKNOWNBLTYPE	The specified driver type is not known.
DBIERR_NOSUCHTABLE	The specified table is invalid.

See also

[DbiOpenFileList](#), [DbiOpenTableList](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiOpenFamilyList](#), [DbiSetDirectory](#), [DbiGetCursorProps](#), [DbiGetFieldDescs](#)

C Examples: DbiOpenFieldList

Get the field names for the specified table:

For standard tables, the extension must be specified. The Fields variable must have sufficient space allocated for function to use. This example uses the following input:

```
fDbiOpenFieldList(hDb, "customer.db", FieldNames);
```

```
DBIResult fDbiOpenFieldList(hDBIDb hTmpDb, pCHAR TblName, pCHAR Fields)
{
    FLDDesc      FldDesc;
    DBIResult    rslt;
    hDBICur      hTmpCur = 0;
    Fields[0] = '\0';
    rslt = Chk(DbiOpenFieldList(hTmpDb, TblName, NULL, FALSE, &hTmpCur));
    while (DbiGetNextRecord(hTmpCur, dbiNOLOCK, (pBYTE)&FldDesc, NULL) ==
    DBIERR_NONE)
    {
        strcat(Fields, FldDesc.szName);
        strcat(Fields, " ");
    }
    if (hTmpCur != 0)
        DbiCloseCursor(&hTmpCur);
    return rslt;
}
```

Delphi Examples: DbOpenFieldList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenFieldTypesList {button C
Examples,JI(">example","exdbiopenfieldtypeslist")} {button Delphi
Examples,JI(">example","dexdbiopenfieldtypeslist")}

C syntax

```
DBIResult DBIFN DbiOpenFieldTypesList (pszDriverType, [pszTblType], phCur);
```

Delphi syntax

```
function DbiOpenFieldTypesList (pszDriverType: PChar; pszTblType: PChar;  
    hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenFieldTypesList creates a table containing a list of field types supported by the table type for the driver type.

Parameters

pszDriverType Type: pCHAR (Input)

Pointer to the driver type. Driver type must be found in the Registry.

pszTblType Type: pCHAR (Input)

Pointer to the table type. Use DbiOpenTableTypesList to retrieve table type information. If *pszTblType* is not specified, the default table type is used. Optional.

phCur Type: phDbiCur (Output)

Pointer to the cursor handle.

Usage

This function can be used to determine the legal field types, sizes, and other field-level attributes for a particular driver and table type. This allows configurable table creation UIs and allows for validation of field types ([FLDType](#)) without creating a table.

DbiResult return values

DBIERR_NONE The table with the list of field types was created successfully.

DBIERR_UNKNOWNDRIVER Invalid *pszDriverType* passed as input.

See also

[DbiGetFieldTypeDesc](#)

C Examples: DbiOpenFieldTypesList

Get the field types for the specified driver.

The Types variable must have sufficient space allocated for function to use. This example uses the following input:

```
fDbiOpenFieldTypesList(szDBASE, Buffer);
DBIResult fDbiOpenFieldTypesList(pCHAR Driver, pCHAR Types)
{
    DBIResult      rslt;
    hDBICur        hTmpCur = 0;
    FLDType        FldType;
    Types[0] = '\0';
    rslt = Chk(DbiOpenFieldTypesList(Driver, NULL, &hTmpCur));
    while (DbiGetNextRecord(hTmpCur, dbiNOLOCK, (pBYTE)&FldType, NULL) ==
        DBIERR_NONE)
    {
        strcat(Types, FldType.szName);
        strcat(Types, " ");
    }
    if (hTmpCur != 0)
        DbiCloseCursor(&hTmpCur);
    return rslt;
}
```


Delphi Examples: DbOpenFieldTypesList

Obtain field types for the driver and append the information to the TStringList passed in.

This example uses the following input:

```
fDbOpenFieldTypesList(TmpList, szParadox, 'PDOX 7.0');  
procedure fDbOpenFieldTypesList(FieldTypeList: TStringList; DrvType,  
  TblType: string);  
var  
  TmpCursor: hDbiCur;  
  FieldType: FLDType;  
  result: dbiResult;  
begin  
  Check(DbOpenFieldTypesList(PChar(DrvType), PChar(TblType), TmpCursor));  
  FieldTypeList.Clear;  
  repeat  
    result:= DbGetNextRecord(TmpCursor, dbiNOLOCK, @FieldType, nil);  
    if (result <> DBIERR_EOF) then  
    begin  
      FieldTypeList.Add('Field Name: ' + FieldType.szName);  
    end;  
  until Result <> DBIERR_NONE;  
  Check(DbCloseCursor(TmpCursor));  
end;
```

DbiOpenFieldXlt {button C
Examples,JI(">example","exdbiopenfieldxlt")} {button Delphi
Examples,JI(">example","dexdbiopenfieldxlt")}

C syntax

```
DBIResult DBIFN DbiOpenFieldXlt (pszSrcDriverType, pszSrcLangDrv, pfldSrc,  
    pszDesDriverType, pszDstLangDrv, pfldDest, pbDataLoss, phXlt);
```

Delphi syntax

```
function DbiOpenFieldXlt (pszSrcTblType: PChar; pszSrcLangDrv: PChar;  
    pfldSrc: pFLDDesc; pszDestTblType : PChar; pszDstLangDrv: PChar; pfldDest:  
    pFLDDesc; var bDataLoss: Bool; var hXlt: hDBIXlt): DBIResult stdcall;
```

Description

DbiOpenFieldXlt builds a field translation object that can be used to translate a logical or physical field type into any other compatible logical or physical field type.

Parameters

pszSrcDriverType Type: pCHAR (Input)
Pointer to the source driver type. Set to NULL for logical.

pszSrcLangDrv Type: pCHAR (Input)
Pointer to the language driver name of the source. Set to NULL if no character set transliteration is desired. Ignored if both source and destination are not character types.

pfldSrc Type: pFLDDesc (Input)
Pointer to the source field descriptor.

pszDesDriverType Type: pCHAR (Input)
Pointer to the destination driver type. Set to NULL for logical.

pszDstLangDrv Type: pCHAR (Input)
Pointer to the language driver name of the destination. Set to NULL if no character set transliteration is desired. Ignored if both source and destination are not character types.

pfldDest Type: pFLDDesc (Input)
Pointer to the destination field descriptor.

pbDataLoss Type: pBOOL (Output)
Pointer to a client variable used to indicate both the possibility of data loss and actual data loss for each field translated when DbiTranslateField is called. If NULL, no data loss detection is done.

phXlt Type: phDBIXlt (Output)
Pointer to the translation object handle.

Usage

This function used in conjunction with [DbiTranslateField](#) allows clients to convert any logical or physical field data to any compatible logical or physical field data. The client supplies a pair of logical or physical field descriptors. These descriptors can be obtained from a call to [DbiGetFieldDescs](#) or [DbiOpenFieldList](#).

If *pbDataLoss* is supplied, this client indicator variable is set to TRUE when the translation object is built if there is the potential for data loss when converting between the source and destination field types. For example, if the user requests a translation object to convert a dBASE character field to a BDE logical TIMESTAMP field, the data loss indicator is set to TRUE, because the character field may not contain a legal TIMESTAMP string according to the current session's DBIDATE and TIME conventions. Additionally, each time DbiTranslateField is called this client flag is set to TRUE if that particular field conversion caused data loss. If supplied, this client variable must remain addressable until the translation object is closed with DbiCloseFieldXlt. For BLOB fields, this function provides a translation object that does nothing.

DbiResult return values

DBIERR_NONE	The translation object was successfully built.
DBIERR_NOTSUPPORTED	The requested field conversion is not considered legal.
DBIERR_INVALIDPARAM	One of the required pointers is NULL.
DBIERR_INVALID_FIELDDESC	One of the field descriptors is invalid.
DBIERR_NO_MEMORY	More space is needed in <i>pbDataLoss</i> .

See also

[DbiTranslateField](#), [DbiCloseFieldXlt](#)

C Examples: DbiOpenFieldXlt

Build a field descriptor object for field translation (physical/logical):

```
DBIResult fDbiOpenFieldXlt(hDBICur hSrcCur, hDBICur hDesCur, phDBIXlt pXlt)
{
    DBIResult      rslt;
    pFLDDesc       psrcFldDesc;
    pFLDDesc       pdesFldDesc;
    CURProps       sCurProps;
    CURProps       dCurProps;
    BOOL           bDataLoss;

    Chk(DbiGetCursorProps(hSrcCur, &sCurProps));
    Chk(DbiGetCursorProps(hDesCur, &dCurProps));
    psrcFldDesc = (pFLDDesc)malloc((sizeof(FLDDesc))*(sCurProps.iFields));
    pdesFldDesc = (pFLDDesc)malloc((sizeof(FLDDesc))*(dCurProps.iFields));
    Chk(DbiGetFieldDescs(hSrcCur, psrcFldDesc));
    Chk(DbiGetFieldDescs(hDesCur, pdesFldDesc));
    rslt = Chk(DbiOpenFieldXlt(szPARADOX, "hebrew", &psrcFldDesc[1],
                              szDBASE, "hebrew", &pdesFldDesc[1],
                              &bDataLoss, pXlt));

    if(bDataLoss == TRUE)
        //Data Loss Possible
    return rslt;
}
```

Delphi Examples: DbiOpenFieldXIt

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenFileList {button C
Examples,JI(">example","exdbiopenfilelist")} {button Delphi
Examples,JI(">example","dexdbiopenfilelist")}

C syntax

```
DBIResult DBIFN DbiOpenFileList (hDb, [pszWild], phCur);
```

Delphi syntax

```
function DbiOpenFileList (hDb: hDBIDb; pszWild: PChar; var hCur: hDBICur):  
    DBIResult stdcall;
```

Description

DbiOpenFileList opens a cursor on a list of files contained within the database.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

pszWild Type: pCHAR (Input)

Pointer to the search string for retrieving a selective list of tables. Two wildcard characters can be used: the asterisk (*) and the question mark (?). The asterisk expands to any number of characters; the question mark expands to a single character.

phCur Type: phDBICur (Output)

Pointer to the file list table.

Usage

Each of the file records can be retrieved by using [DbiGetNextRecord](#). [DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can be cast with the [FILEDesc](#) type definition, and used like an FILEDesc C language structure.

Standard: DbiOpenFileList provides an efficient way to retrieve all the names of files in a database directory. This function returns a list of all files that match the wildcard criteria, if any.

SQL: This function returns information similar to that returned by [DbiOpenTableList](#). Some fields, such as *szExt*, *bDir*, and *iSize*, are not applicable for SQL databases.

Synonyms: Many server vendors (including Oracle) provide objects called *synonyms*. [Synonyms](#) are alternate names for other objects, such as tables or views. [SQL Links](#) provides the option to include synonyms in the table lists returned from [DbiOpenTableList](#) and [DbiOpenFileList](#). See [SQL Links Guide](#)

DbiResult return values

DBIERR_NONE The cursor on the table was opened successfully.

DBIERR_INVALIDHNDL The specified database handle is invalid or NULL, or *phCur* is NULL.

DBIERR_INVALIDPARAM The specified record buffer is NULL.

See also

[DbiOpenDatabase](#), [DbiOpenTableList](#)

pszWild

SQL: The search string has the following format: *<ownername>.<objectname>*. If no period is embedded in the wildcard string, it is assumed that *pszWild* represents a search for the object name only, and that the requested tables are for the current owner.

The following table provides examples of wildcard use for SQL databases:

Setting	Retrieves
NULL	All tables.
.	All tables for all owners. The default if NULL is passed.
*	All tables for the current owner.
*.EMP	All tables named EMP for all owners.
*CUST	All tables for the current owner ending in CUST.

Standard: For standard databases, search conventions are those used by DOS.

C Examples: DbiOpenFileList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenFileList

Return a list of files contained within the database.

This example uses the following input:

```
fDbOpenFileList(Database1.handle, '*.*', MyFileList);  
procedure fDbOpenFileList(hDB: hDbiDb; Wild: string; var FileList:  
  TStringList);  
var  
  TmpCursor: hDbiCur;  
  TmpFileDesc: FileDesc;  
  rslt: dbiResult;  
begin  
  Check(DbOpenFileList(hDB, PChar(Wild), TmpCursor));  
  FileList.Clear;  
  repeat  
    rslt:= DbGetNextRecord(TmpCursor, dbiNOLOCK, @TmpFileDesc, nil);  
    if (rslt <> DBIERR_EOF) then  
    begin  
      FileList.Add(StrPas(TmpFileDesc.szfilename) + '.' +  
        StrPas(TmpFileDesc.szext))  
    end;  
  until rslt <> DBIERR_NONE;  
  Check(DbCloseCursor(TmpCursor));  
end;
```

DbiOpenFunctionArgList {button C Examples,JI(">example","exdbiopenfunctionarglist")} {button Delphi Examples,JI(">example","dexdbiopenfunctionarglist")}

C syntax

```
DBIResult DBIFN DbiOpenFunctionArgList (hDb, pszFuncName, uOverload, phCur);
```

Delphi syntax

```
function DbiOpenFunctionArgList (hDb: hDBIDb; pszFuncName: PChar; uOverload: Word; var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenFunctionArgList opens a cursor to a schema table for the data source function defined by *pszFuncName* for the driver associated with the *hDb*. Record description is of type [DBIFUNCArgDesc](#).

Parameters

<i>hDb</i>	Type: hDBIDb	(Input)
Specifies the universal database handle.		
<i>pszFuncName</i>	Type: pCHAR	(Input)
Name of data source function.		
<i>uOverload</i>	Type: UINT16	(Input)
Overload number, used with functions that take different sets of arguments.		
<i>phCur</i>	Type: phDBICur	(Output)
Specifies returned cursor on the schema table "Arguments"		

Usage

Use DbiOpenFunctionArgList to retrieve the arguments to functions supported by the data source. This information can be useful for clients developing a visual query builder.

When you call DbiOpenFunctionList, you get the number of overloads it can have. By passing the corresponding overload number (*uOverload*) to DbiOpenFunctionArgList you get the list of arguments that function takes with that particular overload number.

```
typedef struct {
    DBINAME      szName;           // Function name
    CHAR         szDesc[255];     // Short description
    UINT16       uOverload;       // Number of function overloads
    FUNCFlags    funcFlags;       // Function flags
} DBIFUNCDesc;
typedef DBIFUNCDesc far *pFUNCDesc;

typedef struct {
    UINT16       uArgNum;         // Argument position num; 0 for fn return
    UINT16       uFldType;       // Field type
    UINT16       uSubType;       // Field subtype (if applicable)
} DBIFUNCArgDesc;
typedef DBIFUNCArgDesc far *pFUNCArgDesc;
```

Prerequisites

DbiInit must be called, and *hDb* must reference a SQL data source.

Completion state

Returns a cursor with the function argument data, which must be closed by using DbiCloseCursor. If *pszFuncName* is not a valid function associated for the driver associated with *hDb*, the cursor

points to an empty table. It returns a 'not applicable' error if the *hDb* is associated with a local table.

DbiResult return values

DBIERR_NONE

The cursor on the table was opened successfully.

DBIERR_INVALIDHNDL

The specified database handle is invalid or NULL, or *phCur* is NULL.

See also

[DbiOpenFunctionList](#)

C Examples: DbiOpenFunctionArgList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenFunctionArgList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenFunctionList **{button C**
Examples,JI(">example","exdbiopenfunctionlist")} **{button Delphi**
Examples,JI(">example","dexdbiopenfunctionlist")}

C syntax

```
DBIResult DBIFN DbiOpenFunctionList (hDb, eUserDefined, phCur);
```

Delphi syntax

```
function DbiOpenFunctionList (hDb: hDBIDb; eoptBits: DBIFUNCOpts; var hCur:  
    hDBICur): DBIResult stdcall;
```

Description

DbiOpenFunctionList opens a cursor to a schema table containing a list of all the functions for the driver associated with *hDb*. Record description is of type [DBIFUNCDesc](#). For SQL data source only.

Parameters

hDb Type: hDBIDb (Input)

Specifies the universal database handle.

eUserDefined Type: DBIFUNCOpts (Input)

Set to `fnListINCL_USER_DEF` (the only setting included in the enumeration) to include user-defined functions. For InterBase only.

phCur Type: phDBICur (Output)

Specifies returned cursor on functions

Usage

Use DbiOpenFunctionList to retrieve the list of functions supported by the data source. This information can be useful for clients developing a visual query builder.

Prerequisites

DbiInit must be called, and *hDb* must reference a SQL data source.

Completion state

Returns a cursor to a schema table that lists all functions supported by the database. When building a SQL query this cursor must be closed with a call to DbiCloseCursor.

DbiResult return values

DBIERR_NOTSUPPORTED DbiOpenFunctionList returns an error if *hDb* is associated with a local table.

See also

[DbiOpenFunctionArgList](#)

C Examples: DbiOpenFunctionList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenFunctionList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenIndex {button C
Examples,JI(">example","exdbiopenindex")} {button Delphi
Examples,JI(">example","dexdbiopenindex")}

C syntax

```
DBIResult DBIFN DbiOpenIndex (hCursor, pszIndexName, iIndexId);
```

Delphi syntax

```
function DbiOpenIndex (hCursor: hDBICur; pszIndexName: PChar; iIndexId:  
    Word): DBIResult stdcall;
```

Description

DbiOpenIndex opens the specified index or indexes for the table associated with the cursor.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

pszIndexName Type: pCHAR (Input)
Pointer to the index name.

iIndexId Type: UINT16 (Input)
Specifies the index number. Used only with Paradox tables.

Usage

dBASE: This function is used to open non-production dBASE indexes. The open index is maintained, but only in the context of this cursor. That is, only updates applied during the use of this cursor maintain the index. If the index is a .MDX index, all tags in that index are opened and maintained.

Paradox: This function can be used only to verify that the specified index exists; it does not open the index. If the index does not exist, an error is returned. With Paradox tables, indexes are automatically opened when the table is opened.

Prerequisites

A valid cursor must be obtained, and the index must exist.

Completion state

DbiOpenIndex does not alter the current record order of the result set or the currency of the cursor. To change the current index order, use DbiSwitchToIndex.

DbiResult return values

DBIERR_NONE	The index was successfully opened on a dBASE table; the index exists on a Paradox table.
DBIERR_INVALIDHNDL	The specified handle is invalid or NULL.
DBIERR_INDEXOPEN	The index is already opened, either implicitly or explicitly.
DBIERR_NOSUCHINDEX	No such index exists for the table.

See also

[DbiAddIndex](#), [DbiCloseIndex](#), [DbiSwitchToIndex](#)

C Examples: DbiOpenIndex

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiOpenIndex

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenIndexList {button C Examples,JI(">example","exdbiopenindexlist")} {button Delphi Examples,JI(">example","dexdbiopenindexlist")}

C syntax

```
DBIResult DBIFN DbiOpenIndexList (hDb, pszTableName, [pszDriverType], phCur);
```

Delphi syntax

```
function DbiOpenIndexList (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar; var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenIndexList opens a cursor on a table listing the indexes on a specified table, along with their descriptions.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

pszTableName Type: pCHAR (Input)

Pointer to the table name for which indexes are to be listed. For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)

Pointer to the driver type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

phCur Type: phDBICur (Output)

Pointer to the cursor handle.

Usage

If there are no indexes, a cursor to an empty table is returned.

Completion state

Each of the index description records can be retrieved using [DbiGetNextRecord](#). [DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can be cast with the [IDXDesc](#) type definition, and used like an [IDXDesc](#) C language structure. This function retrieves index information from a closed table, as opposed to [DbiGetIndexDescs](#) and [DbiGetIndexDesc](#) that use an open table.

DbiResult return values

DBIERR_NONE	The table listing indexes for the table has been created.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL, or <i>phCur</i> is NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_NOSUCHTABLE	The specified table name is invalid.
DBIERR_UNKNOWNTBLTYPE	The specified driver type is invalid.

See also

[DbiGetNextRecord](#), [DbiGetCursorProps](#), [DbiGetIndexDesc](#), [DbiGetIndexDescs](#)

C Examples: DbiOpenIndexList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiOpenIndexList

Return a list of indexes on a specific table.

This example uses the following input:

```
fDbiOpenIndexList(DBASEANIMALS, IndexList);
```

```
procedure fDbiOpenIndexList(Tbl: TTable; var IndexList: TStringList);
var
  TmpCursor: hdbicur;
  rslt: dbiResult;
  IndexDesc: IDXDesc;
begin
  Check(DbiOpenIndexList(Tbl.dbhandle, PChar(Tbl.TableName), nil,
    TmpCursor));
  IndexList.Clear;
  repeat
    rslt:= DbiGetNextRecord(TmpCursor, dbiNOLOCK, @IndexDesc, nil);
    if (rslt <> DBIERR_EOF) then
      begin
        IndexList.Add(StrPas(IndexDesc.szName))
      end;
  until rslt <> DBIERR_NONE;
  Check(DbiCloseCursor(TmpCursor));
end;
```

DbiOpenIndexTypesList {button C
Examples,JI(">example","exdbiopenindextypeslist")} {button Delphi
Examples,JI(">example","dexdbiopenindextypeslist")}

C syntax

```
DBIResult DBIFN DbiOpenIndexTypesList (pszDriverType, phCur);
```

Delphi syntax

```
function DbiOpenIndexTypesList (pszDriverType: PChar; var hCur: hDBICur):  
    DBIResult stdcall;
```

Description

DbiOpenIndexTypesList creates a table containing a list of all supported index types for the driver type.

Parameters

pszDriverType Type: pCHAR (Input)
Pointer to the driver type.

phCur Type: phDBICur (Output)
Pointer to the cursor handle.

Completion state

Each of the index type description records can be retrieved using [DbiGetNextRecord](#).
[DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can
be cast with the [IDXType](#) type definition, and used like an IDXType C language structure.

DbiResult return values

DBIERR_NONE	The list of all supported index types was returned successfully.
DBIERR_UNKNOWNTABLETYPE	The specified driver type is unknown.
DBIERR_INVALIDHNDL	The specified handle is invalid.

See also

[DbiGetIndexDesc](#)

C Examples: DbiOpenIndexTypesList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenIndexTypesList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenLdList {button C
Examples,JI(">example","exdbiopenldlist")} {button Delphi
Examples,JI(">example","dexdbiopenldlist")}

C syntax

```
DBIResult DBIFN DbiOpenLdList (phCur);
```

Delphi syntax

```
function DbiOpenLdList (var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenLdList creates a table containing a list of available language drivers.

Parameters

phCur Type: phDBICur (Output)
Pointer to the cursor handle.

Usage

Each of the language driver records can be retrieved by using [DbiGetNextRecord](#). [DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can be cast with the [LDDesc](#) type definition, and used like an LDDesc C language structure.

DbiResult return values

DBIERR_NONE	The list of available language drivers was returned successfully.
DBIERR_INVALIDHNDL	<i>phCur</i> is NULL.

C Examples: DbiOpenLdList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiOpenLdList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenLockList {button C
Examples,JI(">example","exdbiopenlocklist")} {button Delphi
Examples,JI(">example","dexdbiopenlocklist")}

C syntax

```
DBIResult DBIFN DbiOpenLockList (hCursor, bAllUsers, bAllLockTypes, phLocks);
```

Delphi syntax

```
function DbiOpenLockList (hCursor: hDBICur; bAllUsers: Bool; bAllLockTypes:  
    Bool; var hLocks: hDBICur): DBIResult stdcall;
```

Description

DbiOpenLockList creates an in-memory table containing a list of locks acquired on the table associated with *hCursor*.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

bAllUsers Type: BOOL (Input)

Specifies whether to list locks acquired in the current session only, or to list locks acquired by all sessions. For Paradox tables, *bAllUsers* can be either TRUE or FALSE. If *bAllUsers* is set to TRUE, users for all sessions are listed; if it is set to FALSE, only users for the current session are listed. For dBASE and SQL tables, *bAllUsers* must be set to FALSE. For dBASE, only users for the current session are listed. For SQL, only locks for the current database connection are listed.

bAllLockTypes Type: BOOL (Input)

Specifies whether to include all locks of all types, or record locks only. If set to FALSE, only record locks are listed. If set to TRUE, locks of all types are listed.

phLocks Type: phDBICur (Output)

Pointer to the cursor handle of a table containing the list of locks.

Usage

Retrieve each table lock by using [DbiGetNextRecord](#). After the record is retrieved, it can be cast with the [LOCKDesc](#) type definition.

Paradox: For Paradox tables, the locks on the table are returned, including those placed by the current session and those placed by other users, depending on the value of *bAllUsers*.

dBASE: For dBASE tables, only the locks placed by the current session are returned.

SQL: For SQL tables, only the locks placed by the current database connection are returned.

Prerequisites

A valid cursor handle must be obtained on a base table; this function is not applicable to query cursors or in-memory or temporary table cursors.

Completion state

The cursor is returned in *phLocks*. Lock types returned can include both table and record locks or only record locks, as specified in *bAllLockTypes*.

DbiResult return values

DBIERR_NONE The requested lock list was returned successfully.

DBIERR_INVALIDHNDL The specified cursor handle is invalid or NULL, or *phLocks* is NULL.

See also

[DbiOpenTable](#), [DbiAcqTableLock](#), [DbiAcqPersistTableLock](#)

C Examples: DbiOpenLockList

Retrieve all users on a particular table:

Note: pLockInfo must be large enough to hold data. This example using the following input:

```
char    Buffer[500];
fDbiOpenLockList(hCur, Buffer);
```

```
DBIResult fDbiOpenLockList(hDBICur hTmpCur, pCHAR pLockInfo)
{
    DBIResult    rslt;
    LOCKDesc     LDesc;
    hDBICur      hLockCur = 0;

    strcpy(pLockInfo, "\0");
    rslt = Chk(DbiOpenLockList(hTmpCur, TRUE, TRUE, &hLockCur));
    if (rslt != DBIERR_NONE)
        return rslt;
    while (rslt == DBIERR_NONE)
    {
        rslt = DbiGetNextRecord(hLockCur, dbiNOLOCK, (pBYTE)&LDesc, NULL);
        if (rslt == DBIERR_NONE)
            wsprintf(pLockInfo, "%s\r\nUSER: %s", pLockInfo, LDesc.szUserName);
    }
    if (rslt == DBIERR_EOF)
        rslt = DBIERR_NONE;
    else
        Chk(rslt);
    return rslt;
}
```

Delphi Examples: DbOpenLockList

Return a list of locks acquired on a specific table.

This example uses the following input:

```
fDbOpenLockList(Table1, LockList);  
procedure fDbOpenLockList(Tbl: TTable; var LockList: TStringList);  
var  
    TmpCursor: hdbicur;  
    Lock: LOCKDesc;  
    rslt: dbiResult;  
begin  
    Check(DbOpenLockList(Tbl.handle, True, True, TmpCursor));  
    Check(DbSetToBegin(TmpCursor));  
    LockList.Clear;  
    repeat  
        rslt:= DbGetNextRecord(TmpCursor, dbiNOLOCK, @Lock, nil);  
        if (rslt <> DBIERR_EOF) then  
            begin  
                LockList.Add('Lock Type: ' + inttostr(Lock.iType));  
                LockList.Add('User Name: ' + StrPas(Lock.szUserName));  
                LockList.Add('Net Session: ' + inttostr(Lock.iNetSession));  
                LockList.Add('Session: ' + inttostr(Lock.iSession));  
                LockList.Add('Record Number: ' + inttostr(Lock.iRecNum));  
            end;  
    until rslt <> DBIERR_NONE;  
    Check(DbCloseCursor(TmpCursor));  
end;
```

DbiOpenRintList {button C
Examples,JI(">example","exdbiopenrintlist")} {button Delphi
Examples,JI(">example","dexdbiopenrintlist")}

C syntax

```
DBIResult DBIFN DbiOpenRintList (hDb, pszTableName, [pszDriverType],  
    phChkCur);
```

Delphi syntax

```
function DbiOpenRintList (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar; var hChkCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenRintList creates a table listing the referential integrity links for a specified table, along with their descriptions.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

pszTableName Type: pCHAR (Input)
Pointer to the table name. If *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

pszDriverType Type: pCHAR (Input)
Pointer to the driver type; required only if no extension is specified by *pszTableName*. Currently, the only valid type is szPARADOX.

phChkCur Type: phDBICur (Output)
Pointer to the cursor handle.

Usage

Retrieve each of the referential integrity records by using [DbiGetNextRecord](#). Use [DbiGetCursorProps](#) to allocate the proper record size. After the record is retrieved, it can be cast with the [RINTDesc](#) type definition, and used like a RINTDesc C language structure.

Currently, this function is supported only with Paradox tables.

DbiResult return values

DBIERR_NONE	The cursor to the table was successfully returned.
DBIERR_INVALIDPARAM	The specified table name or pointer to the table name is NULL.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL, or phChkCur is NULL.
DBIERR_UNKNOWNBLTYPE	The specified table type is invalid.
DBIERR_NOSUCHTABLE	The specified table does not exist.

See also

[DbiOpenVchkList](#), [DbiCreateTable](#), [DbiGetRintDesc](#)

C Examples: DbiOpenRintList

Creates a string containing all the names of referential integrity constraints on the specified table.

This example uses the following inputs:

```
fDbiOpenRintList(hDb, "ORDERS.DB", Buffer);
DBIResult fDbiOpenRintList(hDBIDb hDb, pCHAR TblName, pCHAR RIntList)
{
    DBIResult      rslt;
    hDBICur        hTmpCur = 0;
    RINTDesc       RIDesc;
    RIntList[0] = '\0';
    rslt = Chk(DbiOpenRintList(hDb, TblName, szPARADOX, &hTmpCur));
    if (rslt == DBIERR_NONE)
    {
        while (DbiGetNextRecord(hTmpCur, dbiNOLOCK, (pBYTE)&RIDesc, NULL) ==
DBIERR_NONE)
        {
            strcat(RIntList, RIDesc.szRintName);
            strcat(RIntList, " ");
        }
    }
    return rslt;
}
```

Delphi Examples: DbiOpenRintList

An example for this function is under development and will be provided in an upcoming Help release.

C Examples: DbiOpenSecurityList

Get security information for the specified table.

SecInfo must be allocated large enough to hold security information. This example uses the following input:

```
fDbiOpenSecurityList(hDb, "MYSECTBL.DB", Buffer);
DBIResult fDbiOpenSecurityList(hDBIDb hDb, pCHAR TblName, pCHAR SecInfo)
{
    DBIResult      rslt;
    SECDesc        SecDesc;
    hDBICur        hTmpCur;
    CHAR           Buffer[200], Priv[20];
    SecInfo[0] = '\0';
    rslt = Chk(DbiOpenSecurityList(hDb, TblName, szPARADOX, &hTmpCur));
    if (rslt == DBIERR_NONE)
    {
        while (DbiGetNextRecord(hTmpCur, dbiNOLOCK, (pBYTE)&SecDesc, NULL) ==
DBIERR_NONE)
        {
            switch (SecDesc.eprvTable)
            {
                case prvNONE: strcpy(Priv, "None"); break;
                case prvREADONLY: strcpy(Priv, "Read Only"); break;
                case prvMODIFY: strcpy(Priv, "Modify"); break;
                case prvINSERT: strcpy(Priv, "Insert"); break;
                case prvINSDEL: strcpy(Priv, "Insert/Delete"); break;
                case prvFULL: strcpy(Priv, "Full"); break;
                case prvUNKNOWN: strcpy(Priv, "Unknown"); break;
            }
            wsprintf(Buffer, "\r\nID: %d, Privileges: %s, Password: %s",
                SecDesc.iSecNum, Priv, SecDesc.szPassword);
            strcat(SecInfo, Buffer);
        }
    }
    return rslt;
}
```

Delphi Examples: DbOpenSecurityList

Return the record-level security (password) information about a specified Paradox table and append it to the TStringList passed in.

This example uses the following input:

```
fDbOpenSecurityList(SecurityTable, SecurityList);
```

```
procedure fDbOpenSecurityList(Tbl: TTable; SecurityList: TStringList);
var
  TmpCursor: hdbicur;
  Security: SECDesc;
  result: dbiResult;
begin
  Check(DbOpenSecurityList(Tbl.dbhandle, PChar(Tbl.TableName), nil,
    TmpCursor));
  repeat
    result:= DbGetNextRecord(TmpCursor, dbiNOLOCK, @Security, nil);
    if (result <> DBIERR_EOF) then
    begin
      SecurityList.Add('Security Descriptor: ' + inttostr(Security.iSecNum));
      case Security.eprvTable of
        prvNone: SecurityList.Add('No privilege');
        prvREADONLY: SecurityList.Add('Read only Table or Field');
        prvMODIFY: SecurityList.Add('Read and Modify fields (non-key)');
        prvINSERT: SecurityList.Add('Insert + All of above');
        prvINSDEL: SecurityList.Add('Delete + All of above');
        prvFULL: SecurityList.Add('Full Writes');
        prvUNKNOWN: SecurityList.Add('Unknown');
      end;
      SecurityList.Add('Family Rights: ' + inttostr(Security.iFamRights));
      SecurityList.Add('Session: ' + Security.szPassword);
    end;
  until Result <> DBIERR_NONE;
  Check(DbCloseCursor(TmpCursor));
end;
```

DbiOpenSPList {button C
Examples,JI(">example","exdbiopensplist")} {button Delphi
Examples,JI(">example","dexdbiopensplist")}

C syntax

```
DBIResult DBIFN DbiOpenSPList (hdb, bExtended, bSystem, pszQual, phCur);
```

Delphi syntax

```
function DbiOpenSPList (hDb: hDBIDb; bExtended: Bool; bSystem: Bool; pszQual: PChar; var hCur: hDBICur): DBIResult stdcall;
```

Description

The function `DbiOpenSPList` creates a table containing information about the stored procedures associated with the database. Records in the table are described by [SPDesc](#).

Parameters

<i>hDb</i>	Type: hDBIDb	(Input)
Specifies the database handle associated with the database where the stored procedure exists.		
<i>bExtended</i>	Type: BOOL	(Input)
Not currently used.		
<i>bSystem</i>	Type: BOOL	(Input)
True to include system procedures		
<i>pszQual</i>	Type: pCHAR	(Input)
Must be null.		
<i>phCur</i>	Type: phDBICur	(Output)
Pointer to the cursor handle		

Completion state

The parameter *phCur* points to the returned cursor handle. The table contains information about all stored procedures in the database associated with the specified database handle. If the associated database is a standard database, only the stored procedures in the current directory of the database are listed in the table. The record description for the table is [SPDesc](#).

DbiResult return values

DBIERR_NONE	The cursor to the table was successfully returned.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_NOTSUPPORTED	The driver does not support stored procedures.

C Examples: DbiOpenSPList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenSPList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenSPParamList **{button C**
Examples,JI(">example","exdbiopenspparamlist")} **{button Delphi**
Examples,JI(">example","dexdbiopenspparamlist")}

C syntax

```
DBIResult DBIFN DbiOpenSPParamList (hdb, pszSPName, bPhyTypes, uOverload, phCur );
```

Delphi syntax

```
function DbiOpenSPParamList (hDb: hDBIDb; pszSPName: PChar; bPhyTypes: Bool; uOverload: Word; var hCur: hDBICur): DBIResult stdcall;
```

Description

The function `DbiOpenSPParamList` creates a table listing the parameters associated with a specified stored procedure. Records in the table are described by [SPParamDesc](#).

Parameters

<i>hDb</i>	Type: hDBIDb	(Input)
Specifies the database handle associated with the database where the stored procedure exists.		
<i>pszSPName</i>	Type: pCHAR	(Input)
Pointer to the stored procedure name.		
<i>bPhyTypes</i>	Type: BOOL	(Input)
Specifies whether parameter field types are returned in physical or logical datatypes.		
<i>uOverload</i>	Type: UINT16	(Input)
Overload number. Not available for all drivers. This value is 0 unless the driver supports it and has overloaded functions. For an example, see uOverload		
<i>phCur</i>	Type: phDBICur	(Output)
Pointer to the cursor handle.		

Usage

Standard: Not Supported

SQL: Supported.

Sybase: `DbiOpenSPParamList` returns the parameters, but *eParamType* is always equal to *paramUNKNOWN*.

Oracle: For full stored procedure support, your server must be a production Oracle7 server set up with the Procedural option. If it has not been set up properly, you might get the following error from `DbiOpenSPParamList`: "DBMS_DESCRIBE is not defined ...".

Completion state

Returns list of the parameters associated with a specified stored procedure. The record description for the table is *SPParamDesc*.

DbiResult return values

DBIERR_NONE	The cursor to the table was successfully returned.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_NOTSUPPORTED	The driver does not support stored procedures.

See also

[DbiOpenSPList](#)

uOverload

The *uOverload* param in DbiOpenSPParamList allows specification of an overload number if the server supports overloading of procedure and function names. For example, using Oracle 7, you might have this package specification:

```
create package EMP_RECS as
  procedure get_sal_info (
    name      in      emp.ename%type,
    salary    out     emp.sal%type);
  procedure get_sal_info (
    ID_num    in      emp.empno%type,
    salary    out     emp.sal%type);
  function get_sal_info (
    name      emp.ename%type) return emp.sal%type;
end EMP_RECS;
```

DbiOpenSPParamList with *uOverload*=1 would return the *name* and *salary* parameters for procedure 1. If *uOverload* = 2, then *ID_num* and *salary* would be returned.

If a procedure is not overloaded, then *uOverload* should be set to 0. Otherwise *uOverload* should be set to 1..n for *n* overloadings of the name.

C Examples: DbiOpenSPParamList

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbOpenSPParamList

An example for this function is under development and will be provided in an upcoming Help release.

DbiOpenTable {button C
Examples,JI(">example","exdbiopentable")} {button Delphi
Examples,JI(">example","dexdbiopentable")}

C syntax

```
DBIResult DBIFN DbiOpenTable (hDb, pszTableName, [pszDriverType],  
    pszIndexName, pszIndexTagName, iIndexId, eOpenMode, eShareMode, exlMode,  
    [bUniDirectional], [pOptParams], phCursor);
```

Delphi syntax

```
function DbiOpenTable (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar; pszIndexName: PChar; pszIndexTagName: PChar; iIndexId: Word;  
    eOpenMode: DBIOpenMode; eShareMode: DBIShareMode; exlMode: XLTMode;  
    bUniDirectional: Bool; pOptParams: Pointer; var hCursor: hDBICur):  
    DBIResult stdcall;
```

Description

DbiOpenTable opens the given table for access and associates a cursor handle with the opened table.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle associated with the database where the table exists.

pszTableName Type: pCHAR (Input)

Pointer to the table name. For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, *pszTableName* can be a fully qualified name that includes the owner name, in the form <owner>.<tablename>.

If not specified, <owner> is supplied from the database handle. Extensions are not valid for SQL table names.

pszDriverType Type: pCHAR (Input)

Pointer to the driver type. Optional. *pszDriverType* can be one of the following values: szDBASE, szPARADOX, or szASCII (for importing or exporting data to/from text files; see the Usage section).

For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension, or if the client application wants to overwrite the default file extension, including the situation where *pszTableName* is terminated with a period(.). If *pszTableName* does not supply the default extension, and *pszDriverType* is NULL, DbiOpenTable tries to open the table with the default file extension of all file-based drivers listed in the configuration file in the order that the drivers are listed.

This parameter is ignored if the database associated with *hDb* is a SQL database.

pszIndexName Type: pCHAR (Input)

Pointer to the name of the index or pseudo-index to be used to order the records in the result set.

Optional. For SQL tables, the index name does not have to be qualified with the owner for servers supporting naming conventions with owner qualification. The *pszIndexName* string is limited to 127 bytes in length.

pszIndexTagName Type: pCHAR (Input)

Pointer to the tag name of the index in a .MDX file used to order the records in the result set. Optional; used for dBASE tables only. This parameter is ignored if the index given by *pszIndexName* is a .NDX index.

iIndexId Type: UINT16 (Input)

Specifies the index identifier, which is the number of the index to be used to order the records in the result set. Optional; used for Paradox and SQL tables only.

Paradox: For Paradox tables, the range for the index identifier is 1 to 511. This parameter is ignored if

pszIndexName is specified.

SQL: For SQL tables, this field is used only to specify that the table should be opened with no default index. This is done by setting *iIndexId* to NODEFAULTINDEX and is useful when opening a table read-only to speed up record access time.

eOpenMode Type: DBIOpenMode (Input)
Specifies the table open mode. If the mode is read-only, updates to the table are not permitted.

eShareMode Type: DBIShareMode (Input)
Specifies the table share mode, and determines whether other users or other cursors are able to open the table.

exlMode Type: XLTMode (Input)
Specifies the data translation mode.

bUniDirectional Type: BOOL (Input)
Specifies the scan mode of the cursor for SQL only.

pOptParams Type: pBYTE (Input)
Not currently used.

phCursor Type: phDBICur (Output)
Pointer to the cursor handle for the opened table.

Usage

Text: The *DbiOpenTable* call can be used to open a text file for import/export of data. The *pszDriverType* argument is used differently to indicate whether the fields in the text file are fixed length or delimited. The field separator and delimiter are passed through the *pszDriverType* argument.

dBASE: If no index is specified, the table is opened in physical order. If *pszIndexTagName* specifies an index tag, the table is opened with that tag active. The index name and the tag name are specified to open the index.

Paradox: If all index parameters are NULL, the table is opened in primary key order, if a primary key exists. If a secondary key is specified, the table is opened in that key. Either *pszIndexName* or *iIndexId* can be used to specify a composite or non-composite secondary index. A single-field index that is case-insensitive is classified as a composite index. See also: szName

SQL: An index can be specified only in *pszIndexName*. The index name can be qualified or unqualified. SQL provides limited support for exclusive opens, depending on the level of server explicit lock support.

Pseudo-indexes: To describe a pseudo-index rather than an existing physical index, replace the *pszIndexName* parameter with a string composed of field names. The marker character @ denotes the use of a pseudo-index. For example, "@Customer Number@Order Number" describes a pseudo-index on a key formed by concatenating the Customer Number field with the Order Number field.

Each field identifier in the pseudo-index name must be preceded by the @ character. This character is illegal in "true" index names. No new index is generated at the server; the behavior of the pseudo-index is simulated entirely by use of the proper ORDER BY clauses on the query populating the local BDE record cache.

Fields can be identified by field numbers as well as by field names. For example, the string "@2@3@11" describes a pseudo-index consisting of the second, third, and eleventh field of the table, concatenated to make up a single key.

Each of the component fields within a *pszIndexName* is assumed to be in ASCENDING order. Ordering is case-sensitive (unless case-sensitivity is not supported on the specific server). If the fields in the *pszIndexName* represent a real unique index on the server, the pseudo-index becomes unique; otherwise, it is non-unique.

Referential integrity descriptions: By default, *DbiOpenTable* does not retrieve referential integrity information (primary keys, foreign keys, and so on) when opening a table. This improves performance. To retrieve referential integrity information, use DbiSetProp to set *curGETEXTENDEDINFO* to True, then call DbiGetCursorProps.

Prerequisites

If the database is opened read-only, the table cannot be opened read-write.

Completion state

After the table has been successfully opened, the cursor is opened and positioned on the crack at the beginning of the file. A valid cursor is returned.

DbiResult return values

DBIERR_NONE	The table was successfully opened.
DBIERR_INVALIDFILENAME	The specified file name is not valid.
DBIERR_NOSUCHFILE	The specified file could not be found.
DBIERR_TABLEREADONLY	This table cannot be opened for read-write access.
DBIERR_NOTSUFFTABLERIGHTS	The client application does not have sufficient rights to open this table.
DBIERR_INVALIDINDEXNAME	The specified index name is invalid.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL, or <i>phCursor</i> is NULL.
DBIERR_UNKNOWNBLTYPE	The specified table type is invalid.
DBIERR_NOSUCHTABLE	The specified table name is invalid.
DBIERR_NOSUCHINDEX	The specified index is not available.
DBIERR_LOCKED	The table is locked by another user.
DBIERR_DIRBUSY	Invalid attempt to open a table in private directory (Paradox only).
DBIERR_OPENTBLLIMIT	The maximum number of tables is already opened.

See also

[DbiCloseCursor](#)

C Examples: DbiOpenTable

Open the specified table.

If the table is local (Paradox or dBASE), the table name must also have the extension. This function uses the following input:

```
fDbiOpenTable(hDb, "CUSTOMER.DB", &hCur, &CurProps);
```

```
DBIResult fDbiOpenTable(hDBIDb hTmpDb, pCHAR pszTableName, phDBICur phTmpCur,
    pCURProps pCurProps)
{
    DBIResult    rslt;
    rslt = Chk(DbiOpenTable (hTmpDb, pszTableName, NULL, NULL, NULL, 0,
    dbiREADWRITE,
        dbiOPENSHARED, xltFIELD, TRUE, NULL, phTmpCur));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (pCurProps != NULL)
        rslt = Chk(DbiGetCursorProps (*phTmpCur, pCurProps));
    return rslt;
}
```


Delphi Examples: DbiOpenTable

Open a table:

Delphi users should use the Open method associated with the TTable component rather than directly calling DbiOpenTable. This method is defined as:

```
Procedure Open;
```

The Open method opens the dataset, putting it in Browse state.

```
Table1.Open;
```

pseudo-index

For SQL data sources, a current index can be defined as any group of fields from a specific table, whether or not a corresponding index exists on the server. BDE creates a pseudo-index by using one or more user-specified SQL fields to define the requested order.

You can specify the pseudo-index even if there is a real index matching the behavior of the pseudo-index. When specifying the pseudo-index, BDE behavior is the same as it would be if the physical index existed on the server. In particular, `DbiSetRange` and `DbiGetRecordForKey` are allowed on a pseudo-index. `DbiSetToBegin`, `DbiGetNextRecord`, and so on, walk through records in the order implied by a pseudo-index.

For information on implementing pseudo-indexes, see [DbiOpenTable](#) or [DbiSwitchToIndex](#).

Database Open Mode

The following table shows the interaction between the database open mode and *eOpenMode*:

Database	<i>eOpenMode</i>	Result
Read-only	Read-only	Read-only
Read-only	Read-write	Error
Read-write	Read-only	Read-only
Read-write	Read-write	Read-write

Database Share Mode

For dBASE and Paradox tables, if *eShareMode* is set to *dbiOPENEXCL*, then only this session can open the table. If the table is already opened (shared or exclusive) by another session, an attempt to open the table exclusively results in an error. The following table shows the results of different combinations of the database share mode and *eShareMode*:

Database	<i>eShareMode</i>	Result
Exclusive	Exclusive	Exclusive
Exclusive	Share	Exclusive
Share	Exclusive	Exclusive
Share	Share	Share

Scan Mode

This parameter can be one of the following values:

<i>bUniDirectional</i> value	Scan mode of SQL table cursor
TRUE	Unidirectional. The cursor can only be advanced forward.
FALSE	Bidirectional. The cursor can be advanced forward and backward.

DbiOpenTableList {button C
Examples,JI(">example","exdbiopentablelist")} {button Delphi
Examples,JI(">example","dexdbiopentablelist")}

C syntax

```
DBIResult DBIFN DbiOpenTableList (hDb, bExtended, bSystem, pszWild, phCur);
```

Delphi syntax

```
function DbiOpenTableList (hDb: hDBIDb; bExtended: Bool; bSystem: Bool;  
    pszWild: PChar; var hCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenTableList creates a table with information about all the tables associated with the database.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

bExtended Type: BOOL (Input)

The *bExtended* parameter specifies whether to return only the standard table information, or to return extended table information as well. (The default is standard information only).

bSystem Type: BOOL (Input)

The *bSystem* parameter specifies whether to include system tables or not. SQL only.

pszWild Type: pCHAR (Input)

Pointer to the search string for retrieving a selective list of tables. Two *wildcard* characters can be used: the asterisk (*) and the question mark (?). The asterisk expands to any number of characters; the question mark expands to a single character.

phCur Type: phDBICur (Output)

Pointer to the cursor handle.

Usage

The client application can request either standard or extended information for the table. The *bExtended* parameter must be set to TRUE to request extended information.

Standard: The table includes tables in the directory associated with *hDb*.

SQL: For SQL servers, *bSystem* must be set to TRUE to include system tables.

Synonyms: Many server vendors (including Oracle) provide objects called *synonyms*. *Synonyms* are alternate names for other objects, such as tables or views. SQL Links provides the option to include synonyms in the table lists returned from DbiOpenTableList and DbiOpenFileList. See [SQL Links Guide](#)

Completion state

phCur points to the returned cursor handle. The table contains information about all the tables in the database associated with the specified database handle. If the associated database is a standard database, only the tables in the current directory of the database are listed in the table. The record description for the table is [TBLBaseDesc](#) or [TBLFullDesc](#).

DbiResult return values

DBIERR_NONE The cursor to the table was returned successfully.

DBIERR_INVALIDHNDL The specified database handle is invalid or NULL.

See also

[DbiOpenCfgInfoList](#), [DbiOpenDriverList](#), [DbiOpenFieldTypesList](#), [DbiOpenIndexTypesList](#),
[DbiOpenLdList](#), [DbiOpenTableTypesList](#), [DbiOpenUserList](#)

C Examples: DbiOpenTableList

Return a string containing all tables meeting the search criteria (in WildCard).

This example uses the following input:

```
fDbiOpenTableList(hDb, &hCursor);
```

```
DBIResult fDbiOpenTableList(hDBIDb hTmpDb, pCHAR TblList, pCHAR WildCard)
{
    DBIResult      rslt;
    TBLBaseDesc    ListDesc;    // structure to hold information about the
table list.
    hDBICur        hCur;
    CHAR           Buffer[DBIMAXTBLNAMELEN + 1];
    UINT16         Count = 1;
    TblList[0] = '\0';
    rslt = Chk(DbiOpenTableList(hTmpDb, FALSE, FALSE, WildCard, &hCur));
    if (rslt != DBIERR_NONE)
        return rslt;
    while ((DbiGetNextRecord(hCur, dbiNOLOCK, (pBYTE)&ListDesc, NULL)) !=
DBIERR_EOF)
    {
        wsprintf(Buffer, "\r\nTable %d: %s", Count++, ListDesc.szName);
        strcat(TblList, Buffer);
    }
    return rslt;
}
```

Delphi Examples: DbiOpenTableList

Create a table with information about all tables associated with database.

This example retrieves all tables in the database with the .DB extension and puts the tablenames into a TStrings list. The example uses the following input:

```
fDbiOpenTableList(Table1.DBHandle, Memo1.Lines);  
procedure fDbiOpenTableList(hTmpDb: hDBIDb; TableList: TStrings);  
var  
    hCursor : hDBICur;  
    ListDesc : TBLBaseDesc;  
begin  
    Check(DbiOpenTableList(hTmpDb, False, False, '*.DB', hCursor));  
    TableList.Clear;  
    while DbiGetNextRecord(hCursor, dbiNOLOCK, @ListDesc, nil) = dbiErr_None  
    do  
        TableList.Add(ListDesc.szName);  
end;
```


bExtended

***bExtended* value** **Type of table info returned**

TRUE Extended

FALSE Standard

bSystem

***bSystem* value** **System table included?**

TRUE Yes

FALSE No

DbiOpenTableTypesList {button C
Examples,JI(">example","exdbiopentabletypeslist")} {button Delphi
Examples,JI(">example","dexdbiopentabletypeslist")}

C syntax

```
DBIResult DBIFN DbiOpenTableTypesList (pszDriverType, phCur);
```

Delphi syntax

```
function DbiOpenTableTypesList (pszDriverType: PChar; var hCur: hDBICur):  
    DBIResult stdcall;
```

Description

DbiOpenTableTypesList creates a table listing table type names for the given driver.

Parameters

pszDriverType Type: pCHAR (Input)
Pointer to the driver type.

phCur Type: phDBICur (Output)
Pointer to the cursor handle.

Completion state

Each of the table type records can be retrieved via [DbiGetNextRecord](#). [DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can be cast with the TBLType type definition, and used like a TBLType C language structure.

DbiResult return values

DBIERR_NONE	The list of table type names was returned successfully.
DBIERR_INVALIDHNDL	The specified handle is invalid.
DBIERR_DRIVERNOTLOADED	The driver was not initialized.

See also

[DbiGetTableTypeDesc](#)

C Examples: DbiOpenTableTypesList

Display in a MessageBox all table types supported by a driver:

The following input is used in this example:

```
fDbiOpenTableTypesList(szPARADOX);
```

```
DBIResult fDbiOpenTableTypesList(pCHAR Driver)
{
    DBIResult    rslt;
    hDBICur      hTypeCur = 0;
    TBLType      Tbltype;
    CHAR         Buffer[500] = {'\0'};

    rslt = Chk(DbiOpenTableTypesList(Driver, &hTypeCur));
    if (rslt != DBIERR_NONE)
        return rslt;
    while (DbiGetNextRecord(hTypeCur, dbiNOLOCK, (pBYTE)&Tbltype, NULL) ==
        DBIERR_NONE)
        wsprintf(Buffer, "%sTable Name: %s, Maximum Record Size: %d\n",
            Buffer, Tbltype.szName, Tbltype.iMaxRecSize);

    MessageBox(0, Buffer, Driver, MB_OK);
    return rslt;
}
```

Delphi Examples: DbiOpenTableTypesList

Display in a MessageBox all table types supported by a driver.

This example uses the following input:

```
fDbiOpenTableTypesList(szDBASE);
```

```
Procedure fDbiOpenTableTypesList(Driver: String);
var
  hTypeCur: hDBICur;
  TblTypes: TBLType;
  BufStr: String;
begin
  hTypeCur:= nil;
  Check(DbiOpenTableTypesList(PChar(Driver), hTypeCur));
  while (DbiGetNextRecord(hTypeCur, dbiNOLOCK, @TblTypes, nil) = DBIERR_NONE)
  do
  begin
    BufStr:= format('Name: %s, TableLevel: %d',
  [Tbltypes.szName, Tbltypes.iTblLevel]);
    MessageBox(0, PChar(BufStr), PChar(Driver), MB_OK);
  end;
end;
```

DbiOpenUserList {button C
Examples,JI(">example","exdbiopenuserlist")} {button Delphi
Examples,JI(">example","dexdbiopenuserlist")}

C syntax

```
DBIResult DBIFN DbiOpenUserList (phUsers);
```

Delphi syntax

```
function DbiOpenUserList (var hUsers: hDBICur): DBIResult stdcall;
```

Description

DbiOpenUserList creates a table containing a list of users sharing the same network file.

Parameters

phUsers Type: phDBICur (Output)
Pointer to the cursor handle.

Usage

DbiOpenUserList is supported for Paradox only.

Completion state

Each of the user records can be retrieved using [DbiGetNextRecord](#). [DbiGetCursorProps](#) can be used to allocate the proper record size. After the record is retrieved, it can be cast with the [USERDesc](#) type definition, and used like a USERDesc C language structure.

DbiResult return values

DBIERR_NONE	The user list was returned successfully.
DBIERR_INVALIDHNDL	phUsers is NULL.

C Examples: DbiOpenUserList

Get information on users using the current network file.

UserInfo must be allocated large enough to hold security information. This example uses the following input:

```
fDbiOpenUserList(Buffer);
DBIResult fDbiOpenUserList(pCHAR UserInfo)
{
    DBIResult      rslt;
    USERDesc      UserDesc;
    hDBICur       hTmpCur;
    CHAR          Buffer[500];
    UserInfo[0] = '\0';
    rslt = Chk(DbiOpenUserList(&hTmpCur));
    if (rslt == DBIERR_NONE)
    {
        while (DbiGetNextRecord(hTmpCur, dbiNOLOCK, (pBYTE)&UserDesc, NULL) ==
DBIERR_NONE)
        {
            wsprintf(Buffer, "\r\nName: %s, Session: %d, Class: %d, SerialNum:
%s",
                UserDesc.szUserName, UserDesc.iNetSession,
UserDesc.iProductClass,
                UserDesc.szSerialNum);
            strcat(UserInfo, Buffer);
        }
    }
    return rslt;
}
```

Delphi Examples: DbOpenUserList

Return a list of users sharing the same network file

The returned list is appended it to the TStringList passed in. This example uses the following input:

```
fDbOpenUserList(UserList);  
Procedure fDbOpenUserList(UserList: TStringList);  
var  
    TmpCursor: hDbiCur;  
    rslt: dbiResult;  
    UsrDesc: USERDesc;  
begin  
    Check(DbiOpenUserList(TmpCursor));  
    repeat  
        rslt:= DbiGetNextRecord(TmpCursor, dbiNOLOCK, @UsrDesc, nil);  
        if (rslt <> DBIERR_EOF) then  
            begin  
                UserList.Add('User name: ' + UsrDesc.szUserName);  
                UserList.Add('Net Session: ' + inttostr(UsrDesc.iNetSession));  
                UserList.Add('Product Class: ' + inttostr(UsrDesc.iProductClass));  
            end;  
    until rslt <> DBIERR_NONE;  
    Check(DbiCloseCursor(TmpCursor));  
end;
```


DbiOpenVchkList {button C
Examples,JI(">example","exdbiopenvchklist")} {button Delphi
Examples,JI(">example","dexdbiopenvchklist")}

C syntax

```
DBIResult DBIFN DbiOpenVchkList (hDb, pszTableName, [pszDriverType],  
    phChkCur);
```

Delphi syntax

```
function DbiOpenVchkList (hDb: hDBIDb; pszTableName: PChar; pszDriverType:  
    PChar; var hChkCur: hDBICur): DBIResult stdcall;
```

Description

DbiOpenVchkList creates a table containing records with information about validity checks for fields within the specified table.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

pszTableName Type: pCHAR (Input)
Pointer to the table name. If *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)
Pointer to the driver type. For Paradox, required only if no extension is specified by *pszTableName*. The only valid type is *szPARADOX*. This parameter is ignored if the database associated with *hDb* is a SQL database.

phChkCur Type: phDBICur (Output)
Pointer to the cursor handle.

Usage

Paradox: This function returns information about validity checks including required fields, minimum/maximum settings for fields, lookup tables, picture specifications, and default values.

SQL: The only validity check that can be created for SQL tables is *bRequired* (required fields). However, some drivers support reporting of fields with default values.

dBASE: This function is not supported for dBASE tables.

Prerequisites

A valid database handle must be obtained.

Completion state

phChkCur points to the returned cursor handle on the table. Once the cursor is returned, the client application can retrieve information about validity checks from the table. The cursor is read-only.

DbiResult return values

DBIERR_NONE	The cursor to the table was returned successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL, or <i>phChkCur</i> is NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_NOSUCHTABLE	The specified table name does not exist.
DBIERR_UNKNOWNTBLTYPE	The specified driver type is invalid.

See also

DbiOpenRintList, DbiCreateTable, DbiGetVchkDesc

C Examples: DbiOpenVchkList

Get validity check information for the specified table.

VchkList must be allocated large enough to hold security information. This example uses the following input:

```
fDbiOpenVchkList(hDb, "ORDERS.DB", ValidityChecks);
DBIResult fDbiOpenVchkList(hDBIDb hTmpDb, pCHAR TblName, pCHAR VchkList)
{
    DBIResult      rslt;
    hDBICur        hVchkCur = 0;
    VCHKDesc       Vchk;
    CHAR           Buffer[200], Required[4];
    VchkList[0] = '\0';
    rslt = Chk(DbiOpenVchkList(hTmpDb, TblName, NULL, &hVchkCur));
    if (rslt == DBIERR_NONE)
    {
        while (DbiGetNextRecord(hVchkCur, dbiNOLOCK, (pBYTE)&Vchk, NULL) ==
DBIERR_NONE)
        {
            if (Vchk.bRequired == FALSE)
                strcpy(Required, "False");
            else
                strcpy(Required, "True");
            wsprintf(Buffer, "\r\nField Number: %d, Required: %s", Vchk.iFldNum,
Required);
            strcat(VchkList, Buffer);
        }
    }
    if (hVchkCur != 0)
        DbiCloseCursor(&hVchkCur);
    return rslt;
}
```

Delphi Examples: DbOpenVchkList

Create a table containing information about validity checks for fields within the specified table:

// Returns information about validity checks for fields and appends it to the passed in TStringList

This example uses the following input:

```
fDbOpenVchkList(OrdersTable, VchkList);
procedure fDbOpenVchkList(Tbl: TTable; var VCheckList: TStringList);
var
  TmpCursor: hdbicur;
  VCheck: VCHKDesc;
  rslt: dbiResult;
begin
  Check(DbOpenVchkList(Tbl.DbHandle, PChar(Tbl.TableName), nil, TmpCursor));
  Check(DbSetToBegin(TmpCursor));
  VCheckList.Clear;
  repeat
    rslt:= DbGetNextRecord(TmpCursor, dbiNOLOCK, @VCheck, nil);
    if (rslt <> DBIERR_EOF) then
    begin
      VCheckList.Add('Field Number: ' + inttostr(VCheck.ifldNum));
      If VCheck.bRequired = True then
        VCheckList.Add('Field is required: TRUE')
      else
        VCheckList.Add('Field is required: FALSE');
      If VCheck.bHasMinVal = True then
        VCheckList.Add('Has Minimum Value: TRUE')
      else
        VCheckList.Add('Has Minimum Value: FALSE');
      If VCheck.bHasMaxVal = True then
        VCheckList.Add('Has Maximum Value: TRUE')
      else
        VCheckList.Add('Has Maximum Value: FALSE');
      If VCheck.bHasDefVal = True then
        VCheckList.Add('Has Default Value: TRUE')
      else
        VCheckList.Add('Has Default Value: FALSE');
    end;
  until rslt <> DBIERR_NONE;
  Check(DbCloseCursor(TmpCursor));
end;
```

DbiPackTable {button C
Examples,JI(">example","exdbideleterecord")} {button Delphi
Examples,JI(">example","dexdbipacktable")}

C syntax

```
DBIResult DBIFN DbiPackTable (hDb, hCursor, pszTableName, [pszDriverType],
    bRegenIdxs);
```

Delphi syntax

```
function DbiPackTable (hDb: hDBIDb; hCursor: hDBICur; pszTableName: PChar;
    pszDriverType: PChar; bRegenIdxs: Bool): DBIResult stdcall;
```

Description

DbiPackTable optimizes table space by rebuilding the table associated with *hCursor* and releasing any free space.

Parameters

hDb Type: hDBIDb (Input)
 Specifies the valid database handle.

hCursor Type: hDBICur (Input)
 Specifies the cursor on the table to be packed. Optional. If *hCursor* is specified, the operation is performed on the table associated with the cursor. If *hCursor* is NULL, *pszTableName* and *pszDriverType* determine the table to be used.

pszTableName Type: pCHAR (Input)
 Pointer to the table name. Optional. If *hCursor* is NULL, *pszTblName* and *pszTblType* determine the table to be used. (If both *pszTableName* and *hCursor* are specified, *pszTableName* is ignored.) If *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

pszDriverType Type: pCHAR (Input)
 Pointer to the driver type. Optional. This parameter is required if *pszTableName* has no extension. The only valid *pszDriverType* is szDBASE.

bRegenIdxs Type: BOOL (Input)
 Specifies whether or not to regenerate out-of-date table indexes. If TRUE, all out-of-date table indexes are regenerated (applies to maintained indexes only). Otherwise, out-of-date indexes are not regenerated.

Usage

dBASE: dBASE allows users to mark a record for deletion (as opposed to actually removing it from the table). The only way to permanently remove marked records is with DbiPackTable.

Paradox: This function is not valid for Paradox tables. Use DbiDoRestructure with the bPack option, instead.

SQL: This function is not valid for SQL tables.

Prerequisites

Exclusive access to the table is required.

DbiResult return values

DBIERR_NONE	The table was successfully rebuilt.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_INVALIDHNDL	The specified database handle or cursor handle is invalid or NULL.
DBIERR_NOSUCHTABLE	Table name does not exist.
DBIERR_UNKNOWNTBLTYPE	Table type is unknown.

DBIERR_NEEDEXCLACCESS The table is not open in exclusive mode.

See also

[DbiOpenTable](#), [DbiDeleteRecord](#), [DbiDoRestructure](#)

Delphi Examples: DbiParamTable

An example for this function is under development and will be provided in an upcoming Help release.

DbiPutBlob {button C Examples,JI(">example","exdbiputblob")} {button Delphi Examples,JI(">example","dexdbiputblob")}

C syntax

```
DBIResult DBIFN DbiPutBlob (hCursor, pRecBuf, iField, iOffset, iLen, pSrc);
```

Delphi syntax

```
function DbiPutBlob (hCursor: hDBICur; pRecBuf: Pointer; iField: Word; iOffset: Longint; iLen: Longint; pSrc: Pointer): DBIResult stdcall;
```

Description

DbiPutBlob writes data into an open BLOB field.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

pRecBuf Type: pBYTE (Input)

Pointer to the record buffer.

iField Type: UINT16 (Input)

Specifies the ordinal number of a BLOB field within the record buffer.

iOffset Type: UINT32 (Input)

Specifies the starting position, offset from the beginning of the BLOB, where the data is to be written. This value must not exceed the length of the BLOB. Valid values of *iOffset* range from 0 to the BLOB field's length. If *iOffset* is less than the BLOB field's length, part of the existing BLOB field is overwritten. If *iOffset* is equal to the length of the BLOB field, the data is appended to the existing BLOB field.

If the BLOB field also has a BLOB header (BLOB tuple area), and *iOffset* falls within that header area, the information in the tuple is also updated when *DbiModifyRecord*, *DbiAppendRecord*, or *DbiInsertRecord* is called.

iLen Type: UINT32 (Input)

Specifies the number of bytes to write to the BLOB field. *iLen* can be greater than 64K.

pSrc Type: pBYTE (Input)

Pointer to the data to be written to the BLOB field.

Usage

The block of data supplied in *pSrc* is transferred to the BLOB field, based on the values specified in *iOffset* and *iLen*. *DbiPutBlob* can access data in blocks larger than 64Kb, depending on the size you allocate for the buffer.

Note: This does not update the underlying table. The client application must call *DbiAppendRecord*, *DbiModifyRecord*, or *DbiInsertRecord*, using this record buffer, to update the table with the BLOB field.

Prerequisites

The BLOB field must be opened in read-write mode.

Completion state

Performs the equivalent of [DbiPutField](#), for a BLOB field.

DbiResult return values

DBIERR_NONE	The data was successfully written to the BLOB field.
DBIERR_BLOBNOTOPENED	The specified BLOB field was not opened via a call to <i>DbiOpenBlob</i> .
DBIERR_INVALIDBLOBHANDLE	The record buffer supplied contains an invalid BLOB handle.
DBIERR_NOTABLOB	The specified field number does not correspond to a BLOB field.

DBIERR_INVALIDBLOBOFFSET	The specified iOffset is greater than the length of the BLOB field.
DBIERR_READONLYFLD	The BLOB field was opened in dbiREADONLY mode and cannot be modified.

See also

[DbiAppendRecord](#), [DbiModifyRecord](#), [DbiInsertRecord](#), [DbiGetBlob](#), [DbiOpenBlob](#), [DbiTruncateBlob](#), [DbiFreeBlob](#), [DbiGetBlobSize](#)

C Examples: DbiPutBlob

Modify the current record and Blob:

The field specified **must** be a valid memo blob. *pTmpRecBuf* **must** have valid record information. This example uses the following input:

```
fBlobExample1(hCur, pRecBuf, 7, "Blob text goes here!!");
DBIResult fBlobExample2 (hDBICur hTmpCur, pBYTE pTmpRecBuf, UINT16 uFldNum,
                        char *Text)
{
    DBIResult rslt;
    rslt = Chk(DbiOpenBlob(hTmpCur, pTmpRecBuf, uFldNum, dbiREADWRITE));
    if (rslt != DBIERR_NONE)
        return rslt;
    if (Chk(DbiPutBlob(hTmpCur, pTmpRecBuf, uFldNum, 0, strlen(Text) + 1,
                    (pBYTE)Text)) == DBIERR_NONE)
        rslt = Chk(DbiModifyRecord(hTmpCur, pTmpRecBuf, TRUE));
    Chk(DbiFreeBlob(hTmpCur, pTmpRecBuf, uFldNum));
    return rslt;
}
```

Delphi Examples: DbiPutBlob

Modify the current record and blob.

The field specified must be a valid memo blob. The pointer *pTmpRecBuf* must have valid record information. This example uses the following input:

```
fBlobExample1(hCur, pRecBuf, 7, "Blob text goes here!!");  
procedure fBlobExample2(hTmpCur: hDBICur; pTmpRecBuf: pBYTE; uFldNum:  
  LongInt; NewText: String);  
begin  
  Check(DbiOpenBlob(hTmpCur, pTmpRecBuf, uFldNum, dbiREADWRITE));  
  Check(DbiPutBlob(hTmpCur, pTmpRecBuf, uFldNum, 0, strlen(PChar(NewText)) +  
  1, PChar(NewText)));  
  Check(DbiModifyRecord(hTmpCur, pTmpRecBuf, TRUE));  
  Check(DbiFreeBlob(hTmpCur, pTmpRecBuf, uFldNum));  
end;
```

DbiPutField {button C
Examples,JI(">example","exdbiputfield") {button Delphi
Examples,JI(">example","dexdbiputfield")

C syntax

```
DBIResult DBIFN DbiPutField (hCursor, iField, pRecBuf, pSrc);
```

Delphi syntax

```
function DbiPutField (hCursor: hDBICur; iField: Word; pRecBuff: Pointer;  
    pSrc: Pointer): DBIResult stdcall;
```

Description

DbiPutField writes the field value to the correct location in the supplied record buffer.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

iField Type: UINT16 (Input)
Specifies the ordinal number of the field to be updated.

pRecBuf Type: pBYTE (Input)
Pointer to the record buffer, which is updated upon success.

pSrc Type: pBYTE (Input)
Pointer to the new field value.

Usage

This function is used to update a record one field at time. If a NULL pointer is supplied, the field is set to NULL or blank.

If the xltMODE for the cursor is xltFIELD, *pSrc* is assumed to contain field data in BDE logical format. This data is translated to the driver's physical type by this function. If xltMODE is xltNONE, *pSrc* is assumed to contain field data in physical format.

DbiPutField is not supported with BLOB fields.

Prerequisites

[DbiVerifyField](#) may be called to test for field level integrity violations.

Completion state

After using DbiPutField one or more times, the client application must call DbiInsertRecord, DbiAppendRecord, or DbiModifyRecord to update the table with the record buffer. If the function fails, the record buffer is not affected.

DbiResult return values

DBIERR_NONE	The field was updated successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_OUTOFRANGE	iField is equal to zero, or is greater than the number of fields in the table.
DBIERR_INVALIDXLATION	A translation error has occurred.

See also

[DbiVerifyField](#), [DbiAppendRecord](#), [DbiInsertRecord](#), [DbiModifyRecord](#), [DbiSetToKey](#), [DbiGetField](#), [DbiPutBlob](#)

C Examples: DbiPutField

Example 1: Put the field value by field number.

This example uses the following input:

```
fDbiPutField1(hPXCur, pPXRecBuf, 1, (pBYTE)&DFloat);
DBIResult fDbiPutField1(hDBICur hTmpCur, pBYTE pTmpRecBuf, INT16 FldNum,
pBYTE Info)
{
    DBIResult    rslt;
    rslt = Chk(DbiPutField(hTmpCur, FldNum, pTmpRecBuf, Info));
    return rslt;
}
```

Example 2: Put the field value specified by a field name..

If an invalid field name is given, an error is returned. This example uses the following input:

```
fDbiPutField2(hPXCur, pPXRecBuf, "STOCK NO", (pBYTE)&DFloat);
DBIResult fDbiPutField2(hDBICur hTmpCur, pBYTE pTmpRecBuf, pCHAR FldName,
pBYTE Info)
{
    DBIResult    rslt;
    CURProps    CurProps;
    pFLDDesc    pFldDesc;
    UINT16      Field;
    BOOL        Found = FALSE;
    rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    pFldDesc = (pFLDDesc)malloc(CurProps.iFields * sizeof(FLDDesc));
    if (pFldDesc == NULL)
        return DBIERR_NOMEMORY;
    rslt = Chk(DbiGetFieldDescs(hTmpCur, pFldDesc));
    if (rslt != DBIERR_NONE)
    {
        free(pFldDesc);
        return rslt;
    }
    for(Field = 0; Field < CurProps.iFields; Field++)
    {
        if (strncmpi(pFldDesc[Field].szName, FldName) == 0)
        {
            Found = TRUE;
            if (Info != NULL)
                rslt = Chk(DbiPutField(hTmpCur, pFldDesc[Field].iFldNum,
pTmpRecBuf, Info));
        }
    }
    if (Found == FALSE)
        rslt = DBIERR_INVALIDFIELDNAME;
    free(pFldDesc);
    return rslt;
}
```

Delphi Examples: DbiParamField

An example for this function is under development and will be provided in an upcoming Help release.

DbiQAlloc {button C
Examples,JI(">example","exdbiqsetparams")} {button Delphi
Examples,JI(">example","dexdbiqexec")}

C syntax

```
DBIResult DBIFN DbiQAlloc (hDb, eQryLang, phStmt);
```

Delphi syntax

```
function DbiQAlloc (hDb: hDBIDb; eQryLang: DBIQryLang; var hStmt: hDBIStmt):  
    DBIResult stdcall;
```

Description

DbiQAlloc allocates a statement handle required by query prepare functions.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle

eQryLang Type: DBIQryLang (Input)
Specifies the query language, "qrylangSQL" or "qrylangQBE".

phStmt Type: phDBIStmt (Output)
Provides the pointer to the statement handle.

Usage

This function must be called before calling DbiQPrepare in order to obtain a new statement handle. It allows you to set properties to control the query execution process before calling the next function. All query process procedures must follow this pattern:

```
DbiQAlloc  
... // Other query preparation and execution functions.  
DbiQFree
```

This is the only way to do query process procedures.

If you want the query to return an updateable record set, use the following sequence of calls:

```
DbiQAlloc( hDb, eQryLang, &phStmt );  
DbiSetProp( hStmt, stmtLIVENESS, wantLIVE (or wantCANNED) );  
DbiQPrepare( hStmt, pszQuery );
```

In every case, after you have prepared and executed the query, call DbiQFree to free the resources allocated to this query (right after DbiQExec).

DbiResult return values

DBIERR_NONE The statement handle was returned.

See also

[DbiQPrepare](#), [DbiQExec](#), [DbiQFree](#), [DbiQSetParams](#)

DbiQExec {button C
Examples,JI(">example","exdbiqsetparams")} {button Delphi
Examples,JI(">example","dexdbiqexec")}

C syntax

```
DBIResult DBIFN DbiQExec (hStmt, phCur);
```

Delphi syntax

```
function DbiQExec (hStmt: hDBIStmt; phCur: phDBICur): DBIResult stdcall;
```

Description

DbiQExec executes the previously prepared query identified by the supplied statement handle and returns a cursor to the result set, if one is generated.

Parameters

hStmt Type: hDBIStmt (Input)
Specifies the statement handle.

phCur Type: phDBICur (Output)
Pointer to the cursor handle.

Usage

This function is used to execute a prepared query. If the query returns a result set, the cursor handle to the result set is returned into the address given by *phCur*. If the query does not generate a result set, the returned cursor handle is zero. If no cursor handle address is given and a result set would be returned, the result set is discarded.

The same prepared query can be executed several times, but only after the returned cursor has been closed.

DbiResult return values

DBIERR_NONE The prepared query was executed successfully.

See also

[DbiQAlloc](#), [DbiQPrepare](#), [DbiQExecDirect](#), [DbiQFree](#), [DbiQSetParams](#)

Delphi Examples: DbiQExec

Create a table on disk by using a given SQL statement.

The filename is also passed as a parameter. The function returns the number of rows in the result table.

This example uses the following input:

```
fDbiQExec(hNewCur, 'QUERY.DB', 'SELECT * FROM TEST;');
```

```
Function fDbiQExec(hTmpDb: hDBIDB; TblName, SQL: String): Longint;
var
  hStmt: hDBISstmt;
  hQryCur, hNewCur: hDBICur;
  iRecCount: LongInt;
begin
  hQryCur := nil;
  hNewCur := nil;
  hStmt := nil;

  try
    Check(DbiQAlloc(hTmpDb, qrylangSQL, hStmt));
    Check(DbiQPrepare(hStmt, PChar(SQL)));
    Check(DbiQExec(hStmt, @hQryCur));
    Check(DbiQInstantiateAnswer(hStmt, hQryCur, PChar(TblName), szPARADOX,
                                true, hNewCur));
    Check(DbiGetRecordCount(hNewCur, iRecCount));
    Result := iRecCount;
  finally
    if hStmt <> nil then
      Check(DbiQFree(hStmt));
    if hNewCur <> nil then
      Check(DbiCloseCursor(hNewCur));
  end;
end;
```

DbiQExecDirect {button C
Examples,JI(">example","exdbiqexecdirect")}
Examples,JI(">example","dexdbiqexecdirect")} {button Delphi

C syntax

```
DBIResult DBIFN DbiQExecDirect (hDb, eQryLang, pszQuery, phCur);
```

Delphi syntax

```
function DbiQExecDirect (hDb: hDBIDb; eQryLang: DBIQryLang; pszQuery: PChar;  
    phCur: phDBICur): DBIResult stdcall;
```

Description

DbiQExecDirect executes a SQL or QBE query and returns a cursor to the result set, if one is generated.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

eQryLang Type: DBIQryLang (Input)
Specifies the query language, QBE or SQL.

pszQuery Type: pCHAR (Input)
Pointer to the query, formulated in the appropriate language.

phCur Type: phDBICur (Output)
Pointer to the cursor handle.

Usage

This function is used to immediately prepare and execute a query. If the query returns a result set, the cursor handle to the result set is returned into the address given by *phCur*. If the query does not generate a result set, the returned cursor handle is zero. If no cursor handle address is given and a result set would be returned, the result set is discarded.

SQL: For SQL language queries, if the database handle given does not refer to a server database, the BDE SQL dialect is recognized. Otherwise, the appropriate server dialect is expected. Heterogeneous data access and cross-server data access can be achieved by using the BDE SQL dialect and referencing tables qualified with database alias names.

QBE: For QBE language queries, the BDE QBE Syntax is expected. Heterogeneous data access and cross-server data access can be achieved.

DbiResult return values

DBIERR_NONE The query was successfully prepared and executed.

See also

[DbiQAlloc](#), [DbiQExec](#), [DbiQFree](#), [DbiQPrepare](#), [DbiQSetParams](#)

C Examples: DbiQExecDirect

Execute a SQL Statement and return the numbers in the result set if applicable:

Note that Count will be 0 if a result set is not created. The following input is used in this example:
fDbiQExecDirect("Select * from 'CUST.DBF'", hDb, &hTmpCur, &Count);

```
DBIResult fDbiQExecDirect(pCHAR QryStr, hDBIDb hTmpDb, phDBICur phTmpCur,
    pUINT32 Count)
{
    DBIResult    rslt;

    *Count = 0;
    rslt = Chk(DbiQExecDirect(hTmpDb, qrylangSQL, QryStr, phTmpCur));
    if (rslt == DBIERR_NONE)
    {
        if (*phTmpCur != 0)
            Chk(DbiGetRecordCount(*phTmpCur, Count));
    }
    return rslt;
}
```

Delphi Examples: DbiQExecDirect

Execute a SQL statement and return the numbers in the result set if applicable.

Count will be 0 if a result set is not created. The function also returns the number of rows in the result table. This example uses the following input:

```
fDbiQExecDirect('Select * from CUSTOMER', Database1.Handle, hTmpCur);
Function fDbiQExecDirect(QryStr: String; hTmpDb: hDBIDb; var hTmpCur:
  hDBICur): Longint;
var
  Count: Longint;

begin
  Check(DbiQExecDirect(hTmpDb, qrylangSQL, PChar(QryStr), @hTmpCur));
  if hTmpCur <> nil then
  begin
    Check(DbiGetRecordCount(hTmpCur, Count));
    Result := Count;
  end
  else
    Result := 0;
end;
```


C Examples: DbiQExecProcDirect

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbqExecProcDirect

An example for this function is under development and will be provided in an upcoming Help release.

DbiQGetBaseDescs {button C
Examples,JI(">example","exdbiqgetbasedescs")} {button Delphi
Examples,JI(">example","dexdbiqgetbasedescs")}

C syntax

```
DBIResult DBIFN DbiQGetBaseDescs (hStmt, phCur);
```

Delphi syntax

Description

DbiQGetBaseDescs returns the original database, table, and field names of the fields that make up the result set of a query.

Parameters

hStmt	Type: hDBIStmt	(Input)
Statement handle.		
phCur	Type: phDBICur	(Input)
Cursor of type StatementBaseDesc		

Usage

This function gives the client the original columns upon which the result set is based; in other words, the original columns from the SQL select list along with their table and database names. By associating the base or original field attributes with the result set, Delphi users can obtain a complete picture.

As with other BDE functions that return a cursor, the cursor must be closed by the client. The normal calling sequence to use is: DbiQAlloc, DbiQPrepare, DbiQGetBaseDescs, DbiQExec, DbiQFree, DbiCloseCursor(StmtBaseCur).

When the SQL query has an expression (Select Col1+5...) *bExpression* is set to TRUE and the field is the first field encountered in the expression. Thus the following SQL: (SelectCol1 + Col2 from ':alias:Table') would return a record looking like "alias Table Col1 1 0".

When the SQL query has a constant (Select 'test'...) *bConstant* is set to TRUE and field is the constant value.

If the SQL has an aggregate, *bAggregate* is set to TRUE. The order of the records in the cursor represents the order of the items in the select list.

The following SQL, (Select Col3, Col2, Col1...) would result in a table with the records in this order: Col3, Col2, Col1

DbiResult return values

DBIERR_NONE	The query's resources were released successfully.
DBIERR_NOTSUPPORTED	A QBE language query could processed.

See also

[DbiQAlloc](#), [DbiQPrepare](#), [DbiQExec](#), [DbiQFree](#), [DbiCloseCursor](#)

C Examples: DbiQGetBaseDescs

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiQGetBaseDescs

An example for this function is under development and will be provided in an upcoming Help release.

DbiQPrepare {button C
Examples,JI(">example","exdbiqsetparams")} {button Delphi
Examples,JI(">example","dexdbiqexec")}

C syntax

```
DBIResult DBIFN DbiQPrepare (hStmt, pszQuery);
```

Delphi syntax

```
function DbiQPrepare (hStmt: hDBISstmt; pszQuery: PChar): DBIResult stdcall;
```

Description

DbiQPrepare prepares a SQL or QBE query for execution, and accepts a handle to a statement containing the prepared query.

Parameters

hStmt Type: hDBISstmt (Input)
Specifies the statement handle

pszQuery Type: pCHAR (Input)
Pointer to the query, formulated in the appropriate language.

Usage

This function is used to prepare a query for subsequent execution.

SQL: For SQL language queries, if the database handle given does not refer to a server database, the BDE SQL dialect is recognized. Otherwise, the appropriate server dialect is expected. Heterogeneous data access and cross-server data access can be achieved by using the BDE SQL dialect and referencing tables qualified with database alias names.

QBE: For QBE language queries, the BDE QBE Syntax is expected. Heterogeneous data access and cross-server data access can be achieved.

DbiResult return values

DBIERR_NONE	The query was successfully prepared for execution.
DBIERR_ALIASNOTOPEN	One of the aliases used in the query was not opened prior to preparing the query. The alias name can be found on the error context stack.

See also

[DbiQAlloc](#), [DbiQExec](#), [DbiQExecDirect](#), [DbiQFree](#), [DbiQSetParams](#)

DbiQPrepareProc {button C
Examples,JI(">example","exdbiqprepareproc")} {button Delphi
Examples,JI(">example","dexdbiqprepareproc")}

C syntax

```
DBIResult DBIFN DbiQPrepareProc (hDb, pszProc, uParamDescs, paParamDescs,  
    pRecBuf, phStmt);
```

Delphi syntax

```
function DbiQPrepareProc (hDb: hDBIDb; pszProc: PChar; uParamDescs: Word;  
    paParamDescs: pSPPParamDesc; pRecBuff: Pointer; var hStmt: hDBIStmt):  
    DBIResult stdcall;
```

Description

DbiQPrepareProc prepares and optionally binds parameters for a stored procedure.

Parameters

<i>hDb</i>	Type: hDBIDb	(Input)
Specifies the database handle.		
<i>pszProc</i>	Type: pCHAR	(Input)
Stored procedure name.		
<i>uParamDescs</i>	Type: UINT16	(Input)
Specifies the number of parameter descriptors.		
<i>paParamDescs</i>	Type: pSPPParamDesc	(Input)
Pointer to the array of parameter descriptors.		
<i>pRecBuf</i>	Type: pBYTE	(Input)
Pointer to the record buffer (or NULL if parameters are not to be bound.)		
<i>phStmt</i>	Type: phDBIStmt	(Output)
Specifies the returned statement handle.		

Usage

Use with the existing functions DbiQExec and DbiQFree. If *pRecBuf* is NULL, then the parameters are not bound.

DbiResult return values

DBIERR_NONE	The stored procedure was successfully prepared for execution.
-------------	---

See also

[DbiQExecProcDirect](#), [DbiQSetProcParams](#), [DbiQExec](#), [DbiQExecDirect](#), [DbiQFree](#), [DbiOpenSPList](#),
[DbiOpenSPPParamList](#)

C Examples: DbiQPrepareProc

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbIQPrepareProc

An example for this function is under development and will be provided in an upcoming Help release.

DbiQSetParams {button C
Examples,JI(">example","exdbiqsetparams")}
{button Delphi
Examples,JI(">example","dexdbiqsetparams")}

C syntax

```
DBIResult DBIFN DbiQSetParams (hStmt, uFldDescs, paFldDescs, pRecBuf);
```

Delphi syntax

```
function DbiQSetParams (hStmt: hDBIStmt; uFldDescs: Word; paFldDescs:  
  pFLDDesc; pRecBuff: Pointer): DBIResult stdcall;
```

Description

DbiQSetParams associates data with parameter markers embedded within a prepared query.

Parameters

hStmt Type: hDBIStmt (Input)
Specifies the statement handle.

uFldDescs Type: UINT16 (Input)
Specifies the number of parameter field descriptors given.

paFldDescs Type: pFLDDesc (Input)
Pointer to the array of parameter field descriptors.

pRecBuf Type: pBYTE (Input)
Pointer to the client buffer containing data for the specified fields.

Usage

This function is used to set the value of parameter markers in a prepared query before the query execution.

The field descriptor array and record buffer is constructed by the client and passed to BDE, which uses each specified field, along with the record buffer, to locate the data and set the specified parameter. Each field may be either a BDE type or a driver type for the database that the query is prepared for.

Parameter markers are either ":"name" or "~" (tilde). The field descriptor for a "?" parameter marker must contain no name, and must contain a field number that matches the position of the "?" marker within the query, beginning with marker number one. The field descriptor for a ":"name" marker must contain the name of the marker, and a field number of zero.

Parameter settings are retained from statement execution to statement execution. However, all parameters must be set before execution can occur.

DbiResult return values

DBIERR_NONE	The value of parameter markers was successfully set.
DBIERR_OBJNOTFOUND	A field descriptor references a parameter marker that does not exist.
DBIERR_INVALIDHNDL	DbiQSetParams was called without first having called DbiQPrepare.

See also

[DbiQExec](#), [DbiQFree](#), [DbiQPrepare](#), [DbiQAlloc](#)

C Examples: DbiQSetParams

Create a Query result set table.

This example uses the following input:

```
fQFunction1(hDb, "Result");
```

```
DBIResult fQFunction1(hDBIDb hTmpDb, pCHAR TblName)
{
    DBIResult    rslt;
    hDBIStmt     hStmt;
    hDBICur      hQryCur = 0, hNewCur = 0;
    FLDDesc      FldDesc;
    CHAR         SQL[] = "select c.cust_no, c.name, c.state_prov, "
        " o.'Sale Date', o.'Month' "
        "from 'cust.dbf' c, orders o "
        "where (c.cust_no between ? and 4999) "
        " and (c.cust_no = o.'customer no') "
        " and c.state_prov is not null "
        "order by c.name desc, o.'Month' asc; ";
    DFLOAT       Cust = 2000.00;

    // Create a Field Descriptor for the parameter
    memset(&FldDesc, 0, sizeof(FLDDesc));
    FldDesc.iFldNum = 1;
    FldDesc.iFldType = fldFLOAT;
    FldDesc.iUnits1 = 1;
    FldDesc.iLen = sizeof(Cust);
    // Allocate a statement handle
    rslt = Chk(DbiQAlloc(hTmpDb, qrylangSQL, &hStmt));
    if (rslt != DBIERR_NONE)
        return rslt;
    // Prepare the SQL statement
    rslt = Chk(DbiQPrepare(hStmt, SQL));
    if (rslt != DBIERR_NONE)
    {
        DbiQFree(&hStmt);
        return rslt;
    }
    // Since only one parameter is used, there is no need for a record buffer.
    // Use the Cust variable itself.
    rslt = Chk(DbiQSetParams(hStmt, 1, &FldDesc, (pBYTE)&Cust));
    if (rslt != DBIERR_NONE)
    {
        DbiQFree(&hStmt);
        return rslt;
    }
    // Execute the SQL statement
    rslt = Chk(DbiQExec(hStmt, &hQryCur));
    if (rslt != DBIERR_NONE)
    {
        DbiQFree(&hStmt);
        return rslt;
    }
    // Save the Result set to disk and close the result query(hQryCur)
    // Now there is an open cursor on the result set on disk.
    rslt = Chk(DbiQInstantiateAnswer(hStmt, hQryCur, TblName, szPARADOX,
        TRUE, &hNewCur));
}
```

```
if (rslt != DBIERR_NONE)
{
    DbiQFree(&hStmt);
    return rslt;
}
// Close the cursor
if (hNewCur != 0)
    Chk(DbiCloseCursor(&hNewCur));

return rslt;
}
```

Delphi Examples: DbIQSetParams

An example for this function is under development and will be provided in an upcoming Help release.

DbiQSetProcParams {button C
Examples,JI(">example","exdbiqsetprocparams")} {button Delphi
Examples,JI(">example","dexdbiqsetprocparams")}

C syntax

```
DBIResult DBIFN DbiQSetProcParams (hStmt, uParamDescs, paParamDescs, pRecBuf  
);
```

Delphi syntax

```
function DbiQSetProcParams (hStmt: hDBISmt; uParamDescs: Word; paParamDescs:  
  pSPPParamDesc; pRecBuff: Pointer): DBIResult stdcall;
```

Description

DbiQSetProcParams binds parameters for a stored procedure prepared with DbiQPrepareProc.

Parameters

hStmt Type: hDBISmt (Input)
Specifies the statement handle.

uParamDescs Type: UINT16 (Input)
Specifies the number of parameter descriptors.

paParamDescs Type: pSPPParamDesc(Input)
Pointer to the array of parameter descriptors.

pRecBuf Type: pBYTE (Input)
Pointer to the record buffer. (Or NULL if parameters are not to be bound.)

Usage

You must set **all** parameters (including output parameters) before statement execution. After execution, output parameter values are placed in the specified offset of the client-supplied *pRecBuf*. If the output parameter value is NULL or TRUNCATED, then *indNULL* or *indTRUNC* is placed in the *iNullOffset* of the client-supplied *pRecBuf*. Note that *indNULL* and *indTRUNC* are enums defined by *eINDValues*.

Sybase: Output parameter values are not available until **after** all rows have been fetched from the result set.

InterBase: When calling DbiQSetProcParams and DbiQPrepareProc, all input parameters must be specified **before** output parameters.

Prerequisites

The function DbiQPrepareProc must be called before calling DbiQSetProcParams.

These function calls assume that the client knows the stored procedure parameters, parameter types (such as INPUT, OUTPUT, INPUT/OUTPUT), and parameter datatypes.

DbiResult return values

DBIERR_NONE The value of parameter markers was successfully set.

DBIERR_OBJNOTFOUND A field descriptor references a parameter marker that does not exist.

See also

[DbiQPrepareProc](#), [DbiQExecProcDirect](#), [DbiOpenSPList](#), [DbiOpenSPPParamList](#)

C Examples: DbiQSetProcParams

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbIQSetProcParams

An example for this function is under development and will be provided in an upcoming Help release.

DbiReadBlock {button C
Examples,JI(">example","exdbireadblock")} {button Delphi
Examples,JI(">example","dexdbireadblock")}

C syntax

```
DBIResult DBIFN DbiReadBlock (hCursor, piRecords, pBuf);
```

Delphi syntax

```
function DbiReadBlock (hCursor: hDBICur; var iRecords: Longint; pBuf:  
    Pointer): DBIResult stdcall;
```

Description

DbiReadBlock reads a specified number of records (starting from the current position of the cursor) into a buffer.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle to the table.

piRecords Type: pUINT32 (Input/Output)

On input, specifies the number of records to read. On output, pointer to the client variable that receives the number of actual records that were read.

pBuf Type: pBYTE (Output)

Pointer to the client buffer that receives the record data.

Usage

This function is equivalent to doing a loop with DbiGetNextRecord for the specified number in *piRecords*, though it can be considered significantly faster than a DbiGetNextRecord loop.

If filters are active, DbiReadBlock reads only the records that meet filter criteria; all others are skipped. The records are not locked. The number of records read may differ from the number of records requested due to conditions such as end of table.

DbiReadBlock can access data in blocks larger than 64Kb, depending on the size you allocate for the buffer.

Completion state

The variable, *piRecords*, contains the number of actual records read after the function completes. The cursor position is updated according to the actual number of records read.

DbiResult return values

DBIERR_NONE	The block of records was successfully read.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL, or <i>piRecords</i> is NULL, or <i>pBuf</i> is NULL.
DBIERR_EOF	An attempt was made to read beyond the end of the file. The cursor is positioned in the crack at the end of the file. <i>piRecords</i> contains the number of records, if any, that were read before the end of file was reached.

See also

[DbiWriteBlock](#), [DbiGetNextRecord](#)

C Examples: DbiReadBlock

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiReadBlock

An example for this function is under development and will be provided in an upcoming Help release.

DbiRegenIndex {button C
Examples,JI(">example","exdbiregenindex")} {button Delphi
Examples,JI(">example","dexdbiregenindex")}

C syntax

```
DBIResult DBIFN DbiRegenIndex (hDb, [hCursor], [pszTableName],  
    [pszDriverType], pszIndexName, pszIndexTagName, iIndexId);
```

Delphi syntax

```
function DbiRegenIndex (hDb: hDBIDb; hCursor: hDBICur; pszTableName: PChar;  
    pszDriverType: PChar; pszIndexName: PChar; pszIndexTagName: PChar;  
    iIndexId: Word): DBIResult stdcall;
```

Description

DbiRegenIndex regenerates an index to ensure that it is up to date (all records currently in the table are included in the index and are in the index order). It can also be used to pack the index on disk.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle associated with the database where the table exists.

hCursor Type: hDBICur (Input)

Specifies the cursor on the table. Optional. If *hCursor* is specified, the operation is performed on the table associated with the cursor. If *hCursor* is NULL, *pszTblName* and *pszDriverType* determine the table to be used.

pszTableName Type: pCHAR (Input)

Pointer to the table name. Optional. If *hCursor* is NULL, *pszTableName* and *pszDriverType* determine the table to be used. If both *pszTableName* and *hCursor* are specified, *pszTableName* is ignored.

For Paradox and dBASE, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

pszDriverType Type: pCHAR (Input)

Pointer to the table type. Optional. For Paradox and dBASE tables, this parameter is required if *pszTableName* has no extension. *pszDriverType* can be one of the following values: szDBASE or szPARADOX.

pszIndexName Type: pCHAR (Input)

Pointer to the name of the index. See rules for naming indexes in the [IDXDesc](#) section.

pszIndexTagName Type: pCHAR (Input)

Pointer to the tag name of the index in a .MDX file. Used for dBASE tables only. This parameter is ignored if the index given by *pszIndexName* is not a .MDX index.

iIndexId Type: UINT16 (Input)

Specifies the index number.

Usage

iIndexId, *pszIndexName*, and *pszIndexTagName* are used in various combinations to specify the index to regenerate.

Important: A maintained index is automatically updated when the table is updated. A non-maintained index must use DbiRegenIndex to update the index after the table is modified before it can be used to access data.

Paradox: The effect of regenerating a maintained index is that it becomes more efficient and compact. (Frequent updates can fragment an index.)

SQL: A SQL index cannot be regenerated.

dBASE: DbiRegenIndex is normally used to update a non-maintained dBASE index. However, there

may be situations when a maintained index needs to be regenerated. Since a non-production index is maintained only when it is in use, it is not actually maintained at all times. If the index is not up to date, `DbiRegenIndex` can be used to synchronize the index with the current data.

Prerequisites

The table name must be provided and the index must already exist. When regenerating a maintained index, the table must be opened exclusively. When regenerating a non-maintained index, BDE must be able to obtain a write lock on the table.

DbiResult return values

<code>DBIERR_NONE</code>	The index specified by <i>pszIdxName</i> was successfully regenerated.
<code>DBIERR_NOSUCHINDEX</code>	The given index (<i>pszIdxName</i>) does not exist.
<code>DBIERR_INVALIDPARAM</code>	A cursor was not provided for the table, and the table name is either empty or not provided.
<code>DBIERR_INVALIDHNDL</code>	The specified handle was invalid or NULL.
<code>DBIERR_NEEDEXCLACCESS</code>	A cursor was provided for the table, but it was not opened in exclusive mode when regenerating a maintained index.
<code>DBIERR_FILEBUSY</code>	Exclusive access could not be obtained on table.
<code>DBIERR_FILELOCKED</code>	Write lock could not be obtained on table.
<code>DBIERR_NOTSUPPORTED</code>	A SQL index cannot be regenerated.

See also

[DbiRegenIndexes](#)

C Examples: DbiRegenIndex

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiRegenIndex

Regenerate an index to ensure that it is up to date.

This example uses the following input:

```
fDbiRegenIndex(Table1, 'ByCompany', '', 1);  
Procedure fDbiRegenIndex(Tbl: TTable; IndexName, TagName: String; IndexNum:  
    Word);  
begin  
    Check(DbiRegenIndex(Tbl.DBHandle, nil, PChar(Tbl.TableName), nil,  
        PChar(IndexName), PChar(TagName), IndexNum));  
end;
```

DbiRegenIndexes {button C
Examples,JI(">example","exdbiregenindexes")} {button Delphi
Examples,JI(">example","dexdbiregenindexes")}

C syntax

```
DBIResult DBIFN DbiRegenIndexes (hCursor);
```

Delphi syntax

```
function DbiRegenIndexes (hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiRegenIndexes regenerates all indexes associated with a cursor.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle for the table to be regenerated.

Usage

A maintained index is automatically updated when the table is updated.

dBASE: All open indexes are regenerated.

Paradox: All maintained and non-maintained indexes are regenerated.

SQL: SQL indexes cannot be regenerated.

Prerequisites

There can be more than one index open on a table. A valid cursor handle must be obtained, the table must be opened exclusively, and the index must already exist.

DbiResult return values

DBIERR_NONE	All of the indexes for the table associated with the specified cursor have been successfully regenerated.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NEEDEXCLACCESS	The table associated with <i>hCursor</i> is opened in open shared mode.
DBIERR_NOTSUPPORTED	SQL indexes cannot be regenerated.

See also

[DbiRegenIndex](#)

C Examples: DbiRegenIndexes

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiRegenIndexes

Regenerate all indexes associated with a cursor.

This example uses the following input:

```
fDbiRegenIndexes(BIOLIFE_TABLE);  
Procedure fDbiRegenIndexes(TblName: TTable);  
begin  
    Check(DbiRegenIndexes(TblName.Handle));  
end;
```

DbiRegisterCallBack {button C
Examples,JI(">example","exdbiregistercallback")} {button Delphi
Examples,JI(">example","dexdbiregistercallback")}

C syntax

```
DBIResult DBIFN DbiRegisterCallBack (hCursor, ecbType, iClientData,
    iCbBufLen, pCbBuf, pfCb);
```

Delphi syntax

```
function DbiRegisterCallBack (hCursor: hDBICur; ecbType: CBType; iClientData:
    Longint; iCbBufLen: Word; CbBuf: Pointer; pfCb: pfDBICallBack): DBIResult
    stdcall;
```

Description

DbiRegisterCallBack registers a callback function for the client application.

Parameters

hCursor Type: hDBICur (Input)
 Specifies the cursor handle to which the callback is being registered. Optional. If *hCursor* is NULL, the callback is registered to the current session.

ecbType Type: CBType (Input)
 Specifies the type of callback. *ecbType* can be cbGENPROGRESS, cbBATCHRESULT, cbRESTRUCTURE, cbINPUTREQ, cbTABLECHANGED, cbDELAYEDUPD, or cbDBASELOGIN. (See "Usage" below.)

iClientData Type: UINT32 (Input)
 Passthrough data specified by the client. This is used to help the client establish the context of the callback (such as a pointer to a client structure, a window handle, and so on.) This data is passed back to the client as a parameter to the callback function.

iCbBufLen Type: UINT16 (Input)
 Specifies the callback buffer length.

pCbBuf Type: pVOID (Input)
 Pointer to the buffer where the callback data is to be returned. Points to an instantiated callback descriptor, which varies depending upon the type of callback. For example, the **cbGENPROGRESS** callback type creates a pointer to the **CBPROGRESSDesc** structure.

The data that is written to *pCbBuf* is the percentage completed or a message string.

pfCb Type: pfDBICallBack (Input)
 Pointer to the desired callback function. Optional. If *pfCb* is NULL, DbiRegisterCallBack unregisters the previously registered callback function.

Usage

Callbacks are used when a client application needs clarification about a given BDE function before completing an operation or to return information to the client. DbiRegisterCallBack allows the client to instruct BDE about what further actions should be taken by BDE upon the occurrence of an event. BDE calls the client-registered function when the pertinent event occurs, and the client responds to the callback by telling BDE what to do with the appropriate return code (cbrABORT, cbrCONTINUE, and so on). Advantages of this mechanism are that clients do not have to check every return code on every function call, and BDE can get a user's response without interrupting the normal client process flow.

Callback function declarations and associated parameter lists, function return types, and callback data types are defined in the file IDAPI.H, which is the client interface to BDE.

All callback functions use the following prototype:

```
typedef CBRTYPE far *pCBRTYPE;
typedef CBRTYPE (DBIFN * pfDBICallBack)
(
```

```

    CbType ecbType,        // Callback type
    UINT32 iClientData,   // Client callback data
    pVOID pCbInfo         // Call back info/Client
    Input
);

```

For each different callback type, the *pCbInfo* parameter serves a different purpose:

Callback	Description
<u>cbGENPROGRESS</u>	Informs applications about the progress made during large batch operations.
<u>cbRESTRUCTURE</u>	Supplies information about an impending action and requests a response from the caller.
<u>cbBATCHRESULT</u>	Batch processing results.
<u>cbTABLECHANGED</u>	Notifies user that table has changed.
<u>cbCANCELQRY</u>	Allows user to cancel a query.
<u>cbINPUTREQ</u>	A BDE driver requests input from user.
<u>cbDBASELOGIN</u>	Enables clients to access encrypted dBASE tables.
<u>cbFIELDRECALC</u>	Field(s) recalculation
<u>cbTRACE</u>	Trace
<u>cbDBLOGIN</u>	Database login
<u>cbDELAYEDUPD</u>	Cached updates callback
<u>cbNBROFCBS</u>	Number of callbacks

Prerequisites

The client application is responsible for the following actions:

- Allocating memory for *pCbBuf*.
- Declaring the callback function with an associated predefined parameter list.

Completion state

If a cursor is supplied, any previous callbacks for the given cursor are overwritten. All callbacks are applicable to the current session only. The callback is valid only while the cursor is open; when the cursor is closed, any cursor-specific callbacks are automatically unregistered. If *hCursor* is NULL, then the callback applies to all cursors in the current session that do not have an explicit callback of their own. Supplying a NULL function pointer unregisters the callback.

DbiResult return values

DBIERR_NONE	The callback was registered successfully.
DBIERR_OBJIMPLICITLYDROPPED	The field name was modified.
DBIERR_OBJMAYBETRUNCATED	The field width was reduced.
DBIERR_VALFIELDMODIFIED	Inserted field in position pointed to by an existing VCHKDesc.
DBIERR_VALIDATEDATE	An existing VCHKDesc was modified.
DBIERR_INVALIDFLDXFORM	The field type was modified.
DBIERR_KEYVIOL	An existing IDXDesc was modified.
DBIERR_NOMEMORY	Insufficient memory was allocated for <i>pCbBuf</i> .

See also

[DbiGetCallBack](#), [DbiBatchMove](#), [DbiDoRestructure](#), [DbiForceReread](#)

C Examples: DbiRegisterCallback

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbRegisterCallBack

An example for this function is under development and will be provided in an upcoming Help release.

DbiRelPersistTableLock {button C
Examples,JI(">example","exdbirepersisttablelock")} {button Delphi
Examples,JI(">example","dexdbirepersisttablelock")}

C syntax

```
DBIResult DBIFN DbiRelPersistTableLock (hDb, pszTableName, [pszDriverType]);
```

Delphi syntax

```
function DbiRelPersistTableLock (hDb: hDBIDb; pszTableName: PChar;  
    pszDriverType: PChar): DBIResult stdcall;
```

Description

DbiRelPersistTableLock releases the persistent table lock on the specified table for the associated session.

Parameters

hDb Type: hDBIDb (Input)

Specifies the database handle.

pszTableName Type: pCHAR (Input)

Pointer to the name of the table. For Paradox, if *pszTableName* is a fully qualified name of a table, the *pszDriverType* parameter need not be specified. If the path is not included, the path name is taken from the current directory of the database associated with *hDb*.

For SQL databases, this parameter can be a fully qualified name that includes the owner name.

pszDriverType Type: pCHAR (Input)

Pointer to the driver type. Optional. For Paradox tables, this parameter is required if *pszTableName* has no extension. *pszDriverType* must be szPARADOX. This parameter is ignored if the database associated with *hDb* is a SQL database.

Usage

This function is valid only with Paradox and SQL tables, since only Paradox and SQL tables can have persistent locks placed on them.

dBASE: This function is not supported with dBASE tables.

Completion state

The number of persistent locks on the table is decremented. If this is the last persistent lock on the table, the lock is released.

DbiResult return values

DBIERR_NONE	The lock was released successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDPARAM	The specified table name or the pointer to the table name is NULL.
DBIERR_NOTLOCKED	The specified table does not have a persistent lock placed on it.

See also

[DbiAcqPersistTableLock](#)

C Examples: DbiRelPersistTableLock

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiRelPersistTableLock

Place and release persistent lock on the TTable T.

This example uses the following input:

```
AcqAndRelPersistTableLock(Table1);
```

```
procedure AcqAndRelPersistTableLock(T: TTable);
var
  Drv: PChar;
begin
  with T do begin
    if TableType = ttParadox then
      Drv := StrNew(szParadox)
    else if TableType = ttdBASE then
      Drv := StrNew(szdBASE)
    else Drv := Nil;
    try
      Check(DbiAcqPersistTableLock(DBHandle, PChar(TableName), Drv));
      Check(DbiRelPersistTableLock(DBHandle, PChar(TableName), Drv));
    finally
      if Assigned(Drv) then StrDispose(Drv);
    end;
  end;
end;
```


DbiRelRecordLock {button C
Examples,JI(">example","exdbirelrecordlock")} {button Delphi
Examples,JI(">example","dexdbirelrecordlock")}

C syntax

```
DBIResult DBIFN DbiRelRecordLock (hCursor, bAll);
```

Delphi syntax

```
function DbiRelRecordLock (hCursor: hDBICur; bAll: Bool): DBIResult stdcall;
```

Description

DbiRelRecordLock releases the record lock on either the current record of *hCursor* or all the record locks acquired in the current session.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

bAll Type: BOOL (Input)
Specifies which record locks to release. If set to TRUE, all record locks acquired in the current session are released. If set to FALSE, *hCursor* must be positioned on a record in order to release the lock for that record.

Usage

SQL: Optimistic locks are released by this function. The SQL drivers always perform optimistic record locking; therefore, a record lock request does not explicitly attempt to lock the record on the server.

Completion state

The specified record locks are removed.

DbiResult return values

DBIERR_NONE	Locks were successfully released.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NOTLOCKED	The current record is not locked (this error is returned only when <i>bAll</i> is FALSE).
DBIERR_NOCURREC	The cursor is not positioned on a record.

See also

[DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRecord](#), [DbiGetRelativeRecord](#), [DbiIsRecordLocked](#)

C Examples: DbiRelRecordLock

Release all record locks on the table associated with a cursor.

Note: To release only the one record pointed to by the cursor, set *bAll* to FALSE.

```
DBIResult fDbiRelRecordLock(hDBICur hCur)
{
    DBIResult      rslt;
    BOOL           bAll;
    bAll = TRUE;
    rslt = Chk(DbiRelRecordLock(hCur, bAll));
    return rslt;
}
```

Delphi Examples: DbiRelRecordLock

Release the record lock on either the current record or all the record locks in the current session.

This example uses the following input:

```
fDbiRelRecordLock(Table1.Handle, TRUE);  
Procedure fDbiRelRecordLock(hTmpHandle:hDBICur; bAll:boolean);  
begin  
  Check(DbiRelRecordLock(hTmpHandle, bAll));  
end;
```

DbiRelTableLock {button C
Examples,JI(">example","exdbireltablelock")} {button Delphi
Examples,JI(">example","dexdbireltablelock")}

C syntax

```
DBIResult DBIFN DbiRelTableLock (hCursor, bAll, eLockType);
```

Delphi syntax

```
function DbiRelTableLock (hCursor: hDBICur; bAll: Bool; eLockType:  
    DBILockType): DBIResult stdcall;
```

Description

DbiRelTableLock releases table locks of the specified type associated with the session in which *hCursor* was created.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

bAll Type: BOOL (Input)

Determines which table locks to release. If set to TRUE, all locks on the table associated with *hCursor* are released, and *eLockType* is ignored.

eLockType Type: DBILockType (Input)

Specifies the table lock type. *eLockType* is ignored if *bAll* is TRUE.

For dBASE and SQL tables, dbiREADLOCK is upgraded to dbiWRITELOCK. In that case, if *eLockType* specifies dbiREADLOCK, the write lock is released.

Usage

Only locks acquired by calling DbiAcqTableLock can be released. A separate call to DbiRelTableLock is required to release each lock acquired by DbiAcqTableLock, if *bAll* is not set to TRUE.

dBASE: See the *eLockType* parameter description.

SQL: See the *eLockType* parameter description.

Prerequisites

There must be an existing table lock of the type specified in *eLockType*. However, an existing table lock is not required if all locks are being released (*bAll* is TRUE).

DbiResult return values

DBIERR_NONE	Locks were successfully released.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_NOTLOCKED	The table is not locked with the specified lock type (this error is returned only when <i>bAll</i> is FALSE).

See also

[DbiAcqTableLock](#), [DbilsTableLocked](#), [DbiOpenLockList](#)

eLockType

eLockType can be one of the following values:

<i>eLockType</i> value	Table lock type
dbiWRITELOCK	Write lock
dbiREADLOCK	Read lock

C Examples: DbiRelTableLock

Release all locks placed on a table by DbiAcqTableLock.

```
DBIResult fDbiRelTableLock(hDBICur hCur)
{
    DBIResult      rslt;
    rslt = Chk(DbiRelTableLock(hCur, TRUE, NULL));
    return rslt;
}
```

Delphi Examples: DbiRelTableLock

Release all locks placed on a table by DbiAcqTableLock.

Delphi users can use the TTable.UnlockTable method rather than directly calling DbiRelTableLock. This method is defined as: Procedure TTable.UnlockTable(LockType: TLockType); This example uses the following input:

```
fDbiRelTableLock(Table1, True, dbiWRITELOCK);  
Procedure fDbiRelTableLock(TblName: TTable; All: Boolean; Lock: DBILockType);  
var  
    hNewCur: hDbiCur;  
begin  
    Check(DbiGetCursorForTable(TblName.DBHandle, PChar(TblName.TableName), '',  
        hNewCur));  
    Check(DbiRelTableLock(hNewCur, All, Lock));  
end;
```

Release all locks on the specified table.

Delphi users can use the TTable.UnlockTable method rather than directly calling DbiRelTableLock. This example uses the following input:

```
fDbiRelTableLock(Table1);  
procedure fDbiRelTableLock(TblName: TTable);  
begin  
    Check(DbiRelTableLock(TblName.Handle, True, dbiWRITELOCK));  
end;
```

DbiRenameTable {button C
Examples,JI(">example","exdbirenametable")} {button Delphi
Examples,JI(">example","dexdbirenametable")}

C syntax

```
DBIResult DBIFN DbiRenameTable (hDb, pszOldName, [pszDriverType],  
    pszNewName);
```

Delphi syntax

```
function DbiRenameTable (hDb: hDBIDb; pszOldName: PChar; pszDriverType:  
    PChar; pszNewName: PChar): DBIResult stdcall;
```

Description

DbiRenameTable renames the table given in *pszOldName* and all its resources to the new name specified by *pszNewName*.

Parameters

hDb Type: hDBIDb (Input)
Specifies the database handle.

pszOldName Type: pCHAR (Input)
Pointer to the name of existing table. For Paradox and dBASE tables only, if *pszOldName* contains an extension, *pszDriverType* is not needed. The source driver type determines the destination driver type.

pszDriverType Type: pCHAR (Input)
Pointer to the table type. Optional. For Paradox and dBASE tables, this parameter is required if *pszOldName* has no extension. This parameter is ignored if the database associated with *hDb* is a SQL database. *pszTableType* can be one of the following values: szPARADOX or szDBASE.

pszNewName Type: pCHAR (Input)
Pointer to the new name for the table.

Usage

When the table is renamed, other resources are also renamed, depending on the database driver.

Paradox: The following files are renamed:

- The table (.DB extension)
- BLOB files (.MB extension)
- All indexes
- Validity check and referential integrity files (.VAL extension)

If the table is encrypted, the master password must be specified, or the DbiRenameTable call fails. A master table in a referential integrity link, the table cannot be renamed. If it is a detail table and the table is renamed into the same directory, the function automatically maintains the link to its master table. If it is a detail table and the table is renamed into the different directory, referential integrity is dropped. Exclusive access to the master table is required.

dBASE: The following files are renamed:

- The table (.DBF extension)
- BLOB files (.DBT extension)
- The production index (.MDX extension)

SQL: All indexes become associated with the new table name. Some SQL servers do not support DbiRenameTable.

Prerequisites

The client application must have permission to lock the table exclusively.

DbiResult return values

DBIERR_NONE	The table was renamed successfully.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_NOSUCHTABLE	The source table does not exist.
DBIERR_UNKNOWNBLTYPE	The driver type is unknown.
DBIERR_NOTSUFFTABLERIGHTS	The client application has insufficient rights to the table (Paradox only).
DBIERR_NOTSUFFFAMILYRIGHTS	The client application has insufficient rights to family members (Paradox only).
DBIERR_LOCKED	The table is already in use.

See also

[DbiAddPassword](#), [DbiCopyTable](#), [DbiDeleteTable](#)

C Examples: DbiRenameTable

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiRenameTable

Rename the table to the new table name. If ReOpen is true, reset the table's TableName and reopen the table.

Note: Most Delphi users should use TTable.RenameTable.

```
procedure fDbiRenameTable(Table: TTable; NewName: String; ReOpen: Boolean);
var
  hDb: hDBIDb;
  Props: CURProps;

begin
  if Table.Active = False then
    EDatabaseError.Create('Table must be open to complete operation');
  if Table.Exclusive = False then
    EDBEngineError.Create(DBIERR_NEEDEXCLACCESS);
  Check(DbiGetCursorProps(Table.Handle, Props));
  // Get the Database Handle from the table cursor since Table.DBHandle will
  // be invalid once the table is closed
  Check(DbiGetObjFromObj(hDBIObj(Table.Handle), objDATABASE, hDBIObj(hDb)));
  Table.Close;
  Check(DbiRenameTable(hDb, PChar(Table.TableName), Props.szTableType,
    PChar(NewName)));
  if ReOpen = True then
    begin
      Table.TableName := NewName;
      Table.Open;
    end;
end;
```

DbiResetRange {button C
Examples,JI(">example","exdbiresetrange")} {button Delphi
Examples,JI(">example","dexdbiresetrange")}

C syntax

```
DBIResult DBIFN DbiResetRange (hCursor);
```

Delphi syntax

```
function DbiResetRange (hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiResetRange removes the specified cursor's limited range previously established by the function DbiSetRange.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle of the table with the range to be removed.

Usage

DbiResetRange preserves the current position of the cursor.

Prerequisites

The cursor must be opened on an index.

Completion state

The function has no effect on existing filters.

If the cursor was positioned on a valid record before the call, it is left on the same record. If it was positioned on a crack, it is positioned there after the call.

DbiResult return values

DBIERR_NONE	The range was reset successfully.
DBIERR_INVALIDHNDL	hCursor is not valid.
DBIERR_NOASSOCINDEX	The specified table does not have an index open.

See also

[DbiSetRange](#)

C Examples: DbiResetRange

Reset the range of a table after using DbiSetRange.

This example removes constraints on a result set.

```
DBIResult fDbiResetRange(hDBICur hCur)
{
    DBIResult      rslt;
    rslt = Chk(DbiResetRange(hCur));
    return rslt;
}
```

DbiSaveChanges {button C
Examples,JI(">example","exdbisavechanges")}
{button Delphi
Examples,JI(">example","dexdbisetrangle")}

C syntax

```
DBIResult DBIFN DbiSaveChanges (hCursor);
```

Delphi syntax

```
function DbiSaveChanges (hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiSaveChanges forces all updated records associated with *hCursor* to disk.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

Usage

If the table associated with *hCursor* is a temporary table (created with [DbiCreateTempTable](#)), DbiSaveChanges saves all buffered changes to disk and makes the table permanent. This table will not be removed when the cursor is closed.

SQL: This function is not supported with SQL tables.

DbiResult return values

DBIERR_NONE	All changes have been saved successfully.
DBIERR_INVALIDHNDL	The specified cursor is invalid or NULL.
DBIERR_NODISKSPACE	The changes could not be saved because there is no disk space available.
DBIERR_NOTSUPPORTED	This function is not supported for SQL tables.

See also

[DbiMakePermanent](#)

C Examples: DbiSaveChanges

Save changes to the specified table name.

Save changes to the specified table name. The table must be open on the current session. This example uses the following input:

```
fDbiSaveChanges(hCursor);  
DBIResult fDbiSaveChanges (pCHAR TblName)  
{  
    DBIResult      rslt;  
    hDBICur        hTmpCur = 0;  
    rslt = Chk(DbiGetObjFromName(objCURSOR, TblName, &hTmpCur));  
    if (rslt != DBIERR_NONE)  
        return rslt;  
    rslt = Chk(DbiSaveChanges(hTmpCur));  
    return rslt;  
}
```

Delphi Examples: DbSaveChanges

Save all updated records associated with hTmpHandle to disk.

This example uses the following input:

```
fDbSaveChanges(Table1.Handle);  
procedure fDbSaveChanges(hTmpHandle:hDBICur);  
begin  
    Check(DbSaveChanges(hTmpHandle));  
end;
```


DbiSetCurrSession {button C Examples,JI(">example","exdbisetcurrsession")} {button Delphi Examples,JI(">example","dexdbisetcurrsession")}

C syntax

```
DBIResult DBIFN DbiSetCurrSession (hSes);
```

Delphi syntax

```
function DbiSetCurrSession (hSes: hDBISes): DBIResult stdcall;
```

Description

DbiSetCurrSession sets the current session of the client application to the session associated with *hSes*.

Parameters

hSes Type: hDBISes (Input)

Specifies the session handle. If *hSes* is NULL, DbiSetCurrSession sets the current session to the default session.

Completion state

All subsequent operations that do not require an object handle (such as cursor, database, or statement) are associated with this session. Any functions that take an explicit database, query, or cursor handle as an argument are not affected by DbiSetCurrSession. Any resources required by these functions are allocated in the context of the session set by DbiSetCurrSession.

DbiResult return values

DBIERR_NONE	The session has been successfully set to the session associated with <i>hSes</i> .
DBIERR_INVALIDSESHANDLE	The specified session handle is invalid.

See also

[DbiGetCurrSession](#), [DbiStartSession](#), [DbiCloseSession](#), [DbiGetSysInfo](#), [DbiGetSesInfo](#)

C Examples: DbiSetCurrSession

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbisetCurrSession

Set the current session. This example uses the following input:

```
fDbisetCurrSession(Session.Handle);
```

Note: Most Delphi users should use Sessions (TSessionList) and Session (TSession) to alter the current session.

```
procedure fDbisetCurrSession(hSes: hDBISes);  
begin  
    Check(DbisetCurrSession(hSes));  
end;
```

DbiSetDateFormat {button C
Examples,JI(">example","exdbisetdateformat")} {button Delphi
Examples,JI(">example","dexdbisetdateformat")}

C syntax

```
DBIResult DBIFN DbiSetDateFormat (pfmtDate);
```

Delphi syntax

```
function DbiSetDateFormat (var fmtDate: FMTDate): DBIResult stdcall;
```

Description

DbiSetDateFormat sets the date format for the current session.

Parameters

pfmtDate Type: pFMTDate (Input)
Pointer to the date format structure.

Usage

The date format is used by QBE (Query By Example language) for input and wildcard character matching. It is also used by batch operations (such as [DbiDoRestructure](#) and [DbiBatchMove](#)) to handle data type coercion between character and date types.

DbiResult return values

DBIERR_NONE	The date format was successfully set.
DBIERR_INVALIDHNDL	The pointer to the date format structure is NULL.
DBIERR_INVALIDPARAM	Data within the date format structure is invalid.

See also

[DbiGetDateFormat](#)

C Examples: DbiSetDateFormat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbisetDateFormat

Set the date format for the current session.

This example uses the following input:

```
fDbisetDateFormat;
Procedure fDbisetDateFormat;
var
  fDate : FMTDate;
begin
  fDate.szDateSeparator := '/';           { Specifies date separator character
  }
  fDate.iDateMode := 0;                   { Date format. 0 = MDY, 1 = DMY, 2 =
  YMD. }
  fDate.bFourDigitYear := FALSE;         { If TRUE, write year as four
  digits. }
  fDate.bYearBiased := FALSE;            { On input add 1900 to year if TRUE.
  }
  fDate.bMonthLeadingZero := FALSE;       { Month displayed with a leading
  zero if TRUE. }
  fDate.bDayLeadingZero := FALSE;         { Day displayed with leading zero if
  TRUE. }

  Check(DbisetDateFormat(fDate));
end;
.
```

DbiSetDirectory {button C
Examples,JI(">example","exdbisetdirectory")} {button Delphi
Examples,JI(">example","dexdbisetdirectory")}

C syntax

```
DBIResult DBIFN DbiSetDirectory (hDb, pszDir);
```

Delphi syntax

```
function DbiSetDirectory (hDb: hDBIDb; pszDir: PChar): DBIResult stdcall;
```

Description

DbiSetDirectory sets the current directory for a standard database.

Parameters

hDb Type: hDBIDb (Input)

Specifies a standard database handle.

pszDir Type: pCHAR (Input)

Pointer to the client buffer specifying the new current directory path. If set to NULL, DbiSetDirectory sets the current directory to the default directory.

Usage

SQL: DbiSetDirectory is not applicable to SQL databases.

Prerequisites

If DbiSetDirectory has not been called, the directory is set to whatever was specified as the working directory in the [DBIEnv](#) structure in DbInit. If *pszDir* is set to NULL, the directory reverts to the default directory. The default directory is the application's start-up directory. If an alias was used to open the database, the path that was specified in the alias is used as the current directory.

Completion state

After setting the directory, any TblList or FileList cursors opened on this handle are restricted to this directory, and any call to DbiOpenTable without a specified path is limited to searching to this directory. Any resources acquired before DbiSetDirectory is called, such as opened tables, are not affected by the change.

DbiResult return values

DBIERR_NONE	The current directory has been successfully set.
DBIERR_NOTSUPPORTED	This function is not supported with a non-standard database.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.

See also

[DbiGetDirectory](#), [DbInit](#), [DbiOpenTable](#)

C Examples: DbiSetDirectory

Set the working directory for the specified database.

If the main directory cannot be set, the function attempts to set a backup directory. This example uses the following input:

```
fDbiSetDirectory(hDb, "c:\bde\examples\tables", "c:\bde32\examples\tables", &Main);
DBIResult fDbiSetDirectory(hDBIDb hTmpDb, pCHAR MainDir, pCHAR BackupDir,
    pBOOL Main)
{
    DBIResult rslt;
    rslt = Chk(DbiSetDirectory(hTmpDb, MainDir));
    if (rslt == DBIERR_NONE)
        *Main = TRUE;
    else
    {
        rslt = Chk(DbiSetDirectory(hTmpDb, BackupDir));
        if (rslt == DBIERR_NONE)
            *Main = FALSE;
    }
    return rslt;
}
```


Delphi Examples: DbiSetDirectory

Set the current working directory.

This example uses the following input:

```
fDbiSetDirectory(Database1.Handle, 'C:\Tables');  
Procedure fDbiSetDirectory(hdb: hDbiDb; Dir: String);  
begin  
    Check(DbiSetDirectory(hdb, PChar(Dir)));  
end;
```

DbiSetFieldMap {button C
Examples,JI(">example","exdbisetfieldmap")} {button Delphi
Examples,JI(">example","dexdbisetfieldmap")}

C syntax

```
DBIResult DBIFN DbiSetFieldMap (hCur, iFields, pFldDesc);
```

Delphi syntax

```
function DbiSetFieldMap (hCur: hDBICur; iFields: Word; pFldDesc: pFLDDesc):  
    DBIResult stdcall;
```

Description

DbiSetFieldMap sets a field map of the table associated with the given cursor.

Parameters

hCur Type: hDBICur (Input)
Specifies the cursor handle.

iFields Type: UINT16 (Input)
Specifies the number of fields to map.

pFldDesc Type: pFLDDesc (Input)
Pointer to an array of [FLDDesc](#) structures.

Usage

A field map allows the user to effectively reorder the fields of a table or to drop some of the fields from view. This function does not produce a new cursor, but modifies the existing one. The client application specifies a field map by building an array of field descriptors. The order of field descriptors in the array specifies the order in which the cursor presents the fields.

For dBASE and Paradox, all data retrieval functions map the returned records as specified in the field description; no type conversions are allowed. When a record is updated in a table with a field map, the unmapped fields are left unchanged. When a record is inserted in a table with a field map, the unmapped fields are set to blank.

Paradox: When a record is inserted in a table with a field map, the unmapped fields are set to blank or set to any defined default value.

Text: Since no description of the fields are available when the text file is created with [DbiCreateTable](#), it is a good practice to set a field map on the cursor that is opened on that text file. The text driver uses this field map to interpret the data types of the fields in that text file. The [DbiTranslateRecordStructure](#) call can be used to convert the logical or physical fields of a given driver type (such as Paradox or dBASE) to the physical fields of the text driver. These resulting physical text fields can be used in the [DbiSetFieldMap](#) call. When a field map is set on a text table, *iFldType*, *iFldNum*, *iUnits1*, and *iUnits2* must be set correctly in all the field descriptors.

Prerequisites

[DbiGetFieldDescs](#) must be called to retrieve the array of field descriptors for the table.

Completion state

The underlying table is not affected. All the original fields still exist; they are simply not visible. (To drop fields in the underlying table, use [DbiDoRestructure](#).) Setting *iFields* to 0 removes any existing field map and allows the underlying fields to become visible again.

DbiResult return values

DBIERR_NONE

The field map was set successfully.

DBIERR_NA

The field number in the field descriptor is greater than the number of fields in the table, or the specified field name does not exist. Some drivers return this error if the user tried to set a field map on a table that already has a

field map set.

See also

[DbiGetFieldDescs](#)

C Examples: DbiSetFieldMap

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbisetFieldMap

Set a field map for the current table. This example uses the following input:

```
fDbisetFieldMap(CustomerTbl, [CustomerTbl.FieldByName('Company'),  
    CustomerTbl.FieldByName('City')]);
```

Note: Most Delphi users should use the Fields Editor of a TTable to set the field mapping.

```
procedure fDbisetFieldMap(Table: TTable; const Fields: array of TField);  
var  
    CurrentElement, Elements, FldNum: Integer;  
    pFields, pOrigFields, pF, pOF: pFLDDesc;  
  
begin  
    Elements := sizeof(Fields) div sizeof(TField);  
    pFields := AllocMem(Elements * sizeof(FLDDesc));  
    pOrigFields := AllocMem(Table.FieldCount * sizeof(FLDDesc));  
    pF := pFields;  
    try  
        // Get the original field descriptors  
        Check(DbisetFieldDescs(Table.Handle, pOrigFields));  
        // Iterate through the original fields and create a pFLDDesc structure  
        // for the new field map structure  
        for CurrentElement := 0 to Elements - 1 do  
            begin  
                pOF := pOrigFields;  
                for FldNum := 1 to Table.FieldCount do  
                    begin  
                        // Add only the field names that match  
                        if StrIComp(PChar(Fields[CurrentElement].FieldName), pOF.szName) = 0  
then  
                            begin  
                                // Move the original FLDDesc to the new FLDDesc  
                                move(pOF^, pF^, sizeof(FLDDesc));  
                                Inc(pF);  
                                break;  
                            end  
                        else  
                            Inc(pOF);  
                        end;  
                    end;  
                end;  
                Check(DbisetFieldMap(Table.Handle, Elements, pFields));  
            finally  
                FreeMem(pFields, Elements * sizeof(FLDDesc));  
                FreeMem(pOrigFields, Table.FieldCount * sizeof(FLDDesc));  
            end;  
        end;  
    end;
```

DbiSetLockRetry {button C
Examples,JI(">example","exdbisetlockretry")} {button Delphi
Examples,JI(">example","dexdbisetlockretry")}

C syntax

```
DBIResult DBIFN DbiSetLockRetry (iWait);
```

Delphi syntax

```
function DbiSetLockRetry (iWait: SmallInt): DBIResult stdcall;
```

Description

DbiSetLockRetry sets the table and record lock retry time for the current session.

Parameters

iWait Type: INT16 (Input)
Specifies the lock retry time in seconds. The default setting is five seconds.

Value	Description
<= -1	Any negative value causes infinite retries
= 0	No retry is attempted
>= 1	Number of seconds to retry

Usage

DbiSetLockRetry functions only with Paradox and dBASE tables. Whenever table or record lock fails, the lock is repeatedly attempted until the retry time expires. If *iWait* is 0, no retry is performed, resulting in the immediate failure of any unsuccessful lock request. The default setting is five seconds. The following functions retry locking if the lock fails:

Record locks:

- [DbiGetNextRecord](#)
- [DbiGetRelativeRecord](#)
- [DbiGetPriorRecord](#)
- [DbiGetRecord](#)

Table locks:

- [DbiAcqTableLock](#)
(Persistent table locks are not affected.)

The following functions do not retry locking if the lock fails:

- [DbiOpenDatabase](#)
- [DbiOpenTable](#)
- [DbiSetDirectory](#)
- [DbiSetPrivateDir](#)

SQL: This function is not supported with SQL tables.

Completion state

The number of retry seconds is set. Whenever a Paradox or dBASE table or record lock fails, the lock will be attempted until the retry time limit is reached.

DbiResult return values

DBIERR_NONE The lock retry time was successfully set for the session.

See also

[DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRelativeRecord](#), [DbiGetRecord](#), [DbiAcqTableLock](#),

DbiAcqPersistTableLock, DbiSetPrivateDir, DbiSetDirectory, DbiOpenTable

C Examples: DbiSetLockRetry

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbisetLockRetry

Set the specified session's lock retry time. This example uses the following input:

```
fDbisetLockRetry(Session, 100);  
procedure fDbisetLockRetry(LockSession: TSession; Wait: Integer);  
var  
    OriginalSession: TSession;  
begin  
    // Save the current session  
    OriginalSession := Sessions.CurrentSession;  
    // Set the current session to the specified session  
    Sessions.CurrentSession := LockSession;  
    // Set the lock retry time  
    Check(DbisetLockRetry(Wait));  
    // Set the current session back to the original session  
    Sessions.CurrentSession := OriginalSession;  
end;
```

DbiSetNumberFormat {button C
Examples,JI(">example","exdbisetnumberformat")} {button Delphi
Examples,JI(">example","dexdbisetnumberformat")}

C syntax

```
DBIResult DBIFN DbiSetNumberFormat (pfmtNumber);
```

Delphi syntax

```
function DbiSetNumberFormat (var fmtNumber: FMTNumber): DBIResult stdcall;
```

Description

DbiSetNumberFormat sets the number format for the current session.

Parameters

pfmtNumber Type: pFMTNumber (Input)
Pointer to the client-allocated FMTNumber structure.

Usage

The number format is used by QBE for input and wildcard character matching. It is also used by batch operations (such as DbiDoRestructure and DbiBatchMove) to handle data type coercion between character and numeric types.

DbiResult return values

DBIERR_NONE	The number format was set successfully.
DBIERR_INVALIDHNDL	The pointer to the number format structure is NULL.
DBIERR_INVALIDPARAM	Data within the number format structure is invalid.

See also

[DbiGetNumberFormat](#)

C Examples: DbiSetNumberFormat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbisetNumberFormat

An example for this function is under development and will be provided in an upcoming Help release.

DbiSetPrivateDir {button C
Examples,JI(">example","exdbisetprivatedir")} {button Delphi
Examples,JI(">example","dexdbisetprivatedir")}

C syntax

```
DBIResult DBIFN DbiSetPrivateDir (pszDir);
```

Delphi syntax

```
function DbiSetPrivateDir (pszDir: PChar): DBIResult stdcall;
```

Description

DbiSetPrivateDir sets the private directory for the current session.

Parameters

pszDir Type: pCHAR (Input)

Pointer to the full path name of the new private directory. Optional. If NULL, then the private directory is reset to the default startup directory.

Usage

Although DbiSetPrivateDir is specific to Paradox tables, it has one important use for all drivers: all temporary or auxiliary files are created in this directory by default. If no private directory is specified, then all temporary or auxiliary tables are created in the default startup directory. Examples of functions that may create temporary or auxiliary tables are DbiDoRestructure and DbiBatchMove.

If you want the private directory to be the same as the default working directory, you must explicitly set first the private directory, then set the default directory by using [DbiSetDirectory](#).

Prerequisites

The directory must be available for exclusive access. No other BDE users can access the private directory.

DbiResult return values

DBIERR_NONE	The private directory was successfully set.
DBIERR_DIRBUSY	The specified directory is currently in use.

See also

[DbiGetSesInfo](#)

C Examples: DbiSetPrivateDir

Set the private directory.

If the main directory cannot be set, the function attempts to set a backup directory. This example uses the following input:

```
fDbiSetPrivateDir("c:\\temp", "c:\\temp", &Main);
DBIResult fDbiSetPrivateDir(pCHAR MainDir, pCHAR BackupDir, pBOOL Main)
{
    DBIResult rslt;
    rslt = Chk(DbiSetPrivateDir(MainDir));
    if (rslt == DBIERR_NONE)
        *Main = TRUE;
    else
    {
        rslt = Chk(DbiSetPrivateDir(BackupDir));
        if (rslt == DBIERR_NONE)
            *Main = FALSE;
    }
    return rslt;
}
```

Delphi Examples: DbiSetPrivateDir

Set the private directory.

Delphi programs should use the TSession, PrivateDir property rather than using the dbi function directly. This sets the private directory for Paradox tables. For all drivers, all temporary or auxiliary files are created/kept in this directory. This example uses the following input:

```
fDbiSetPrivateDir('C:\Temp');  
procedure fDbiSetPrivateDir(Dir: String);  
begin  
    Check(DbiSetPrivateDir(PChar(Dir)));  
end;
```

DbiSetProp {button C
Examples,JI(">example","exdbisetprop")} {button Delphi
Examples,JI(">example","dexdbisetprop")}

C syntax

```
DBIResult DBIFN DbiSetProp (hObj, iProp, iPropValue);
```

Delphi syntax

```
function DbiSetProp (hObj: hDBIObj; iProp: Longint; iPropValue: Longint):  
    DBIResult stdcall;
```

Description

DbiSetProp sets the specified properties of an object to a given value. See [Getting and Setting Properties](#).

Parameters

hObj Type: hDBIObj (Input)
Specifies the object handle to a system, client, session, driver, database, cursor, or statement object.

iProp Type: UINT32 (Input)
Specifies the property to set.

iPropValue Type: UINT32 (Input)
Specifies the value of the property.

Usage

The specified object does not necessarily have to match the type of property as long as the object is associated with the object type of the property. For example, the property `drvDRIVERTYPE` assumes an object of type `objDRIVER`, but because a cursor is derived from a driver, a cursor handle (`objCURSOR`) could also be specified. See [DbiGetObjFromObj](#) for details about associated objects.

Example

To set the translation mode of a cursor to `xltNONE` (see [DbiOpenTable](#)), use:

```
DbiSetProp (hCursor, curXLTMODE, (UINT32) xltNONE);
```

For properties wider than 32-bits, pass a pointer to the property, and cast the pointer to (UINT32).

Example

The following example shows how you can use `DbiSetProp` to specify your preference for live or canned result sets during query execution. A canned result set is like a snapshot or a copy of the original data selected by the query. In contrast, a live result set is a view of the original data; specifically, if you modify a live result set, the changes are reflected in the original data.

```
DbiSetProp (hSt, stmtLIVENESS, (UINT32) wantLIVE);
```

DbiResult return values

DBIERR_NONE	The property of the object was successfully set.
DBIERR_NOTSUPPORTED	Property is not supported for this object.
DBIERR_INVALIDPARAM	<i>hObj</i> is null or invalid.

See also

[DbiOpenTable](#), [DbiGetProp](#)

C Examples: DbiSetProp

Execute a SQL statement and return a live cursor (if possible).

Note: If a live cursor cannot be created, the SQL statement will not be executed. This example uses the following input:

```
fDbiSetProp1("SELECT * FROM 'CUST.DBF'", hDb, &hTmpCur)
```

```
DBIResult fDbiSetProp1(pCHAR QryStr, hDBIDb hTmpDb, phDBICur phTmpCur)
{
    DBIResult    rslt;
    hDBISstmt    hStmnt;

    rslt = Chk(DbiQAlloc(hTmpDb, qrylangSQL, &hStmnt));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiQPrepare(hStmnt, QryStr));
    if (rslt != DBIERR_NONE)
    {
        Chk(DbiQFree(&hStmnt));
        return rslt;
    }
    rslt = Chk(DbiSetProp(hStmnt, stmtLIVENESS, (UINT32)wantLIVE));
    if (rslt != DBIERR_NONE)
    {
        Chk(DbiQFree(&hStmnt));
        return rslt;
    }
    rslt = Chk(DbiQExec(hStmnt, phTmpCur));
    Chk(DbiQFree(&hStmnt));
    return rslt;
}
```

Delphi Examples: DbiSetProp

Set soft deletes to True or False depending on the boolean variable SoftDelete. This example uses the following input:

```
fDbiSetProp1(AnimalTbl, True);
procedure fDbiSetProp1(Table: TTable; SoftDelete: Boolean);
var
  rslt: DBIResult;
  Props: CURProps;

begin
  Check(DbiGetCursorProps(Table.Handle, Props));
  if Props.szTableType = szDBASE then
    raise EDBEngineError.Create(DBIERR_NOTSUPPORTED);
  // Make sure that the property can be set
  rslt := DbiValidateProp(hDBIObj(Table.Handle), curSOFTDELETEON, True);
  if rslt = DBIERR_NONE then
    // Set the property
    Check(DbiSetProp(hDBIObj(Table.Handle), curSOFTDELETEON,
Longint(SoftDelete)))
  else
    raise EDBEngineError.Create(rslt);
end;
```

Set the maximum rows that can be fetched from a SQL table. This example uses the following input:

```
fDbiSetProp2(IBTable, 100);
procedure fDbiSetProp2(Table: TTable; MaxRows: Longint);
var
  rslt: DBIResult;
  DBType: string;
  Len: Word;

begin
  SetLength(DBType, DBIMAXNAMELEN);
  Check(DbiGetProp(hDBIObj(Table.DBHandle), dbDATABASETYPE, PChar(DBType),
DBIMAXNAMELEN, Len));
  SetLength(DBType, StrLen(PChar(DBType)));
  // Make sure the table type is not dBASE or Paradox (must be SQL based)
  if DBType = 'STANDARD' then
    raise EDBEngineError.Create(DBIERR_NOTSUPPORTED);
  // Make sure that the property can be set
  rslt := DbiValidateProp(hDBIObj(Table.Handle), curMAXROWS, True);
  if rslt = DBIERR_NONE then
    // Set the property
    Check(DbiSetProp(hDBIObj(Table.Handle), curMAXROWS, MaxRows))
  else
    raise EDBEngineError.Create(rslt);
end;
```

DbiSetRange {button C Examples,JI(">example","exdbisetrangle")} {button Delphi Examples,JI(">example","dexdbisetrangle")}

C syntax

```
DBIResult DBIFN DbiSetRange (hCursor, bKeyItself, [iFields1], [iLen1],  
    [pKey1], bKey1Incl, iFields2, iLen2, [pKey2], bKey2Incl);
```

Delphi syntax

```
function DbiSetRange (hCursor: hDBICur; bKeyItself: Bool; iFields1: Word;  
    iLen1: Word; pKey1: Pointer; bKey1Incl: Bool; iFields2: Word; iLen2: Word;  
    pKey2: Pointer; bKey2Incl: Bool): DBIResult stdcall;
```

Description

DbiSetRange constrains the result set to the subset bounded by two keys.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

bKeyItself Type: BOOL (Input)
Defines the key buffer type. If set to TRUE, *pKey1* and *pKey2* contain the keys directly; if set to FALSE, *pKey1* and *pKey2* point to record buffers from which the keys can be extracted.

iFields1 Type: UINT16 (Input)
Specifies the number of fields to be used for composite keys, for the beginning of the range. Optional. The *iFields1* and *iLen1* parameters together indicate how much of the key is to be used for matching. If both are zero, the entire key is used. If a partial match is required on a given field of the key, all the key fields preceding it in the composite key must be included. Only character fields can be matched for a partial key; all other field types must be fully matched.

For partial key matches, *iFields1* must be equal to the number (if any) of key fields preceding the field being partially matched. *iLen1* specifies the number of characters in the partial key to be matched.

iLen1 Type: UINT16 (Input)
Specifies the length into the last field to be used for composite keys. If not zero, the last field to be used must be a character type.

pKey1 Type: pBYTE (Input)
Pointer to the key value or record buffer for the beginning of the range. Optional. If NULL, no low limit is set.

bKey1Incl Type: BOOL (Input)
Specifies whether to include the beginning key value in the range. *bKey1Incl* can be either TRUE or FALSE.

iFields2 Type: UINT16 (Input)
Specifies the number of fields to be used for composite keys, for the end of the range. Optional. The *iFields2* and *iLen2* parameters together indicate how much of the key is to be used for matching. If both are zero, the entire key is used. If a match is required on a given field of the key, all the key fields preceding it in the composite key must also be supplied. Only character fields can be matched for a partial key; all other field types must be fully matched.

For partial key matches, *iFields2* must be equal to the number (if any) of key fields preceding the field being partially matched. *iLen2* specifies the number of characters in the partial key to be matched.

iLen2 Type: UINT16 (Input)
Specifies the length into the last field to be used for composite keys. If not zero, the last field to be used must be a character type.

pKey2 Type: pBYTE (Input)
Pointer to the key value or record buffer for the end of the range. Optional. If NULL, no high limit is set.

bKey2Incl Type: BOOL (Input)
Specifies whether to include the end key value in the range. *bKey2Incl* can be either TRUE or FALSE.

Prerequisites

There must be an active index.

Completion state

DbiSetRange positions the cursor at the beginning of the range, not on the first record in the range.

After this function is called, the cursor allows access only to records in the table that fall within the defined range. Any attempt to reference records outside the range results in a BOF or EOF error condition.

Paradox: *DbiGetRecordCount* now reflects only the records in the range. *DbiGetSeqNo* is relative to the beginning of the range, rather than the beginning of the table.

DbiResult return values

DBIERR_NONE	The range was set successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_OUTOFRANGE	(<i>iField</i> <i>iLen</i>) is less than the whole key.
DBIERR_NOASSOCINDEX	The specified cursor does not have an active index.

See also

DbiResetRange, *DbiExtractKey*, *DbiSetToKey*, *DbiGetRecordCount*, *DbiGetSeqNo*

C Examples: DbiSetRange

Set the range for the specified cursor and return the amount of records in the range.

For this example to operate, the first field of the table must be numeric, such as STOCK.DB. This example uses the following input:

```
fDbiSetRange(hPXCur, &Count);
DBIResult fDbiSetRange(hDBICur hTmpCur, pUINT32 Count)
{
    DBIResult      rslt;
    pBYTE          pMinBuf, pMaxBuf;
    DFLOAT         key_min = 1000.00, key_max = 2000.00;
    CURProps       CurProps;
    rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    pMinBuf = (pBYTE)malloc(CurProps.iRecBufSize * sizeof(BYTE));
    if (pMinBuf == NULL)
        return DBIERR_NOMEMORY;
    pMaxBuf = (pBYTE)malloc(CurProps.iRecBufSize * sizeof(BYTE));
    if (pMaxBuf == NULL)
        return DBIERR_NOMEMORY;
    rslt = Chk(DbiPutField(hTmpCur, 1, pMinBuf, (pBYTE)&key_min));
    if (rslt != DBIERR_NONE)
    {
        free(pMinBuf); free(pMaxBuf);
        return rslt;
    }
    rslt = Chk(DbiPutField(hTmpCur, 1, pMaxBuf, (pBYTE)&key_max));
    if (rslt != DBIERR_NONE)
    {
        free(pMinBuf); free(pMaxBuf);
        return rslt;
    }
    rslt = Chk(DbiSetRange(hTmpCur, FALSE, 0, 0, (pBYTE)pMinBuf, FALSE,
                          0, 0, (pBYTE)pMaxBuf, TRUE));
    *Count = 0L;
    Chk(DbiGetRecordCount(hTmpCur, Count));
    free(pMinBuf); free(pMaxBuf);
    return rslt;
}
```

Delphi Examples: DbiSetRange

Set the range for the specified cursor and return the amount of records in the range.

Delphi programs should call the SetRange, ApplyRange, ResetRange methods of a TTable. This example sets the range for the specified cursor and returns the amount of records in the range. For this example to operate, the first field of the table must be numeric. such as, STOCK.DB. This example uses the following input:

```
fDbiSetRange(Table1.Handle, Count);
procedure fDbiSetRange(hTmpCur: hDBICur; var Count: LongInt);
var
  pMinBuf, pMaxBuf: PByte;
  key_min, key_max: double;
  CurProp: CURProps;
begin
  pMinBuf:= nil;
  pMaxBuf:= nil;
  key_min:= 1000.00;
  key_max:= 2000.00;

  Check(DbiGetCursorProps(hTmpCur, CurProp));

  GetMem(pMinBuf, CurProp.iRecBufSize);
  if (pMinBuf = nil) then
    Check(DBIERR_NOMEMORY);

  GetMem(pMaxBuf, CurProp.iRecBufSize);
  if (pMaxBuf = nil) then
    Check(DBIERR_NOMEMORY);
  try
    Check(DbiPutField(hTmpCur, 1, pMinBuf, @key_min));
    Check(DbiPutField(hTmpCur, 1, pMaxBuf, @key_max));

    Check(DbiSetRange(hTmpCur, false, 0, 0, pMinBuf, false,
                      0, 0, pMaxBuf, true));

    // Set the return count for the number of records in the limited range
    Count:= 0;
    Check(DbiGetRecordCount(hTmpCur, Count));

    Check(DbiResetRange(hTmpCur));
  finally
    FreeMem(pMinBuf);
    FreeMem(pMaxBuf);
  end;
end;
```

DbiSetTimeFormat {button C
Examples,JI(">example","exdbisetimeformat")} {button Delphi
Examples,JI(">example","dexdbisetimeformat")}

C syntax

```
DBIResult DBIFN DbiSetTimeFormat (pfmtTime);
```

Delphi syntax

```
function DbiSetTimeFormat (var fmtTime: FMTTime): DBIResult stdcall;
```

Description

DbiSetTimeFormat sets the time format for the current session.

Parameters

pfmtTime Type: pFMTTime (Input)
Pointer to the client-allocated FMTTime structure.

Usage

The time format is used by QBE for input and wildcard character matching. It is also used by batch operations (such as DbiDoRestructure and DbiBatchMove) to handle data type coercion between character and time or datetime types.

DbiResult return values

DBIERR_NONE	The time format was successfully set.
DBIERR_INVALIDHNDL	The pointer to the time format structure is NULL.
DBIERR_INVALIDPARAM	Data within the time format structure is invalid.

See also

DbiGetTimeFormat

C Examples: DbiSetTimeFormat

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbisetTimeFormat

An example for this function is under development and will be provided in an upcoming Help release.

DbiSetToBegin {button C
Examples,JI(">example","exdbisettobegin")} {button Delphi
Examples,JI(">example","dexdbisettobegin")}

C syntax

```
DBIResult DBIFN DbiSetToBegin (hCursor);
```

Delphi syntax

```
function DbiSetToBegin (hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiSetToBegin positions the cursor to the beginning of the result set.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

Usage

This function is used to reposition the cursor to the beginning of the result set. [DbiGetNextRecord](#) or [DbiGetRelativeRecord](#) can then be called to position the cursor on the first valid record of the result set.

Completion state

The cursor is positioned on the crack before the first record. There is no current record after [DbiSetToBegin](#) completes. ([DbiGetRecord](#) returns DBIERR_BOF.)

DbiResult return values

DBIERR_NONE	The cursor was successfully set to BOF.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.

See also

[DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRelativeRecord](#), [DbiSetToEnd](#), [DbiSetToCursor](#)

C Examples: DbiSetToBegin

Position the cursor at the beginning of the table.

The beginning of the table means the crack before the first record.

```
DBIResult fDbiSetToBegin(hDBICur hCur)
{
    DBIResult      rslt;
    rslt = Chk(DbiSetToBegin(hCur));
    return rslt;
}
```

Delphi Examples: DbisetToBegin

Position the cursor at the beginning of the table.

Delphi programs should use the First method from a TDataset object. This method positions the cursor at the beginning of the result set. This example uses the following input:

```
fDbisetToBegin(hCur);  
Procedure fDbisetToBegin(hTmpCur: hDbisetCur);  
begin  
  Check (DbisetToBegin (hTmpCur) );  
end;
```

DbiSetToBookMark {button C Examples,JI(">example","exdbisettobookmark")} {button Delphi Examples,JI(">example","dexdbisettobookmark")}

C syntax

```
DBIResult DBIFN DbiSetToBookMark (hCur, pBookMark);
```

Delphi syntax

```
function DbiSetToBookMark (hCur: hDBICur; pBookMark: Pointer): DBIResult  
    stdcall;
```

Description

DbiSetToBookMark positions the cursor to the position saved in the specified bookmark.

Parameters

hCur Type: hDBICur (Input)

Specifies the cursor handle. *hCur* must be compatible with the cursor used when the bookmark was obtained.

pBookMark Type: pBYTE (Input)

Pointer to the bookmark. The bookmark is obtained by a prior call to [DbiGetBookMark](#).

Usage

This function is used to position the cursor to a saved position. To determine if the bookmark is stable, call [DbiGetCursorProps](#) and examine the `bBookMarkStable` property.

Prerequisites

[DbiGetBookMark](#) must have been called to retrieve a valid bookmark. The supplied cursor can be different from the one used to retrieve the bookmark information, but the cursor must be opened on the same table, with the same index order, if any.

Note: [DbiSwitchToIndex](#) may make bookmarks obtained under a different index order unusable with the new order.

Completion state

The cursor is positioned at the bookmark location. If the record pointed to by the bookmark has been deleted, the cursor is positioned on a crack where the original record was.

Note: If the bookmark is unstable, the cursor may be in an unexpected position.

DbiResult return values

DBIERR_NONE	The call was successful; however, the position may not be the expected one if the record has been deleted, or if the bookmark was unstable.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL, or the pointer to the bookmark is NULL, or the specified bookmark is NULL.
DBIERR_INVALIDBOOKMARK	The specified bookmark is not from the same table, or the bookmark is corrupt.

See also

[DbiOpenTable](#), [DbiGetCursorProps](#), [DbiGetBookMark](#), [DbiCompareBookMarks](#)

C Examples: DbiSetToBookMark

Set the cursor to the bookmark position.

If the bookmark is unstable, the cursor will not be moved. This example uses the following input:

```
fDbiSetToBookMark(hPXCur, pBook);  
DBIResult fDbiSetToBookMark(hDBICur hCur, pBYTE pBookMark)  
{  
    DBIResult    rslt;  
    CURProps     CurProps;  
    rslt = Chk(DbiGetCursorProps(hCur, &CurProps));  
    if (rslt != DBIERR_NONE)  
        return rslt;  
    if(CurProps.bBookMarkStable != TRUE)  
        return DBIERR_INVALIDBOOKMARK;  
    rslt = Chk(DbiSetToBookMark(hCur, pBookMark));  
    return rslt;  
}
```

Delphi Examples: DbiSetToBookMark

Set the cursor to the bookmark position:

Delphi users should use the `GoToBookmark` method associated with descendants of `TDataSet` including `TTable`, `TQuery`, and `TStoredProc` rather than directly calling `DbiSetToBookmark`. This method is defined as:

```
Procedure GotoBookmark(Bookmark: TBookmark);
```

The following code moves the the cursor to the record within `Table1` to the corresponding bookmark obtained through a call to `GetBookmark`.

```
Table1.GoToBookmark(SetBookMark);
```

DbiSetToCursor {button C
Examples,JI(">example","exdbisettocursor")}
{button Delphi
Examples,JI(">example","dexdbisettocursor")}

C syntax

```
DBIResult DBIFN DbiSetToCursor (hDest, hSrc);
```

Delphi syntax

```
function DbiSetToCursor (hDest: hDBICur; hSrc: hDBICur): DBIResult stdcall;
```

Description

DbiSetToCursor sets the position of one cursor (the destination cursor) to the position of the source cursor.

Parameters

hDest Type: hDBICur (Input)
Specifies the destination cursor handle.

hSrc Type: hDBICur (Input)
Specifies the source cursor handle.

Usage

This function synchronizes the position of two cursors on the same table.

Prerequisites

Source and destination cursors must be opened on the same table in the same session, and both must be valid. If both cursors are opened on a single table, they do not have to have the same current index. The source cursor must have a current record if the index order is different.

Completion state

After DbiSetToCursor executes, the destination cursor is positioned on the same record as the source cursor. They remain independent of each other, they do not track each other.

DbiResult return values

DBIERR_NONE	The destination cursor was successfully set to the record of the source cursor.
DBIERR_INVALIDHNDL	The specified source cursor or destination cursor is invalid or NULL.
DBIERR_NOCURRREC	The source cursor has no current record.
DBIERR_NOTSAMESESSION	The source and destination cursors are not opened in the same session.

See also

[DbiGetBookMark](#), [DbiSetToBookMark](#), [DbiCloneCursor](#), [DbiOpenTable](#)

C Examples: DbiSetToCursor

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiSetToCursor

Set the position of the destination cursor to the position of the source cursor

Delphi users should use the `GoToCurrent` method associated the `TTable` component rather than directly calling `DbiSetToCursor`. This method is defined as:

```
Procedure GoToCurrent(Table: TTable);
```

The following is an example:

```
Table1.GoToCurrent(Table2);
```

DbiSetToEnd {button C
Examples,JI(">example","exdbisettoend")} {button Delphi
Examples,JI(">example","dexdbisettoend")}

C syntax

```
DBIResult DBIFN DbiSetToEnd (hCursor);
```

Delphi syntax

```
function DbiSetToEnd (hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiSetToEnd positions the cursor at the end of the result set.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

Usage

This function is used to reposition the cursor at the end of the result set. DbiGetPriorRecord or DbiGetRelativeRecord can be called to position the cursor on the last valid record of the result set.

Completion state

The cursor is positioned on the crack after the end of the result set. There is no current record after DbiSetToEnd completes. (DbiGetRecord returns DBIERR_EOF.)

DbiResult return values

DBIERR_NONE	The cursor was successfully set to the EOF position.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.

See also

[DbiSetToBegin](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiGetRelativeRecord](#), [DbiSetToCursor](#)

C Examples: DbiSetToEnd

Move the cursor to the end of the table.

The end of the table means the crack after the last record.

```
DBIResult fDbiSetToEnd(hDBICur hCur)
{
    DBIResult      rslt;
    rslt = Chk(DbiSetToEnd(hCur));
    return rslt;
}
```

Delphi Examples: DbiSetToEnd

Position the cursor at the end of the result set.

Delphi programs should use the Last method from a TDataset object. This example uses the following input:

```
fDbiSetToEnd(hCur);  
Procedure fDbiSetToEnd(hTmpCur: hDbiCur);  
begin  
  Check (DbiSetToEnd (hTmpCur) );  
end;
```

DbiSetToKey {button C Examples,JI(">example","exdbisettokey")} {button Delphi Examples,JI(">example","dexdbisettokey")}

C syntax

```
DBIResult DBIFN DbiSetToKey (hCursor, eSearchCond, bDirectKey, [iFields], [iLen], pBuf);
```

Delphi syntax

```
function DbiSetToKey (hCursor: hDBICur; eSearchCond: DBISearchCond; bDirectKey: Bool; iFields: Word; iLen: Word; pBuff: Pointer): DBIResult stdcall;
```

Description

DbiSetToKey positions an ordered cursor based on the given key value.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

eSearchCond Type: DBISearchCond (Input)
Specifies the search condition: keySEARCHEQ, keySEARCHGT, or keySEARCHGEQ.

bDirectKey Type: BOOL (Input)
Specifies whether the key is supplied directly in *pBuff* or not. If set to TRUE, *pBuff* specifies the pointer to the key in physical format; if set to FALSE, *pBuff* specifies the pointer to the record buffer.

iFields Type: UINT16 (Input)
Specifies the number of complete fields to be used for composite keys. Optional. If *iFields* and *iLen* are both 0, the entire key is used.

iLen Type: UINT16 (Input)
Specifies the length into the last field to be used for composite keys. If not zero, the last field to be used must be a character type.

pBuf Type: pBYTE (Input)
Pointer to either the record buffer or the key itself, determined by *bDirectKey*.

Usage

If no index is currently associated with the cursor, an error is generated and no cursor movement occurs.

There are three possible search conditions: keySEARCHEQ, keySEARCHGT, and keySEARCHGEQ. Searches always result in the cursor being positioned on the crack before the record of the specified key value. Assuming all the arguments are specified correctly, only the (=) search condition can return a DBIERR_RECNOTFOUND error.

(> or >=) always succeeds.

You can specify the key either by setting the key fields in a record buffer and supplying the record buffer or by specifying the key buffer directly as a string of bytes. To construct the key buffer, use [DbiExtractKey](#).

The *iFields* and *iLen* parameters together indicate how much of the key is to be used for matching. If both are 0, the entire key is used. If a partial match is required on a given field of the key, all the key fields preceding it in the composite key must also be specified for match. Only character fields can be matched for a partial key; all other field types must be fully matched.

Prerequisites

A cursor handle must be ordered using an index.

Completion state

A search using keySEARCHEQ or keySEARCHGEQ positions the cursor on the crack just prior to the specified key; using keySEARCHGT positions the cursor on the crack just after the specified key.

DbiResult return values

DBIERR_NONE	The record was successfully found.
DBIERR_NOASSOCINDEX	There is no index to search on.
DBIERR_INVALIDPARAM	One of the specified parameters is invalid (for example, iLen is invalid for the current index).
DBIERR_RECNOTFOUND	No record matches the key value.

See also

[DbiSetRange](#), [DbiSwitchToIndex](#), [DbiSetToBookMark](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#)

C Examples: DbiSetToKey

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiSetToKey

Find the specified value in the table and return the record and record buffer

This examples works with the STOCK.DB table open on the primary key and uses the following input:

```
fDbiSetToKey(hCur, pRecBuf);  
Function fDbiSetToKey(hTmpCur: hDBICur; pTmpRecBuf: PByte): Longint;  
var  
    key: double;  
    RecProp: RecProps;  
begin  
    key:= 1330.00;  
  
    Check(DbiInitRecord(hTmpCur, pTmpRecBuf));  
    Check(DbiPutField(hTmpCur, 1, pTmpRecBuf, @key));  
    Check(DbiSetToKey(hTmpCur, keySEARCHEQ, false, 0, 0, pTmpRecBuf));  
    Check(DbiGetNextRecord(hTmpCur, dbiNoLock, pTmpRecBuf, @RecProp));  
    Result := RecProp.iSeqNum;  
end;
```

DbiSetToRecordNo {button C
Examples,JI(">example","exdbisettorecordno")} {button Delphi
Examples,JI(">example","dexdbisettorecordno")}

C syntax

```
DBIResult DBIFN DbiSetToRecordNo (hCursor, iRecNo);
```

Delphi syntax

```
function DbiSetToRecordNo (hCursor: hDBICur; iRecNo: Longint): DBIResult  
    stdcall;
```

Description

DbiSetToRecordNo positions the cursor to the given physical record number.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

iRecNo Type: UINT32 (Input)
Specifies the physical record number.

Usage

This function is currently valid only with dBASE tables. The physical record number can be retrieved from the *iPhyRecNum* field of the RECProps structure in calls to [DbiGetRecord](#), [DbiGetNextRecord](#), [DbiGetPriorRecord](#), or [DbiGetRelativeRecord](#).

If the given record number is beyond the valid range for the cursor, the cursor is set to the beginning or end of the file (BOF/EOF).

DbiResult return values

DBIERR_NONE	The cursor was successfully set to the record specified by <i>iRecNo</i> .
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_BOF	The specified record number is zero.
DBIERR_EOF	The specified record number is greater than the number of records in the table.
DBIERR_NOTSUPPORTED	This function is not supported for Paradox and SQL tables.

See also

[DbiSetToSeqNo](#)

C Examples: DbiSetToRecordNo

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiSetToRecordNo

Position the cursor to the given physical record number.

Valid only for dBASE tables. This example uses the following input:

```
fDbiSetToRecordNum(DBASEANIMALS, 20);
```

```
Procedure fDbiSetToRecordNo(Tbl: TTable; RecordNum: LongInt);
var
  rslt: dbiResult;
begin
  rslt:= DbiSetToRecordNo(Tbl.handle, RecordNum);
  if rslt <> DBIERR_NONE then
  begin
    if rslt = DBIERR_EOF then
      tbl.last;
    if rslt = DBIERR_BOF then
      tbl.first;
  end;
  Tbl.Resync([]);
end;
```

DbiSetToSeqNo {button C
Examples,JI(">example","exdbisettoseqno")} {button Delphi
Examples,JI(">example","dexdbisettoseqno")}

C syntax

```
DBIResult DBIFN DbiSetToSeqNo (hCursor, iSeqNo);
```

Delphi syntax

```
function DbiSetToSeqNo (hCursor: hDBICur; iSeqNo: Longint): DBIResult  
    stdcall;
```

Description

DbiSetToSeqNo positions the cursor to the specified sequence number of a table. Currently supported by Paradox only.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

iSeqNo Type: UINT32 (Input)
Specifies the logical record number.

Usage

This function is currently valid only with Paradox tables. The sequence number can be retrieved by calling DbiGetSeqNo or from the *iSeqNo* field of the RECProps structure in calls to DbiGetRecord, DbiGetNextRecord, DbiGetPriorRecord, or DbiGetRelativeRecord.

A sequence number is the position of a record in the result set associated with *hCursor*. If the given sequence number is beyond the valid sequence number for the cursor, the cursor is set to the beginning or end of the file (BOF/EOF). For example, if the table is empty, this function leaves the cursor positioned at BOF and returns DBIERR_BOF. If the table is not empty and the user attempts to position the cursor beyond a valid sequence number, the cursor is set to EOF, and DBIERR_EOF is returned.

Note: The sequence number for a given record is not stable. If a record is inserted or deleted before the given index order, the sequence number for the record changes.

DbiResult return values

DBIERR_NONE	The Paradox cursor was successfully set to the sequence number specified by <i>iSeqNo</i> .
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_EOF	The specified record number is greater than the number of records in the table.
DBIERR_BOF	The specified record number is zero.
DBIERR_NOTSUPPORTED	This function is not supported for SQL or dBASE drivers.

See also

DbiGetSeqNo, DbiSetToRecordNo

C Examples: DbiSetToSeqNo

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiSetToSeqNo

Position the cursor to the specified sequence number of the table.

If the table is not a Paradox type, the cursor is not moved. This example uses the following input:

```
fDbiSetToSeqNo(Table1, 40);  
procedure fDbiSetToSeqNo(var Tbl: TTable; RecNum: longint);  
var  
    Props: CurProps;  
begin  
    Check(DbiGetCursorProps(Tbl.Handle, Props));  
    if StrComp(Props.szTableType, szPARADOX) = 0 then  
        Check(DbiSetToSeqNo(Tbl.Handle, RecNum));  
    Tbl.Resync([]);  
end;
```

DbiSortTable {button C Examples,JI(">example","exdbisorttable")} {button Delphi Examples,JI(">example","dexdbisorttable")}

C syntax

```
DBIResult DBIFN DbiSortTable (hDb, pszTableName, pszDriverType, hSrcCur,
    pszSortedName, phSortedCur, hDstCur, iSortFields, piFieldNum,
    [pbCaseInsensitive], [pSortOrder], [*ppfsortFn], bRemoveDups,
    [hDuplicatesCur], [plRecsSort]);
```

Delphi syntax

```
function DbiSortTable (hDb: hDBIDb; pszTableName: PChar; pszDriverType:
    PChar; hSrcCur: hDBICur; pszSortedName: PChar; phSortedCur: phDBICur;
    hDstCur: hDBICur; iSortFields: Word; piFieldNum: PWord; pbCaseInsensitive:
    PBool; pSortOrder: pSORTOrder; ppfSortFn: ppfSORTCompFn; bRemoveDups: Bool;
    hDuplicatesCur: hDBICur; var lRecsSort: Longint): DBIResult stdcall;
```

Description

DbiSortTable sorts an opened or closed table, either into itself or into a destination table. There are options to remove duplicates, to enable case-insensitive sorts and special sort functions, and to control the number of records sorted.

Parameters

hDb Type: hDBIDb (Input)

Optional. Specifies the database handle when *pszTableName* and *pszDriverType* are used to identify the source table (not used when *hSrcCur* is supplied). Must be a valid database handle.

pszTableName Type: pCHAR (Input)

Optional. Pointer to the table name. Must be a defined table name and the table must exist. If *hDb*, *pszTableName*, and *pszTableType* are supplied, *hSrcCur* should be NULL. A valid extension may be specified.

pszDriverType Type: pCHAR (Input)

Optional. Supplied only when *hDb* and *pszTableName* are supplied. Pointer to the driver type. Must be a defined driver type.

hSrcCur Type: hDBICur (Input)

Optional. This parameter is supplied when an opened source table is to be sorted to a destination table, as specified in *pszSortedName*. When the table is to be sorted into itself, *hDb*, *pszTableName*, and *pszDriverType* must be used to identify the table instead of *hSrcCur*.

pszSortedName Type: pCHAR (Input)

Optional. Pointer to the file name to be used as the sorted destination table. The table must be closed. The extension must match that of the source table. (To specify a destination table of a different driver type, *hDstCur* must be used.) If this parameter, *phSortedCur*, and *hDstCur* are all NULL, the source table is sorted into itself.

phSortedCur Type: phDBICur (Output)

Optional. Pointer to a cursor handle on the sorted destination table, with the name specified by *pszSortedName*. If NULL, the cursor handle is not returned.

hDstCur Type: hDBICur (Input)

Optional. Used instead of *pszSortedName* to specify the sorted destination table. In this case, the destination table is already open, and the cursor handle is specified. If this parameter and *phSortedName* are NULL, the source table is sorted into itself.

iSortFields Type: UINT16 (Input)

Specifies the number of sort fields to be used.

piFieldNum Type: pUINT16 (Input)

Pointer to an array of the field numbers on which to sort. The number of elements in the array must

equal the number specified in *iSortFields*.

pbCaseInsensitive Type: pBOOL (Input)

Optional. Pointer to an array of values indicating whether the sort is to be case-insensitive for each sort field. TRUE specifies case-insensitive. The number of elements in the array must equal the number specified in *iSortFields*.

If a NULL pointer is given, the default is case-sensitive. Only text fields are affected.

pSortOrder Type: pSORTOrder (Input)

Optional. Pointer to an array of the sort order for each field, either ascending or descending. If a NULL pointer is given, the order is ascending. The number of elements in the array must equal the number specified in *iSortFields*.

**ppfsortFn* Type: pfSORTCompFn (Input)

Optional. Pointer to an array of pointers to client-supplied compare functions. The number of elements in the array must be equal to the number specified in *iSortFields*.

bRemoveDups Type: BOOL (Input)

Specifies whether duplicates are to be removed during sorting or not. If TRUE, duplicates are removed from the destination table. Duplicates may be written to a table associated with *hDuplicatesCur*.

hDuplicatesCur Type: hDBICur (Input)

Optional. If specified, duplicates removed from the table are placed in a Duplicates table associated with the specified cursor. The structure of this table must be the same as the source table.

pIRecsSort Type: pUINT32 (Input/Output)

Optional. Used only when the source table is identified by *hSrcCur*. On input, pointer to the number of records to sort, from the current position of the source table cursor. On output, pointer to the client variable that receives the actual number of records sorted into the destination table.

Usage

As the table is sorted, the records are physically ordered according to the specified sort criteria. Source and destination tables can be of different driver types; if so, the destination table must be specified by *hDstCur*.

Paradox: A Paradox table with a primary key cannot be sorted into itself. Autoincrement fields cannot be sorted.

SQL: DbiSortTable is not supported with SQL tables as the destination.

Completion state

The records in the destination table are ordered according to the sort criteria. If *pIRecSort* is specified, only *pIRecSort* records are sorted, starting from the current position in the table, otherwise the whole table is sorted.

DbiResult return values

DBIERR_NONE	The sort was successful.
DBIERR_INVALIDHNDL	The specified database handle is invalid or NULL.
DBIERR_INVALIDFILENAME	The source table name was not provided.
DBIERR_UNKNOWNTBLTYPE	The source driver type was not provided.
DBIERR_INVALIDPARAM	The specified number of sort fields is invalid.
DBIERR_NOTSUPPORTED	This function is not supported for sort to self on a Paradox table with a primary index.

See also

[DbiBatchMove](#), [DbiCreateTable](#), [DbiDoRestructure](#), [DbiCopyTable](#)

C Examples: DbiSortTable

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiSortTable

Sort the source table into the destination table on the given field. This example uses the following input:

```
fDbiSortTable(CustomerTbl, CustomerTbl2, CustomerTbl.FieldByName('COMPANY'));
function fDbiSortTable(SrcTbl, DestTbl: TTable; SortField: TField): longint;
var
  Field: Word;
  CaseIns: boolean;
  Recs: longint;

begin
  Recs := SrcTbl.RecordCount;
  CaseIns := True;
  Field := SortField.Index + 1;

  if DestTbl.Active = False then
    raise EDatabaseError.Create('Cannot complete operation with destination
table closed');

  Check(DbiSortTable(SrcTbl.DBHandle, nil, nil, SrcTbl.Handle, nil, nil,
  DestTbl.Handle, 1, @Field, @CaseIns, nil, nil, False, nil, Recs));
  Result := Recs;
end;
```

DbiStartSession {button C
Examples,JI(">example","exdbistartsession")} {button Delphi
Examples,JI(">example","dexdbistartsession")}

C syntax

```
DBIResult DBIFN DbiStartSession ([pszName], phSes, [pNetDir]);
```

Delphi syntax

```
function DbiStartSession (pszName: PChar; var hSes: hDBISes; pNetDir: PChar):  
    DbiResult stdcall;
```

Description

DbiStartSession starts a new session for the client application.

Parameters

pszName Type: pCHAR (Input)

Pointer to the session name. Allows you to name the newly created session; if NULL, BDE names the session. Optional.

phSes Type: phDBISes (Output)

Pointer to the session handle. Used to identify the session.

pNetDir Type: pCHAR (Input)

Pointer to the network file directory for the session. This directory is used for Paradox locking. Use of this pointer allows you to have different NETDIRs for distinct sessions.

Usage

Use DbiStartSession to create different concurrency schemes.

Completion state

DbiStartSession makes the new session the current session.

DbiResult return values

DBIERR_NONE	The session was successfully started.
DBIERR_INVALIDHNDL	phSes is NULL.
DBIERR_SESSIONSLIMIT	The maximum number of sessions are open.

See also

[DbiSetCurrSession](#), [DbiCloseSession](#)

C Examples: DbiStartSession

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbStartSession

Start a new session for the client application.

Delphi programs can use the TSession object in the component library.

```
Procedure fDbStartSession(pName: String; var hSes: hDBISes; pNetDir:
  String);
begin
  Check(DbStartSession(PChar(pName), hSes, PChar(pNetDir)));
end;
```

Create a new session and return the session number.

Most Delphi users can use TSession.Open, TSessionList.OpenSession or the TSession component.

This example uses the following input:

```
    SesNo := fDbStartSession('NewSession', hSes, 'C:\Netdir');
function fDbStartSession(pName: String; var hSes: hDBISes; pNetDir: String):
  Word;
var
  Ses: SESInfo;

begin
  Check(DbStartSession(PChar(pName), hSes, PChar(pNetDir)));
  Check(DbGetSesInfo(Ses));
  Result := Ses.iSession;
end;
```

DbiSwitchToIndex {button C Examples,JI(">example","exdbiswitchtoindex")} {button Delphi Examples,JI(">example","dexdbiswitchtoindex")}

C syntax

```
DBIResult DBIFN DbiSwitchToIndex (phCursor, pszIndexName, pszTagName, iIndexId, bCurrRec);
```

Delphi syntax

```
function DbiSwitchToIndex (var hCursor: hDBICur; pszIndexName: PChar; pszTagName: PChar; iIndexId: Word; bCurrRec: Bool): DBIResult stdcall;
```

Description

DbiSwitchToIndex changes the active index order of the given cursor.

Parameters

phCursor Type: phDBICur (Input/Output)

On input, *phCursor* specifies the original cursor handle; on output, pointer to the new cursor handle.

pszIndexName Type: pCHAR (Input)

Pointer to the name of the index or pseudo-index. The *pszIndexName* string is limited to 127 bytes in length.

pszTagName Type: pCHAR (Input)

Pointer to the tag name string. Used for dBASE tables only.

iIndexId Type: UINT16 (Input)

Specifies the index ID.

bCurrRec Type: BOOL (Input)

If TRUE, positions the new cursor on the current record of the original cursor.

Usage

This function allows the user to change the index order of a cursor without closing the cursor and opening another cursor. The original cursor is passed into the function, and a new cursor handle is returned with the new ordering. The original cursor handle becomes invalid and cannot be used.

Setting *pszIndexName*, *pszTagName*, and *iIndexId* to NULL is equivalent to changing the order to the default order. As a result, the cursor is set to one of the following orders:

- Relational order for dBASE and SQL tables.
- Primary index order for a keyed Paradox table or physical order for a Paradox heap table.

If *bCurrRec* is set to TRUE, the new cursor is positioned on the same record as the original cursor. If *bCurrRec* is set to FALSE, the new cursor is positioned at BOF. If the original cursor is not positioned on a valid record (for example, the current record has been deleted and the cursor has not been advanced), this function with *bCurrRec* set to TRUE fails. If this function is used to switch to the same index, then no action is taken.

Note: The size of a bookmark buffer may change after a call to DbiSwitchToIndex.

Pseudo-indexes: To describe a pseudo-index rather than an existing physical index, replace the *pszIndexName* parameter with a string composed of field names. The marker character @ denotes the use of a pseudo-index. For example, "@Customer Number@Order Number" describes a pseudo-index on a key formed by concatenating the Customer Number field with the Order Number field.

Each field identifier in the pseudo-index name must be preceded by the @ character. This character is illegal in "true" index names. No new index is generated at the server; the behavior of the pseudo-index is simulated entirely by use of the proper ORDER BY clauses on the query populating the local BDE record cache.

Fields can be identified by field numbers as well as by field names. For example, the string "@2@3@11" describes a pseudo-index consisting of the second, third, and eleventh field of the table,

concatenated to make up a single key.

Each of the component fields within a *pszIndexName* is assumed to be in ASCENDING order. Ordering is case-sensitive (unless case-sensitivity is not supported on the specific server). If the fields in the *pszIndexName* represent a real unique index on the server, the pseudo-index becomes unique; otherwise, it is non-unique.

Prerequisites

A valid cursor handle must be obtained on a table; not on a query or an in-memory table. If the given index is not open, it is automatically opened by this function before switching to that index order. (Therefore, all error return codes for [DbiOpenIndex](#) apply.)

Completion state

Switching the index may change some properties of the cursor, such as bookmark size. Existing bookmarks on the original cursor cannot be used in the new cursor, so any saved positions will no longer be applicable to the new cursor.

DbiResult return values

DBIERR_NONE	The index was successfully changed.
DBIERR_NOCURRREC	Cannot position to the current record because the original cursor is not positioned on a valid record. (Applicable only if bCurrRec is set to TRUE.)
DBIERR_NOSUCHINDEX	No such index exists for the table.
DBIERR_INVALIDHNDL	The specified handle was invalid or NULL.
DBIERR_INDEXOUTOFDATE	An attempt was made to switch to a non-maintained index that is out of date.

See also

[DbiAddIndex](#), [DbiOpenIndex](#), [DbiRegenIndex](#), [DbiRegenIndexes](#), [DbiOpenTable](#)

C Examples: DbiSwitchToIndex

Set cursor to the specified index name:

This examples uses the following input:

```
fDbiSwitchToIndex(&hPXCur, "Vendor No", FALSE);
```

```
DBIResult fDbiSwitchToIndex(phDBICur phTmpCur, pCHAR IdxName, BOOL SavePos)
{
    DBIResult    rslt;
    rslt = Chk(DbiSwitchToIndex(phTmpCur, IdxName, NULL, NULL, SavePos));
    return rslt;
}
```

Delphi Examples: DbiSwitchToIndex

Set cursor to the specified index name:

Users of TTable objects should use the IndexName property to change indexes. Set cursor to the specified index name and keep the cursor on the same record. This example uses the following input:

```
fDbiSwitchToIndex(Tabl1.Handle, 'Vendor No');  
Procedure fDbiSwitchToIndex(var hTmpCur: hDbiCur; IdxName: String);  
begin  
  Check(DbiSwitchToIndex(hTmpCur, PChar(IdxName), nil, 0, True));  
end;
```

DbiTimeDecode {button C
Examples,JI(">example","exdbitimedecode")} {button Delphi
Examples,JI(">example","dexdbitimedecode")}

C syntax

```
DBIResult DBIFN DbiTimeDecode (timeT, piHour, piMin, piMilSec);
```

Delphi syntax

```
function DbiTimeDecode (timeT: Time; var iHour: Word; var iMin: Word; var  
    iMilSec: Word): DBIResult stdcall;
```

Description

DbiTimeDecode decodes TIME into separate components (hours, minutes, milliseconds).

Parameters

timeT Type: TIME (Input)

Specifies the encoded time.

piHour Type: pUINT16 (Output)

Pointer to the client variable that receives the decoded hours. Valid values range from 0 through 23.

piMin Type: pUINT16 (Output)

Pointer to the client variable that receives the decoded minutes. Valid values range from 0 through 59.

piMilSec Type: pUINT16 (Output)

Pointer to the client variable that receives the decoded milliseconds. Valid values range from 0 through 59999.

Usage

This function enables the client application to interpret time values obtained from [DbiGetField](#). This function is a non-driver related service function; it works for all drivers.

DbiResult return values

DBIERR_NONE The time was decoded successfully.

DBIERR_INVALIDHNDL The pointer to the decoded hours, minutes, or milliseconds is NULL.

DBIERR_INVALIDTIME The specified encoded time is invalid.

See also

[DbiTimeEncode](#), [DbiDateDecode](#), [DbiDateEncode](#), [DbiTimeStampDecode](#), [DbiTimeStampEncode](#)

C Examples: DbiTimeDecode

Decode a TIME variable into hour, minutes, and seconds.

This example uses the following input:

```
fDbiTimeDecode(MyTime, &Hour, &Minute, &Sec);
```

```
DBIResult fDbiTimeDecode(TIME Time, pUINT16 Hour, pUINT16 Minute, pUINT16
Seconds)
{
    DBIResult    rslt;
    UINT16       MSeconds;
    rslt = Chk(DbiTimeDecode(Time, Hour, Minute, &MSeconds));
    if (rslt == DBIERR_NONE)
        *Seconds = (UINT16)(MSeconds / 1000);
    return rslt;
}
```

Delphi Examples: DbiTimeDecode

Decode a TIME variable into hour, minutes, and seconds.

This example decodes Hour, Minute, and Seconds from a TIME variable and returns a time string. This example uses the following input:

```
TimeStr := fDbiTimeDecode(MyTime, MyHour, MyMin, MyMilSec);
Function fDbiTimeDecode(TimeT: Time; var iHour: Word; var iMin: Word; var
  iSec: Word): String;
begin
  Check(DbiTimeDecode(TimeT, iHour, iMin, iSec));
  iSec := iSec div 1000;
  SetLength(Result, 12);
  if iHour < 12 then
  begin
    if iHour = 0 then
      iHour := 12;
    Result := Format('%d:%d:%d AM', [iHour, iMin, iSec]);
  end
  else
  begin
    if iHour > 12 then
      dec(iHour, 12);
    Result := Format('%d:%d:%d PM', [iHour, iMin, iSec]);
  end;
  SetLength(Result, StrLen(PChar(Result)));
end;
```

DbiTimeEncode {button C
Examples,JI(">example","exdbitimeencode")}
Examples,JI(">example","dexdbitimeencode")} {button Delphi

C syntax

```
DBIResult DBIFN DbiTimeEncode (iHour, iMin, iMilSec, ptimeT);
```

Delphi syntax

```
function DbiTimeEncode (iHour: Word; iMin: Word; iMilSec: Word; var timeT:  
    Time): DBIResult stdcall;
```

Description

DbiTimeEncode encodes separate time components into TIME for use by DbiPutField and other functions.

Parameters

iHour Type: UINT16 (Input)
Specifies hours. Valid values range from 0 through 23.

iMin Type: UINT16 (Input)
Specifies minutes. Valid values range from 0 through 59.

iMilSec Type: UINT16 (Input)
Specifies milliseconds. Valid values range from 0 through 59999.

ptimeT Type: pTIME (Output)
Pointer to the client variable that receives the encoded time.

Usage

This function enables the client application to construct a time value for use by [DbiPutField](#). This function is a non-driver related service function; it works for all drivers.

DbiResult return values

DBIERR_NONE	The time was successfully encoded.
DBIERR_INVALIDHNDL	<i>ptimeT</i> is NULL.
DBIERR_INVALIDTIME	Ranges of hour, minute, and millisecond parameters are invalid.

See also

[DbiDateEncode](#), [DbiDateDecode](#), [DbiTimeStampDecode](#), [DbiTimeStampEncode](#), [DbiPutField](#)

C Examples: DbTimeEncode

Encode Hour, Minute, and Seconds into a TIME variable.

This example uses the following input:

```
fDbTimeEncode(10, 50, 15, &MyTime);
```

```
DBIResult fDbTimeEncode(UINT16 Hour, UINT16 Minute, UINT16 Seconds, pTIME
Time)
{
    DBIResult    rslt;
    UINT16       MSeconds;
    MSeconds = (UINT16)(Seconds * 1000);
    if (MSeconds > 59999)
        return DBIERR_INVALIDTIME;
    else
        rslt = Chk(DbTimeEncode(Hour, Minute, MSeconds, Time));
    return rslt;
}
```

Delphi Examples: DbiTimeEncode

Encode Hour, Minute, and Seconds into a TIME variable.

This example uses the following input:

```
fDbiTimeEncode(4,20,42, MyTime);  
Procedure fDbiTimeEncode(iHour: Word; iMin: Word;  
                          iSec: Word; var TimeT: Time);  
begin  
  if iSec > 59 then  
    Check(dbiErr_InvalidTime);  
  iSec := iSec * 1000;  
  Check(DbiTimeEncode(iHour, iMin, iSec, TimeT));  
end;
```


DbiTimeStampDecode **{button C**
Examples,JI(">example","exdbitimestampdecode")} **{button Delphi**
Examples,JI(">example","dexdbitimestampdecode")}

C syntax

```
DBIResult DBIFN DbiTimeStampDecode (tsTS, pdateD, ptimeT);
```

Delphi syntax

```
function DbiTimeStampDecode (tsTS: TIMESTAMP; var dateD: DbiDate; var timeT:  
    Time): DBIResult stdcall;
```

Description

DbiTimeStampDecode extracts separate encoded DBIDATE and TIME components from the TIMESTAMP.

Parameters

tsTS Type: TIMESTAMP (Input)

Specifies the encoded DATETIME timestamp.

pdateD Type: pDBIDATE (Output)

Pointer to the client variable that receives the encoded DBIDATE component.

ptimeT Type: pTIME (Output)

Pointer to the client variable that receives the encoded TIME component.

Usage

This function enables the client to interpret TIMESTAMP values obtained from [DbiGetField](#). This function is a non-driver related service function; it works for all drivers.

Completion state

DateDecode and *TimeDecode* must be called in order to further decode the date and time elements into their individual components (for example, month, day, year/hours, minutes, milliseconds).

DbiResult return values

DBIERR_OK The timestamp was successfully decoded.

DBIERR_INVALIDHNDL *pdateD* or *ptimeT* is NULL.

See also

[DbiTimeStampEncode](#), [DbiGetField](#)

C Examples: DbiTimeStampDecode

Decode a TimeStamp variable into a string including all information.

This example uses the following input:

```
fDbiTimeStampDecode(TS, Buffer);
```

```
DBIResult fDbiTimeStampDecode(TIMESTAMP TS, pCHAR TSStr)
{
    DBIResult    rslt;
    DBIDATE      Date;
    TIME         Time;
    UINT16       h, m, ms, M, D;
    INT16        Y;
    CHAR         AMPM[3] = "AM";

    rslt = Chk(DbiTimeStampDecode(TS, &Date, &Time));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiTimeDecode(Time, &h, &m, &ms));
    if (rslt != DBIERR_NONE)
        return rslt;

    rslt = Chk(DbiDateDecode(Date, &M, &D, &Y));
    if (rslt != DBIERR_NONE)
        return rslt;

    if (h > 12)
    {
        strcpy(AMPM, "PM");
        h -= (UINT16)12;
    }

    wsprintf(TSStr, "%d:%d:%d %s, %d/%d/%d", h, m, (ms / 1000), AMPM, M, D,
Y);
    return rslt;
}
```

Delphi Examples: DbTimeStampDecode

Decode a TimeStamp variable into a string including all information

This example uses the following input:

```
fDbTimeStampDecode(TS, Buffer);
```

```
Function fDbTimeStampDecode(timestampTS: TimeStamp): String;
```

```
var
```

```
    DateVar: dbiDATE;
```

```
    TimeVar: TIME;
```

```
    hour, min, millsec, Month, Day: Word;
```

```
    Year: SmallInt;
```

```
begin
```

```
    SetLength(Result, 100);
```

```
    Check(DbiTimeStampDecode(timestampTS, DateVar, TimeVar));
```

```
    Check(DbiTimeDecode(TimeVar, hour, min, millsec));
```

```
    Check(DbiDateDecode(DateVar, Month, Day, Year));
```

```
    if (hour > 12) then
```

```
        Result := Format('Time: %d:%d:%d PM, Date: %d/%d/%d',[hour - 12, min,  
millsec div 1000, Month, Day, Year])
```

```
    else
```

```
        Result := Format('Time: %d:%d:%d AM, Date: %d/%d/%d',[hour, min, millsec  
div 1000, Month, Day, Year]);
```

```
    SetLength(Result, StrLen(PChar(Result)));
```

```
end;
```

DbiTimeStampEncode {button C
Examples,JI(">example","exdbitimestampencode")} {button Delphi
Examples,JI(">example","dexdbitimestampencode")}

C syntax

```
DBIResult DBIFN DbiTimeStampEncode (dateD, timeT, ptsTS);
```

Delphi syntax

```
function DbiTimeStampEncode (dateD: DbiDate; timeT: Time; var tsTS:  
    TimeStamp): DBIResult stdcal;
```

Description

DbiTimeStampEncode encodes the encoded DBIDATE and encoded TIME into a TIMESTAMP.

Parameters

dateD Type: DBIDATE (Input)

Specifies the encoded date.

timeT Type: TIME (Input)

Specifies the encoded time.

ptsTS Type: pTIMESTAMP (Output)

Pointer to the client variable that receives the encoded timestamp.

Usage

This function enables the client application to construct a TIMESTAMP value for use in [DbiPutField](#). This function is a non-driver related service function; it works for all drivers.

DbiResult return values

DBIERR_NONE The timestamp was successfully encoded.

DBIERR_INVALIDHNDL *ptsTS* is NULL.

DBIERR_INVALIDTIMESTAMP The range of date and time parameters is invalid.

See also

[DbiTimeStampDecode](#), [DbiPutField](#)

C Examples: DbiTimeStampEncode

Encode a TimeStamp variable from a DBIDATE and TIME variable.

This example uses the following input:

```
fDbiTimeStampEncode(MyDate, MyTime, &TS);
```

```
DBIResult fDbiTimeStampEncode(DBIDATE Date, TIME Time, pTIMESTAMP TS)
{
    DBIResult    rslt;
    rslt = Chk(DbiTimeStampEncode(Date, Time, TS));
    return rslt;
}
```

Delphi Examples: DbiTimeStampEncode

Encode a TimeStamp variable from a DBIDATE and TIME variable.

This example uses the following input:

```
fDbiTimeStampEncode(MyDate, MyTime, TS);  
Procedure fDbiTimeStampEncode(Date: dbiDate; timeT: Time; var timestampTS:  
    TimeStamp);  
begin  
    Check(DbiTimeStampEncode(Date, timeT, timestampTS));  
end;
```

DbiTranslateField {button C Examples,JI(">example","exdbittranslatefield")} {button Delphi Examples,JI(">example","dexdbittranslatefield")}

C syntax

```
DBIResult DBIFN DbiTranslateField (hXlt, pSrc, pDest);
```

Delphi syntax

```
function DbiTranslateField (hXlt: hDBIXlt; pSrc: Pointer; pDest: Pointer):  
    DBIResult stdcall;
```

Description

DbiTranslateField translates a logical or physical field value to any compatible logical or physical field value.

Parameters

<i>hXlt</i>	Type: hDBIXlt	(Input)
Specifies the translate handle.		
<i>pSrc</i>	Type: pBYTE	(Input)
Pointer to the source field.		
<i>pDest</i>	Type: pBYTE	(Output)
Pointer to the destination field.		

Usage

This function reads the source field and places the data in the destination field after converting the data to the type of the destination field.

SQL: This function can be used only on fields that are contained with a valid SQL record buffer. You must build the translation object by using a BDE-supplied field descriptor because each field descriptor contains an offset to a NULL indicator and each field translation must read or write this NULL indicator. The offset from the field buffer to the NULL indicator is stored when the translation object is built.

DbiResult return values

DBIERR_NONE	The field was translated successfully.
DBIERR_FIELDISBLANK	The source field is blank.

See also

[DbiOpenFieldXlt](#), [DbiCloseFieldXlt](#)

C Examples: DbiTranslateField

Translate a field from IDAPI Logical format to its physical format equivalent or vice versa.

```
DBIResult fDbiTranslateField(hDBICur hCur, hDBIXlt hXlt, pBYTE pTransField)
{
    DBIResult      rslt;
    pBYTE          pFieldBuf;
    pBYTE          pRecBuf;
    CURProps       CurProps;
    Chk(DbiGetCursorProps(hCur, &CurProps));
    pRecBuf = (pBYTE)malloc(CurProps.iRecBufSize);
    pFieldBuf = (pBYTE)malloc(1024);
    pTransField = (pBYTE)malloc(1024);
    Chk(DbiSetToBegin(hCur));
    Chk(DbiGetNextRecord(hCur, dbiNOLOCK, pRecBuf, NULL));
    Chk(DbiGetField(hCur, 1, pRecBuf, pFieldBuf, NULL));
    rslt = Chk(DbiTranslateField(hXlt, pFieldBuf, pTransField));
    return rslt;
}
```


Delphi Examples: DbTranslateField

An example for this function is under development and will be provided in an upcoming Help release.

DbiTranslateRecordStructure {button C
Examples,JI(">example","exdbitranslaterecordstructure")} {button Delphi
Examples,JI(">example","dexdbitranslaterecordstructure")}

C syntax

```
DBIResult DBIFN DbiTranslateRecordStructure (pszSrcDriverType, iFlds,  
      pfldsSrc, pszDstDriverType, pszLangDriver, pfldsDst, bCreatable);
```

Delphi syntax

```
function DbiTranslateRecordStructure (pszSrcDriverType: PChar; iFlds: Word;  
      pfldsSrc: pFLDDesc; pszDstDriverType: PChar; pszLangDriver: PChar;  
      pfldsDst: pFLDDesc; bCreateable: Bool): DBIResult stdcall;
```

Description

DbiTranslateRecordStructure translates the source driver's physical or logical fields to equivalent physical or logical fields of the destination driver.

Parameters

pszSrcDriverType Type: pCHAR (Input)
Pointer to the source driver type. If NULL, it is assumed that the source fields are logical with a NULL driver type.

iFlds Type: UINT16 (Input)
Specifies the number of fields.

pfldsSrc Type: pFLDDesc (Input)
Pointer to an array of the logical or physical types of the source fields.

pszDstDriverType Type: pCHAR (Input)
Pointer to the destination driver type. If NULL, it is assumed that the destination fields are logical with a NULL driver type.

pszLangDriver Type: pCHAR (Input)
Pointer to the destination driver's language driver name. This language driver is used to validate the destination field names after the translation.

pfldsDst Type: pFLDDesc (Output)
Pointer to an array of the destination fields.

bCreatable Type: BOOL (Input)
If True, map to creatable fields only

Usage

This function takes the logical or physical fields of the source driver and attempts to map them to equivalent logical or physical fields of the destination driver. If an exact match is not found, the function attempts to map to the closest possible logical or physical fields of the destination driver. If a close match is not found, this returns the error DBIERR_NOTSUPPORTED.

DbiResult return values

DBIERR_NONE	The translation was successfully completed.
DBIERR_NOTSUPPORTED	Returned if source fields cannot be translated into equivalent destination fields.

C Examples: DbiTranslateRecordStructure

Create a new table of the specified type by borrowing a field structure from another table.

The new table is created in the same directory or server as the source table. Return the cursor to the newly created table. This example uses the following input:

```
fDbiTranslateRecordStructure(hBCur, "NEWCUST", "INTRBASE", &hTmpCur);
DBIResult fDbiTranslateRecordStructure(hDBICur hSrcCur, pCHAR NewTblName,
                                       pCHAR DrvType, phDBICur phDstCur)
{
    DBIResult    rslt;
    pFLDDesc     SrcFldDesc, DestFldDesc;
    CURProps     CurProps;
    CRTblDesc    TblDesc;
    hDBIDb       hTmpDb;

    rslt = Chk(DbiGetCursorProps(hSrcCur, &CurProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    SrcFldDesc = (pFLDDesc)malloc(CurProps.iFields * sizeof(FLDDesc));
    DestFldDesc = (pFLDDesc)malloc(CurProps.iFields * sizeof(FLDDesc));
    rslt = Chk(DbiGetFieldDescs(hSrcCur, SrcFldDesc));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiTranslateRecordStructure(NULL, CurProps.iFields,
                                          SrcFldDesc, DrvType, NULL, DestFldDesc, FALSE));
    if (rslt != DBIERR_NONE)
    {
        free(SrcFldDesc); free(DestFldDesc);
        return rslt;
    }
    memset((void *) &TblDesc, 0, sizeof(CRTblDesc));
    strcpy(TblDesc.szTblName, NewTblName);
    strcpy(TblDesc.szTblType, DrvType);
    TblDesc.iFldCount = CurProps.iFields;
    TblDesc.pfldDesc = DestFldDesc;
    rslt = Chk(DbiGetObjFromObj(hSrcCur, objDATABASE, &hTmpDb));
    if (rslt != DBIERR_NONE)
    {
        free(SrcFldDesc); free(DestFldDesc);
        return rslt;
    }
    rslt = Chk(DbiCreateTable(hTmpDb, TRUE, &TblDesc));
    if (rslt != DBIERR_NONE)
    {
        free(SrcFldDesc); free(DestFldDesc);
        return rslt;
    }
    rslt = Chk(DbiOpenTable(hTmpDb, NewTblName, DrvType, NULL, NULL, 0,
                           dbiREADWRITE,
                           dbiOPENSERIALIZED, xltFIELD, FALSE, NULL, phDstCur));
    free(SrcFldDesc); free(DestFldDesc);
    return rslt;
}
```

Delphi Examples: DbiTranslateRecordStructure

Creates an empty version of SrcTbl to DestTbl. This will convert from any source type to any destination type--Paradox to InterBase and so on. The Table doesn't have any indexes. This example uses the following input:

```
fDbiTranslateRecordStructure(AnimalTbl, NewTbl, AnimalTbl.DBHandle);
procedure fDbiTranslateRecordStructure(SrcTbl, DestTbl: TTable; DestDB:
  hDBIDb);
var
  pSrcFlds, pDestFlds: pFLDDesc;
  TblDesc: CRTblDesc;
  DBType: string;
  W: Word;

begin
  pSrcFlds := AllocMem(SrcTbl.FieldCount * sizeof(FLDDesc));
  pDestFlds := AllocMem(SrcTbl.FieldCount * sizeof(FLDDesc));
  try
    SetLength(DBType, DBIMAXNAMELEN);
    // Get the destination database type
    Check(DbiGetProp(hDBIObj(DestDb), dbDATABASETYPE, PChar(DBType),
  DBIMAXNAMELEN, W));
    SetLength(DBType, StrLen(PChar(DBType)));
    if DBType = 'STANDARD' then
      begin
        if UpperCase(ExtractFileExt(DestTbl.TableName)) = '.DB' then
          DBType := szParadox
        else
          if UpperCase(ExtractFileExt(DestTbl.TableName)) = '.DBF' then
            DBType := szDbase
          else
            if UpperCase(ExtractFileExt(DestTbl.TableName)) = '.' then
              DBType := szParadox
            else
              raise EDBEngineError.Create(DBIERR_UNKNOWNDRIVER);
        end;
        // Get the source field information
        Check(DbiGetFieldDescs(SrcTbl.Handle, pSrcFlds));
        // Translate the source fields into the destination fields
        Check(DbiTranslateRecordStructure(nil, SrcTbl.FieldCount, pSrcFlds,
          PChar(DBType), nil, pDestFlds, False));
        fillchar(TblDesc, sizeof(TblDesc), #0);
        StrPCopy(TblDesc.szTblName, DestTbl.TableName);
        StrPCopy(TblDesc.szTblType, DBType);
        TblDesc.iFldCount := SrcTbl.FieldCount;
        TblDesc.pFldDesc := pDestFlds;
        // Create the destination table
        Check(DbiCreateTable(DestDB, True, TblDesc));
      finally
        FreeMem(pSrcFlds, SrcTbl.FieldCount * sizeof(FLDDesc));
        FreeMem(pDestFlds, SrcTbl.FieldCount * sizeof(FLDDesc));
      end;
    end;
end;
```

DbiTruncateBlob {button C
Examples,JI(">example","exdbitruncateblob")} {button Delphi
Examples,JI(">example","dexdbitruncateblob")}

C syntax

```
DBIResult DBIFN DbiTruncateBlob (hCursor, pRecBuf, iField, iLen);
```

Delphi syntax

```
function DbiTruncateBlob (hCursor: hDBICur; pRecBuf: Pointer; iField: Word;  
    iLen: Longint): DBIResult stdcall;
```

Description

DbiTruncateBlob is used to shorten the size of the contents of a BLOB field, or to delete the contents of a BLOB field from the record, by shortening it to zero.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle.

pRecBuf Type: pBYTE (Input)

Pointer to the record buffer.

iField Type: UINT16 (Input)

Specifies the ordinal number of BLOB field within the record buffer.

iLen Type: UINT32 (Input)

Specifies the new shorter length of the BLOB. If zero is specified, the whole BLOB is truncated.

Usage

This is the only way to delete a BLOB without deleting the entire record.

Standard: It is advisable to lock the record before opening the BLOB in read-write mode to ensure that another client application does not lock the record.

Prerequisites

The current record must contain a BLOB field. The BLOB field must be open in dbiREADWRITE mode by a call to DbiOpenBlob.

Completion state

After shortening the BLOB field, DbiModifyRecord must be called to post the altered record to the table.

DbiResult return values

DBIERR_NONE	The BLOB field was successfully truncated.
DBIERR_BLOBNOTOPENED	The specified BLOB field was not opened via a call to DbiOpenBlob.
DBIERR_INVALIDBLOBHANDLE	The BLOB handle supplied in the record buffer is invalid.
DBIERR_NOTABLOB	The specified field number does not correspond to a BLOB field.
DBIERR_INVALIDBLOBOFFSET	The specified <i>iOffset</i> is greater than the length of the BLOB field.
DBIERR_READONLYFLD	The BLOB field was opened in dbiREADONLY mode and cannot be modified.

See also

[DbiGetBlob](#), [DbiOpenBlob](#), [DbiPutBlob](#), [DbiFreeBlob](#), [DbiModifyRecord](#)

C Examples: DbiTruncateBlob

Copy a table from the specified cursor and empty all the blob fields.

Packing the newly created table will free up space. This example uses the following input:

```
fDbiTruncateBlob(hPXBlobCur, "NEWBIO", &hTmpCur)
```

```
DBIResult fDbiTruncateBlob(hDBICur hTmpCur, pCHAR NewTblName, phDBICur
    phTmpCur)
{
    DBIResult    rslt;
    hDBIDb       hTmpDb;
    CURProps     CurProps;
    pFLDDesc     pFldDesc;
    UINT16       FldCount;
    pBYTE        pRecBuf;

    rslt = Chk(DbiGetObjFromObj(hTmpCur, objDATABASE, &hTmpDb));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiGetCursorProps(hTmpCur, &CurProps));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiCopyTable(hTmpDb, TRUE, CurProps.szName,
    CurProps.szTableType, NewTblName));
    if (rslt != DBIERR_NONE)
        return rslt;
    rslt = Chk(DbiOpenTable(hTmpDb, NewTblName, CurProps.szTableType, NULL,
    NULL, 0,
        dbiREADWRITE, dbiOPENSHARED, xltFIELD, FALSE, NULL,
    phTmpCur));
    if (rslt != DBIERR_NONE)
        return rslt;
    pFldDesc = (pFLDDesc)malloc(CurProps.iFields * sizeof(FLDDesc));
    pRecBuf = (pBYTE)malloc(CurProps.iRecBufSize * sizeof(BYTE));
    rslt = Chk(DbiGetFieldDescs(*phTmpCur, pFldDesc));
    if (rslt != DBIERR_NONE)
    {
        free(pFldDesc); free(pRecBuf);
        return rslt;
    }
    while (DbiGetNextRecord(*phTmpCur, dbiWRITELOCK, pRecBuf, NULL) ==
    DBIERR_NONE)
    {
        for (FldCount = 0; FldCount < CurProps.iFields; FldCount++)
        {
            if (pFldDesc[FldCount].iFldType == fldBLOB)
            {
                rslt = Chk(DbiOpenBlob(*phTmpCur, pRecBuf,
                pFldDesc[FldCount].iFldNum,
                    dbiREADWRITE));
                if (rslt != DBIERR_NONE)
                {
                    free(pFldDesc); free(pRecBuf);
                    return rslt;
                }
            }
            rslt = Chk(DbiTruncateBlob(*phTmpCur, pRecBuf,
            pFldDesc[FldCount].iFldNum, 0));
        }
    }
}
```

```
    if (rslt != DBIERR_NONE)
    {
        free(pFldDesc); free(pRecBuf);
        return rslt;
    }
    rslt = Chk(DbiModifyRecord(*phTmpCur, pRecBuf, TRUE));
    if (rslt != DBIERR_NONE)
    {
        free(pFldDesc); free(pRecBuf);
        return rslt;
    }
    rslt = Chk(DbiFreeBlob(*phTmpCur, pRecBuf,
pFldDesc[FldCount].iFldNum));
    if (rslt != DBIERR_NONE)
    {
        free(pFldDesc); free(pRecBuf);
        return rslt;
    }
}
}
}
rslt = Chk(DbiSetToBegin(*phTmpCur));
free(pFldDesc); free(pRecBuf);
return rslt;
}
```

Delphi Examples: DbiTruncateBlob

Truncate all BLOBs in the specified field to zero. If any error occurs while removing BLOB information, stop at that record. This example uses the following input:

```
fDbiTruncateBlob(BiotestTbl, BiotestTbl.FieldByName('Notes').Index);
procedure fDbiTruncateBlob(BlobTbl: TTable; Index: Word);
var
  hCur: hDBICur;
  pRecBuf: pBYTE;
begin
  hCur := nil;
  // Make sure the field specified is a BLOB type
  if BlobTbl.Fields[Index] is TBlobField then
  begin
    pRecBuf := AllocMem(BlobTbl.RecordSize);
    try
      // Clone a cursor to the table so data aware controls keep their place
      Check(DbiCloneCursor(BlobTbl.Handle, False, False, hCur));
      Check(DbiSetToBegin(hCur));
      // Iterate through the table removing BLOB information
      while DbiGetNextRecord(hCur, dbiWRITELOCK, pRecBuf, nil) = DBIERR_NONE
      do
        begin
          // BDE functions use a 1 for the first field vs. Delphi's 0; add 1
          // to the index
          Check(DbiOpenBlob(hCur, pRecBuf, Index + 1, dbiREADWRITE));
          Check(DbiTruncateBlob(hCur, pRecBuf, Index + 1, 0));
          Check(DbiModifyRecord(hCur, pRecBuf, True));
          Check(DbiFreeBlob(hCur, pRecBuf, Index + 1));
        end;
      finally // Close cloned cursor and free record buffer memory
        if hCur <> nil then
          Check(DbiCloseCursor(hCur));
          FreeMem(pRecBuf, BlobTbl.RecordSize);
        end;
      end
    else
      raise EDatabaseError.Create('Field: ' + BlobTbl.Fields[Index].FieldName +
        ', is not a blob type');
    end;
end;
```


DbiUndeleteRecord {button C
Examples,JI(">example","exdbiundeleterecord")} {button Delphi
Examples,JI(">example","dexdbiundeleterecord")}

C syntax

```
DBIResult DBIFN DbiUndeleteRecord (hCursor);
```

Delphi syntax

```
function DbiUndeleteRecord (hCursor: hDBICur): DBIResult stdcall;
```

Description

DbiUndeleteRecord undeletes a dBASE record that has been marked for deletion (a soft delete).

Parameters

hCursor Type: hDBICur (Input)
Specifies the dBASE cursor handle.

Usage

dBASE: This function is supported with dBASE tables only.

Paradox: This function is not supported with Paradox tables.

SQL: This function is not supported with SQL tables.

Prerequisites

The cursor must be positioned on a record. The cursor must have the property `bDeletedOn` set to `TRUE`.

Completion state

The current record is recalled if it was marked for deletion.

DbiResult return values

DBIERR_NONE	The dBASE record was successfully undeleted.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.
DBIERR_BOF	The cursor is positioned on the crack at the beginning of the file.
DBIERR_EOF	The cursor is positioned on the crack at the end of the file.
DBIERR_NA	The specified record was not deleted; cannot undelete the record.
DBIERR_TABLEREADONLY	The specified table is read-only; cannot undelete the record.
DBIERR_FILELOCKED	The table is locked by another user; cannot undelete the record.
DBIERR_NOTSUPPORTED	The function is supported only for dBASE tables.
DBIERR_NOCURRREC	The cursor is not positioned on a valid record.

See also

[DbiDeleteRecord](#), [DbiPackTable](#)

C Examples: DbiUndeleteRecord

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiUndeleteRecord

Undeletes a dBASE record if it is supported. This example uses the following input:

```
fDbiUndeleteRecord(AnimalTbl);  
procedure fDbiUndeleteRecord(dBASETbl: TTable);  
var  
    CProps: CurProps;  
  
begin  
    Check(DbiGetCursorProps(dBASETbl.Handle, CProps));  
    // Raise an EDBEngineError exception if the table is not dBASE  
    if StrIComp(CProps.szTableType, szDBASE) <> 0 then  
        raise EDBEngineError.Create(DBIERR_NOTSUPPORTED);  
    // Raise an EDatabaseError exception if the cursor does not have soft  
    deletes on  
    if CProps.bDeletedOn = False then  
        raise EDatabaseError.Create('Soft deletes is not on');  
    Check(DbiUndeleteRecord(dBASETbl.Handle));  
end;
```

DbiUnlinkDetail `{button C
Examples,JI(">example","exdbiunlinkdetail")}` `{button Delphi
Examples,JI(">example","dexdbiendlinkmode")}`

C syntax

```
DBIResult DBIFN DbiUnlinkDetail (hDetlCursor);
```

Delphi syntax

```
function DbiUnlinkDetail (hDetlCursor: hDBICur): DBIResult stdcall;
```

Description

DbiUnlinkDetail removes the link from a detail cursor and its master.

Parameters

hDetlCursor Type: hDBICur (Input)
Specifies the detail cursor handle.

Usage

Links should be removed before calling DbiEndLinkMode.

Prerequisites

A call to [DbiLinkDetail](#) or [DbiLinkDetailToExp](#).

Completion state

The cursors are no longer related to each other, but remain in the linked cursor mode. The function unlinks *hDetlCursor* from its master table, leaving *hDetlCursor* as a linked cursor associated with no master cursor. Thus, the detail cursor is not constrained by its master.

DbiResult return values

DBIERR_NONE	The link between the detail and master cursors was removed successfully.
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL.

See also

[DbiLinkDetail](#), [DbiLinkDetailToExp](#), [DbiBeginLinkMode](#), [DbiEndLinkMode](#)

C Examples: DbiUnlinkDetail

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbUnlinkDetail

An example for this function is under development and will be provided in an upcoming Help release.

C Examples: DbiUseIdleTime

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiUseIdleTime

Force records from buffer to disk when application is idle.

```
Procedure TForm1.FormCreate(Sender: TObject);
begin
    Application.OnIdle := UseIdle;
end;

Procedure TForm1.UseIdle(Sender: TObject; var Done: Boolean);
begin
    DbiUseIdleTime;
    Done := True;
end;
```

DbiValidateProp {button C
Examples,JI(">example","exdbvalidateprop")} {button Delphi
Examples,JI(">example","dexdbissetprop")}

C syntax

```
DBIResult DBIFN DbiValidateProp (hObj, iProp, bSetting );
```

Delphi syntax

```
function DbiValidateProp (hObj: hDBIObj; iProp: Longint; bSetting: Bool):  
    DBIResult stdcall;
```

Description

DbiValidateProp validates a property for a specified object handle.

Parameters

hObj Type: hDBIObj (Input)

Specifies the object handle.

iProp Type: UINT32 (Input)

Specifies the property to validate.

bSetting Type: BOOL (Input)

Set to TRUE if DbiValidateProp is setting the property; to FALSE if DbiValidateProp is getting the property.

Usage

Use DbiValidateProp to determine whether a given property can be changed or retrieved from the supplied object handle. You can call DbiValidateProp before [DbiSetProp](#) and [DbiGetProp](#) to determine if a property is valid for a given object.

DbiResult return values

DBIERR_NONE The data meets all the requirements for the specified property.

DBIERR_NOTSUPPORTED The property is invalid for the given object.

See also

[DbiSetProp](#), [DbiGetProp](#)

C Examples: DbiValidateProp

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiValidateProp

An example for this function is under development and will be provided in an upcoming Help release.

DbiVerifyField {button C
Examples,JI(">example","exdbverifyfield")} {button Delphi
Examples,JI(">example","dexdbverifyfield")}

C syntax

```
DBIResult DBIFN DbiVerifyField (hCursor, iField, pSrc, [pbBlank]);
```

Delphi syntax

```
function DbiVerifyField (hCursor: hDBICur; iField: Word; pSrc: Pointer; var  
    bBlank: Bool): DBIResult stdcall;
```

Description

DbiVerifyField verifies that the data specified in *pSrc* is a valid data type for the field specified by *iField*, and that all validity checks specified for the field are satisfied. It can also be used to check if a field is blank.

Parameters

hCursor Type: hDBICur (Input)
Specifies the cursor handle.

iField Type: UINT16 (Input)
Specifies the ordinal number of the field in the record.

pSrc Type: pBYTE (Input)
Pointer to the buffer containing the data to be verified. If NULL, the function verifies whether a blank value is allowed.

pbBlank Type: pBOOL (Output)
Pointer to the client variable that is set to TRUE if the field is blank; otherwise, it is set to FALSE.

Usage

If the translation mode of the cursor is *xlFIELD*, *pSrc* is assumed to contain field data in BDE logical format, otherwise it is considered to be the driver's physical format. The validity checking aspect of this function enables the client application to report errors without actually attempting to write the data. It can also be used to check if a field is blank. If *pSrc* is NULL, the function verifies whether or not a blank value is allowed.

DbiVerifyField is not supported with BLOB fields.

dBASE: For dBASE tables, this function can be used only to determine if a field is blank.

Paradox: For Paradox tables, this function evaluates field-level validity checks; it does not evaluate referential integrity constraints.

Completion state

If the field is blank, the variable pointed to by *pbBlank* is set to TRUE. If any field-level validity check has failed, an error message is returned, indicating which type of validity check the field has failed.

DbiResult return values

DBIERR_NONE	The data meets all the requirements for the specified field.
DBIERR_MINVALERR	The data is less than the required minimum value.
DBIERR_MAXVALERR	The data is greater than the required maximum value.
DBIERR_REQDERR	The field cannot be blank.
DBIERR_LOOKUPTABLEERR	The value cannot be located in the assigned lookup table.

See also

[DbiOpenTable](#), [DbiPutField](#), [DbiInsertRecord](#), [DbiModifyRecord](#), [DbiAppendRecord](#)

C Examples: DbiVerifyField

Verify that a given field is valid.

Information was placed into the field buffer by using DbiPutField or DbiGetField.

```
DBIResult fDbiVerifyField(hDBICur hCur, INT16 FldNum, pBYTE FldBuf)
{
    DBIResult      rslt;
    rslt = Chk(DbiVerifyField(hCur, FldNum, FldBuf, NULL));
    return rslt;
}
```

Delphi Examples: DbiVerifyField

Verify that the data specified is valid for the first field.

In this example, the field must be of type double. Blank is set to True if the field is blank. This example uses the following input:

```
fDbiVerifyField(Table1.Handle, Blank);  
Function fDbiVerifyField(hTmpCur: hDBICur; var Blank: Bool): DbiResult;  
var  
    Key: double;  
begin  
    Key:= 20000.00;  
    Result := DbiVerifyField(hTmpCur, 1, @key, Blank);  
end;
```

DbiWriteBlock {button C
Examples,JI(">example","exdbiwriteblock")} {button Delphi
Examples,JI(">example","dexdbiwriteblock")}

C syntax

```
DBIResult DBIFN DbiWriteBlock (hCursor, piRecords, pBuf);
```

Delphi syntax

```
function DbiWriteBlock (hCursor: hDBICur; var iRecords: Longint; pBuf: Pointer): DBIResult stdcall;
```

Description

DbiWriteBlock writes a block of records to the table associated with *hCursor*.

Parameters

hCursor Type: hDBICur (Input)

Specifies the cursor handle to the table.

piRecords Type: pUINT32 (Input/Output)

On input, *piRecords* is a pointer to the number of records to write. On output, pointer to the client variable that receives the actual number of records written. The number actually written may be less than requested if an integrity violation or other error occurred.

pBuf Type: pBYTE (Input)

Pointer to the buffer containing the records to be written.

Usage

This function is similar to calling DbiAppendRecord for the specified number of *piRecords*.

DbiWriteBlock can access data in blocks larger than 64Kb, depending on the size you allocate for the buffer.

Note: This function cannot be used if the records contain non-empty BLOBs.

Paradox: This function verifies any referential integrity requirements or validity checks that may be in place. If either fails, the write operation is canceled.

Completion state

The cursor is positioned at the last record that was inserted.

DbiResult return values

DBIERR_NONE	The block of records contained in <i>pBuf</i> has been successfully written to the table specified by <i>hCursor</i> .
DBIERR_INVALIDHNDL	The specified cursor handle is invalid or NULL, or <i>piRecords</i> is NULL, or <i>pBuf</i> is NULL.
DBIERR_TABLEREADONLY	The table is opened read-only; cannot write to it.
DBIERR_NOTSUFFTABLERIGHTS	Insufficient table rights to insert a record. (Paradox only.)
DBIERR_NODISKSPACE	Insertion failed due to insufficient disk space.

See also

[DbiReadBlock](#), [DbiAppendRecord](#), [DbiInsertRecord](#)

C Examples: DbiWriteBlock

An example for this function is under development and will be provided in an upcoming Help release.

Delphi Examples: DbiWriteBlock

Add multiple records to a table

This example assumes that the Customer TTable object is the Customer.DB table. It uses the following input:

```
fDbiWriteBlock(Table1; NumRecs);
procedure fDbiWriteBlock(Customer: TTable; var RecordsToInsert: Longint);
var
  pRecordsBuf, pTmpBuf: pBYTE;
  Rec: longint;
  CustNo: double;

begin
  Randomize;
  GetMem(pRecordsBuf, Customer.RecordSize * RecordsToInsert);
  pTmpBuf := pRecordsBuf;
  try
    for Rec := 1 to RecordsToInsert do
      begin
        CustNo := Random(1000000);
        // Iterate through the entire record buffer filling each individual
        record with information
        with Customer do
          begin
            Check(DbiInitRecord(Handle, pTmpBuf));
            Check(DbiPutField(Handle, FieldByName('CustNo').Index + 1, pTmpBuf,
              pBYTE(@CustNo)));
            Check(DbiPutField(Handle, FieldByName('Company').Index + 1, pTmpBuf,
              PChar('Borland International')));
            Inc(pTmpBuf, RecordSize);
          end;
        end;
        Check(DbiWriteBlock(Customer.Handle, RecordsToInsert, pRecordsBuf));
      finally
        FreeMem(pRecordsBuf, Customer.RecordSize * RecordsToInsert);
      end;
    end;
  end;
```

Data structures

This topic is an overview of various data structures used by BDE or its drivers, and miscellaneous data structures defined in the BDE header file IDAPI.H.

For topics on other data structures, click here:

{button ,AL("types")} [Other data structure topics](#)

Major data structures used in BDE are listed in this table:

Structure	Description
<u>BATTblDesc</u>	Batch table definition
<u>CANExpr</u>	Expression tree descriptor
<u>CANHdr</u>	Header for all filter node classes
<u>CBPROGRESSDesc</u>	Progress callback
<u>CBRESTCbDesc</u>	Restructure callback
<u>CFGDesc</u>	Configuration descriptor
<u>CLIENTInfo</u>	Describes a client/application
<u>CRTblDesc</u>	Defines the general attributes of a table
<u>CURProps</u>	Describes the most commonly used cursor properties
<u>DBDesc</u>	Database descriptor
<u>DBIEnumFld</u>	Defines an enumerated field
<u>DBIEnv</u>	Defines the BDE environment
<u>DBIErrInfo</u>	Provides error information
<u>DBIFUNCArgDesc</u>	Returns arguments for a remote data source function, including field type and sub type.
<u>DBIFUNCDesc</u>	Describes a remote data source function, including name, overloads, and flags.
<u>DBIQryProgress</u>	Describes the status of a query
<u>DRVType</u>	Describes the driver and its capabilities
<u>FILEDesc</u>	File descriptor
<u>FILTERInfo</u>	Provides filter information
<u>FLDDesc</u>	Field descriptor
<u>FLDType</u>	Describes a field type
<u>FMLDesc</u>	Describes family of files in language driver descriptor
<u>FMTBcd</u>	Provides binary coded decimal format
<u>FMTDate</u>	Provides date format
<u>FMTNumber</u>	Provides number format
<u>FMTTime</u>	Provides time format
<u>IDXDesc</u>	Index descriptor
<u>IDXType</u>	Describes an index type
<u>LDDesc</u>	Describes a language driver
<u>LOCKDesc</u>	Lock descriptor
<u>RECProps</u>	Describes the record properties
<u>RINTDesc</u>	Provides referential integrity options

<u>SECDesc</u>	Describes each security descriptor
<u>SESInfo</u>	Provides session information
<u>SPDesc</u>	Describes a stored procedure
<u>SPParamDesc</u>	Describes the parameters to a stored procedure
<u>SYSConfig</u>	Provides basic system configuration information
<u>SYSInfo</u>	Provides BDE system status
<u>SYSVersion</u>	Provides BDE system version information
<u>TBLBaseDesc</u>	Provides basic information about a table
<u>TblExtDesc</u>	Provides additional information about a table
<u>TBLFullDesc</u>	Provides a complete description of the table
<u>TBLType</u>	Describes a table's capabilities
<u>USERDesc</u>	Describes a user
<u>VCHKDesc</u>	Provides information about validity checking constraints
<u>XInfo</u>	Transaction descriptor

BATTbIDesc (batch table definition)

The BATTbIDesc structure defines a batch table, using the following fields:

Field	Type	Description
<i>hDb</i>	hDBIDb	Specifies the database handle.
<i>szTblName</i>	DBIPATH	Specifies the table name.
<i>szTblType</i>	DBINAME	Specifies the driver type; optional.
<i>szUserName</i>	DBINAME	Not currently used.
<i>szPassword</i>	DBINAME	Not currently used.

CANHdr (filter descriptor)

The CANHdr structure is the header for all filter node classes. It contains the following fields:

nodeClass **Type: NODEClass**

The following node classes are valid:

Node Class	Description
<u>nodeUNARY</u>	Node is a unary operator.
<u>nodeBINARY</u>	Node is a binary operator.
<u>nodeCOMPARE</u>	Node is a compare operator.
<u>nodeFIELD</u>	Node is a field.
<u>nodeCONST</u>	Node is a constant.
<u>nodeTUPLE</u>	Node is a record. Not currently used.
<u>nodeCONTINUE</u>	Node is a continue node.

CANExpr (expression tree descriptor)

For details on usage of this descriptor, see [Using an expression tree](#).

Nodes and literals are in this structure:

Type	Name	Description
UINT16	<i>iVer</i>	Version tag of expression
UINT16	<i>iTotalSize</i>	Size of this structure
UINT16	<i>iNodes</i>	Number of nodes
UINT16	<i>iNodeStart</i>	Starting offset of nodes
UINT16	<i>iLiteralStart</i>	Starting offset of literals

canOP Type: CANOp

The following operators are valid:

Relational operators

canNOTDEFINED	Make this the first one
canISBLANK	Unary; is operand blank
canNOTBLANK	Unary; is operand not blank
canEQ	Binary; equal
canNE	Binary; not equal
canGT	Binary; greater than
canLT	Binary; less than
canGE	Binary; greater or equal
canLE	Binary; less or equal

Logical operators

canNOT	Unary; NOT
canAND	Binary; AND
canOR	Binary; OR

Operators identifying leaf operands

canTUPLE	Unary; entire record is operand
canFIELD	Unary; operand is field
canCONST	Unary; operand is constant

Miscellaneous operators

canCONTINUE	Unary; Stops evaluating records when operand evaluates to false. This is provided as a stop at high range filter value
-------------	--

CBPROGRESSDesc (progress callback)

The progress callback enables the client to be kept up to date as to the progress of a potentially long-running operation (such as [DbiBatchMove](#) or [DbiQExec](#)). When the client registers the callback, a callback buffer must be supplied. The buffer must be at least as large as `sizeof(CBPROGRESSDesc)`. During query execution, the supplied callback function is called after certain milestones have been reached, giving the client an update on how execution is progressing. The `CBPROGRESSDesc` structure is stored in the client's call back buffer.

The `CBPROGRESSDesc` structure contains the following fields:

Field	Type	Description
<i>iPercentDone</i>	UINT16	Any number from -1 to 100 is valid. A value between 1 and 100 specifies the percentage done; for example, the value 50 indicates that the execution is half complete. If the value is -1, the progress of execution is indicated via the string <i>szMsg</i> , rather than with a percentage.
<i>szMsg</i>	DBIMSG	Specifies a string containing a message. This message serves as a progress report; for example, "Steps completed: 5." The message is displayed when <i>iPercentDone</i> is -1.

CBRESTcbDesc (restructure callback)

The CBRESTcbDesc structure contains the following fields:

Field	Type	Description
<i>iErrCode</i>	DBIResult	Specifies the error code number.
<i>iTblNum</i>	UINT16	Specifies the table number.
<i>iObjNum</i>	UINT16	For old objects <i>iObjNum</i> is the sequence or field number; for new objects <i>iObjNum</i> is the order in CRTblDesc.
<i>eRestrObjType</i>	RESErrObjType	Specifies the <u>object type</u> .

eRestrObjType

Object type is a union of the following structures:

Structure	Type	Description
fldDesc	FLDDesc	Field descriptor
idxDesc	IDXDesc	Index descriptor
vchkDesc	VCHKDesc	Validity check descriptor
rintDesc	RINTDesc	Referential integrity descriptor
secDesc	SECDesc	Security descriptor

CFGDesc (configuration descriptor)

The CFGDesc structure describes the BDE configuration. It contains the following fields:

Field	Type	Description
<i>szNodeName</i>	DBINAME	Specifies the name of the leaf node.
<i>szDescription</i>	DBINAME	Specifies detailed information about the configuration leaf node.
<i>iDataType</i>	UINT16	Specifies the data type, which is always a string.
<i>szValue</i>	CHAR	Specifies a value large enough to hold any value [DBIMAXSCFLDLEN].
<i>bHasSubnodes</i>	BOOL	TRUE, if not a leaf node.

CLIENTInfo (client information)

The CLIENTInfo structure describes a client/application. It contains the following fields:

Field	Type	Description
<i>szName</i>	DBINAME	Specifies the documentary name.
<i>iSessions</i>	UINT16	Specifies the number of sessions.
<i>szWorkDir</i>	DBIPATH	Specifies the working directory.
<i>szLang</i>	DBINAME	Specifies the language of the client (for messages). See <u>szLang</u>

CRTblDesc (table descriptor)

DbiDoRestructure and DbiCreateTable both use the CRTblDesc structure, but the way they use the structure is quite different. Some of the fields within CRTblDesc are not specified at create time for use with DbiCreateTable; they are specified only with DbiDoRestructure to modify the table.

CRTblDesc for creating a table

The CRTblDesc structure defines the general attributes of the table and supplies pointers to arrays of field, index, and other descriptors. The following CRTblDesc structure defines the table structure:

Field	Type	Description
<i>szTblName</i>	DBITBLNAME	Specifies the table name, including optional path and extension.
<i>szTblType</i>	DBINAME	Specifies the driver type.
<i>szErrTblName</i>	DBIPATH	Reserved.
<i>szUserName</i>	DBINAME	Reserved.
<i>szPassword</i>	DBINAME	Specifies the master password (if <i>bProtected</i> is TRUE). (Paradox only.)
<i>bProtected</i>	BOOL	TRUE if encryption is desired (Paradox only).
<i>iFldCount</i>	UINT16	Specifies the number of field definitions supplied.
<i>pfldDesc</i>	pFLDDesc	Specifies the array of field descriptors.
<i>idxCount</i>	UINT16	Specifies the number of index definitions supplied.
<i>pidxDesc</i>	pIDXDesc	Specifies the array of index descriptors.
<i>iSecRecCount</i>	UINT16	Specifies the number of security definitions given (Paradox only).
<i>psecDesc</i>	pSECDesc	Specifies the array of security descriptors (Paradox only).
<i>iValChkCount</i>	UINT16	Specifies the number of validity checks (Paradox and SQL only).
<i>pvchkDesc</i>	pVCHKDesc	Specifies the array of validity check descriptors (Paradox and SQL only).
<i>iRintCount</i>	UINT16	Specifies the number of referential integrity specifications (Paradox and SQL only).
<i>rintDesc</i>	pRINTDesc	Specifies the array of referential integrity specifications (Paradox and SQL only).
<i>iOptParams</i>	UINT16	Specifies the number of optional parameters.
<i>pfldOptParams</i>	pFLDDesc	Specifies the array of field descriptors for optional parameters.
<i>pOptData</i>	pBYTE	Specifies the values of optional parameters.

CRTblDesc for restructuring a table

A complete description of CRTblDesc, as used to restructure a table is described below.

Type	Name	Description
DBITBLNAME	<i>szTblName</i>	Required; specifies the source table name. The table name can contain an extension.
DBINAME	<i>szTblType</i>	If specified, it must match the driver type associated with the source table.
DBIPATH	<i>szErrTblName</i>	Not currently used.
DBINAME	<i>szUserName</i>	Not currently used.

DBINAME	<i>szPassword</i>	Optional; if <i>bProtected</i> is set to TRUE, specifies the password of the destination table.
BOOL	<i>bProtected</i>	Optional; If TRUE, specifies that a master password is supplied for the destination table. Paradox only.
BOOL	<i>bPack</i>	Optional; If TRUE, specifies packing for restructure.

iFldCount, *pecrFldOp*, and *pfldDesc* are required to describe the new record structure:

UINT16	<i>iFldCount</i>	Optional; used if the record structure is changing. Specifies the number of field operators and field descriptors passed in <i>pecrFldOp</i> and <i>pFldDesc</i> for the new record structure.
pCROpType	<i>pecrFldOp*</i>	Optional; pointer to an array of CROpType structures, one for each field in the record; used if the record structure is changing, it indicates how the fields are rearranged. For each changed field, set it to <i>crADD</i> if the field is added, <i>crMODIFY</i> if the field is modified, or <i>crCOPY</i> if the field is moved.
pFLDDesc	<i>pfldDesc</i>	Optional; used if the record structure is changing. Specifies an array of physical field descriptors for the new record structure. <i>ifldNum</i> in each <i>pfldDesc</i> must be 0 if the field is added. Otherwise, it must contain the field position (1 to n) in the old record structures. If a field is dropped, its descriptor is simply left out of the new record structure. Additionally, any changes to dependent objects are made automatically (that is, all single field indexes, validity checks, and auxiliary passwords are dropped).

For all the following objects, only the changes must be input:

UINT16	<i>IdxCount</i>	Optional; specifies the number of index operators and index descriptors passed in <i>pIdxDesc</i> .
pCROpType	<i>pecrIdxOp</i>	Optional; to change an index, specify <i>crADD</i> , <i>crMODIFY</i> , <i>crREDO</i> , or <i>crDROP</i> .
pIDXDesc	<i>pidxDesc</i>	Optional; specifies an array of index descriptors.
UINT16	<i>iSecRecCount</i>	Optional; for Paradox only; specifies the number of security definitions passed in <i>pSecDesc</i> .
pCROpType	<i>pecrSecOp</i>	Optional; to change a security definition, specify <i>crADD</i> , <i>crMODIFY</i> , or <i>crDROP</i> .
pSECDesc	<i>psecDesc</i>	Optional; for Paradox only; specifies an array of security descriptors.
UINT16	<i>iValChkCount</i>	Optional; for Paradox only; specifies the number of validity checks passed in <i>pecrValChkOp</i> and <i>pvchkDesc</i> .
pCROpType	<i>pecrValChkOp</i>	Optional; for Paradox only; to change a validity check, specify <i>crADD</i> , <i>crMODIFY</i> , or <i>crDROP</i> .
pVCHKDesc	<i>pvchkDesc</i>	Optional; for Paradox only; specifies an array of validity check descriptors.
UINT16	<i>iRintCount</i>	Optional; for Paradox only; specifies the number of referential integrity operators passed in <i>printDesc</i> .
pCROpType	<i>pecrRintOp</i>	Optional; for Paradox only; to change a referential integrity operator, specify <i>crADD</i> , <i>crMODIFY</i> , or <i>crDROP</i> . <i>crMODIFY</i> cannot be used to change the name of a referential integrity constraint. To modify the name, use <i>crDROP</i> and <i>crADD</i> .
pPRINTDesc	<i>printDesc</i>	Optional; for Paradox only; specifies an array of referential

UINT16	<i>iOptParams</i>	integrity specifications. Optional; specifies the number of optional parameters (for example, language driver information).
pFLDDesc	<i>pfldOptParams</i>	Optional; specifies an array of field descriptors for optional parameters.
pBYTE	<i>pOptData</i>	Optional; specifies values of optional parameters.

The following operation types are valid only for restructuring the table:

Operation type	Value	Description
crNOOP	0	Perform no operation
crADD	1	Add a new element
crCOPY	2	Copy an existing element
crMODIFY	3	Modify an element
crDROP	4	Removes an element

CURProps (cursor properties)

The cursor properties (CURProps) structure describes the most commonly used cursor properties, using the following fields:

Field	Type	Description
<i>szName</i>	DBITBLNAME	Specifies the table name.
<i>iFNameSize</i>	UINT16	Specifies the size of the buffer needed to retrieve full table name (including extension and path, if applicable).
<i>szTableType</i>	DBINAME	Specifies the driver type.
<i>iFields</i>	UINT16	Specifies the number of fields in the table. The client must allocate a buffer whose size is: [iFields * sizeof(FLDDesc)] in order to get the field descriptors for the table.
<i>iRecSize</i>	UINT16	Specifies the record size, depending on the xltMODE for the cursor. If the xltMODE is xltFIELD, <i>iRecSize</i> specifies the logical record size. In other words, it is the size of the record if all fields were represented as BDE logical types. If the xltMODE is xltNONE, <i>iRecSize</i> specifies the physical record size.
<i>iRecBufSize</i>	UINT16	Specifies the physical record size. This is the size of the record buffer that the client must allocate in order to retrieve the records using <i>DbiGetNextRecord</i> , <i>DbiGetPriorRecord</i> , and other functions. This size can change if <i>DbiSetFieldMap</i> is called.
<i>iKeySize</i>	UINT16	Specifies the key size of the current active index (if any). This is the size of the key buffer that the client must allocate in order to retrieve a key using <i>DbiExtractKey</i> . This size changes if <i>DbiSwitchToIndex</i> is called.
<i>iIndexes</i>	UINT16	Specifies the number of currently open indexes for this cursor. The client can call <i>DbiGetIndexDesc</i> with <i>iIndexSeqNo</i> set from 1 to <i>iIndexes</i> , to have all the index descriptors returned. The client could also allocate a buffer whose size is [iIndexes * sizeof(IDXDesc)] and have all the index descriptors returned by calling <i>DbiGetIndexDescs</i> .
<i>iValChecks</i>	UINT16	Specifies the number of validity checks existing for this table.
<i>iRefIntChecks</i>	UINT16	Specifies the number of referential integrity constraints existing for this table.
<i>iBookMarkSize</i>	UINT16	Specifies the size of the bookmark. Bookmarks are always allocated by the client before <i>DbiGetBookMark</i> is called. Note that the size of the bookmark could change if <i>DbiSwitchToIndex</i> is called.
<i>bBookMarkStable</i>	BOOL	TRUE, if this cursor supports stable bookmarks. Stable bookmarks are those that remain unchanged after another user has modified the table. For example, this value is TRUE for Paradox tables having a primary key, but FALSE for Paradox heap tables.
<i>eOpenMode</i>	DBIOpenMode	Specifies the <u>open mode</u> that this cursor was opened with.
<i>eShareMode</i>	DBIShareMode	Specifies the <u>share mode</u> that this cursor was opened with:
<i>bIndexed</i>	BOOL	This value is TRUE if there is a current active index for this cursor. In other words, it is TRUE if there is a non-default order associated with this cursor.
<i>iSeqNums</i>	INT16	This is an enumerated value which is interpreted as follows:

		1 This cursor supports the sequence number concept (Paradox).
		0 This cursor supports the record number concept (dBASE).
		< 0 (-1, -2. . .): None (SQL)
<i>bSoftDeletes</i>	BOOL	This value is set to TRUE if this cursor supports soft deletes (dBASE only).
<i>bDeletedOn</i>	BOOL	This value is set to TRUE if the curSOFTDELETEON property is TRUE. This field makes sense only if the cursor supports the soft delete concept. If TRUE, deleted records can be seen while using this cursor (dBASE only).
<i>iRefRange</i>	UINT16	Not currently used.
<i>exlMode</i>	XLTMode	Specifies the value of the <u>translate mode</u> property for this cursor.
<i>iRestrVersion</i>	UINT16	Specifies the restructure version number for the table. (Paradox only.)
<i>bUniDirectional</i>	BOOL	This value is set to TRUE if this cursor is unidirectional (SQL only.)
<i>eprvRights</i>	PRVType	Specifies an enumerated value that gives the <u>table-level rights</u> for the user who opened the table.
<i>iFmlRights</i>	UINT16	Reserved.
<i>iPasswords</i>	UINT16	Specifies the number of auxiliary passwords for this table. (Paradox only.)
<i>iCodePage</i>	UINT16	Specifies the code page associated with the table. If the code page is unknown, the value is 0.
<i>bProtected</i>	BOOL	This value is set to TRUE if the table is protected by a password.
<i>iTblLevel</i>	UINT16	Specifies the table level. This value is driver dependent.
<i>szLangDriver</i>	DBINAME	Specifies the name of the language driver associated with the table.
<i>bFieldMap</i>	BOOL	This value is set to TRUE if a field map is active for this cursor.
<i>iBlockSize</i>	UINT16	Specifies the value of the BLOCKSIZE for the table, in bytes.
<i>bStrictRefInt</i>	BOOL	This value applies only to Paradox for DOS tables and the Paradox engine. If TRUE, it means that a referential integrity check has been specified and that the STRICT bit is set in the header, which makes the table inaccessible using Paradox for DOS.
<i>iFilters</i>	UINT16	Specifies the number of filters currently on the cursor.
<i>bTempTable</i>	BOOL	TRUE, if the cursor is on a temporary table. For queries, this means the result set is canned, rather than live. This field can be examined to determine whether the requested preference for LIVENESS in the DbiSetProp call were honored.

eOpenMode

The following open modes are valid:

Open Mode	Description
dbiREADWRITE	Read and write (default)
dbiREADONLY	Read-only

eShareMode

The following share modes are valid:

Share Mode	Description
dbiOPENSARED	Open shared (default)
dbiOPENEXCL	Open exclusive

Note: This might not always be the same value used by the client to call DbiOpenTable. In particular, dbiOPENSARED can be promoted to dbiOPENEXCL in some cases.

exitMode

The translate mode values supported are:

Translate Mode	Description
xlitNONE	No translation; use physical types
xlitFIELD	Field-level translation; use logical types

eprvRights

The table-level rights supported are:

Privilege	Description
prvNONE	No privileges
prvREADONLY	Read-only table or field
prvMODIFY	Read and modify fields
prvINSERT	Insert all of above
prvINSDEL	Delete all of above
prvFULL	Full rights
prvUNKNOWN	Unknown

DBDesc (database descriptor)

The DBDesc structure describes a database, using the following fields:

Field	Type	Description
<i>szName</i>	DBINAME	Specifies the database alias name.
<i>szText</i>	DBINAME	Descriptive text.
<i>szPhyName</i>	DBIPATH	Specifies the physical name/path.
<i>szDbType</i>	DBINAME	Specifies the database type.

DBIEnumFld (enumerated field information)

The DBIEnumFld structure defines an enumerated field, using the following fields:

Field	Type	Description
<i>szDisplayStr</i>	DBINAME	Specifies the display string for the value
<i>abVal</i> [DBIMAXENUMFLDLEN+1]	BYTE	Specifies the data value

DBIEnv (environment information)

The DBIEnv structure defines the BDE environment, using the following fields:

Field	Type	Description
<i>szWorkDir</i>	DBIPATH	Specifies the working directory.
<i>szIniFile</i>	DBIPATH	Specifies the fully qualified file name of the configuration file.
<i>bForceLocallnit</i>	BOOL	If TRUE, forces local initialization.
<i>szLang</i>	DBINAME	Specifies the language of the client. This <u>value</u> is the primary language ID from WIN32 (as shown in WINNT.H).
<i>szClientName</i>	DBINAME	Specifies the client name.

szLang

szLang is part of the DBIEnv structure which is passed to Dbilnit. The language of the client is specified as the primary language ID from WIN32 (as shown in WINNT.H).

Note: You must add two leading zero's to this value.

For example, the primary language ID for French is "0c". Thus, to start BDE so that it uses French messages and French QBE keywords, you would add two leading zero's to 0c and set *szLang* equal to "000c".

Here is a table of possible *szlang* values :

Language	szLang value
Danish	0006
English	0009
French	000c
German	0007
Italian	0010
Norwegian	0014
Portuguese	0016
Spanish	000a
Swedish	001d

DBIErrInfo (error information)

The DBIErrInfo structure describes error information, using the following fields:

Field	Type	Description
<i>iError</i>	DBIResult	Specifies the last error code returned.
<i>szErrCode</i>	DBIMSG	Specifies the error code.
<i>szContext1</i>	DBIMSG	Specifies the context-dependent information at the top level of the error stack.
<i>szContext2</i>	DBIMSG	Specifies the context-dependent information at the second level of the error stack.
<i>szContext3</i>	DBIMSG	Specifies the context-dependent information at the third level of the error stack.
<i>szContext4</i>	DBIMSG	Specifies the context-dependent information at the fourth level of the error stack.

DBIQryProgress (query progress)

The DBIQryProgress structure describes the status of a query, using the following fields:

Field	Type	Description
<i>stepsInQry</i>	UINT16	Specifies the total number of steps in the query.
<i>stepsCompleted</i>	UINT16	Specifies the number of steps completed out of the total.
<i>totElemInStep</i>	UINT32	Specifies the total number of elements in the current step.
<i>elemCompleted</i>	UINT32	Specifies the number of elements completed in the current step.

DRVType (driver capabilities)

The DRVType structure describes the driver and its capabilities, using the following fields:

Field	Type	Description
<i>szType</i>	DBINAME	Specifies the symbolic name identifying the driver.
<i>szText</i>	DBINAME	Descriptive text.
<i>edrvCat</i>	DRVCat	Specifies the <u>driver category</u> .
<i>bTrueDb</i>	BOOL	If TRUE, the driver supports the true database concept.
<i>szDbType</i>	DBINAME	Specifies the database type.
<i>bMultiUser</i>	BOOL	If TRUE, the driver supports multiuser access.
<i>bReadWrite</i>	BOOL	If TRUE, the driver supports read-write access; otherwise, the driver supports only read-only access.
<i>bTrans</i>	BOOL	If TRUE, the driver supports transactions.
<i>bPassThruSQL</i>	BOOL	If TRUE, the driver supports passthrough SQL.
<i>bLogIn</i>	BOOL	If TRUE, the driver requires explicit login.
<i>bCreateDb</i>	BOOL	If TRUE, the driver can create a database.
<i>bDeleteDb</i>	BOOL	If TRUE, the driver can drop a database.

edrvCat

The following driver categories are valid:

Driver Category	Description
drvFILE	File-based (Paradox, dBASE, Text)
drvOTHERSERVER	Other kind of server
drvSQLBASEDSERVER	SQL-based server

FILEDesc (file descriptor)

The FILEDesc structure describes a file, using the following fields:

Field	Type	Description
<i>szFileName</i>	DBIPATH	File name (no directory or extension).
<i>szExt</i>	DBIEXT	Specifies the file extension.
<i>bDir</i>	BOOL	If TRUE, this file is a directory.
<i>iSize</i>	UINT32	Specifies the file size in bytes.
<i>dtDate</i>	DBIDATE	Specifies the date on the file.
<i>tmTime</i>	TIME	Specifies the time on the file.

FILTERInfo (filter information descriptor)

The FILTERInfo structure describes a filter using the following fields:

Field	Type	Description
<i>iFilterId</i>	UINT16	Specifies the ID for the filter.
<i>hFilter</i>	hBBIFilter	Specifies the filter handle.
<i>iClientData</i>	UINT32	Not used.
<i>iPriority</i>	UINT16	Not used.
<i>bCanAbort</i>	BOOL	Not used.
<i>pfFilter</i>	pfGENFilter	Not used.
<i>pCanExpr</i>	pVOID	Specifies the supplied expression.
<i>bActive</i>	BOOL	TRUE, if the filter is active.

FLDDesc (field descriptor)

The FLDDesc structure defines a field in a table, using the properties in the following table:

Note: The same descriptor structure is used both in creating a table and in inquiring about the table structure after it is opened. The application developer does not specify the last five properties in the field descriptor structure when a table is created.

Field	Type	Description
<i>iFldNum</i>	UINT16	On input, specifies the field number. This value can be from 1 to <i>curProps.iFields</i> . On output, this is the invariant field ID. Note: Do <i>not</i> use this value as a field number.
<i>szName</i>	DBINAME	Specifies the name of the field.
<i>iFldType</i>	UINT16	Specifies the type of the field. In output mode, if translate mode is set to <i>sltNONE</i> , field types represent the physical types of that driver type, otherwise, the types are BDE logical types.
<i>iSubType</i>	UINT16	Specifies the subtype of the field. This could be a BDE logical subtype or a driver physical subtype depending on the translate mode setting.
<i>iUnits1</i>	INT16	Specifies the number of characters, digits, and so on. The interpretation of this field can be dependent on the driver and also on the specific field type. For most drivers, if the field is of the numeric type, <i>iUnits1</i> is the precision and <i>iUnits2</i> is the scale.
<i>iUnits2</i>	INT16	Specifies the number of decimal places, and so on. The interpretation of this field can depend on the driver and also on the specific field type. For most drivers, if the field is of the numeric type, <i>iUnits1</i> is the precision and <i>iUnits2</i> is the scale.
<i>iOffset</i>	UINT16	Reports the offset of this field in the record buffer. This offset depends on the translation mode; it could be the offset in the physical or logical representation of the record. This field applies only to existing tables; it is not applicable when a table is created.
<i>iLen</i>	UINT16	Reports the length in bytes of this field. The length depends on the translation mode; that is, it could be the length of the logical or physical representation of the field. The application developer uses this value to allocate a buffer in which to retrieve the field value. This field applies only to existing tables; it is not applicable when a table is created.
<i>iNullOffset</i>	UINT16	Reports the offset of the NULL indicator for this field in the record buffer. If zero, there is no NULL indicator. Otherwise, <i>iNullOffset</i> is the offset to an INT16 value, which is -1 if the field is NULL. This field applies only to existing tables; it is not specified when a table is created.
<i>efldvVchk</i>	FLDVchk	Reports the types of validity checks associated with this field (this field applies only to existing tables; it is not specified when a table is created). The following validity check types can be reported: <i>fldvNOCHECKS</i> , <i>fldvHASCHECKS</i> , or <i>fldvUNKOWN</i> .
<i>efldrRights</i>	FLDRights	Reports the field level rights for this user (this field applies only to existing tables; it is not specified when a table is created). Field rights can be one of the following values: <i>fldrREADWRITE</i> , <i>fldrREADONLY</i> , <i>fldrNONE</i> , or <i>fldrUNKOWN</i> .
<i>bCalcField</i>	BOOL16	TRUE, if field is a calculated field (computed).

iUnused3

UINT16

Reserved for future use

FLDType (field types)

The FLDType structure describes a field type using the following fields:

Field	Type	Description
<i>ild</i>	UINT16	Specifies the ID of the field type.
<i>szName</i>	DBINAME	Specifies the symbolic name of field type; for example, ALPHA.
<i>szNativeName</i>	DBINAME	Name used in SQL DDL statements.
<i>szText</i>	DBINAME	Descriptive text.
<i>iPhyType</i>	UINT16	Specifies the physical/native type.
<i>iXltType</i>	UINT16	Specifies the default translated type.
<i>iXltSubType</i>	UINT16	Specifies the default translated subtype.
<i>iMaxUnits1</i>	UINT16	Specifies the maximum units allowed (1).
<i>iMaxUnits2</i>	UINT16	Specifies the maximum units allowed (2).
<i>iPhySize</i>	UINT16	Specifies the physical size in bytes (per unit).
<i>bRequired</i>	BOOL	If TRUE, supports required option.
<i>bDefaultVal</i>	BOOL	If TRUE, supports user-specified default.
<i>bMinVal</i>	BOOL	If TRUE, the field supports the minimum validity constraint.
<i>bMaxVal</i>	BOOL	If TRUE, the field supports the maximum validity constraint.
<i>bRefIntegrity</i>	BOOL	If TRUE, the field can participate in referential integrity.
<i>bOtherChecks</i>	BOOL	If TRUE, the field supports other kinds of checks.
<i>bKeyed</i>	BOOL	If TRUE, the field type can be keyed.
<i>bMultiplePerTable</i>	BOOL	If TRUE, the table can have more than one of this type.
<i>iMinUnits1</i>	UINT16	Specifies the minimum units required (1).
<i>iMinUnits2</i>	UINT16	Specifies the minimum units required (2).
<i>bCreateable</i>	BOOL	If TRUE, the field type can be created.

FMLDesc (family language driver descriptor)

Files belonging to a given table are considered a "family" that must be kept together. FMLDesc returns the filenames of the files in a language driver family.

Field	Type	Description
<i>szName</i>	DBINAME	Member name (documentary)
<i>ild</i>	UINT16	Id (if applicable)
<i>eType</i>	FMLType	Member type
<i>szFileName</i>	DBIPATH	File name of member

FMTBcd (binary coded decimal format)

The FMTBcd structure describes the format for binary coded decimal, using the following fields:

Field	Type	Description
<i>iPrecision</i>	BYTE	Any specified number between 1 to 64 is considered valid.
<i>iSignSpecialPlaces</i>	BYTE	Specifies the following values: sign bit on: negative number special bit on: number is blank places: number of decimals (0 to <i>iPrecision</i>).
<i>iFraction</i> [32]	BYTE	Specifies an array of BCD nibbles, 00 to 99 per byte, high nibble first. The number of significant nibbles in <i>iFraction</i> is <i>iPrecision</i> ; the rest are ignored.

See Also

[DbiBcdToFloat](#), [DbiBcdFromFloat](#)

FMTDate (date format)

The FMTDate structure describes the date format for the session, using the following fields:

Field	Type	Description
<i>szDateSeparator[4]</i>	CHAR	Specifies the date separator character.
<i>iDateMode</i>	INT8	Specifies the date format: 0 = MDY, 1 = DMY, 2=YMD.
<i>bFourDigitYear</i>	INT8	If TRUE, write year as four digits.
<i>bYearBiased</i>	NT8	If TRUE, on input add 1900 to year.
<i>bMonthLeadingZero</i>	INT8	If TRUE, the month is displayed with a leading zero.
<i>bDayLeadingZero</i>	NT8	If TRUE, the day is displayed with a leading zero.

FMTNumber (number format)

The FMTNumber structure describes the number format for the current session, using the following fields:

Field	Type	Description
<i>cDecimalSeparator</i>	CHAR	Specifies the character to be used as the decimal separator (for example, ".").
<i>cThousandSeparator</i>	CHAR	Specifies the character to be used as the thousands separator (for example, ",").
<i>iDecimalDigits</i>	INT8	Specifies the number of decimal digits.
<i>bLeadingZero</i>	INT8	If TRUE, use leading zeros.

FMTTime (time format)

The FMTTime structure describes the time format for the current session, using the following fields:

Field	Type	Description
<i>cTimeSeparator</i>	CHAR	Specifies the time separator character (for example, ".").
<i>bTwelveHour</i>	INT8	If TRUE, represent as 12-hour time.
<i>szAmString[6]</i>	CHAR	Specifies the string to use for designating AM time (only for 12-hour time).
<i>szPmString[6]</i>	CHAR	Specifies the string to use for designating PM time (only for 12-hour time).
<i>bSeconds</i>	INT8	If TRUE, show seconds.
<i>bMilSeconds</i>	INT8	If TRUE, show milliseconds.

DBIFUNCArgDesc (argument descriptor)

The DBIFUNCArgDesc structure describes the arguments to a remote data source function, using the following fields:

Field	Type	Description
<i>uArgNum</i>	UINT16	Argument position number. 0 for fn return
<i>uFldType</i>	UINT16	Field type
<i>uSubType</i>	UINT16	Field subtype. if applicable.

DBIFUNCDesc (function descriptor)

The DBIFUNCDesc structure describes a remote data source function, using the following fields:

Field	Type	Description
<i>szName</i>	DBINAME	Remote function name
<i>szDesc[255]</i>	CHAR	Short description
<i>uOverload</i>	UINT16	Number of function overloads
<i>funcFlags</i>	FUNCFlags	Remote function flags

IDXDesc (index descriptor)

The IDXDesc structure describes each index in a table. The same structure is used both in creating an index and inquiring about the index after a cursor is opened. The application does not specify the following fields in the index descriptor structure when creating an index: *iRestrNum*, *bOutofDate*, and *iKeyLen*.

The fields required in this structure vary by driver type and index type.

Note: The first three fields, *szName*, *iIndexId*, and *szTagName* are used to identify the index. A different combination of these three fields is used, depending on the driver type and on the specific index type. The rules are given below:

Driver Type	Index Type
dBASE	.NDX style: <i>szName</i> alone identifies the index. .MDX style: <i>szName</i> and <i>szTagName</i> together identify the index.
Paradox	Either <i>iIndexId</i> or <i>szName</i> identifies the index.
Text driver	Indexing not supported.
All SQL drivers	<i>szName</i> alone identifies the index. <i>pszIndexName</i> may be used to identify a <u>pseudo-index</u> .

Field	Type	Description
<i>szName</i>	DBITBLNAME	Specifies the <u>index name</u> .
<i>iIndexId</i>	UINT16	Specifies the number identifying the index.
<i>szTagName</i>	DBINAME	Specifies the index tag name. Supported for dBASE only.
<i>szFormat</i>	DBINAME	Currently, for information only. Describes the physical index format type (for example, BTREE or HASH).
<i>bPrimary</i>	BOOL16	TRUE, if the key is primary.
<i>bUnique</i>	BOOL16	TRUE, if the key is unique.
<i>abDescending</i>	BOOL16	True, to support descending/unique secondary indexes
<i>bDescending</i>	BOOL16	TRUE, if the key is descending.
<i>bMaintained</i>	BOOL16	TRUE, if the key is maintained.
<i>bSubset</i>	BOOL16	TRUE, if the index is a subset index. Supported for dBASE only.
<i>bExpIdx</i>	BOOL16	TRUE, if the index is an expression index. Supported for dBASE only.
<i>iCost</i>	UINT16	Reserved.
<i>iFldsInKey</i>	UINT16	Specifies the number of key fields in a composite index. If the index is an expression, set to 0.
<i>iKeyLen</i>	UINT16	Not specified while index is created. Specifies the physical length of the key in bytes. The application developer needs to allocate a buffer of <i>iKeyLen</i> bytes to use as a key buffer. A key buffer is used with functions such as <i>DbiExtractKey</i> and <i>DbiSetToKey</i> .
<i>bOutofDate</i>	BOOL16	Not specified while index is created; TRUE, if the index is out-of-date.
<i>iKeyExpType</i>	UINT16	Specifies the type of the key expression (dBASE only). This value can be one of the following: <i>fldDBCHAR</i> , <i>fldDBKEYNUM</i> , or <i>fldDBKEYBCD</i> .
<i>aiKeyFld</i>	DBIKEY	Specifies an array of field numbers in the key.
<i>szKeyExp</i>	DBIKEYEXP	Specifies the key expression for an expression index (dBASE

		only). This field is used only if <i>bExpIdx</i> = TRUE. The expression is stated as a dBASE expression.
<i>szKeyCond</i>	DBIKEYEXP	Specifies the expression that defines the subset condition (dBASE only). This field is used only if <i>bSubset</i> = TRUE. The expression is stated as a dBASE expression.
<i>bCaseInsensitive</i>	BOOL16	TRUE, if the index is case-insensitive.
<i>iBlockSize</i>	UINT16	Specifies the internal block size in bytes for this index.
<i>iRestrNum</i>	UINT16	Not specified while index is created. Specifies the internal restructure number for this index. This number is set when the index descriptor is retrieved and should not be changed when passing the descriptor back to <i>DbiDoRestructure</i> .

Note: The following four fields, explained in detail above, are used to describe the key for an index: *iFldsInKey*, *aiKeyFld*, *bExpIdx*, *szKeyExp*. The key is described by specifying either one of the following combinations:

For traditional indexes	For expression indexes
--------------------------------	-------------------------------

<i>iFldsInKey</i> and <i>aiKeyFld</i>	<i>bExpIdx</i> and <i>szKeyExp</i>
---------------------------------------	------------------------------------

szName

The following table describes how to name Paradox indexes:

Index ID Param	Non-composite index	Composite index
<i>szName</i>	Same as field name	Can be any legal name not used as a field name; must be unique
<i>iIndexID</i>	Same as field number (1 to 255)	Valid ID (256 to 511) Output only; not specified while index is created

IDXType (index types)

The IDXType structure describes an index type, using the following fields:

Field	Type	Description
<i>ild</i>	UINT16	Specifies the ID of the index type.
<i>szName</i>	DBINAME	Specifies the symbolic name of the index type.
<i>szText</i>	DBINAME	Descriptive text.
<i>szFormat</i>	DBINAME	Optional. Information only about the format (for example, BTREE, HASH).
<i>bComposite</i>	BOOL	If TRUE, supports composite keys.
<i>bPrimary</i>	BOOL	If TRUE, this index type supports a primary index.
<i>bUnique</i>	BOOL	If TRUE, this index type supports unique indexes.
<i>bKeyDescending</i>	BOOL	If TRUE, the key can be descending.
<i>bFldDescending</i>	BOOL	If TRUE, the key can be descending at the field level.
<i>bMaintained</i>	BOOL	If TRUE, this index type supports the maintained option.
<i>bSubset</i>	BOOL	If TRUE, this index type supports the subset expression (dBASE only).
<i>bKeyExpr</i>	BOOL	If TRUE, the key can be an expression (dBASE only).
<i>bCaseInsensitive</i>	BOOL	If TRUE, this index type supports case-insensitive keys.

LDDesc (language driver descriptor)

The LDDesc structure describes a language driver, using the following fields:

Field	Type	Description
<i>szName</i>	DBINAME	Specifies the driver's symbolic name.
<i>szDesc</i>	DBINAME	Specifies the driver description.
<i>iCodePage</i>	UINT16	Specifies the code page number.
<i>PrimaryCpPlatform</i>	UINT16	Specifies the <u>platform type</u> to which the driver's character set corresponds. For example, DOS or Windows.
<i>AlternateCpPlatform</i>	UINT16	Specifies the alternate platform. For internal use only.

PrimaryCpPlatform

The following table shows valid values:

Value	Description
1	DOS (OEM) platform
2	Windows (ANSI) platform
6	HP UNIX (ROMAN8) platform

LOCKDesc (lock descriptor)

The LOCKDesc structure describes a lock, using the following fields:

Field	Type	Description
<i>iType</i>	UINT16	Specifies the lock type (0 for record lock).
<i>szUserName</i>	DBIUSERNAME	Specifies the user name.
<i>iNetSession</i>	UINT16	Specifies the net level session number.
<i>iSession</i>	UINT16	Specifies the BDE session number, if BDE lock.
<i>iRecNum</i>	UINT32	Specifies the record number for the record lock, if this is a record lock.
<i>iInfo</i>	UINT16	Specifies information for table locks (Paradox only).

RECProps (record properties)

The RECProps structure describes the record properties, using the following fields:

Field	Type	Description
<i>iSeqNum</i>	UINT32	Specifies the sequence number of the record. Applicable if the cursor supports sequence numbers (Paradox only).
<i>iPhyRecNum</i>	UINT32	Specifies the record number of the record. Applicable only when physical record numbers are supported (dBASE only).
<i>bRecChanged</i>	BOOL	Not currently used.
<i>bSeqNumChanged</i>	BOOL	Not currently used.
<i>bDeleteFlag</i>	BOOL	Specifies if the record is deleted. Applicable only when soft delete is supported (dBASE only).

RINTDesc (referential integrity)

The RINTDesc structure describes the referential integrity options for a table (currently Paradox only), using the following fields:

Field	Type	Description
<i>iRintNum</i>	UINT16	Specifies the referential integrity number.
<i>szRintName</i>	DBINAME	Specifies the referential integrity name.
<i>eType</i>	RINTType	Specifies the type, either rintMASTER or rintDEPENDENT.
<i>szTblName</i>	DBIPATH	Specifies the other table name.
<i>eModOp</i>	RINTQual	Specifies the modify qualifier, either rintRESTRICT or rintCASCADE.
<i>eDelOp</i>	RINTQual	Specifies the delete qualifier, either rintRESTRICT or rintCASCADE.
<i>iFldCount</i>	UINT16	Specifies the number of fields in the linking key.
<i>aiThisTabFld</i>	DBIKEY	Specifies the field numbers that make up this referential integrity constraint in this table.
<i>aiOthTabFld</i>	DBIKEY	Specifies the number of fields in the other table.

For more information on referential integrity options for Paradox, see [Integrity Constraints](#)

SECDesc (security descriptor)

The SECDesc structure describes each security descriptor in the table (currently, Paradox only), using the following fields:

Field	Type	Description
<i>iSecNum</i>	UINT16	Specifies the number identifying the descriptor.
<i>eprvTable</i>	PRVType	Specifies the table privileges: prvNONE, prvREADONLY, prvMODIFY, prvINSERT, prvINSDEL, prvFULL, prvUNKNOWN.
<i>iFamRights</i>	UINT16	Specifies the family rights: NOFAMRIGHTS, FORMRIGHTS, RPTRIGHTS, VALRIGHTS, SETRIGHTS, ALLFAMRIGHTS.
<i>szPassword</i>	DBINAME	Specifies a NULL terminated string.
<i>aprvFld</i>	PRVType	Specifies the field privileges: prvNONE, prvREADONLY, prvFULL. [DBIMAXFLDSINSEC]

SESInfo (session information)

The SESInfo structure provides information about a session, using the following fields:

Field	Type	Description
<i>iSession</i>	UINT16	Specifies the session ID (1 to n).
<i>szName</i>	DBINAME	Specifies the documentary name of the session.
<i>iDatabases</i>	UINT16	Specifies the number of open databases.
<i>iCursors</i>	UINT16	Specifies the number of open cursors.
<i>iLockWait</i>	INT16	Specifies the lock wait time (in seconds).
<i>szNetDir</i>	DBIPATH	Specifies the directory location for the network control file.
<i>szPrivDir</i>	DBIPATH	Specifies the private directory.

SPDesc (stored procedure information)

The SPDesc structure provides information about a stored procedure, using the following fields:

Field	Type	Description
<i>szName</i>	DBISPNAME	Specifies the documentary name of the stored procedure.
<i>dtDate</i>	DBIDATE	Specifies the date on the stored procedure.
<i>tmTime</i>	TIME	Specifies the time on the stored procedure.
<i>MaxSPNameLen</i>	UINT16	Specifies the maximum stored procedure field name length.

SPParamDesc (stored procedure parameters)

The SPParamDesc structure describes the parameters of a stored procedure, using the following fields:

Field	Type	Description
<i>uParamNum</i>	UINT16	Specifies the parameter number.
<i>szName</i>	DBINAME	Specifies the name of the parameter.
<i>eParamType</i>	STMTParamType	Specifies the type of the parameter.
<i>uFldType</i>	UINT16	Specifies the field type.
<i>uSubType</i>	UINT16	Specifies the sub-type (if applicable)
<i>iUnits1</i>	INT16	Specifies the number of characters and digits.
<i>iUnits2</i>	INT16	Specifies the number of decimal places.
<i>uOffset</i>	UINT16	Specifies the computed offset.
<i>uLen</i>	UINT16	Specifies the computed length in bytes.
<i>uNullOffset</i>	UINT16	Specifies the computed offset for NULL bits.

SYSConfig (system configuration)

The SYSConfig structure provides basic system configuration information, using the following fields:

Field	Type	Description
<i>bLocalShare</i>	BOOL	TRUE, if local files will be shared with non-BDE applications.
<i>iNetProtocol</i>	UINT16	Not currently used.
<i>bNetShare</i>	BOOL	Not currently used.
<i>szNetType</i>	DBINAME	Specifies the network type.
<i>szUserName</i>	DBIUSERNAME	Specifies the network user name.
<i>szIniFile</i>	DBIPATH	Specifies the fully qualified configuration file name.
<i>szLangDriver</i>	DBINAME	Specifies the system language driver.

SYSInfo (system status and information)

The SYSInfo structure provides BDE system status and information, using the following fields:

Field	Type	Description
<i>iBufferSize</i>	UINT16	Specifies the size of the buffer space in kilobytes.
<i>iHeapSpace</i>	UINT16	Specifies the size of the heap space in kilobytes.
<i>iDrivers</i>	UINT16	Specifies the number of currently loaded drivers.
<i>iClients</i>	UINT16	Specifies the number of active clients.
<i>iSessions</i>	UINT16	Specifies the number of sessions (for all clients).
<i>iDatabases</i>	UINT16	Specifies the number of open databases (for all clients).
<i>iCursors</i>	UINT16	Specifies the number of cursors (for all clients).

SYSVersion (system version information)

The SYSVersion structure provides the BDE system version information, using the following fields:

Field	Type	Description
<i>iVersion</i>	UINT16	Specifies the BDE version.
<i>iIntfLevel</i>	UINT16	Specifies the client interface level.
<i>dateVer</i>	DBIDATE	Specifies the version date.
<i>timeVer</i>	TIME	Specifies the version time.

TBLBaseDesc (base table descriptor)

The TBLBaseDesc structure provides basic information about a table, using the following fields:

Field	Type	Description
<i>szName</i>	DBITBLNAME	Specifies the table name (no extension or directory).
<i>szFileName</i>	DBITBLNAME	Specifies the file name.
<i>szExt</i>	DBIEXT	Specifies the file extension.
<i>szType</i>	DBINAME	Specifies the driver type.
<i>dtDate</i>	DBIDATE	Specifies the date on the table.
<i>tmTime</i>	TIME	Specifies the time on the table.
<i>iSize</i>	UINT32	Specifies the size in bytes.
<i>bView</i>	BOOL	TRUE, if this a view (SQL only).
<i>bSynonym</i>	BOOL16	TRUE, if the object is a synonym

bSynonym

Synonyms are supported by a new field in the TBLBaseDesc structure called bSynonym. The field bSynonym is a BOOL16, which is set to TRUE if the object is a synonym.

The BDE configuration option LIST SYNONYMS can be found in the Registry's DB OPEN section for Oracle DRIVERS and DATABASES. See BDE Configuration Utility Guide

The value of LIST SYNONYMS determines whether or not to include synonyms in the schema table returned from DbOpenTableList and DbOpenFileList, as shown in the following table.

Value	Meaning
NONE	Do not include any synonyms (Default)
PRIVATE	Only include private synonyms
ALL	Include both private and public synonyms

Oracle: Oracle has PUBLIC synonyms that show up in the table list when the value of LIST SYNONYMS = ALL. However, to open a PUBLIC synonym, the user must also have SELECT privileges on the base object of the synonym. If the user does not have SELECT privileges and tries to open the PUBLIC SYNONYM, Oracle returns the error "Table or view does not exist".

Oracle has PUBLIC synonyms to a set of dynamic performance tables. Even though these are PUBLIC synonyms, they are accessible only to the DBA user SYS, by default (other users can be granted privileges). These synonym names are in the format, V\$... (that is, V\$DATABASE, V\$ACCESS, and so on).

TBLExtDesc (extended table descriptor)

The TBLExtDesc structure provides additional information about a table, using the following fields:

Field	Type	Description
<i>szStruct</i>	DBINAME	Specifies the physical structure.
<i>iRestrVersion</i>	UINT16	Specifies the version number.
<i>iRecSize</i>	UINT16	Specifies the physical record size.
<i>iFields</i>	UINT16	Specifies the number of fields.
<i>iIndexes</i>	UINT16	Specifies the number of indexes.
<i>iValChecks</i>	UINT16	Specifies the number of field validity checks.
<i>iRintChecks</i>	UINT16	Specifies the number of referential integrity checks.
<i>iRecords</i>	UINT32	Specifies the number of records in table.
<i>bProtected</i>	BOOL	TRUE, if the table is protected.
<i>bValidInfo</i>	BOOL	If FALSE, all or some of the extended data is not available.

TBLFullDesc (full table descriptor)

The TBLFullDesc structure provides a complete description of the table (base extended), using the following fields:

Field	Type	Description
<i>tblBase</i>	TBLBaseDesc	Specifies the base description.
<i>tblExt</i>	TBLExtDesc	Specifies the extended description.

TBLType (table capabilities)

The TBLType structure describes the table's capabilities, using the following fields

Field	Type	Description
<i>ild</i>	UINT16	Specifies the ID of the table type.
<i>szName</i>	DBINAME	Specifies the descriptive name of the table type; for example, dBASE5.
<i>szText</i>	DBINAME	Descriptive text.
<i>szFormat</i>	DBINAME	Specifies the format; for example, HEAP.
<i>bReadWrite</i>	BOOL	If TRUE, the user can read and write.
<i>bCreate</i>	BOOL	If TRUE, the user can create new tables of this type.
<i>bRestructure</i>	BOOL	If TRUE, BDE can restructure a table of this type.
<i>bValChecks</i>	BOOL	If TRUE, the user can specify validity checks for this table type.
<i>bSecurity</i>	BOOL	If TRUE, a table of this type can be protected.
<i>bRefIntegrity</i>	BOOL	If TRUE, a table of this type can participate in referential integrity.
<i>bPrimaryKey</i>	BOOL	If TRUE, a table of this type supports the primary key concept.
<i>bIndexing</i>	BOOL	If TRUE, a table of this type can have indexes.
<i>iFldTypes</i>	UINT16	Specifies the number of physical field types supported.
<i>iMaxRecSize</i>	UINT16	Specifies the maximum record size.
<i>iMaxFldsInTable</i>	UINT16	Specifies the maximum fields in a table.
<i>iMaxFldNameLen</i>	UINT16	Specifies the maximum field name length.
<i>iTblLevel</i>	UINT16	Specifies the driver dependent table level (version).

USERDesc (user information descriptor)

The USERDesc structure describes a user, using the following fields:

Field	Type	Description
<i>szUserName</i>	DBIUSERNAME	Specifies the user name.
<i>iNetSession</i>	UINT16	Specifies the net level session number.
<i>iProductClass</i>	UINT16	Specifies the product class of the user (Paradox only).
<i>szSerialNum[22]</i>	CHAR	Specifies the serial number (Paradox only).

VCHKDesc (validity check)

The VCHKDesc structure provides information about validity checking constraints on a field (Paradox and SQL tables only), using the following fields (*bRequired* is the only option supported by the SQL drivers):

Field	Type	Description
<i>iFldNum</i>	UINT16	Specifies the field number (1 to n).
<i>bRequired</i>	BOOL	Specifies whether or not the field is required: TRUE, FALSE.
<i>bHasMinVal</i>	BOOL	Has minimum value: TRUE, FALSE, or TODAYVAL.
<i>bHasMaxVal</i>	BOOL	Has maximum value: TRUE, FALSE, or TODAYVAL.
<i>bHasDefVal</i>	BOOL	Has default value: TRUE, FALSE, or TODAYVAL.
<i>aMinVal</i>	DBIVCHK	Specifies the minimum value.
<i>aMaxVal</i>	DBIVCHK	Specifies the maximum value.
<i>aDefVal</i>	DBIVCHK	Specifies the default value.
<i>szPict</i>	DBIPICT	Specifies the picture string.
<i>elkupType</i>	LKUPTYPE	Specifies the <u>lookup type</u> .
<i>szLkupTblName</i>	DBIPATH	Specifies the lookup table name; for information only.

elkupType

The following lookup and fill types are valid for Paradox tables:

Lookup Type	Description
lkupNONE	The table has no lookup.
lkupPRIVATE	Only current field private.
lkupALLCORRESP	All corresponding no help.
lkupHELP	Only current field help and fill.
lkupALLCORRESPHELP	All corresponding help.

Xinfo (Information Transactions)

The XInfo structure describes a transaction, using the following fields:

Field	Type	Description
<i>exState</i>	eXState	Specifies the transaction state: xsACTIVE or xsINACTIVE.
<i>eXIL</i>	eXILType	Specifies the transaction <u>isolation level</u> .
<i>uNests</i>	UINT16	Specifies the transaction children.

eXIL

The following transaction isolation levels are valid:

Isolation Level	Description
xiiDIRTYREAD	Uncommitted changes; no phantoms
xiiREADCOMMITTED	Committed changes; no phantoms
xiiREPEATABLEREAD	Full read repeatability

CANUnary (unary node descriptor)

Type	Name	Description
NODEClass	<i>nodeClass</i>	Unary node
CANOp	<i>canOp</i>	Operator
UINT16	<i>iOperand1</i>	Byte offset of operand

CANBinary (binary node descriptor)

Type	Name	Description
NODEClass	<i>nodeClass</i>	Binary node
CANOp	<i>canOp</i>	Operator
UINT16	<i>iOperand1</i>	Byte offset of operand 1
UINT16	<i>iOperand2</i>	Byte offset of operand 2

CANCompare (extended compare node descriptor)

Type	Name	Description
NODEClass	<i>nodeClass</i>	Extended compare node
CANOp	<i>canOp</i>	Operator
BOOL	<i>bCaseInsensitive</i>	3 values: UNKNOWN, "fastest", "native"
UINT16	<i>iOperand1</i>	Byte offset of Operand1
UINT16	<i>iOperand2</i>	Byte offset of Operand2

CANField (field node descriptor)

Type	Name	Description
NODEClass	<i>nodeClass</i>	Field node
CANOp	<i>canOp</i>	Operator
UINT16	<i>iFieldNum</i>	Field number
UINT16	<i>iNameOffset</i>	Name offset in literal pool

CANConst (constant node descriptor)

Type	Name	Description
NODEClass	<i>nodeClass</i>	Constant
CANOp	<i>canOp</i>	Operator
UINT16	<i>iType</i>	Constant type
UINT16	<i>iSize</i>	Constant size (in bytes)
UINT16	<i>iOffset</i>	Offset in literal pool

CANTuple (tuple node descriptor)

Type	Name	Description
NODEClass	<i>nodeClass</i>	Tuple (record)
CANOp	<i>canOp</i>	Operator
UINT16	<i>iSize</i>	Constant size (in bytes)

CANContinue (break node descriptor)

Type	Name	Description
NODEClass	<i>nodeClass</i>	Break node
CANOp	<i>canOp</i>	Operator
UINT16	<i>iContOperand</i>	Continue if operand is TRUE; otherwise, stop evaluating records.

Callback definitions

The following callbacks are defined in the header file IDAPI.H:

Callback	Description
<u>cbGENPROGRESS</u>	Informs applications about the progress made during large batch operations.
<u>cbRESTRUCTURE</u>	Supplies information about an impending action and requests a response from the caller.
<u>cbBATCHRESULT</u>	Batch processing results.
<u>cbTABLECHANGED</u>	Notifies user that table has changed.
<u>cbCANCELQRY</u>	Allows user to cancel a query.
<u>cbINPUTREQ</u>	A BDE driver requests input from user.
<u>cbDBASELOGIN</u>	Enables clients to access encrypted dBASE tables.
<u>cbFIELDRECALC</u>	Field(s) recalculation
<u>cbTRACE</u>	Trace
<u>cbDBLOGIN</u>	Database login
<u>cbDELAYEDUPD</u>	Cached updates callback
<u>cbNBROFCBS</u>	Number of callbacks

{button ,AL("types")} [Other data type topics](#)

cbGENPROGRESS

pCbBuf is assumed to be of the type `cbPROGRESSDesc`. This callback is issued by BDE to inform applications about the progress made during large batch operations, such as [DbiBatchMove](#). The Generic Progress Report callback allows the client to obtain progress reports during an operation, and to cancel the operation, if desired. The client registers a progress callback function using `cbGENPROGRESS` as the value for *ecbType*. The body of the progress callback function (written by the client) should cast the callback buffer as a structure of type `cbPROGRESSDesc`.

The BDE returns either a percentage done (returned in the *iPercentDone* parameter of the `cbPROGRESSDesc` structure), or a message string to display on the status bar. The client should assume the following: if the *iPercentDone* value is negative, then the message string is valid; otherwise, the *iPercentDone* value should be considered. The message string format should always be `<Text String><:><Value>` to allow easy international translations. For example,

```
Records copied: 250
```

In the message string, the value and colon fields are optional. Possible return values are: `cbrABORT` (stop processing), or `cbrCONTINUE` (continue processing).

cbRESTRUCTURE

pCbBuf is assumed to be of the type `RESTCbDesc`. This callback may be issued several times during a call to `DbiDoRestructure`. Each time it is issued, BDE supplies information about an impending action and requests a response from the caller. The *iErrCode* in the `CBRESTCbDesc` structure is used to inform the caller about the different actions. Other fields of `CBRESTCbDesc` describes, if applicable, the object (for example, field, index, or validity check) to which this callback refers. Any callback may return with a `cbrABORT` that aborts the restructure. The batch result callback would be issued in the following different situations:

- When *iErrCode* == `DBIERR_OBJMAYBETRUNCATED`, a YES response forces data trimming. A NO response forces record that would be trimmed to a problems table.
- When *iErrCode* == `DBIERR_TABLELEVELCHANGED`, a YES response allows the table level to change. A NO response aborts the restructure operation.
- When *iErrCode* == `DBIERR_VALIDATEDATA`, a YES force validity checks to be applied to existing data. A NO response applies validity checks to new data only.
- When *iErrCode* == `DBIERR_OBJIMPLICITLYMODIFIED`, this is a warning that an object was implicitly modified. For example, when a field that is part of a composite secondary index restructure is dropped, that field is implicitly dropped from the index.
- When *iErrCode* == `DBIERR_OBJIMPLICITLYDROPPED`, this is a warning that an object was dropped.
- When *iErrCode* == `DBIERR_VALFIELDMODIFIED`, this is a warning that the type or size of a field containing a validity check was modified.
- When *iErrCode* == `DBIERR_VCHKMAYNOTBEENFORCED`, this is a warning that because of referential integrity constraints on fields in the master table, new validity checks on these fields cannot be enforced on existing data.

cbBATCHRESULT

pCbBuf is assumed to be of the type RESTCbDesc. See ([CBRESTCbDesc](#)) This callback may be issued several times during a call to [DbiBatchMove](#).

cbTABLECHANGED

pCbBuf is not used for this callback. The Table Changed callback is used to inform applications about changes to the table associated with a cursor. This callback is supported only by the Paradox driver.

cbCANCELQRY

Allows the user to cancel a long running query. The installed callback function is called periodically, and the user can return cbrABORT to cancel.

Any other return code will have no affect. No other BDE API calls are allowed from within the callback function.

cbINPUTREQ

The cbINPUTREQ callback is used when a BDE driver needs to communicate with the end user. This callback is used in the following cases:

- a) a dBASE BLOB (.MDX) file is missing: cbiMDXMISSING
- b) a Paradox BLOB (.MB) file is missing: cbiPDXBLOB
- c) a Paradox lookup table is missing: cbiPDXLOOKUP
- d) a dBASE ??? (.DBT) file is missing: cbiDBTMISSING

The structure passed to the callback function is defined as follows:

```
typedef struct {
    CBInputId    eCbInputId;           // Id for this input request
    INT16        iCount;               // Number of entries
    INT16        iSelection;           // Selection 1..n (In/Out)
    BOOL16       bSave;               // Save this option (In/Out)
    DBIMSG       szMsg;               // Message to display
    CEntry       acbEntry[MAXCBENTRIES]; // Entries
} CBInputDesc;
```

Structure	Type	Description
<i>eCbInputId</i>	CBInputId	<i>eCbInputId</i> is an enumerated type indicating what this input request is for. This will match one of the aforementioned values (cbiMDXMISSING,...).
<i>iCount</i>	INT16	<i>iCount</i> refers to the number of entries in the array <i>acbEntry</i> . (See below.)
<i>iSelection</i>	INT16	<i>iSelection</i> is used as both input to the callback function and output back to the driver. The input value from the driver indicates what the default choice in <i>acbEntry</i> should be. The output value is used to tell the driver which choice was selected.
<i>bSave</i>	BOOL16	The <i>bSave</i> element is used to tell the driver if it encounters a similar error on a different relation to take the same action as this time.
<i>szMsg</i>	DBIMSG	<i>szMsg</i> is a string the client can display to indicate what the problem is.
<i>acbEntry</i>	CEntry	This array contains a list of operations that the driver can take to remedy the problem (such as Open the base table as read-only Abort the operation). The array also contains a help string for each of the choices. The array <i>acbEntry</i> is defined as:

```
typedef struct { // Entries for input requested
    callback
    DBINAME      szKeyWord; // Keyword to display
    DBIMSG       szHelp;    // Help String
} CEntry;
```

Where *szKeyWord* is a string indicating an operation that the driver can perform for this case. The *szHelp* element contains a help string associated with the operation that the client can display.

cbDBASELOGIN

Use the callback cbDBASELOGIN to enable clients to access encrypted dBASE tables.

The cbDBASELOGIN structure contains the following fields:

Structure	Type	Description
<i>szUserName</i>	DBINAME	Login name of user
<i>szGroupName</i>	DBINAME	Group to log in to
<i>szUserPassword</i>	DBINAME	User password

In some cases, no login may be performed. This may occur when either:

- a) the optional login security has been turned off in dBASE; or
- b) another client is using secured dBASE tables.

When no login has been performed in dBASE, you can call [DbiOpenTable](#) to attempt to open an encrypted table or you can call [DbiCreateTable](#) to create and encrypt a table (with Security enabled.)

In either case, when no login has been performed, the driver issues a cbDBASELOGIN callback. The client then displays a login screen with group name, user name, and password. The data from this screen is returned to the driver, which verifies it and sets the group name and user name in the session level properties. If the information is invalid (such as an invalid password, or the GroupName and UserName does not exist), then an error is returned, and the table is not opened/created.

The structure passed to the callback function is defined as follows:

```
// dBASE login callback structure
typedef struct
{
    DBINAME  szUserName;           // Login name of user
    DBINAME  szGroupName;        // Group to log in to
    DBINAME  szUserPassword;     // User password
} CBLoginDesc;

typedef CBLoginDesc far * pCBLoginDesc;
```

cbFIELDRECALC

Used for recalculation of fields.

cbTRACE

The cbTRACE is a system-level callback that can be used to retrieve trace information. The trace string retrieved through the callback is the same as that which goes to the debug window via OutputDebugString.

This structure is used to return trace info to the callback:

```
typedef struct          // trace callback info
{
    TRACECat    eTraceCat;    // trace category
    UINT16      uTotalMsgLen; // total message length
    CHAR        pszTrace[];   // trace string
                                // (recommended size = DBIMAXTRACELEN
    (8192))
} TRACEDesc;

typedef enum           // trace categories
{
    traceUNKNOWN      = 0x0000,
    traceQPREPARE     = 0x0001,    // prepared query statements
    traceQEXECUTE     = 0x0002,    // executed query statements
    traceERROR        = 0x0004,    // vendor errors
    traceSTMT         = 0x0008,    // statement ops (i.e. allocate, free)
    traceCONNECT      = 0x0010,    // connect / disconnect
    traceTRANSACT     = 0x0020,    // transaction
    traceBLOB         = 0x0040,    // blob i/o
    traceMISC         = 0x0080,    // misc.
    traceVENDOR       = 0x0100,    // vendor calls
} TRACECat;
```

The TRACECat enums have the same bit sequence used to set the TRACE MODE configuration option, and can also be used (singularly or |'d together) as input to the dbTRACEMODE database property. The uTotalMsgLen field of the TRACEDesc struct can be used to determine whether the returned string (in pszTrace) has been truncated.

EXAMPLE of registering the cbTRACE callback:

```
DbiRegisterCallBack
(
    NULL,
    cbTRACE,
    iClientData,
    sizeof (TRACEDesc) + DBIMAXTRACELEN,
    (pVOID)pTraceInfo,          // ptr to client-allocated
    TRACEDesc
    (pfDBICallBack) lpfnTrace);
```

cbDBLOGIN
Database login.

cbDELAYEDUPD

This Callback mechanism is invoked when the cached updates feature fails to write a modified record to the database. Because updates are not sent to the underlying table until the commit time, no errors (such as integrity constraint violation, and so on) are detected before the commit operation. If an error occurs at the commit time, you are prompted with an error message indicating what sort of error has happened. The clients should register a Callback function for delayed updates by using the `DbiRegisterCallback` function (ecbType for this Callback is `cbDELAYEDUPD`) to be notified of the errors during the commit.

Here is the Callback descriptor, `cbDELAYEDUPD`, for delayed updates:

```
// type of delayed update object (delayed updates Callback)
typedef enum
{
    delayupdNONE           = 0,
    delayupdMODIFY         = 1,
    delayupdINSERT         = 2,
    delayupdDELETE         = 3
} DelayUpdErrOpType;

// delayed updates Callback descriptor.
typedef struct
{
    DBIResult              iErrCode;
    DelayUpdErrOpType     eDelayUpdErrOpType;
    // Record size (physical record)
    UINT16                 iRecBufSize;
    pBYTE                  pNewRecBuf;
    pBYTE                  pOldRecBuf;
} DELAYUPDCbDesc;
```

In the above Callback descriptor, *eDelayUpdErrOpType* indicates the operation type, such as insert, delete or modify and *iErrCode* indicates what sort of error has occurred during the *eDelayUpdErrOpType* operation.

Clients should allocate enough memory for *pNewRecBuf* and *pOldRecBuf*. Each record buffer should be at least the delayed update cursor's physical record buffer size. The new (after the update) and old (before the update) record buffers are returned to the clients through *pNewRecBuf* and *pOldRecBuf* record buffers.

Clients can respond to this Callback function with `cbrABORT`, `cbrSKIP`, `cbrCONTINUE` and `cbrRETRY` return codes. The following actions are taken depending on the return codes.

- If the return code is `cbrABORT`, the entire commit operation is aborted. Rollback of the committed updates will occur depending on the delayed updates cursor's property.
- If the return code is `cbrSKIP` or `cbrCONTINUE`, the failed update operation is discarded and the commit process continues with the remaining updates.
- If the return code is `cbrRETRY`, the failed update operation is tried again.

If no Callback function is registered, the default return code is `cbrABORT`.

cbNBROFCBS

Indicates the maximum number of callback types.

Paradox and dBASE physical types

These two lists show physical types supported by Paradox and dBASE, respectively:

Paradox physical types

fldPDXCHAR
fldPDXNUM
fldPDXMONEY
fldPDXDATE
fldPDXSHORT
fldPDXMEMO
fldPDXBINARYBLOB
fldPDXFMTMEMO
fldPDXOLEBLOB
fldPDXGRAPHIC
fldPDXBLOB
fldPDXLONG
fldPDXTIME
fldPDXDATETIME
fldPDXBOOL
fldPDXAUTOINC
fldPDXBYTES
fldPDXBCD

dBASE physical types

fldDBCHAR
fldDBNUM
fldDBMEMO
fldDBBOOL
fldDBDATE
fldDBFLOAT
fldDBLOCK
fldDBBINARY
fldDBOLEBLOB
fldDBBYTES

{button ,AL("types")} [Other data type topics](#)

Data type translations

When a table is copied or appended to a table of a different driver type, data type translations take place according to the following tables. (You can widen this Help window to display the full width of the chart.)

From Paradox	To dBASE	To Oracle	To Sybase	To InterBase	To Informix
Alpha	Character	Character	VarChar	Varying	Character
Number	Float {20.4}	Number	Float	Double	Float
Money	Number {20.4}	Number	Money	Double	Money {16.2}
Date	Date	Date	DateTime	Date	Date
Short	Number {6.0}	Number	SmallInt	Short	SmallInt
Memo	Memo	Long	Text	Blob/1	Text
Binary	Memo	LongRaw	Image	Blob	Byte
Formatted memo	Memo	LongRaw	Image	Blob	Byte
OLE	OLE	LongRaw	Image	Blob	Byte
Graphic	Binary	LongRaw	Image	Blob	Byte
Long	Number {11.0}	Number	Int	Long	Integer
Time	Character {>8}	Character {>8}	Character {>8}	Character {>8}	Character {>8}
DateTime	Character {>8}	Date	DateTime	Date	DateTime
Bool	Bool	Character {1}	Bit	Character {1}	Character
AutoInc	Number{11.0}	Number	Int	Long	Integer
Bytes	Memo	LongRaw	Image	Varying	Byte
BCD	N/A	N/A	N/A	N/A	N/A

From dBASE	To Paradox	To Oracle	To Sybase	To InterBase	To Informix
Character	Alpha	Character	VarChar	Varying	Character
Number iUnits2=0 && iUnits1<5	Short	Number	SmallInt	Short	SmallInt
others	Number	Number	Float	Double	Float
Float	Number	Number	Float	Double	Float
Date	Date	Date	DateTime	Date	Date
Memo	Memo	Long	Text	Blob/1	Text
Bool	Bool	Character {1}	Bit	Character {1}	Character
Lock	Alpha {24}	Character {24}	Character {24}	Character {24}	Character
OLE	OLE	LongRaw	Image	Blob	Byte
Binary	Binary	LongRaw	Image	Blob	Byte
Bytes	Bytes	LongRaw	Image	Blob	Byte (temp tables only)

From Oracle	To Paradox	To dBASE	To Sybase	To InterBase	To Informix
Character	Alpha	Character	VarChar	Varying	Character
Raw	Number	Float {20.4}	Float	Double	Float
Date	DateTime	Date	DateTime	Date	DateTime
Number	Number	Float {20.4}	Float	Double	Float
Long	Memo	Memo	Text	Blob/1	Text
LongRaw	Binary	Memo	Image	Varying	Byte

From Sybase	To Paradox	To dBASE	To Oracle	To InterBase	To Informix
-------------	------------	----------	-----------	--------------	-------------

Character	Alpha	Character	Character	Varying	Character
Var Character	Alpha	Character	Character	Varying	Character
Int	Number	Number {11.0}	Number	Long	Integer
Small Int	Short	Number {6.0}	Number	Short	SmallInt
Tiny Int	Short	Number {6.0}	Number	Short	SmallInt
Float	Number	Float {20.4}	Number	Double	Float
Money	Money	Number {20.4}	Number	Double	Money {16.2}
Text	Memo	Memo	Long	Blob/1	Text
Binary	Binary	Memo	Raw	Varying	VarChar
Var Binary	Binary	Memo	Raw	Varying	VarChar
Image	Binary	Memo	LongRaw	Blob	Byte
Bit	Alpha	Bool	Character	Varying	Character
DateTime	DateTime	Date	Date	Date	DateTime
TimeStamp	Binary	Memo	Raw	Varying	VarChar
Float4	Number	Number	Number	Double	Float
Money4	Money	Number {20.4}	Number	Double	Money {16.2}
DateTime4	DateTime	Date	Date	Date	DateTime

From InterBase	To Paradox	To dBASE	To Oracle	To Sybase	To Informix
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Short	Short	Number {6.0}	Number	Small Int	SmallInt
Long	Number	Number {11.0}	Number	Int	Integer
Float	Number	Float {20.4}	Number	Float	Float
Double	Number	Float {20.4}	Number	Float	Float
Char	Alpha	Character	Character	VarChar	Character
Varying	Alpha	Character	Character	VarChar	Character
Date	DateTime	Date	Date	DateTime	DateTime
Blob	Binary	Memo	LongRaw	Image	Byte
Blob/1	Memo	Memo	Long	Text	Text

From Informix	To Paradox	To dBASE	To Oracle	To Sybase	To InterBase
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Char	Alpha	Character	Character	VarChar	Varying
Smallint	Short	Number {6.0}	Number	Small Int	Short
Integer	Number	Number {11.0}	Number	Int	Long
Smallfloat	Number	Float {20.4}	Number	Float	Double
Float	Number	Float {20.4}	Number	Float	Double
Money	Money	Number {20.4}	Number	Float	Double
Decimal	Number	Float	Number	Float	Double
Date	Date	Date	Date	DateTime	Date
Datetime	DateTime	Date	Date	DateTime	Date
Interval	Alpha	Character	Character	VarChar	Varying
Serial	Number	Number {11.0}	Number	Int	Long
Byte	Binary	Memo	LongRaw	Image	Blob
Text	Memo	Memo	Long	Text	Blob/1
VarChar	Alpha	Character	Character	VarChar	Varying

{button ,AL("types")} Other data type topics

Logical types and driver-specific physical types

The following tables show physical types translated into logical types, and then into the physical type of a different driver. (You might need to widen this Help window to display the full width of the chart.)

From Paradox physical type	To BDE logical type	To dBASE physical type
fldPDXBINARYBLOB	fldBLOB/fldstBINARY	fldDBMEMO
fldPDXBLOB	fldPDXMEMO	fldDBMEMO
fldPDXCHAR	fldZSTRING	fldDBCHAR
fldPDXDATE	fldDATE	fldDATE
fldPDXFMTMEMO	fldBLOB/fldstFMTMEMO	fldDBMEMO
fldPDXGRAPHIC	fldBLOB/fldstGRAPHIC	fldDBBINARY
fldPDXMEMO	fldBLOB/fldstMEMO	fldDBMEMO
fldPDXMONEY	fldFLOAT/fldstMONEY	fldDBNUM {20.4}
fldPDXNUM	fldFLOAT	fldDBFLOAT {20.4}
fldPDXOLEBLOB	fldBLOB/fldstOLEOBJ	fldDBOLEBLOB
fldPDXSHORT	fldINT16	fldDBNUM {6.0}

Paradox level 5 data types:

fldPDXAUTOINC	fldINT32/fldstAUTOINC	fldDBNUM {11.0}
fldPDXBCD	fldBCD	fldDBCHAR
fldPDXBOOL	fldBOOL	fldDBBOOL
fldPDXBYTES	fldBYTES	fldDBMEMO
fldPDXDATETIME	fldTIMESTAMP	fldDBCHAR {30}
fldPDXLONG	fldINT32	fldDBNUM {11.0}
fldPDXTIME	fldTIME	fldDBCHAR {>8}

From dBASE physical type	To BDE logical type	To Paradox physical type
fldDBBINARY	fldBLOB/fldstTYPEDBINARY	fldPDXBINARYBLOB
fldDBLOCK	fldLOCKINFO	fldPDXCHAR {24}
fldDBBOOL	fldBOOL	fldPDXBOOL
fldDBBYTES	fldBYTES	fldPDXBYTES (only for temp tables)
fldDBCHAR	fldZSTRING	fldPDXCHAR
fldDBDATE	fldDATE	fldPDXDATE
fldDBFLOAT	fldFLOAT	fldPDXNUM
fldDBMEMO	fldBLOB/fldstMEMO	fldPDXMEMO
fldDBNUM	if (iUnits2=0 && iUnits1<5) fldINT16 else fldFLOAT	fldPDXSHORT
fldDBOLEBLOB	fldBLOB/fldstDBSOLEOBJ	fldPDXOLEBLOB

From Oracle physical type	To BDE logical type	To Paradox physical type	To dBASE physical type
----------------------------------	----------------------------	---------------------------------	-------------------------------

fldORACHAR	fldZSTRING	fldPDXCHAR	fldDBCHAR
fldORARAW	fldVARBYTES	fldPDXBINARYBLOB	fldDBMEMO
fldORADATE	fldTIMESTAMP	fldPDXDATETIME	fldDBCHAR
fldORANUMBER	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldORALONG	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldORALONGRAW	fldBLOB/fldstBINARY	fldPDXBINARYBLOB	fldDBMEMO
fldORAVARCHAR	fldZSTRING	fldPDXCHAR	fldDBCHAR
fldORAVARCHAR2			
iUnits1 <=255	fldSTRING	fldPDXCHAR	fldDBCHAR
iUnits1 >255	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldORAFLOAT	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}

From Sybase physical type	To BDE logical type	To Paradox physical type	To dBASE physical type
fldSYBBINARY	fldBYTES	fldPDXBYTES	fldDBMEMO
fldSYBBIT	fldBOOL	fldPDXBOOL	fldDBBOOL
fldSYBCHAR	fldZSTRING	fldPDXCHAR	fldDBCHAR
fldSYBDATETIME	fldTIMESTAMP	fldPDXDATETIME	fldDBDATE
fldSYBDATETIME4	fldTIMESTAMP	fldPDXDATETIME	fldDBDBDATE
fldSYBFLOAT	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldSYBFLOAT4	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldSYBIMAGE	fldBLOB/fldstBINARY	fldPDXBINARYBLOB	fldDBMEMO
fldSYBINT	fldINT32	fldPDXLONG	fldDBNUM {11.0}
fldSYBMONEY	fldFLOAT/fldstMONEY	fldPDXMONEY	fldDBNUM {20.4}
fldSYBMONEY4	fldFLOAT/fldstMONEY	fldPDXMONEY	fldDBNUM {20.4}
fldSYBSMALLINT	fldINT16	fldPDXSHORT	fldDBNUM {6.0}
fldSYBTEXT	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldSYBTIMESTAMP	fldVARBYTES	fldPDXBINARYBLOB	fldDBMEMO
fldSYBTINYINT	fldINT16	fldPDXSHORT	fldDBNUM {6.0}
fldSYBVARBINARY	fldVARBYTES	fldPDXBINARYBLOB	fldDBMEMO
fldSYBVARCHAR	fldZSTRING	fldPDXCHAR	fldDBCHAR

If you are using Sybase System 10, the following additional Sybase physical types are available:

From Sybase physical type	To BDE logical type	To Paradox physical type	To dBASE physical type
fldSYBDECIMAL	fldFLOAT	fldPDXNUM	fldDBFLOAT(20,4)
fldSYBNUMERIC	fldFLOAT	fldPDXNUM	fldDBFLOAT(20,4)

From MS SQL physical type	To BDE logical type	To Paradox physical type	To dBASE physical type
fldMSSBINARY	fldBYTES	fldPDXBYTES	fldDBMEMO
fldMSSBIT	fldBOOL	fldPDXBOOL	fldDBBOOL
fldMSSCHAR	fldZSTRING	fldPDXCHAR	fldDBCHAR
fldMSSDATETIME	fldTIMESTAMP	fldPDXDATETIME	fldDBDATE

fldMSSDATETIME4	fldTIMESTAMP	fldPDXDATETIME	fldDBDBDATE
fldMSSDECIMAL	fldFLOAT	fldPDXNUM	fldDBFLOAT(20,4)
fldMSSFLOAT	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldMSSFLOAT4	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldMSSIMAGE	fldBLOB/fldstBINARY	fldPDXBINARYBLOB	fldDBMEMO
fldMSSINT	fldINT32	fldPDXLONG	fldDBNUM {11.0}
fldMSSMONEY	fldFLOAT/fldstMONEY	fldPDXMONEY	fldDBNUM {20.4}
fldMSSMONEY4	fldFLOAT/fldstMONEY	fldPDXMONEY	fldDBNUM {20.4}
fldMSSNUMERIC	fldFLOAT	fldPDXNUM	fldDBFLOAT(20,4)
fldMSSSMALLINT	fldINT16	fldPDXSHORT	fldDBNUM {6.0}
fldMSSTEXT	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldMSSTIMESTAMP	fldVARBYTES	fldPDXBINARYBLOB	fldDBMEMO
fldMSSTINYINT	fldINT16	fldPDXSHORT	fldDBNUM {6.0}
fldMSSVARBINARY	fldVARBYTES	fldPDXBINARYBLOB	fldDBMEMO
fldMSSVARCHAR	fldZSTRING	fldPDXCHAR	fldDBCHAR

From InterBase physical type	To BDE logical type	To Paradox physical type	To dBASE physical type
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fldIBBLOB	fldBLOB	fldPDXBINARYBLOB	fldDBMEMO
fldIBBLOB/1	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldIBCHAR			
iUnits 1 <=255	fldZSTRING	fldPDXCHAR	fldDBCHAR
iUnits1 > 255	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldIBDATE	fldTIMESTAMP	fldPDXDATETIME	fldDBDATE
fldIBDOUBLE	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldIBFLOAT	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldIBLONG	fldINT32	fldPDXLONG	fldDBNUM {11.0}
fldIBSHORT	fldINT16	fldPDXSHORT	fldDBNUM {6.0}
fldIBVARYING			
iUnits1 <= 255	fldSTRING	fldPDXCHAR	fldDBCHAR
iUnits1 >255	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO

From Informix physical type	To BDE logical type	To Paradox physical type	To dBASE physical type
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fldINFBYTE	fldBLOB/fldstBINARY	fldPDXBINARYBLOB	fldDBMEMO
fldINFCHAR			
iUnits1 <=255	fldZSTRING	fldPDXCHAR	fldDBCHAR
iUnits1 > 255	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldINFDATE	fldDATE	fldPDXDATE	fldDBDATE
fldINFDATETIME	fldTIMESTAMP	fldPDXDATETIME	fldDBDATE
fldINFDECIMAL	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldINFFLOAT	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldINFINTEGER	fldINT32	fldPDXLONG	fldDBNUM {11.0}
fldINFINTERVAL	fldZSTRING	fldPDXCHAR	fldDBCHAR

fldINFMONEY	fldFLOAT/fldstMONEY	fldPDXMONEY	fldDBNUM {20.4}
fldINFSERIAL	fldINT32	fldPDXLONG	fldDBNUM {11.0}
fldINFSMALLFLOAT	fldFLOAT	fldPDXNUM	fldDBFLOAT {20.4}
fldINFSMALLINT	fldINT16	fldPDXSHORT	fldDBNUM {6.0}
fldINFTEXT	fldBLOB/fldstMEMO	fldPDXMEMO	fldDBMEMO
fldINFVARCHAR	fldZSTRING	fldPDXCHAR	fldDBCHAR

{button ,AL("types")} [Other data type topics](#)

International compatibility

The following sections describe considerations that may be encountered for international applications:

- Character Sets
- Sorting and Uppercasing Rules
- Language Drivers
- Date, Time, and Number Formats

Character sets

The shapes of characters that appear onscreen depend on an operating system's conventions for associating these shapes to internal binary values. Such conventions are called character sets, or code pages. The 8-bit code pages supported by BDE have 256 characters, numbered from 0 to 255 (using decimal values).

While most code pages use exactly the same numeric values (code points) for characters that are important in the United States, many of the symbols that are important to non-English-speaking countries map to different code points, depending on the particular code page. For example, the accented letter 'á' maps to 160 on many DOS code pages, but in the Windows (ANSI) character set the same letter maps to code point 225. If an attempt is made to pass this character from an environment that uses the ANSI character set (used by most Windows programs) to a DOS environment, without translating the internal code point, the character appears under DOS as 'ß' (the German double-s) and may be misinterpreted in indexing, sorting, and so on. Character set identification and translation is therefore a very important issue if data loss is to be avoided internationally.

Characters whose code points are less than 128 are said to fall in the standard ASCII range; all the special international characters, located above code point 127, are known as extended characters.

BDE does not have a native character set. Usually, it operates with the binary values of characters. Strings should be passed to BDE in their default character set. The following table summarizes the default character sets for different character strings:

Use	For
DOS code page	Local file names and pathnames, local user names and database aliases, names for table lookup and referential integrity, non-maintained index names
SQL server's character set	SQL data and metadata (table, field and index names, passwords and user names)
Table's character set	Table field names, data, validity checks, and secondary and maintained index names
ANSI	All SQL scripts (for local or SQL tables)

For QBE scripts, use the DOS character set for local table names and aliases. Use the ANSI character set for keywords and the table's character set for remaining characters in the script.

To translate character data between a table's native character set and Windows ANSI, use the functions [DbiNativeToAnsi](#) and [DbiAnsiToNative](#). BDE returns error messages in the Windows ANSI character set.

Sorting and uppercasing rules

When character data is sorted in English-speaking countries, the sort sequence is usually based on the numeric values of the characters defined by the code page. This kind of sorting is known as binary collation. The approach is reasonable for English because most code pages define English letters in a neat, ascending numeric order.

However, binary sorting is not reasonable for other languages, because most code pages assign higher, fairly arbitrary values for their special characters (that is, the characters occur out of sequence with the standard ASCII characters among which they must be sorted). For similar reasons, uppercasing can be based on binary values for English, but not for other languages. To provide support for country-, code page-, and language-specific sorting and uppercasing rules, BDE uses information stored in language drivers.

Language drivers

A language driver (LD) specifies a particular primary (or native) character set, as well as a country/language-dependent set of rules for character manipulation, such as sorting, upper- and lowercasing, and the set of characters that are considered alphabetic. A language driver's primary character set is the character set in which its rules are defined. It specifies sorting and uppercasing in terms of the code points used by that particular code page. It also defines the character translation mapping between its primary character set and the ANSI code page, when necessary. (For a complete list of available language drivers and their primary character sets, use [DbiOpenLdList](#).)

Long name	Short name	Character set	Collation sequence
'ascii' ANSI	DBWINUS0	ISO8859.1 (ANSI)	Binary
'Spanish' ANSI	DBWINES0	ISO8859.1 (ANSI)	Spanish
'WEurope' ANSI	DBWINWE0	ISO8859.1 (ANSI)	Multilingual Western Europe
Borland DAN Latin-1	BLLT1DA0	Latin-1	Danish
Borland DEU Latin-1	BLLT1DE0	Latin-1	German
Borland ENG Latin-1	BLLT1UK0	Latin-1	English/UK
Borland ENU Latin-1	BLLT1US0	Latin-1	Binary
Borland ESP Latin-1	BLLT1ES0	Latin-1	Spanish
Borland FIN Latin-1	BLLT1FI0	Latin-1	Finnish
Borland FRA Latin-1	BLLT1FR0	Latin-1	French
Borland FRC Latin-1	BLLT1CA0	Latin-1	
Borland ISL Latin-1	BLLT1IS0	Latin-1	
Borland ITA Latin-1	BLLT1IT0	Latin-1	Italian
Borland NLD Latin-1	BLLT1NL0	Latin-1	Dutch
Borland NOR Latin-1	BLLT1NO0	Latin-1	Norwegian
Borland PTG Latin-1	BLLT1PT0	Latin-1	
Borland SVE Latin-1	BLLT1SV0	Latin-1	Swedish
dBASE CSY cp852	DB852CZ0	DOS CODE PAGE 852	dBASE Czech852
dBASE CSY cp867	DB867CZ0	DOS CODE PAGE 867	dBASE Czech867
dBASE DAN cp865	DB865DA0	DOS CODE PAGE 865	dBASE Danish
dBASE DEU cp437	DB437DE0	DOS CODE PAGE 437	dBASE German
dBASE DEU cp850	DB850DE0	DOS CODE PAGE 850	dBASE German850
dBASE ELL GR437	db437gr0	DOS CODE PAGE 437	dBASE Greek
dBASE ENG cp437	DB437UK0	DOS CODE PAGE 437	dBASE English/UK
dBASE ENG cp850	DB850UK0	DOS CODE PAGE 850	dBASE English850/UK
dBASE ENU cp437	DB437US0	DOS CODE PAGE 437	dBASE English/US
dBASE ENU cp850	DB850US0	DOS CODE PAGE 850	dBASE English/US
dBASE ESP cp437	DB437ES1	DOS CODE PAGE 437	dBASE Spanish
dBASE ESP cp850	DB850ES0	DOS CODE PAGE 850	dBASE Spanish850
dBASE FIN cp437	DB437FI0	DOS CODE PAGE 437	dBASE Finnish
dBASE FRA cp437	DB437FR0	DOS CODE PAGE 437	dBASE French
dBASE FRA cp850	DB850FR0	DOS CODE PAGE 850	dBASE French850
dBASE FRC cp850	DB850CF0	DOS CODE PAGE 850	dBASE Canadian-French850

dBASE FRC cp863	DB863CF1	DOS CODE PAGE 863	dBASE Canadian-French863
dBASE HUN cp852	db852hdc	DOS CODE PAGE 852	dBASE Hungarian
dBASE ITA cp437	DB437IT0	DOS CODE PAGE 437	dBASE Italian
dBASE ITA cp850	DB850IT1	DOS CODE PAGE 850	dBASE Italian850
dBASE NLD cp437	DB437NLD0	DOS CODE PAGE 437	dBASE Dutch
dBASE NLD cp850	DB850NLD0	DOS CODE PAGE 850	dBASE Dutch850
dBASE NOR cp865	DB865NO0	DOS CODE PAGE 865	dBASE Norwegian
dBASE PLK cp852	db852po0	DOS CODE PAGE 852	dBASE Polish852
dBASE PTB cp850	DB850PT0	DOS CODE PAGE 850	dBASE Brazilian Portuguese 850
dBASE PTG cp860	DB860PT0	DOS CODE PAGE 860	dBASE Brazilian Portuguese 860
dBASE RUS cp866	db866ru0	DOS CODE PAGE 866	dBASE Russian
dBASE SLO cp852	db852sl0	DOS CODE PAGE 852	
dBASE SVE cp437	DB437SV0	DOS CODE PAGE 437	dBASE Swedish
dBASE SVE cp850	DB850SV1	DOS CODE PAGE 850	dBASE Swedish850
dBASE THA cp437	db437th0	DOS CODE PAGE 437	dBASE Thai
dBASE TRK cp857	DB857TR0	DOS CODE PAGE 857	dBASE Turkish
Hebrew dBASE	dbHebrew		dBASE Hebrew
Oracle SQL WE850	ORAWE850	DOS CODE PAGE 850	Multilingual Western Europe
Paradox 'ascii'	ascii	DOS CODE PAGE 437	Binary
Paradox 'hebrew'	hebrew		Hebrew
Paradox 'intl'	intl	DOS CODE PAGE 437	Multilingual Western Europe
Paradox 'intl' 850	intl850	DOS CODE PAGE 850	Brazilian Portuguese, French Canadian
Paradox 'nordan'	nordan	DOS CODE PAGE 865	Norwegian/Danish (Paradox 3.5)
Paradox 'nordan40'	nordan40	DOS CODE PAGE 865	Norwegian/Danish (Paradox 4.0, 5.0, 5.5, 7.0)
Paradox 'swedfin'	swedfin	DOS CODE PAGE 437	Swedish/Finnish
Paradox 'turk'	turk		Turkish
Paradox ANSI HEBREW	ANHEBREW		HebrewAnsi
Paradox Cyrr 866	cyrr	DOS CODE PAGE 866	Cyrillic
Paradox Czech 852	czech	DOS CODE PAGE 852	Czech852
Paradox Czech 867	cskamen	DOS CODE PAGE 867	Czech867
Paradox ESP 437	SPANISH	DOS CODE PAGE 437	Spanish
Paradox Greek GR437	grcp437	DOS CODE PAGE 437	Greek
Paradox Hun 852 DC	hun852dc	DOS CODE PAGE 852	Hungarian
Paradox ISL 861	iceland	DOS CODE PAGE 861	Icelandic
Paradox Polish 852	polish	DOS CODE PAGE 852	Polish
Paradox Slovene 852	slovene	DOS CODE PAGE 852	Slovene
Paradox Thai 437	thai	DOS CODE PAGE 437	Thai

Pdox ANSI Cyrillic	ancyrr	ANSI	Compatible with Paradox "cyrr"
Pdox ANSI Czech	anczech	ANSI	Compatible with Paradox "czech"
Pdox ANSI Greek	angreek1	ANSI	Compatible with Paradox "greek"
Pdox ANSI Hun. DC	anhundc	ANSI	Compatible with Paradox "hung"
Pdox ANSI Intl	ANSIINTL	ISO8859.1 (ANSI)	Compatible with Paradox "intl"
Pdox ANSI Intl850	ANSII850	ISO8859.1 (ANSI)	Compatible with Paradox "intl850"
Pdox ANSI Nordan4	ANSINOR4	ISO8859.1 (ANSI)	Compatible with Paradox "nordan40"
Pdox ANSI Polish	anpolish		Compatible with Paradox "polish"
Pdox ANSI Slovene	ansislov		Compatible with Paradox "slovene"
Pdox ANSI Spanish	ANSISPAN	ISO8859.1 (ANSI)	Compatible with Paradox "SPANISH"
Pdox ANSI Swedfin	ANSISWFN	ISO8859.1 (ANSI)	Compatible with Paradox "swedfin"
Pdox ANSI Thai	anthai		Compatible with Paradox "thai"
Pdox ANSI Turkish	ANTURK		Compatible with Paradox "turk"
SQL Link ROMAN8	BLROM800	Roman-8	Binary
Sybase SQL Dic437	SYDC437	DOS CODE PAGE 437	Sybase 437 dict. with case-sensitivity
Sybase SQL Dic850	SYDC850	DOS CODE PAGE 850	Sybase 850 dict. with case-sensitivity

Default language driver settings are defined in the BDE configuration file (IDAPI.CFG). You can change these defaults using the BDE Configuration Utility. If you can be certain that your application will not need to support character sets other than Windows ANSI, you can reduce the need for extra processing, such as character translation, by changing your language driver defaults to ANSI-based ones. Additionally, if your application will be working exclusively with data from a particular SQL server, it may be advantageous to reset local language driver defaults to the driver you have associated with the SQL database alias.

When a Paradox or dBASE table is created, the default language driver's identification is stored in the table file header. The default language driver setting can be overridden at creation by specifying optional parameters to [DbiCreateTable](#). The table's language driver will be used by BDE functions that manipulate character data, such as [DbiSortTable](#), [DbiAddIndex](#), and a variety of other functions such as [DbiGetNextRecord](#), [DbiGetPriorRecord](#), [DbiSetRange](#), [DbiSetToKey](#), [DbiInsertRecord](#), and so on. A table's language driver can be changed after creation by using [DbiDoRestructure](#). [DbiDoRestructure](#) does not translate table data or metadata to the character set of the new language driver, in cases where the character sets of the old and new language drivers differ. However, table data is transliterated between differing character sets by [DbiBatchMove](#).

For SQL table driver types, such as Sybase or Oracle, language driver settings are defined with the

database alias in the BDE configuration file (IDAPI.CFG). All of the above operations when applied to SQL tables are governed by this setting.

To obtain the name of a table's language driver or the name of the default LD for a specific table driver, use the function DbiGetLdName.

The following table summarizes the default settings for language drivers.

Language driver for	Default Setting
System	System language driver setting current in IDAPI.CFG.
Paradox driver	Paradox language driver setting current in IDAPI.CFG.
dBASE driver	dBASE language driver setting current in IDAPI.CFG.
Text driver	System language driver.
SQL database	LANGDRIVER setting for this database current in IDAPI.CFG.
SQL drivers	LANGDRIVER setting in DB OPEN section of IDAPI.CFG for this driver.
Table cursor	Language driver associated with this table at the time it was created.
Database handle	Language driver of the database this handle represents.

Note: You can override all defaults by using DbiSetProp.

Date, time, and number formats

Default settings for date, time, and number formats are defined in the Registry. (See the Date, Time, and Number pages in the BDE Configuration Utility.) These settings are used by BDE anywhere conversion must be performed between strings (such as "15/12/94") and internal representations of dates, times, and numbers (for example, when parsing a date found in a query string). For best results, the BDE default settings should be kept in synchronization with the Windows Control Panel. The default settings can be overridden at any time with [DbiSetDateFormat](#), [DbiSetTimeFormat](#), and [DbiSetNumberFormat](#).

Credits

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Niel Henry

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