4th Dimension®

Discover 4th Dimension
Mac OS and Windows Versions

4th Dimension
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Discover 4th Dimension
Version 6.0 for Mac™ OS and Windows®

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Preface

Welcome to the 4th Dimension.

From the time of its release in the mid-1980's, 4D has been winning awards from the computer industry press and winning praise from users for its power, elegance, and simplicity. Millions of users and developers all around the world are using 4th Dimension to store data that is vital to their organizations.

What is the 4th Dimension? Albert Einstein, the great physicist, helped the world to see that Time is the fourth dimension. The name of our product is not a coincidence. Throughout six major versions and several dozen updates, the authors and publishers of the 4D family of products have held steadfastly to our mission—giving you, the user, the power to accomplish more, in less time.

As the first major graphical user interface relational database product on the Macintosh, 4th Dimension pioneered the concept of RAD—Rapid Application Development. Now, with Version 6, we have taken Windows® and Macintosh™ RAD to a whole new level.

The tutorials in *Discover 4th Dimension* use the example of a personal music collection to build and work with a database. In the next two hours, using 4th Dimension and the tutorials, you will do all of the following:

- Create a relational database to track your personal music collection.
- Create custom Input and Output forms to view the data.
- Import several hundred records of sample data.
- Create and save your own custom queries.
- Create a custom report to print a list of your albums.
- Design your own labels for your CD holders.
- Print three-dimensional charts to analyze your collection by type of music.
- Create a multi-window, custom menu environment for your database.
- Create Web-enabled forms for viewing the data on the Web.
- Publish the database on the World Wide Web.

What is most remarkable is the fact that you will do all of this in 4th Dimension, without using any add-on products, and by writing only two lines of programming code!

After you finish the tutorials, you will also find out how you can add even more power to the application—debug it; cross-reference it; compile it; serve it to multiple users; embed word processing, spreadsheet, and drawing functions into it; and connect it to back-end SQL databases—all with tools from the 4D family of products.

Welcome to the 4th Dimension.

About Discover 4th Dimension

The four chapters in this manual are tutorials—step-by-step explanations—that show you how to use 4th Dimension to create useful databases. As you work through these tutorials, you will become familiar with many of the major features of 4th Dimension.

How to Use the Tutorials

It should take you no more than two hours to work through all the chapters. When you have finished *Discover 4th Dimension*, you can start building your own 4th Dimension databases.

You should work through the tutorials in order; the work you do in each chapter prepares the database for the work that you will do in the next. Each chapter begins with an estimate of how long it will take you to complete the work in it. Feel free to stop at the end of any chapter, take a break, and begin the next chapter by opening the database on which you have been working.

Tutorial Database

We have provided "progressive copies" of the tutorial database. The copy labeled "Chapter2" picks up at the beginning of Chapter 2; "Chapter3" picks up at the beginning of Chapter3; and "Chapter4" picks up at the beginning of Chapter 4. If you misplace your work in the middle of the tutorial, you don't have start over; just launch the appropriate progressive copy and continue to follow the tutorial.

Assumptions

This manual assumes that you have already installed 4th Dimension as described in the *4th Dimension Installation Guide*, and that you are ready to create a new database of your own.

Conventions

This manual uses certain conventions to help you understand the material.

Steps and Explanations

The tutorials provide specific steps for you to follow, as well as general information that explains 4th Dimension. The format for steps and explanations looks like this:

1 **A numbered step tells you what to do.**

Following the numbered step, there may be a paragraph that offers an explanation or a comment.

2 **Type “Smith” in the Last Name field.**

A numbered step can contain the following special notations:

Notation	Example	Meaning
Quotation Marks	**Type “Smith”**	When a numbered step asks you to type something, the characters you should type are enclosed in quotation marks.Type exactly what is enclosed in the quotation marks, including any spaces or punctuation; however, do not type the quotation marks.
Underline	**in the Last Name field.**	The underlined text tells you where to do something. You should locate that object or menu on the screen, and do what the step describes.

Database Terms

All table names are shown in brackets in the text to help distinguish them from the names of fields, forms, and other items. For instance, the Albums table is written as the [Albums] table.

Other Notation

The tutorials also use the following explanatory notes:

Note Text emphasized like this provides annotations and shortcuts that will help you use 4th Dimension more productively.

4D Server Throughout the manual, 4th Dimension and 4D Server/4D Client are referred to simply as 4th Dimension. Differences between the operation of the two products are explained in 4D Server notes, which provide information about using 4D Server/4D Client. This information is provided only when the operation of 4D Server/4D Client differs from that of 4th Dimension.

Notes like this alert you to important pieces of information and alert you to situations where data might be lost.

In this manual, the names 4th Dimension and 4D are used interchangeably.

Cross-Platform Considerations

This manual explains the use of 4th Dimension on both the Windows® and Mac™OS (Macintosh and Power Macintosh) platforms. Although the concepts and functionality of both versions of 4th Dimension are nearly identical, the manual addresses any differences where necessary. Such differences may include the graphical user interface and keyboard commands.

The screen shots illustrate 4th Dimension in the Windows 95 environment. The two versions of the same screen are only presented if there are any major differences between them.

This manual assumes that you are familiar with basic Macintosh or Windows operations, such as selecting objects, choosing menu items, clicking, dragging, and so on. For complete information and instructions, refer to the user guide or the on-line help that came with your computer.

1 Creating a Database with 4D

Estimated time to complete: 30 minutes

In this chapter, you will learn how to design a database using 4th Dimension. You will also learn some of the database terminology, such as table, field, query, and index. When you have finished this chapter, you will know how to do the following:

- Create a table, create fields, and change the properties of fields.
- Create default input and output forms.
- Create standard choice lists.
- Enter new records and modify existing records.
- Import records from a document on disk.
- Find records in your database.
- Index fields to improve search performance.

This chapter assumes that you have already installed 4th Dimension as described in the *4th Dimension Installation Guide*, and that you are ready to create a new database of your own.

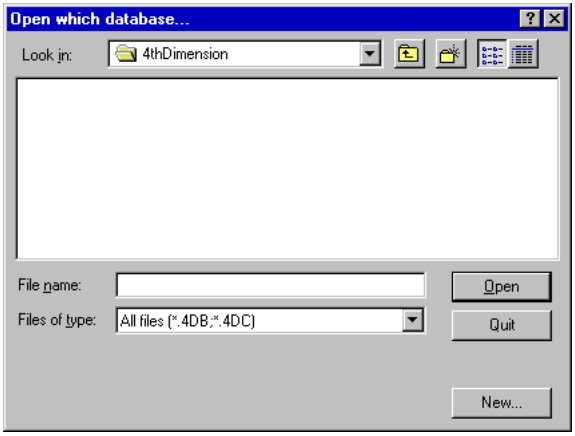
Creating a New Database

► To create your Music Collection database in 4th Dimension.

1 Launch 4D.exe (Windows) or 4th Dimension 6.0 (Macintosh).

You can double-click 4th Dimension, or select the 4th Dimension application and choose Open from the File menu.

4D displays the operating system's standard Open File dialog.



2 Click the New... button to create a new database.

4D prompts you to name your new database.

3 Type the file name "MyMusic".

4 Click the Save button.

4D prompts you for the name of the data file, and defaults to the name "MyMusic.4DD" on Windows and "MyMusic.data" on Macintosh.

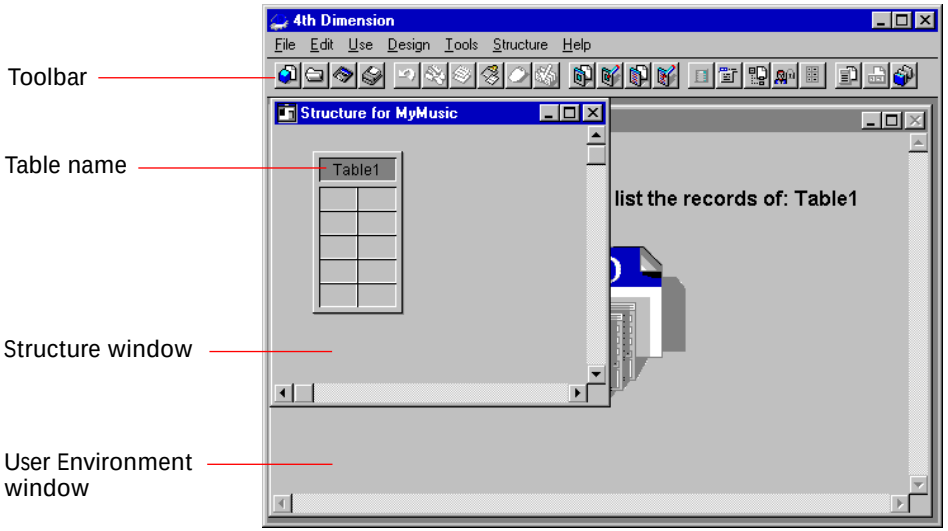
Your 4th Dimension database will be composed of three files on Windows and two files on Macintosh.

Macintosh	Windows	Description
MyMusic	MyMusic.4DB	Structure file containing forms, tables, methods
—	MyMusic.RSR	Part 2 of the structure file on Windows
MyMusic	MyMusic.4DD	The data file containing data and indexes

5 Click the Save button.

You are now ready to begin building your database. When you create a new database, as you have done here, 4th Dimension opens in the Design environment and the User environment simultaneously.

The structure window—part of the Design environment—is the frontmost window on the screen. This is the window in which you create the structure (the tables and fields) of your database.



As you work through the exercises in this manual, you will become familiar with both the Design and User environments and discover how easy it is to switch between them. For now, we will concentrate on the Design environment.

Creating a Table

Now you are ready to create your database structure. In the structure window, note that 4th Dimension has created a default table and named it Table1.

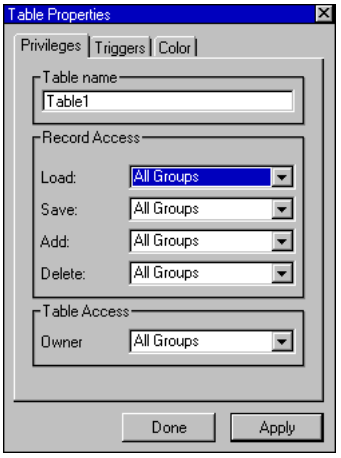
Naming the Table

This first table will store album information, so you should rename the table to something more descriptive of its contents. We will call this first table [Albums].

► To change the name of this table to Albums.

1 Double-click the table name Table1 in the Structure window.

The Table Properties dialog box appears.



2 Highlight the name Table1 and replace it with the name "Albums."

For information about the other options in the Table Properties dialog box, see the *4th Dimension Design Reference*.

3 Click the Apply button to save your changes.

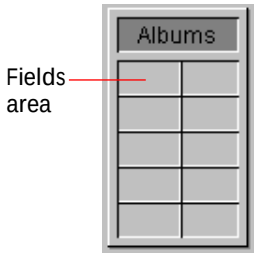
4 Click the Done button to close the Table Properties dialog box.

The structure window displays the renamed table. You are now ready to create the fields for this table.

Creating Fields

Let's assume that you want to keep track of the album title, musician's name, format (CD, tape, etc.), music category (jazz, rock, etc.), year recorded, date purchased, purchase price, and notes. In the case of classical albums, you also want to enter the name of the orchestra that performed the piece on that album.

► To create fields:



1 Double-click the first box in the Fields area of the [Albums] table.

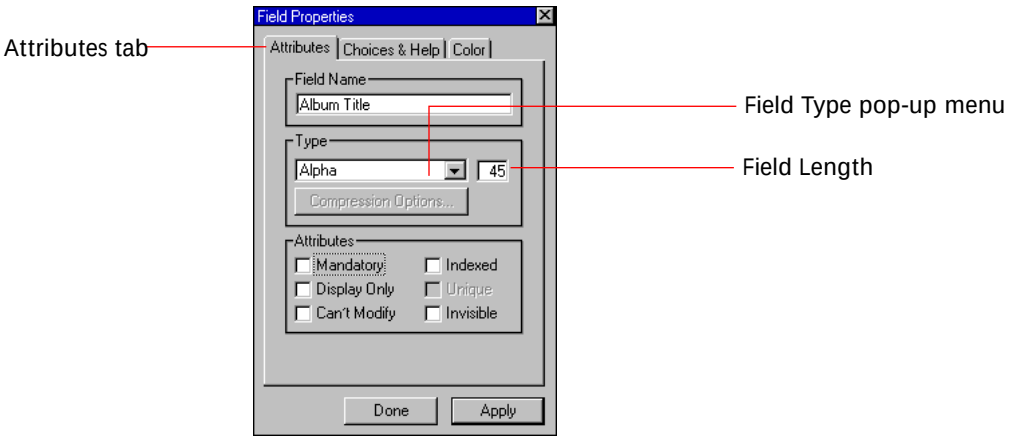
The Field Properties dialog box appears, with the Attributes tab window showing. The default name of this first field is Field1. We will rename this first field "Album Title."

2 Change the field name to "Album Title."

3 Make sure that the field type is Alpha.

4 Change the field length to 45 characters.

Your Field Properties dialog box looks like this:



Later in this tutorial, we will explain the other options in the Field Properties dialog box. For additional information about field properties, see the *4th Dimension Design Reference* manual.

The Type pop-up menu tells 4th Dimension what kind of data to store in the field. Note that 4D assumes the first field to be type Alpha, which can store letters, numbers, and special characters—often called alphanumeric information. An Alpha field may contain between 2 and 80 characters.

5 Click the Apply button.

When you click the Apply button, 4th Dimension saves the field definition information from Field1 and automatically adds a new field with the default name of Field2.

6 Create the remaining fields for the [Albums] table.

Each time you create a field, you will do the following:

- Type the field name.
- Choose the field type from the pop-up menu.
- Change the field length, if applicable.
- Click the Apply button.

Field name	Field type and length	Type of data you can store in the field
Musician	Alpha 45	Alphanumeric Characters (Maximum 45)
Format	Alpha 15	Alphanumeric characters (maximum 15)
Music Category	Alpha 15	Alphanumeric characters (maximum 15)
Year Recorded	Integer	Whole numbers (no decimals)
Date Purchased	Date	Dates
Purchase Price	Real	Numbers with decimals
Notes	Text	Alphanumeric characters (maximum 32,767)
Performed by	Alpha 45	Alphanumeric characters (maximum 45)

7 Click the Done button.

When you click Done, 4th Dimension closes the Field Properties dialog box.

In the structure window, the table definition for [Albums] now looks like this:

You are now ready to enter the User environment and test your table by actually entering and modifying data.

Entering and Modifying Data

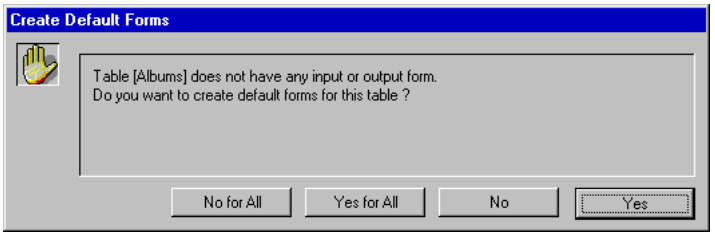
We now need a way to get data into the database. In this tutorial, we will use the default input and output forms that 4D creates.

Creating Default Input and Output Forms

► To enter data in a record:

1 Go to the User environment by choosing User in the Use menu.

The following dialog appears:



2 Click the Yes button.

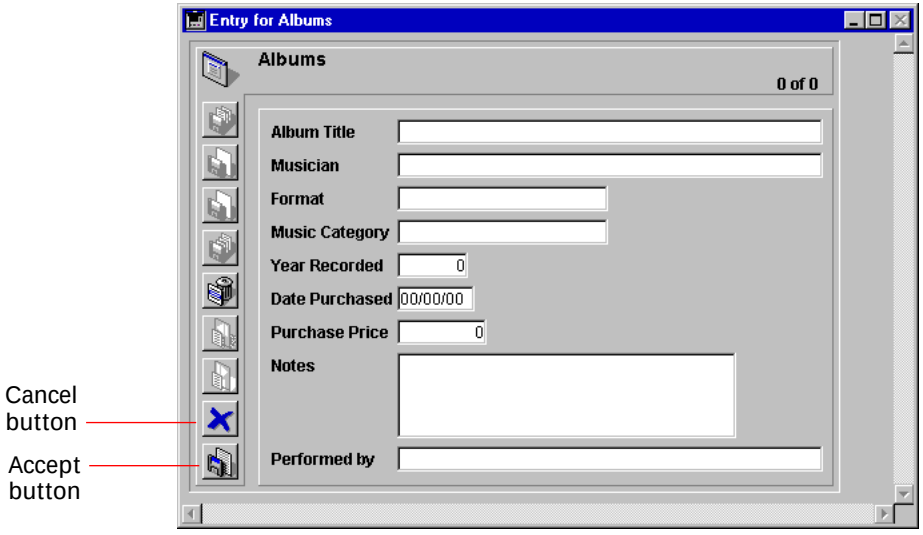
After 4th Dimension creates automatic forms for you, your screen looks like this:

The Design environment's Structure window is hidden behind the User environment window, but the Design environment is still running and available in the background. 4th Dimension is a "multi-process" application that allows you to have multiple environments open at the same time.

You can have the Design environment, User environment, and several different Custom Menu environments all open at the same time. This feature is helpful for Rapid Application Development (RAD), because there is no time lost in going from "development mode" to "testing mode" to "runtime mode."

3 Choose New Record in the Enter menu.

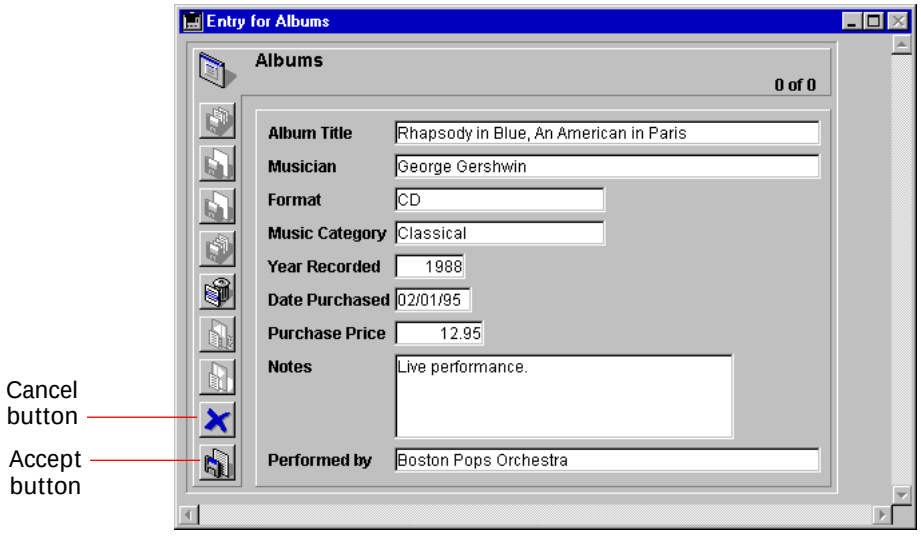
The input form for the [Albums] table appears; the cursor is already in the Album Title field.



4 Enter the following data.

Field Name	Data
Album Title	Rhapsody in Blue, An American in Paris
Musician	George Gershwin
Format	CD
Music Category	Classical
Year Recorded	1988
Date Purchased	2/1/95
Purchase Price	12.95
Notes	Live performance
Performed by	Boston Pops Orchestra

Your screen now looks like this:



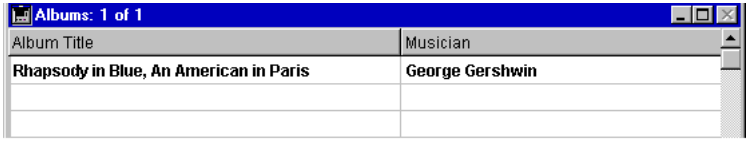
5 Click the Accept button.

Clicking Accept saves the record.

4D brings up a blank record for you to continue entering data. When you save a new record that you just created in the User environment, 4D always assumes that you want to continue entering new records.

6 Click the Cancel button.

4D takes you back to the [Albums] Output form, where you see your new record listed.



Congratulations! You have created the first record in your album collection. Now, let's see what we can do to automate your data entry.

Automating Data Entry Using Standard Choice Lists

In a database, there are usually fields that have a limited number of possible entries. You can automate and standardize data entry by associating standard choice lists with these types of fields. In your [Albums] table, two fields fit that category:

Field	Possible Entries
Music Category	Jazz, Rock, Classical, Blues, Soul, Easy Listening, Country
Format	CD, Cassette, Video, LP Record

Let's set up standard choice lists corresponding to the fields [Albums]Music Category, [Albums]Format.

Creating Standard Choice Lists

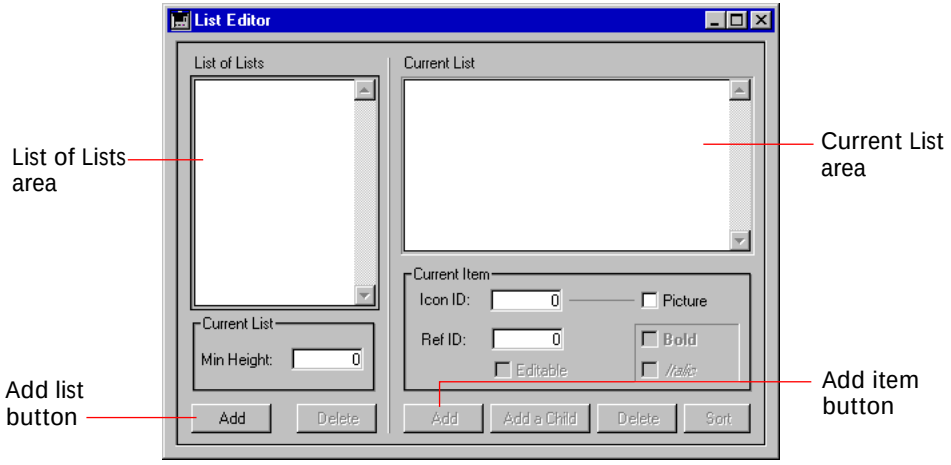
► To create the Music Category choice list:

1 Go to the Design environment.

To return to the Design environment, click on any Design window or choose Design in the Use menu.

2 Choose List Editor... in the Tools menu.

The List Editor appears.



The List of Lists area lets you create choice lists. The Current List area lets you add items to a choice list.

There are two Add buttons on this screen. The Add button in the Lists of Lists area (the Add list button) adds a new choice list; the Add button in the Current List area (the Add item button) adds an item to an existing choice list.

3 Click the Add button in the List of Lists area.

4D creates a new choice list; the cursor is in the List of Lists text area.

4 Type the name "Music Category."

5 Click the Add button in the Current List area.

4D creates a new list item; the cursor is in the Current List text area.

6 Type the new item "Jazz."

7 Continue adding list items:
Rock, Classical, Blues, Soul, Easy Listening, Country.

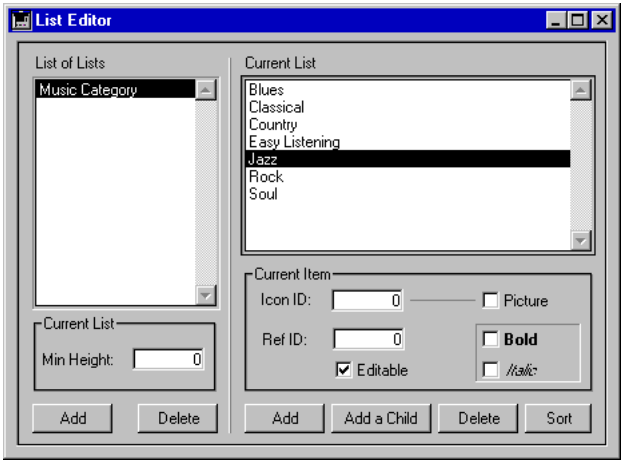
For each new list item, click the Add button in the Current List area and type the name of the item.

Now you can sort the current choice list. We sort choice lists to make them an even more efficient tool for automating data entry.

► To sort the Music Category list:

■ **Click the Sort button**

4D sorts the Music Category choice list items in alphabetical order. The List Editor dialog box now looks like this:



Now you can create and sort standard choice lists for the other category: Format.

► To create and sort the Format choice list:

1 **Click the Add list button in the List of Lists area.**

4D creates a new choice list; the cursor is in the List of Lists text area.

2 **Type the name "Format."**

3 **Click the Add item button in the Current List area.**

4D creates a new list item; the cursor is in the Current List text area.

4 **Type the new item "CD."**

5 **Continue adding list items:**
Cassette, LP Record, Video.

For each new list item, click the Add button in the Current List area and type the name of the item.

6 **Click the Sort button.**

4D sorts the Format choice list items in alphabetical order.

For the sake of convenience, we will now create one more choice list that will be used in the next tutorial. This is the Nationality list.

► To create and sort the Nationality choice list, just repeat the process:

1 **Click the Add list button in the List of Lists area.**

2 **Type the list name "Nationality."**

3 **Click the Add item button in the Current List area.**

4 **Type the new item "USA."**

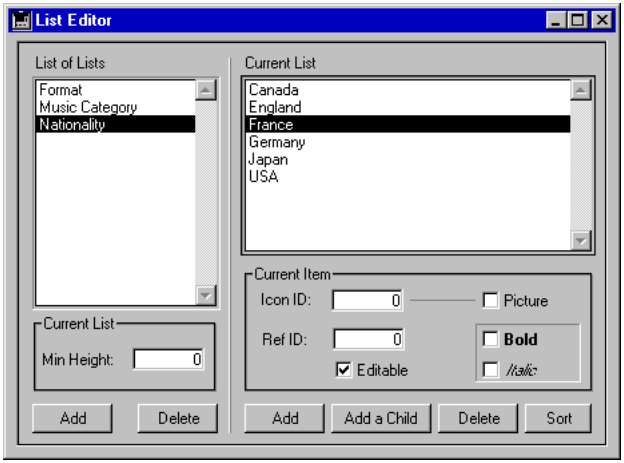
5 **Continue adding list items:**
Canada, France, England, Japan, Germany.

For each new list item, click the Add button in the Current List area and type the name of the item.

6 **Click the Sort button.**

4D sorts the Nationality choice list items in alphabetical order.

The List Editor now looks like this:



7 Click the Close Box to close the dialog box.

On the Macintosh, the close box is on the top left of the dialog box; on Windows, the close box is on the top right.

You have created three standard choice lists. Your next step is to associate the choice lists with fields (objects) in your database.

Associating a Choice List with a Field

After you associate a choice list with a field, 4D will automatically present the choice list any time you try to enter data into that field in the Input form.

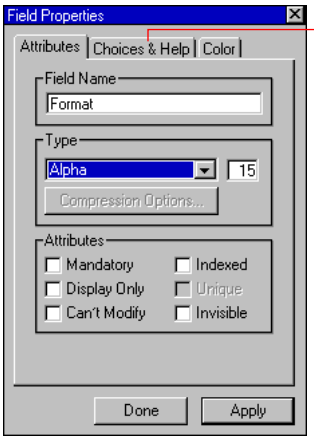
► To associate a choice list with a field:

1 Click on the Database Structure window to make it active.

You can also choose Database Structure in the Tools menu.

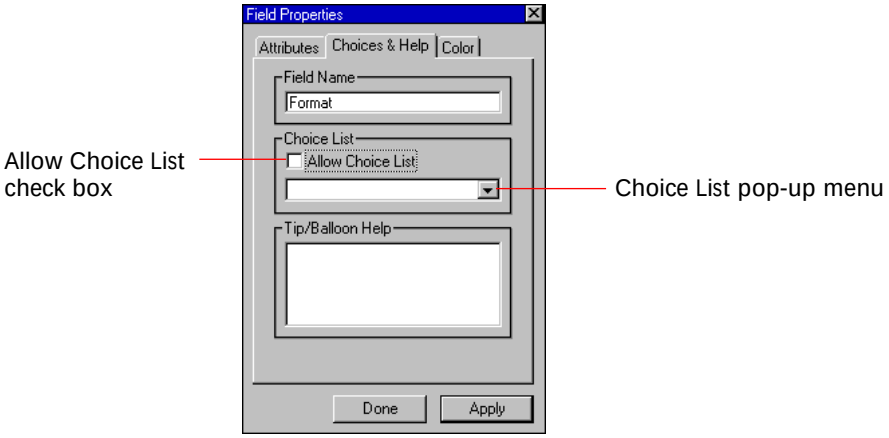
2 Double-click the field Format.

The Field Properties dialog box appears. Note that the Attributes tab is in the front.



3 Click the Choices & Help tab.

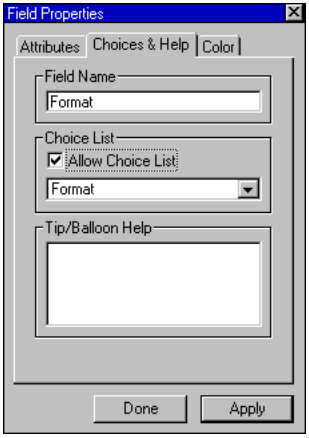
The Choices & Help window now appears in the Field Properties dialog box.



4 Click the Allow Choice List check box.

5 Choose Format from the Choice List pop-up menu.

The Field Properties dialog box now looks like this:



6 **Click the Apply button.**

4D saves your changes. Leave the Field Properties dialog box open; you will use it again in the next step.

7 **Click on the Music Category field in the Structure window.**

Note that the Field Properties dialog box is updated; it now indicates that you are modifying the properties of the Music Category field.

8 **Click the Allow Choice List button.**

9 **Choose Music Category from the Choice List pop-up menu.**

10 **Click the Apply button.**

11 **Click the Done button.**

You have now associated choice lists with the fields Music Category and Format. Whenever you use those fields in data entry, searching, or sorting, their associated choice lists will appear and let you make a selection.

REMINDER: *We will associate field with the Nationality choice list in a later tutorial.*

Entering Data with Choice Lists

Let's enter a record using the choice lists to speed up and simplify data entry. Using choice lists saves time, eliminates typing errors, and standardizes the spelling of data entry items. This makes the information easier to find later when you want to search for it.

► To enter data using choice lists:

1 Go to the User environment.

Click on the User Environment window or choose User in the Use menu.

2 Choose New Record in the Enter menu.

The [Albums] Input form appears.

3 Enter the following data:

Field Name	Data
Album Title	Sound of Jazz
Musician	Lionel Hampton
Format	CD
Music Category	Jazz
Year Recorded	1988
Date Purchased	12/14/96
Purchase Price	12.00
Notes	Traditional Jazz Vibraphone ("vibes")

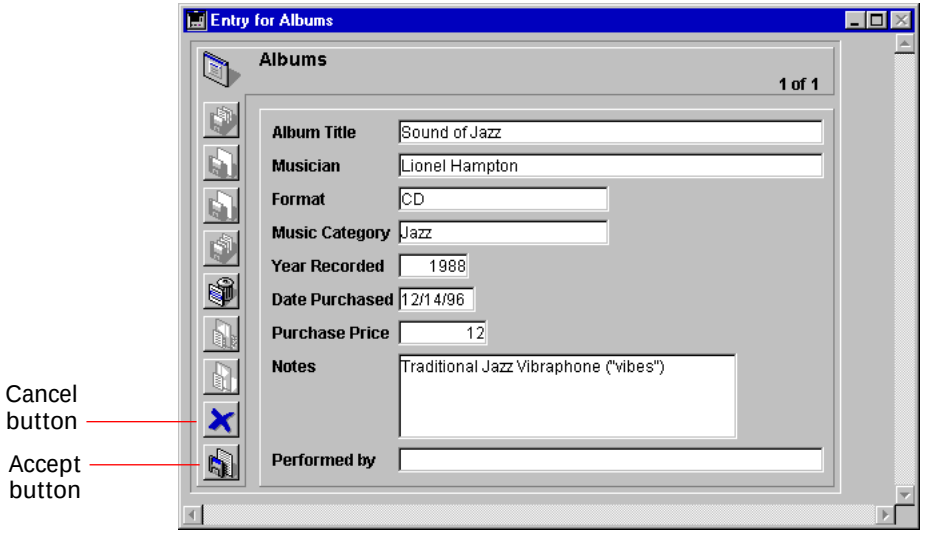
Each time you move the cursor to a field that has an associated choice list, the list automatically appears in the middle of your screen. For example, when you go to the Music Category field, the following choice list appears:

There are two ways to select an item in the choice list:

- Type the first letter (or letters) of the name of the item you want to enter. The item is highlighted. Click the OK button.
- Double-click the item in the list.

After you select the item, it is automatically entered into the field

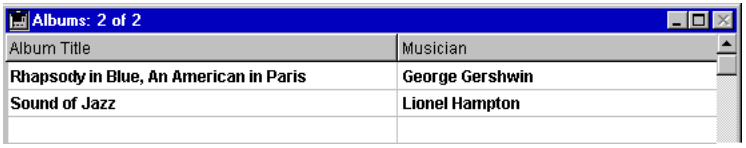
Your [Albums] Input form looks like this:



4 Click the Accept button.

5 Click the Cancel button to return to the [Albums] Output Form.

You now have two records in your database.



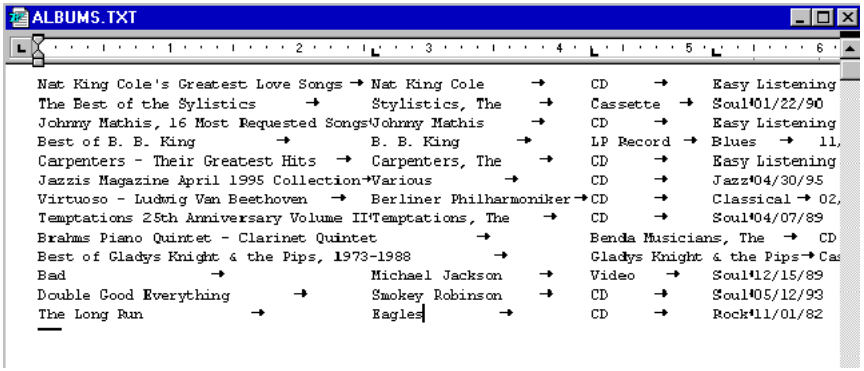
Congratulations! You have created standard choice lists to help you enter and modify database records. Now, let's see what we can do to further expedite your data entry.

Entering Data by Importing Records from a Document

If you are creating all of your data for the first time, you can enter it quickly and easily with the Input form and choice lists. However, there is another way to get data into 4D—by importing it. This can be especially useful if you have a great deal of data.

Suppose you have been keeping track of your album collection in a spreadsheet. You can save your data from the spreadsheet as a text file, and import the text file into 4D. For the purposes of this tutorial, we have already created a text file that you can import. The name of the file is Albums.txt.

Here is how the Albums.txt text file looks in a text editor:



Note Depending on the text file, the albums may not appear in the same order as shown.

The text file contains one record for each album. Within each record, the fields are separated by tabs and the end of the record is indicated by a carriage return. You can import files from text and several other formats, directly into 4D.

► To import data from a text file:

1 Close the Albums.txt file.

If you were viewing the file with a text editor, be sure to close the file before attempting to use the file to import the information into 4D.

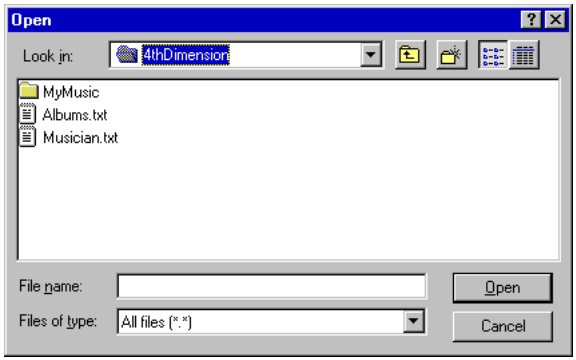
2 Choose Import Data... in the File menu.

The operating system's standard Open File dialog appears.

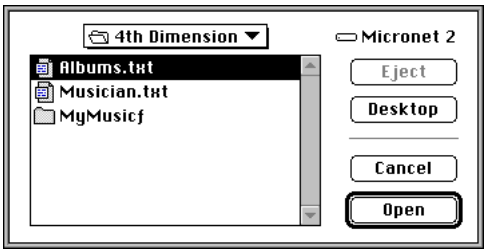
3 Navigate to the 4th Dimension directory.

During installation of 4th Dimension on your hard drive, the 4D Installer created a file called Albums.txt.

Windows



Macintosh

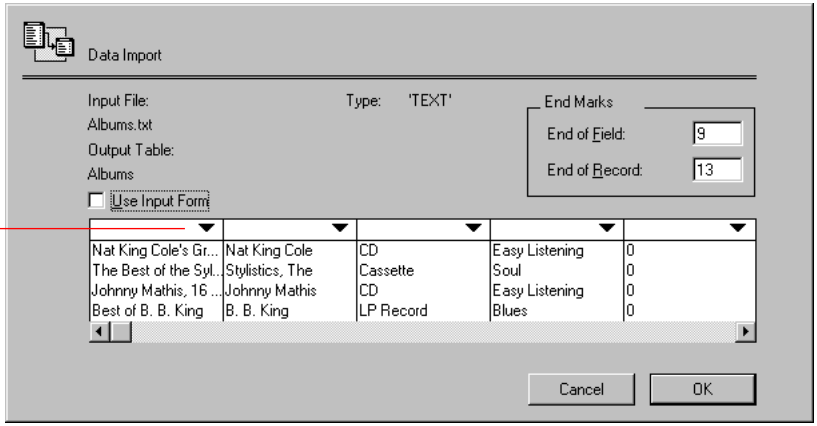


4 Double-click the Albums.txt icon to open the file.

There is another file, Musician.txt, in the same directory. Ignore the Musician.txt file for now; we will use it later.

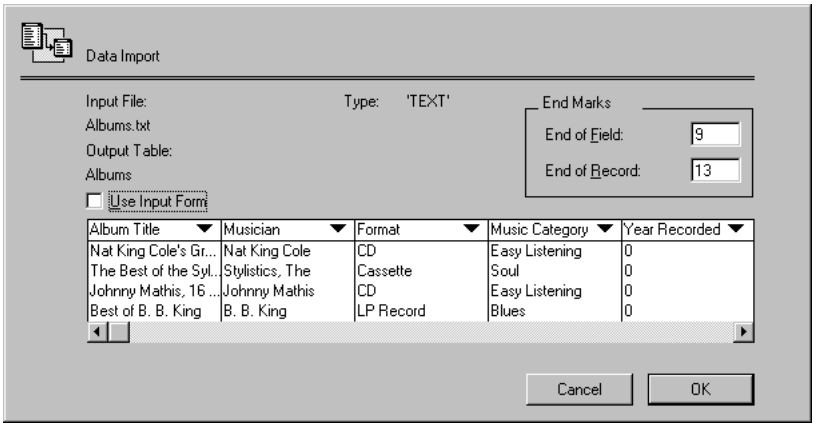
The 4D Import Wizard appears, showing you the first few records so you can align columns in the import file with fields in your database.

Pop-up menu for the first field



5 Hold down the Shift key and choose Album Title in the pop-up menu above the first column of text.

When you hold down the Shift key and choose a field, the Import Wizard assumes that the data in your import file is in the same order as the fields in your database. If some of the field choices are not correct, you can easily go to each pop-up list and change the field selection.



For help with specific importing challenges, see the *4th Dimension User Reference Manual*.

6 Click the OK button.

4D returns to the [Albums] Output form, which displays the 19 records that you just imported. Note that the top of the window now says "Albums: 19 of 21," which means that you now have 21 records in your database.

7 Choose Show All in the Queries menu.

The [Albums] Output form lists all 21 records in the [Albums] table.

Album Title	Musician
Rhapsody in Blue, An American in Paris	George Gershwin
Season for Love	London Symphony Orchestra
Johnny Mathis: In The Still Of The Night	Johnny Mathis
Lucille and Other Classics by Kenny Rogers	Kenny Rogers
Johnny Mathis, 16 Most Requested Songs	Johnny Mathis
Sound of Jazz	Lionel Hampton
Nat King Cole's Greatest Love Songs	Nat King Cole
Virtuoso - Ludwig Van Beethoven	Berliner Philharmoniker
Kool & The Gang Spin Their Top Hits	Kool & The Gang
Jazzis Magazine April 1995 Collection	Various
The Long Run	Eagles
Whitney Houston	Whitney Houston
Double Good Everything	Smokey Robinson
Best of B. B. King	B. B. King
Brahms Piano Quintet - Clarinet Quintet	Benda Musicians, The

Congratulations! You have imported records from a text file into your database.

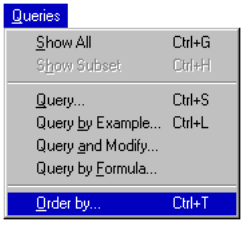
Finding Records in Your Database

Sorting Records in a Table

As you add more records to the database, you will notice that finding records becomes more difficult. Suppose, for example, that you have 150 Album records in your database. If your monitor can display 15 records per screen when displaying the Output form, you might have to scroll through as many as 10 screens to find a specific album.

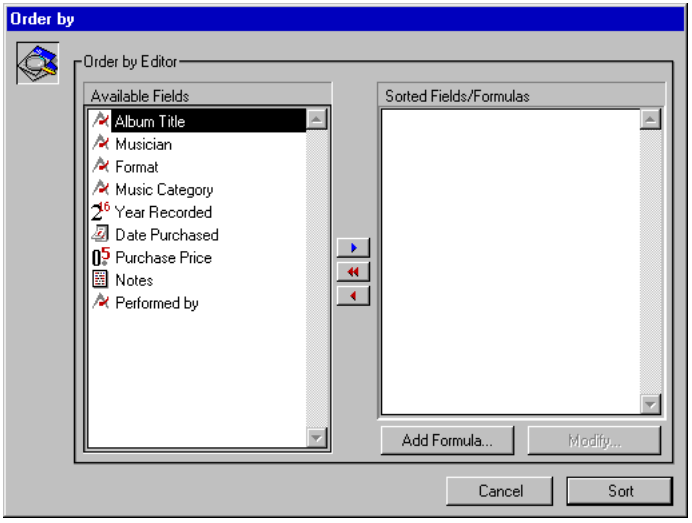
To make it faster and easier to find information in a large table, 4th Dimension allows you to arrange the records in alphabetical, numerical, or date order. When you arrange the records in this way, you are putting the records into Sorted Order.

► To sort records:



1 Choose Order by... in the Queries menu.

The Order By Editor appears.



2 Double-click the field Musician in the Available Fields list.

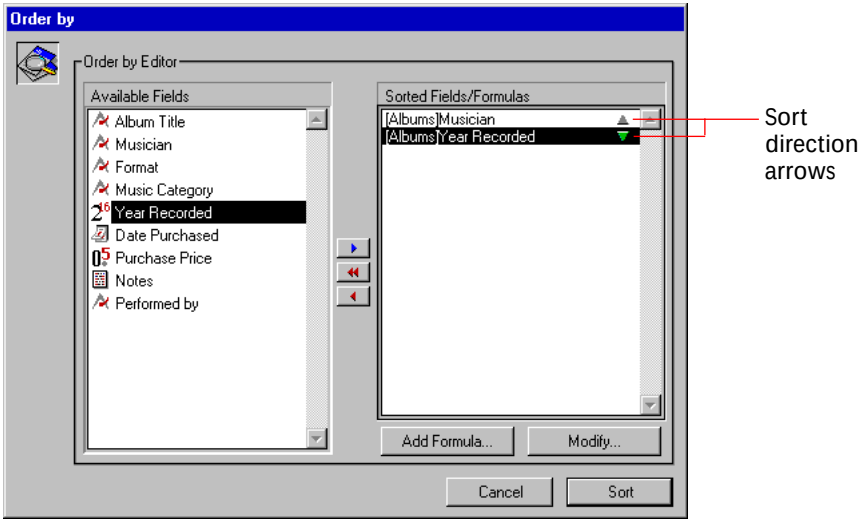
The field appears in the Sorted Fields/Formulas list.

3 Double-click the field Year Recorded.

The field appears in the Sorted Fields/Formulas list.

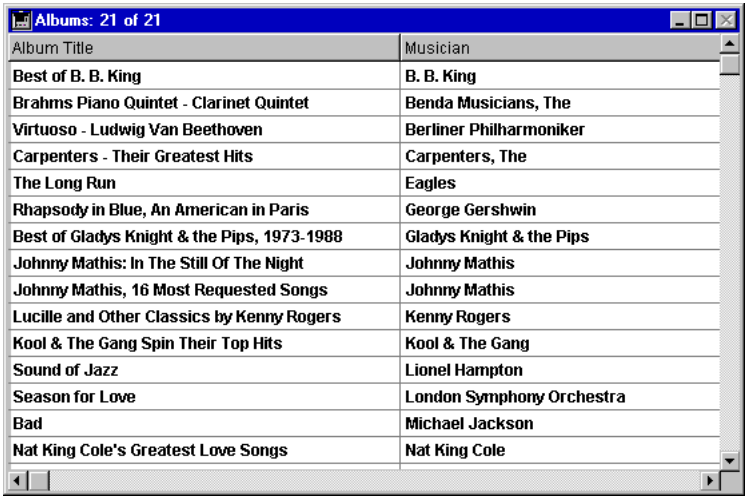
4 In the Sorted Fields/Formulas list, click once on the Sort Direction arrow for the Year Recorded field.

The arrow changes to point downward. You have instructed 4D to sort your albums alphabetically by Musician, with the musician's most recent albums first in the list. The Order by... Editor looks like this:



5 Click the Sort button.

The records are sorted alphabetically by musician, with the musician's most recent albums first.



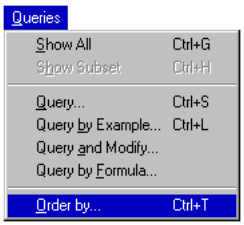
Although you cannot see the Year Recorded field on this screen, 4D also used that field in the sort.

For more information about the options in the Order By... Editor, see the *4th Dimension Design Reference Manual*.

Querying by Example

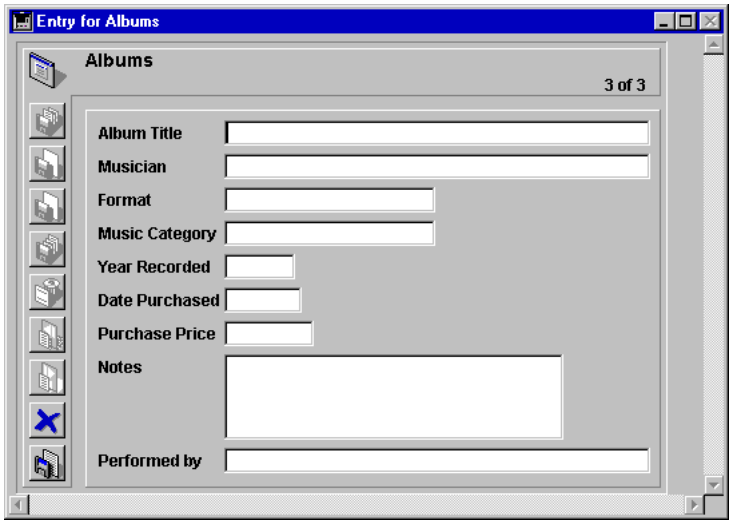
Sorting the records and then scrolling to find a particular album works very well for a few dozen records, but it does not work well for larger numbers of records. As your music collection grows and the number of records increases into the hundreds, you will need a better way to find a particular record. 4D allows you to search for a particular record by bringing up a Query screen that resembles your data entry screen. You type in an example of the information that you're looking for, and 4D looks for matching records. That feature is called Query by Example.

► To find records by example:



1 Choose Query by Example... in the Queries menu.

The Query by Example wizard appears.



You will find this wizard very easy to use, because it looks exactly like your input form. You will notice, however, that the cursor is an eye instead of the standard arrow pointer.

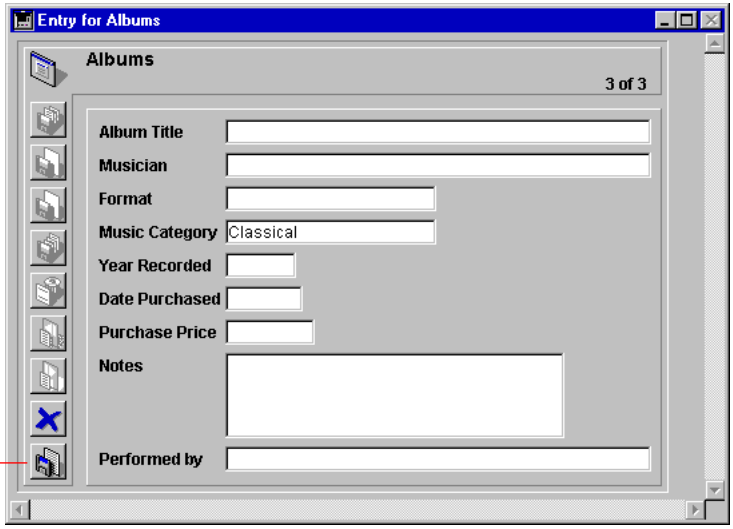
2 Click on the Music Category field.

The Music Category choice list appears.

This demonstrates the advantage of associating a choice list with a field in the structure—any time you enter data into that field or search by that field, the choice list will appear automatically.

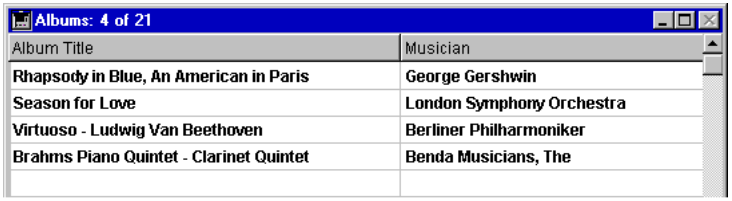
3 Double-click the list item Classical.

Your screen looks like this:



4 Click the Accept button.

4D finds the Classical albums in your collection.



Indexing to Improve Search Performance

As the number of records in your database grows, these queries will become slower and slower, because the database has to look through the records sequentially (one-by-one), compare every record to your search example, and then display the records that you are looking for. Instead of doing a sequential search, 4D can make use of something called an Index. An index in a database works very much like an indexed Card Catalog in a library—Card catalogues are indexed by Author, by Title, and by Subject. If you want to find all the books about Classical music, you look in the Subject card file that contains the "C's" and then under the "C's" you scan alphabetically until you find "Classical."

Databases use the electronic equivalent of card catalogues. In databases, instead of calling them card catalogues, we call them Indexes. Classical will appear in the Music Category Index, and CD will appear in the Format index. When you search by example for CD's of Classical music, the database will quickly find all the records that meet both conditions: "Classical" Music and "CD" Format.

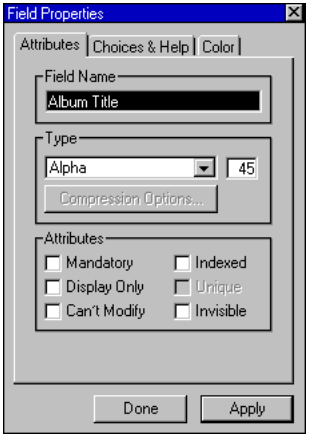
► To set up some indexes in the [Albums] table.

1 Go to the Database Structure window in the Design environment.

Choose Design under Use menu, or click directly on the Structure window if it is already visible.

2 Double-click the Album Title field.

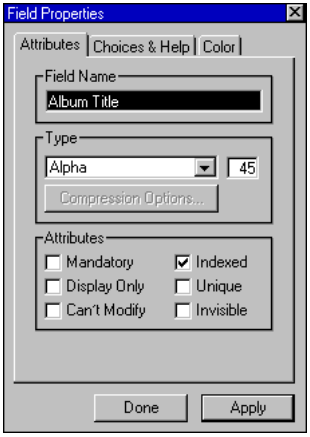
The Field Properties dialog box appears.



3 In the Attributes tab, click the Indexed check box.

4 Click the Apply button.

The dialog box now looks like this:



5 Leave the Field Properties dialog box open, and repeat the same procedure with three additional fields: Musician, Format, Music Category

Each time, you will:

- Click on the field.
- Click the Indexed attribute check box.
- Click the Apply button.

Your Structure window now looks like this:

4D shows the names of the indexed fields in bold type. When you query these fields, the performance will be 10 to 100 times faster than it was before you indexed the fields.

6 Click the Done button to close the Field Properties dialog box.

Summary

Congratulations! In this chapter, you have learned how to:

- Create a table, create fields, and change the properties of fields.
- Create standard choice lists.
- Create default input and output (listing) forms.
- Enter new records and modify existing records.
- Import records from a document on disk.
- Find records in your database.
- Index fields to improve search performance.

If you want to take a break before going to the next chapter, be sure to Quit (Exit) 4D before turning off your computer.

2 Adding Tables and Creating Relations

Estimated time to complete: 30 minutes

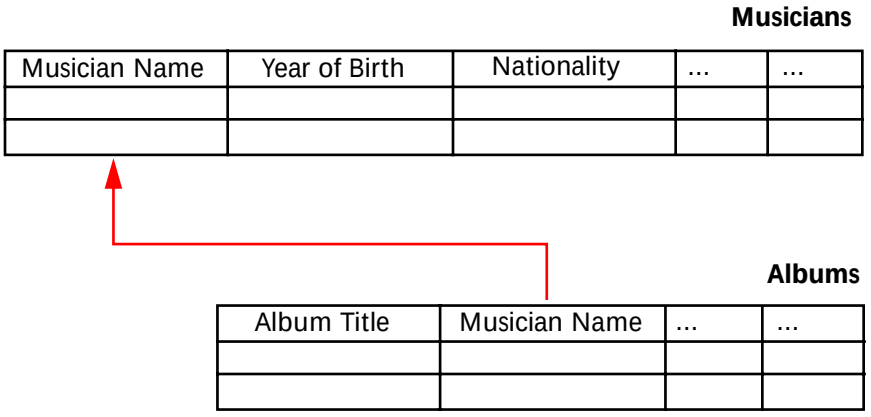
In this chapter, you will learn how to design a relational database using 4th Dimension. You will also learn some database terminology, such as relational database and one-to-many. When you have finished this chapter, you will know how to do the following:

- Create a [Musicians] table to store information about musicians.
- Define a relationship between the tables [Albums] and [Musicians].
- Use several advanced options of the Form Wizard.
- View and edit data from both tables on the same form.

Understanding Relational Databases

As you have seen, a single-table database has some definite advantages— it is quick, simple, and easy to understand. Depending on how detailed you want to be in keeping track of your data, a single table may be sufficient. However, if you need more power, you can use 4th Dimension as a relational database.

The Relational Database of your two tables looks like this.



Simply stated, a relational database is a collection of tables with the following characteristics:

- **Specialization**: Each table "specializes" in storing a certain type of information. In the example shown, the [Albums] table stores information about albums, and the [Musicians] table stores information about musicians.
- **Key fields**: Each table has a column called the "Key Field." The data in this key field is unique—no two records will have exactly the same data in the key field. This unique quality is what makes it possible to distinguish one record in the table from all other records in the table.

  In the example shown, the key field for the [Albums] table is [Albums]Album Title. The key field for the [Musicians] table is [Musicians]Musician Name.
- **Indexed**: Each key field is indexed for fast searches.
- **Relations**: Some of the tables are related to each other, so that they can share information. That is the reason for the term **relational database**.

- **Duplicated related fields**: To identify the relationships, we copy the key field data into the related records. For example, when we enter records related to the musician Johnny Mathis into [Albums], we copy Johnny Mathis' name into the [Albums] table record. This makes it possible for us to match or relate [Albums] information to [Musicians] information.

Note For several technical reasons, many professional database designers prefer to use a sequence number as the unique field, instead of using real-world data such as a name. For example, you can assign each album a unique ID number, and use that number as the unique key instead of the title of the album. You can set this up and let 4D keep track of the unique number sequences for you. In the 4th Dimension folder, there is an expanded example, "MusicPro," in which we show you how to use automatic sequence numbers. For detailed information on setting up unique ID numbers, see the *4th Dimension Design Reference Manual*.

Advantages of a Relational Database

Now that you understand the basic idea of a relational database, let's briefly discuss the advantages of having a relational database.

Data Lookups

Instead of re-typing the same data over and over, you can use a relation to look up the data and display where you need it. In the MyMusic database, we can type in the musician information one time in a table called [Musicians]. After that, instead of retyping the musician's name for each record in the [Albums] table, we can let 4D automatically copy this information into the record for us. Not only does this save time, but it also eliminates typing mistakes, making our data entry more consistent and more accurate.

Flexibility

You gain flexibility with a relational database, because you don't need to know in advance how many albums you will have by a musician, or how many songs there will be on an album. If you have one album or one hundred albums by the same musician, your system can handle it.

Analysis and Reporting

Analysis and reporting capabilities with a relational database are far more powerful than with a single-table database. You can look at the information in many different ways. For example, suppose you are planning a party and you want to schedule your music. You can ask your relational database the following questions:

- How many Easy Listening CD's do I have?
- I want to play Beethoven's music during dinner. Which Classical CD's have selections that were written by Beethoven?
- After dinner, I want to play dance music—Rock and Soul. Give me a list of my Rock and Soul albums.

This is just a small sample of the types of answers you could get from a relational database.

Scalability

Scalability is the ability of a database to grow with your needs. Although we have used a two-table database in our example, real-life relational databases can be much larger in scale.

You can continue to add tables to your database as your information storage needs grow and change. The current version of 4th Dimension allows you to create 256 tables and thousands of subtables.

Note To find out how to create and use subtables, consult the *4th Dimension Design Reference Manual*.

When you finish this tutorial, you will have a very handy tool for storing information about your personal albums; however, if you want to take it farther, you can. In addition to the [Musicians] and [Albums] tables that we cover in this tutorial, the expanded MusicPro example in the Example Databases folder contains the following table:

- The [Album_Songs] table stores information about the songs on an album. You can use this table to find all the different renditions of the same song: the album, the track, the tempo, and the length (in minutes) of that version of the song.

Thus, scalability—the ability to expand your database as your needs expand—is one of the primary advantages of the relational model.

Creating a Second Table

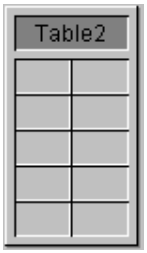
To store information about the performers on your albums, you will create a table called [Musicians].

Creating the Table

► To create a table:

1 Choose New Table... in the Structure menu.

The cursor turns into a small icon that looks like a miniature structure table.

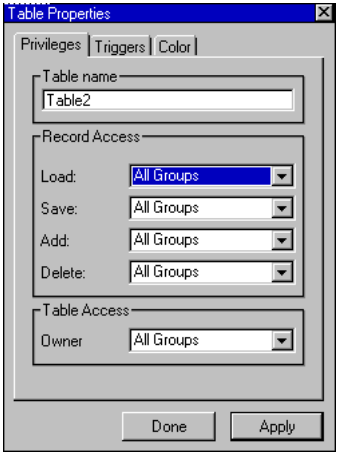


2 Click on any blank space in the database structure window.

4D creates a new table and gives it the default name "Table2."

3 Double-click the name Table2.

The Table Properties dialog box appears.



4 Highlight the name Table2 and replace it with the name "Musicians."

For information about the other options in the Table Properties dialog box, see the *4th Dimension Design Reference*.

5 Click the Apply button.

4D saves your changes.

6 Click the Done button to close the Table Properties dialog box.

The structure window displays the renamed table. You are now ready to create the fields for this table.

Creating Fields

► To create new fields:

1 **Double-click in the first box in the Fields area of the [Musicians] table to create a new field.**

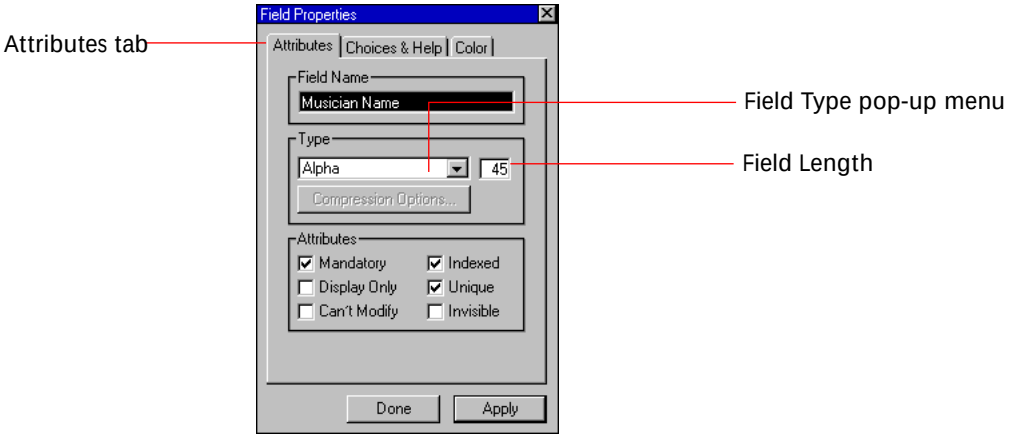
The Field Properties dialog box appears, with the Attributes tab window showing. The default name of this first field is "Field1." We will rename this first field "Musician Name."

2 **Change the field name to "Musician Name."**

3 **Make the field type Alpha, the length 45.**

4 **Click the following field attribute check boxes: Mandatory, Indexed, and Unique to turn them all On.**

The settings for the Musician Name field look like this:



5 **Click the Apply button.**

6 **Create the remaining fields for the [Musicians] table.**

Field name	Field type and length	Attributes	Remarks
Year of Birth	Integer		
Country of Birth	Alpha 20	Indexed: Choice List	Use the "Nationality" choice list
Year Deceased	Integer		
Notes	Text		Up to 32,000 characters

Each time you create a field, do the following:

- Type the field name.
- Choose the field type from the pop-up menu.
- Change the field length, if applicable.
- Click the Apply button.

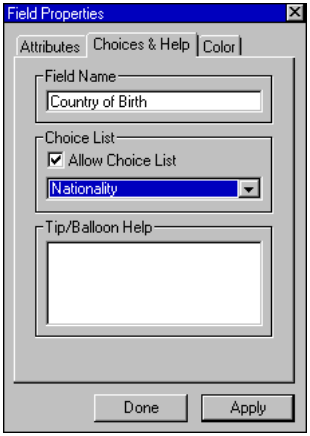
7 Associate the Nationality choice list with the Country of Birth field.

Remember the Nationality choice list that we created in the last tutorial. We will now associate it with the Country of Birth field in the [Musicians] table.

To refresh your memory, here are the steps for associating the choice list with a field:

- Double-click the field name [Musicians]Country of Birth in the structure window. This brings up the Field Properties dialog box.
- Click the Choices & Help tab to display the Choices & Help tab window.
- Click the Allow Choice List check box to turn it On.
- Choose Nationality in the Choice List pop-up menu.
- Click the Apply button.

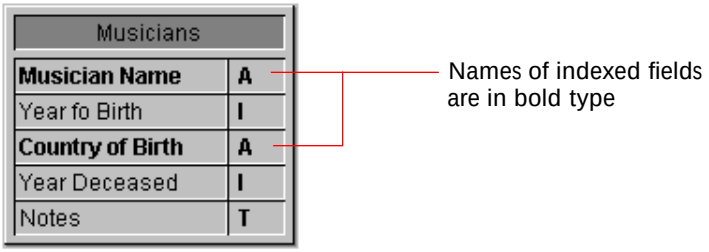
The Field Properties dialog looks like this:



8 Click the Done button.

When you click the Done button, 4th Dimension closes the Field Properties dialog box.

In the structure window, the table definition for [Musicians] now looks like this:



Establishing the Relationship Between Two Tables

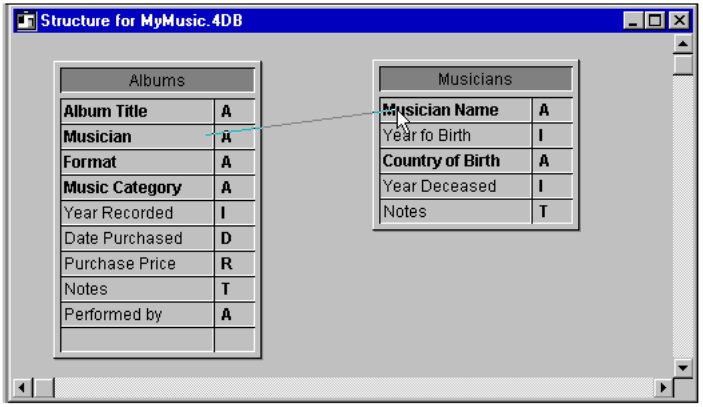
Now that you have the [Albums] and [Musicians] tables, you are ready to establish the relationship between them. Each musician could record several albums, so you have a "one-to-many" relationship between [Musicians] and [Albums].

► To define this relationship:

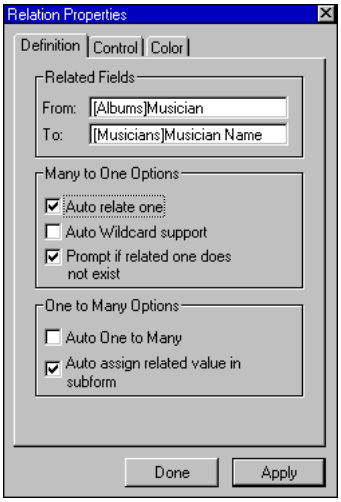
1 **In the table [Albums], click the field name [Albums]Musician.**

2 **Drag a line from the field [Albums]Musicians to the field [Musicians]Musician Name.**

Important: When defining relations, always drag the relationship line from the Many table to the One table.

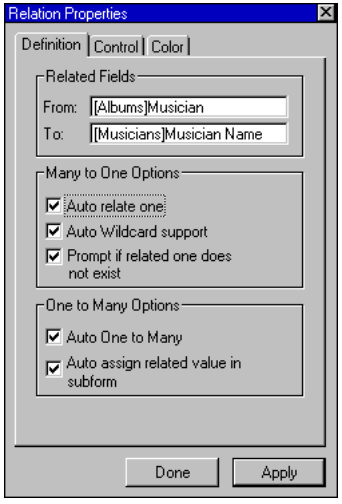


When you release the mouse, the Relation Properties dialog box appears, with the Definition tab window showing.



3 Make sure that all of the check boxes are selected to be On. Click to select: Auto Wildcard support, and Auto One to Many.

All check boxes should be selected. So far, the Relation Properties dialog box looks like this:

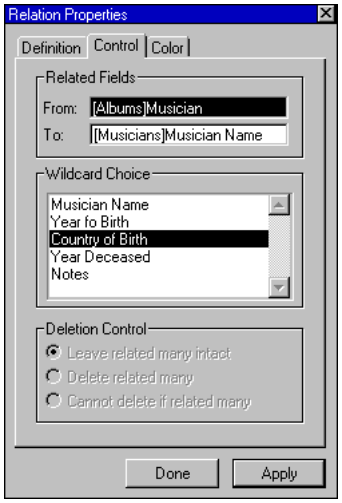


4 Click the Control tab to set your Lookup Control options.

5 Highlight the field Country of Birth as your Wildcard Choice.

6 Click the Apply button to save the changes.

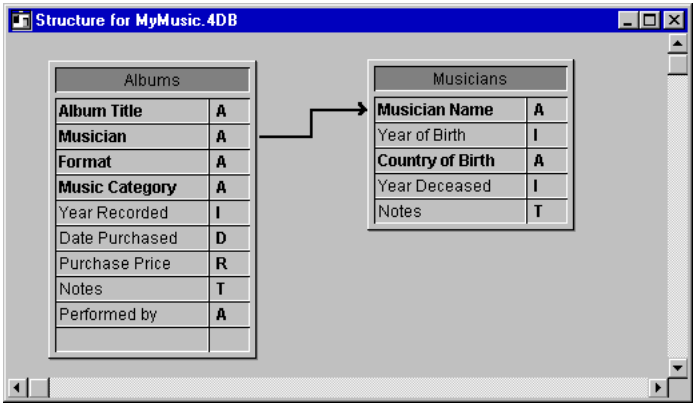
The dialog box now looks like this:



For information about the other options in the Relation Properties dialog box, see the *4th Dimension Design Reference Manual*.

7 Click the Done button to close the window.

Your structure window now looks like this:



Congratulations! You have just created your first One-to-Many relation in 4th Dimension!

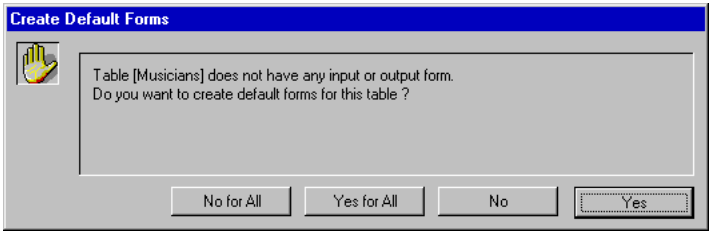
Adding Data to the New Table

Before you use the new relation, you need to add some data to your new [Musicians] table. First you will create a new record to test the Input form, then you will import some additional records, as you did for the [Albums] table.

► To create the first record:

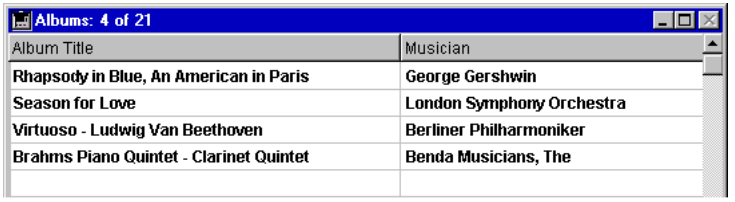
1 Click on the User environment window, or choose User in the Use menu to go to the User environment.

The following dialog appears:



2 Click the Yes button.

When you go to the User environment, 4th Dimension returns you to the Output form of the [Albums] table.



3 Display the List of tables dialog box.

In the User environment, you can use the List of tables dialog box to "jump" to any table in your database. Here are the shortcut keys to present the List of tables dialog box:

Platform	To present the List of tables dialog box
Windows	Hold down the Ctrl key and press the Space bar
Macintosh	Hold down the Command key and press the Space Bar

4 Click the word Musicians to go to the[Musicians] table.

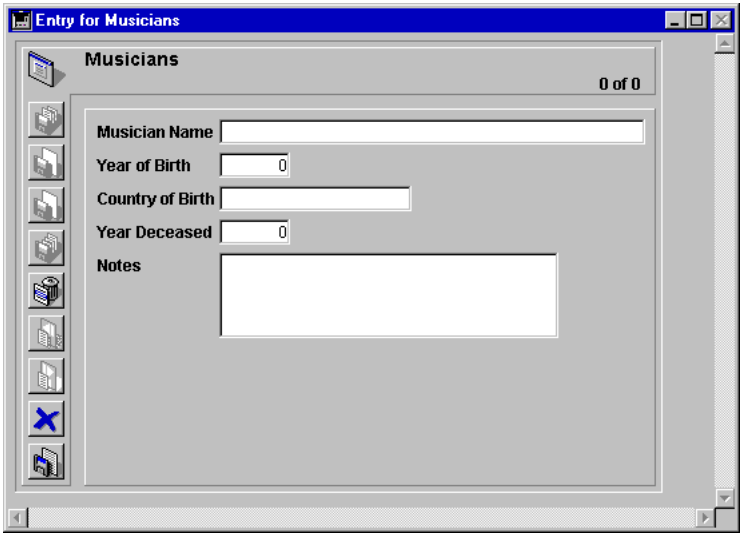
You jump to the [Musicians] table.

The screen informs you that no records are selected for the [Musicians] table.

5 Choose New Record in the Enter menu.

The Input form for the [Musicians] table appears; the cursor is already in the Musician Name field.

4th Dimension created this form for you automatically!

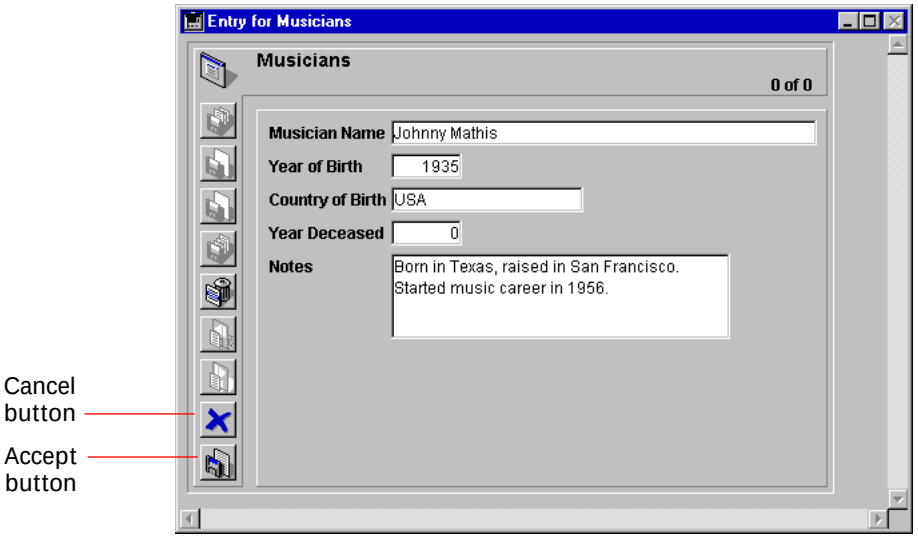


Note If the List of tables dialog box is still in the front of your screen, just click on the Input form to bring it forward.

6 Enter the following data:

Field Name	Data
Musician Name	Johnny Mathis
Year of Birth	1935
Country of Birth	USA
Date Deceased	
Notes	Born in Texas, raised in San Francisco. Started music career in 1956.

Your screen now looks like this:

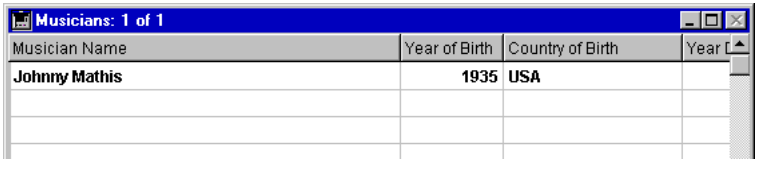


7 Click the Accept button to save the record.

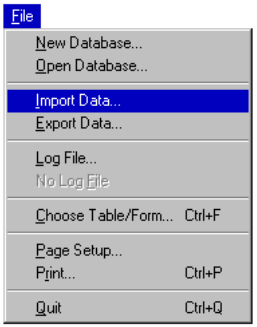
4th Dimension saves the record and brings up a blank record for you to continue entering data. When you save a new record that you just created in the User environment, 4D always assumes that you want to continue entering new records.

8 Click the Cancel button.

4th Dimension takes you back to the [Musicians] Output form, where you see your new record listed.



Importing Records into the Table



In Chapter 1, you imported data into the [Albums] table. Now, you will import data into the [Musicians] table. We have already created a text file that you can import. The name of the file is Musician.txt.

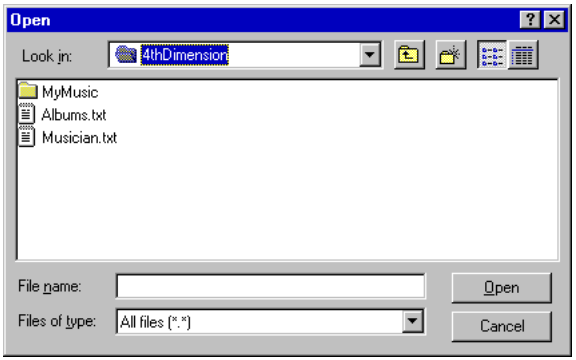
The text file contains one record for each musician. Within each record, the fields are separated by tabs. The end of the record is indicated by a carriage return.

► To import the text file into 4th Dimension:

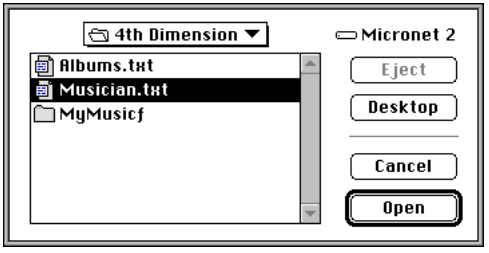
1 Choose Import Data... in the File menu.

The operating system's standard Open File dialog appears.

Windows



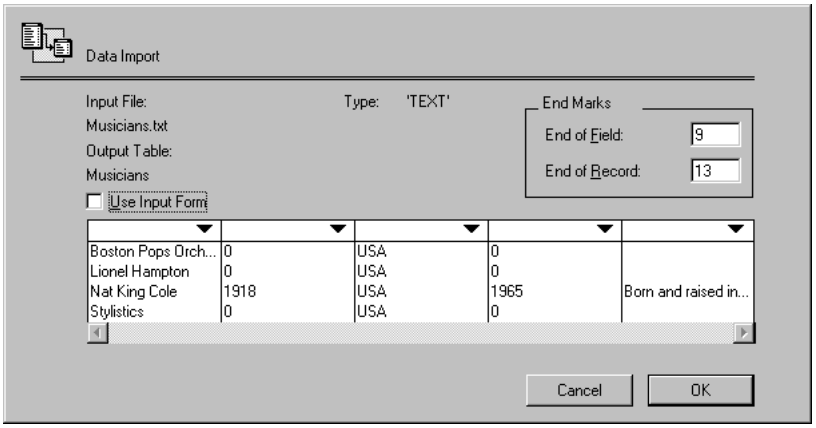
Macintosh



If you are not already in the 4th Dimension directory where the file Musician.txt is located, you will have to navigate to that directory.

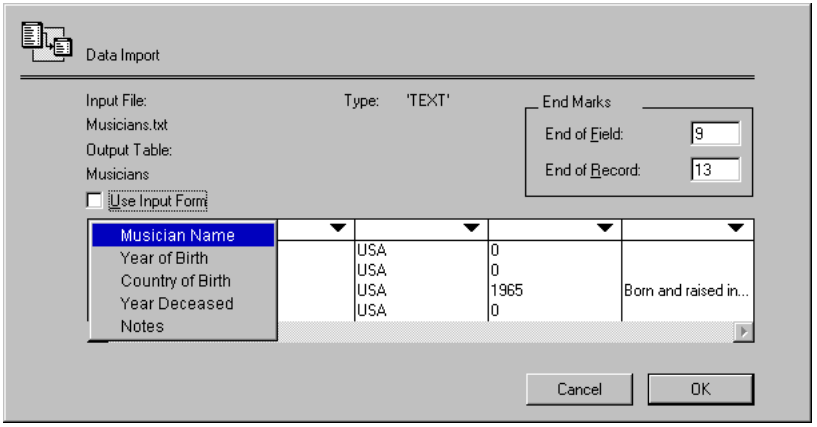
2 Double-click the file Musician.txt to open it.

The 4D Import Wizard appears, showing you the first few records so you can align the columns in the Musician.txt import file with the fields in your database.



3 Hold down the Shift key and choose Musician Name in the pop-up menu above the first column of text.

The screen looks like this:



When you hold down the Shift key and choose a field, the Import Wizard assumes that the data in your import file is in the same order as the fields in your database. If some of the field choices are not correct, you can easily go to each pop-up list and change the field selection.

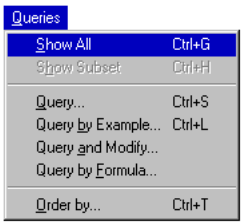
For additional information, and for help with specific importing challenges, see the *4th Dimension User Reference Manual*.

4 Click the OK button.

4D returns to the [Musicians] Output form, which displays the 20 records that you just imported. Note that the top of the window now says “Musicians: 20 of 21,” which means that you now have a total of 21 records in your database.

Musicians: 20 of 21

Musician Name	Year of Birth	Country of Birth	Year D
Boston Pops Orchestra	0	USA	
Lionel Hampton	0	USA	
Nat King Cole	1918	USA	
Stylistics	0	USA	
B. B. King	1925	USA	
Carpenters	0	USA	
Various	0		
Berliner Philharmoniker	0	Germany	
Temptations	0	USA	
Benda Musicians	0	USA	
Gladys Knight & the Pips	0	USA	
Michael Jackson	1958	USA	
Smokey Robinson	0	USA	
Eagles	1972	USA	
Donald-D	0	USA	
Anita Baker	0	USA	
Bobby Brown	0	USA	



5 Choose Show All in the Queries menu.

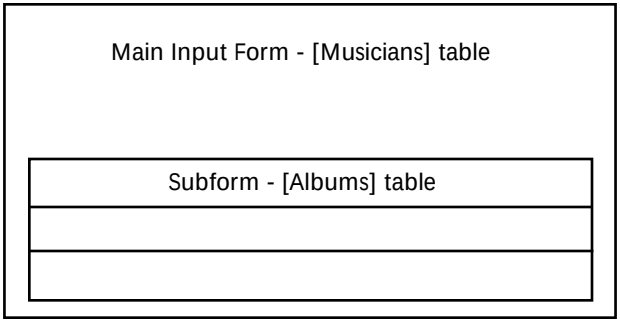
The [Musicians] Output form displays all of the records in the [Musicians] table.

Musicians: 21 of 21

Musician Name	Year of Birth	Country of Birth	Year D
Johnny Mathis	1935	USA	
Boston Pops Orchestra	0	USA	
Lionel Hampton	0	USA	
Nat King Cole	1918	USA	
Stylistics	0	USA	
B. B. King	1925	USA	
Carpenters	0	USA	
Various	0		
Berliner Philharmoniker	0	Germany	
Temptations	0	USA	
Benda Musicians	0	USA	
Gladys Knight & the Pips	0	USA	
Michael Jackson	1958	USA	
Smokey Robinson	0	USA	
Eagles	1972	USA	
Donald-D	0	USA	

Creating a Relational Data Entry Form

Your next step is to create a data entry form that enables you to enter and view data from both tables at the same time. Using the Form Wizard, you will first create a subform in the [Albums] table; then you will add the subform to your [Musicians] Input form. The relational Input form will look like this:

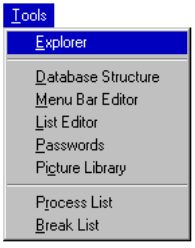


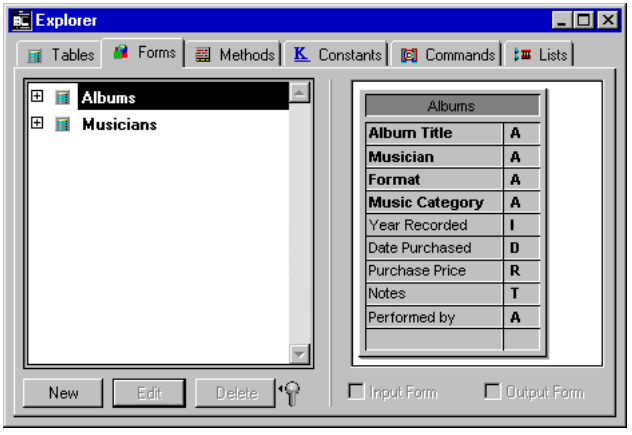
Creating a Subform in a Table

► To create a subform in the [Albums] table:

1 Go to the Design environment by clicking on any Design environment window, or by choosing Design in the Use menu.

2 Choose Explorer in the Tools menu to present the Explorer window.



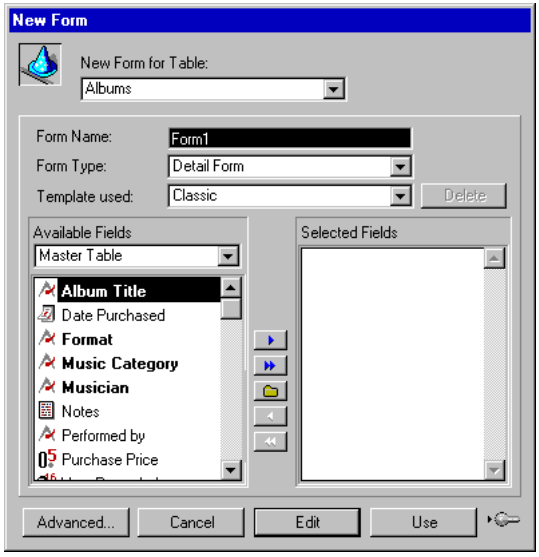


3 Click the Forms tab to bring it to the front.

[Albums] should already be selected. If it is not, select it. Note the thumbnail image of the [Albums] table on the right.

4 Click the New button

The Form Wizard appears.



Every form in 4th Dimension is associated with a table. This form will be associated with your One table, the [Musicians] table.

5 Choose Albums in the New Form for Table: pop-up menu. It may already be selected.

6 In the Form Name: text box, change the form name to "Subform."

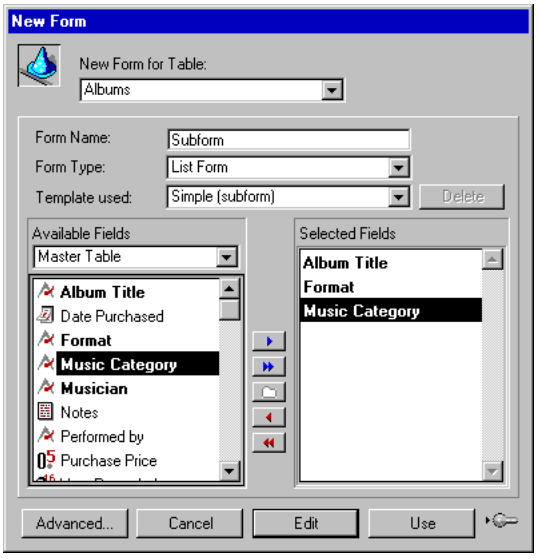
7 Choose List Form in the Form Type pop-up menu.

8 Choose Simple (subform) in the Template used pop-up menu.

9 In the Available Fields list, double-click to select each of the following fields: Album Title, Format, Music Category.

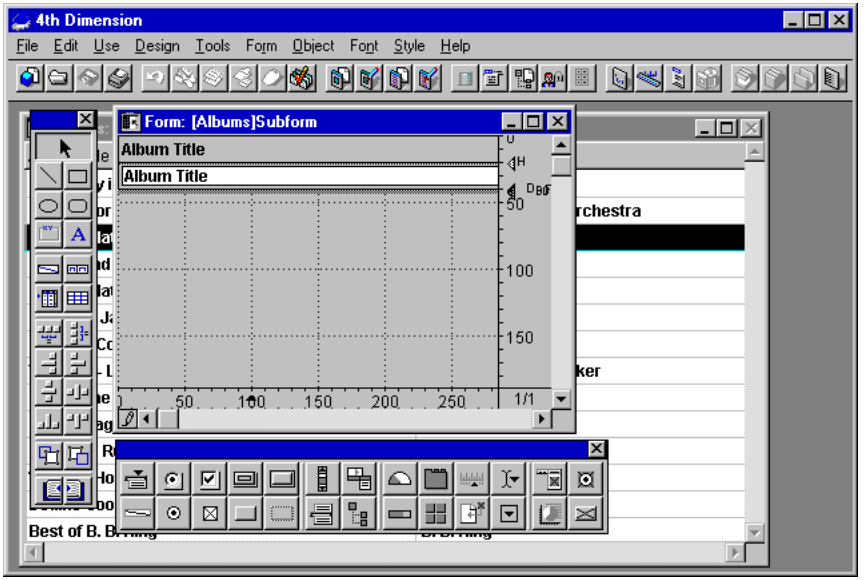
Note You may have noticed that there is an Advanced... button on the Form Wizard. This button gives you access to several advanced form design features in 4th Dimension. To learn more about the Form Wizard, see the *4th Dimension Design Reference Manual*.

So far, your screen looks like this:



10 Click the Edit button.

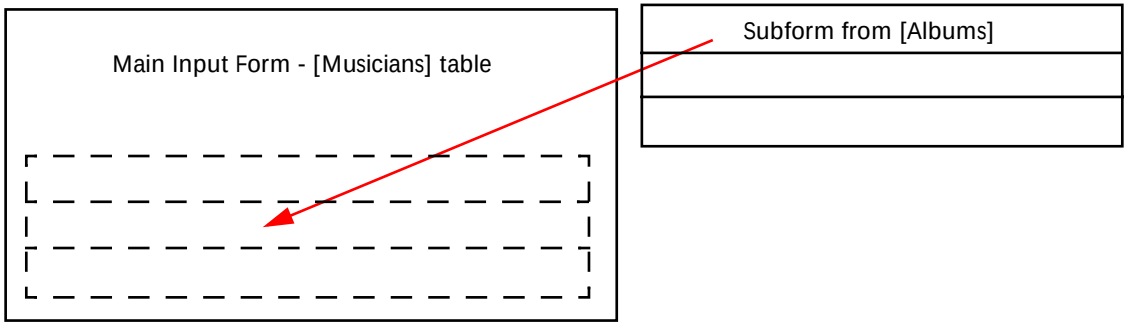
4th Dimension opens your new subform in the Design environment, along with two form design palettes.



4D only shows you a small portion of the subform. To see the rest of your fields, you can use the scroll bar or expand the window.

Adding the Subform to the Main Input Form

The next step is to drag the subform onto the Musicians Input form in order to see a list of all the albums by a particular musician.The drag operation will look like this:

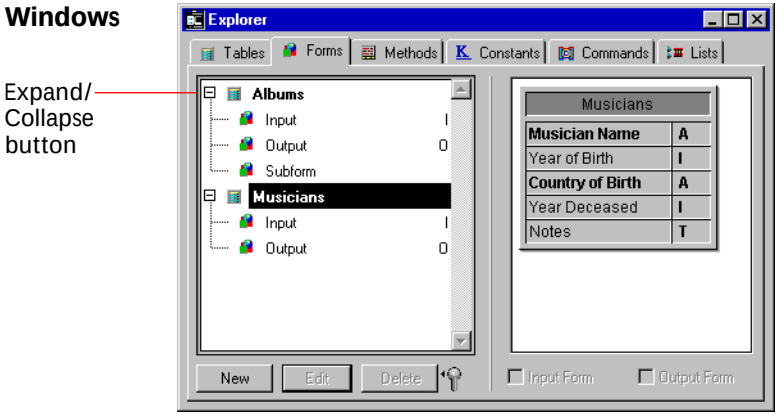


► To drag the subform onto the [Musicians] Input form:

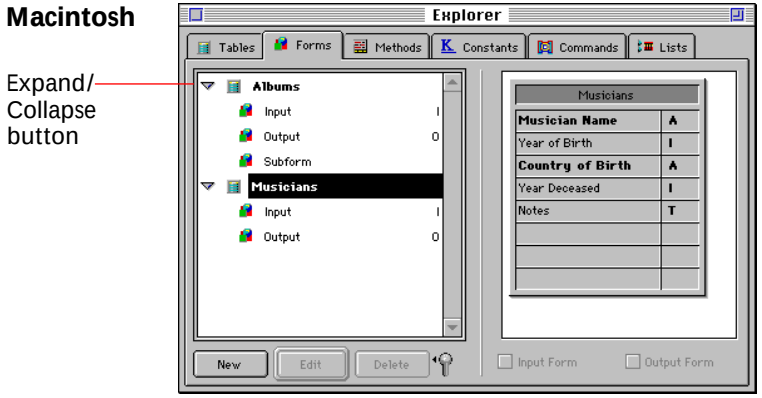
1 Choose Explorer in the Tools menu.

The 4th Dimension Explorer appears, with the Forms tab showing.

Windows



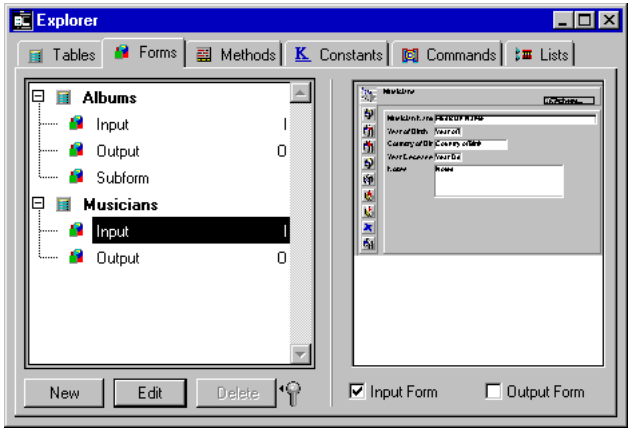
Macintosh



Note If the list of forms for each table is not expanded to display all the forms for each table, click the Expand/Collapse button to show them.

2 Click the [Musicians] Input form icon.

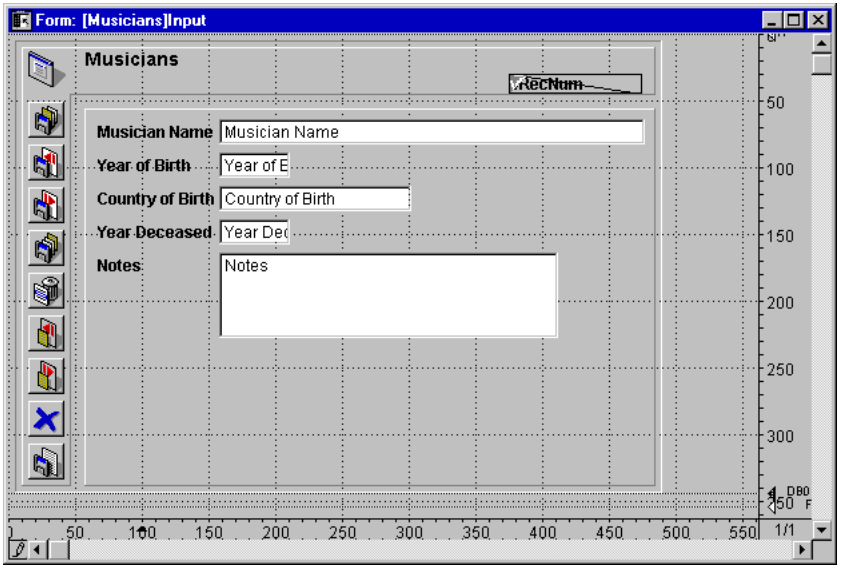
Note the thumbnail image of the [Musicians] Input form on the right side of the Explorer window.



3 Double-click the [Musicians] Input form icon to open the form

The [Musicians] Input form appears on your screen.

4 Expand the size of the Input form window so you can see the bottom of the form.

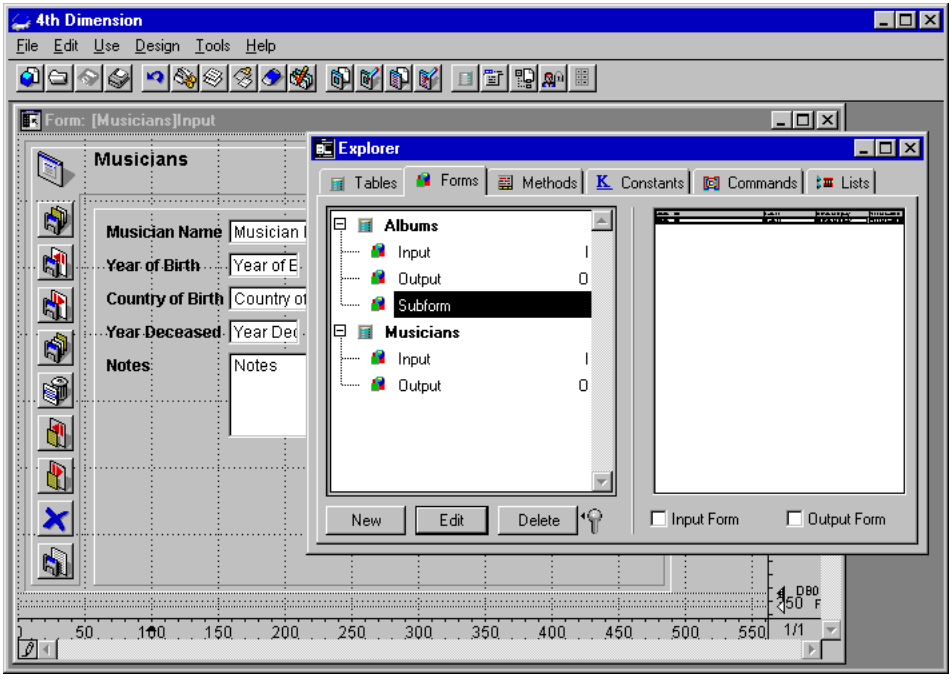


5 Choose Explorer..., again, in the Tools menu.

6 Click the [Albums] Subform icon.

Note the thumbnail image of the [Albums] subform on the right side of the Explorer window.

7 Arrange your screen so that the [Musicians] Input form is visible on the left, and the Explorer is visible on the right.



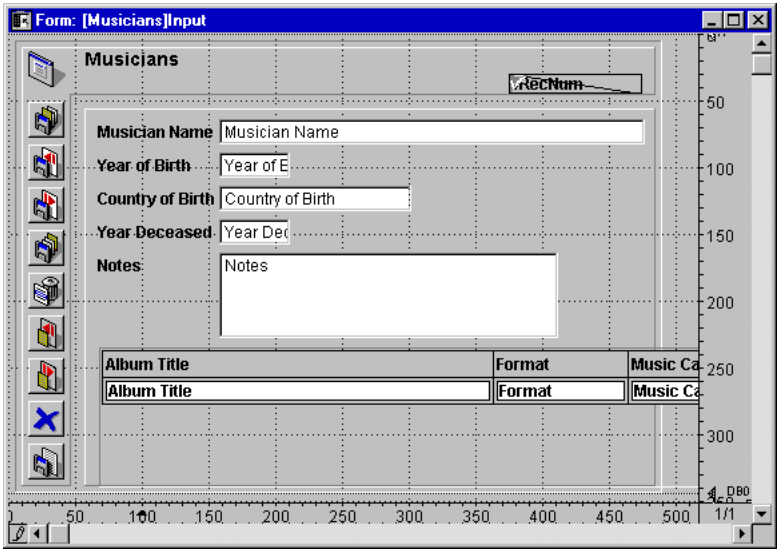
8 Click and drag the [Albums] Subform icon to the bottom of the [Musicians] Input form.

You will see a small rectangle at the cursor as you drag.

When you release the mouse button, you will see that the subform is now in the Input form. In 4D terminology, the subform is now an "Included area" on the [Musicians] Input form.

9 Move the Subform to align it on the [Musicians] Input form.

Your screen should look like this:



Designating the Full-Page Form

Now that you have the [Albums] subform as an included area in the [Musicians] Input form, you will want to use it to enter information about several albums by a given musician.

In 4D, you can double-click an included area to present a full-page form associated with it. This is useful for data entry in a subform.

You will designate the [Albums] Input form as the full-page form that will appear when you double-click the included [Albums] subform.

► To assign the full-page form of an included area:

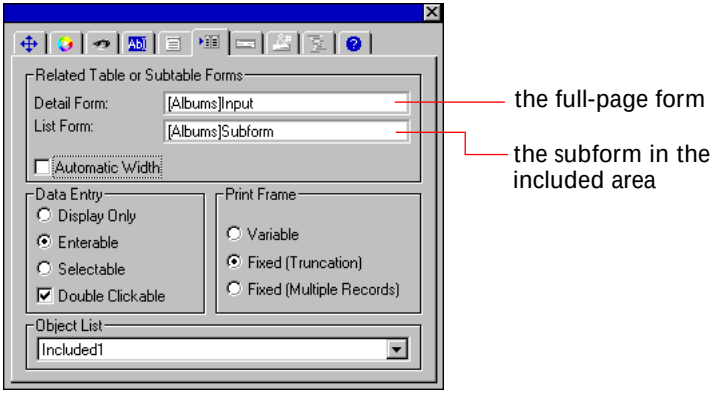
1 **Choose Explorer... in the Tools menu.**

2 **While pressing the Shift key, click and drag the [Albums] Input form icon into the included area on the [Musicians] Input form.**

This assigns the [Albums] Input form to be used by the [Albums] subform.

3 **Double-click the subform included area in the [Musicians] Input form.**

The Object Properties dialog box appears.



4 Click the check box Double Clickable to turn it On.

For an description of the other options in the included area Object Properties dialog box, see the *4th Dimension Design Reference Manual*.

5 Click the Close Box to close the window.

The close box is at the top right of the window on Windows, and at the top left of the window on Macintosh.

Testing the New Form

Let's go back to the User environment and see how the relational form works.

► To test the new relational form:

1 Choose User in the Use menu.

4D takes you to the [Albums] table.

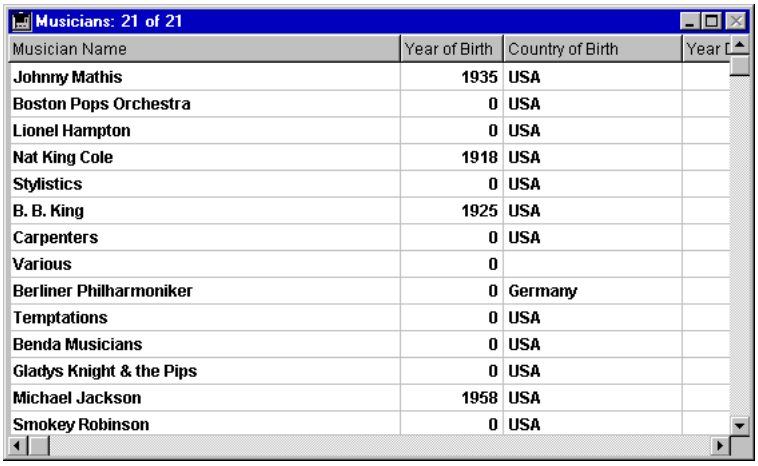
2 Display the List of tables dialog box.

In the User environment, you can use the List of tables dialog box to "jump" to any table in your database. Here are the shortcut keys to present the List of tables dialog box:

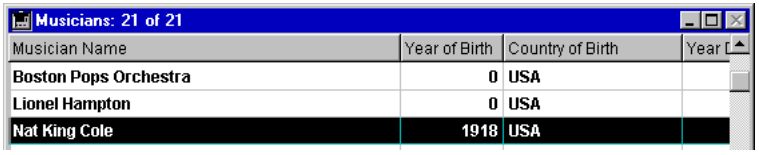
Platform	To present the List of tables dialog box
Windows	Hold down the Ctrl key and press the Space bar
Macintosh	Hold down the Command key and press the Space Bar

3 Click the word Musicians to go to the[Musicians] table.

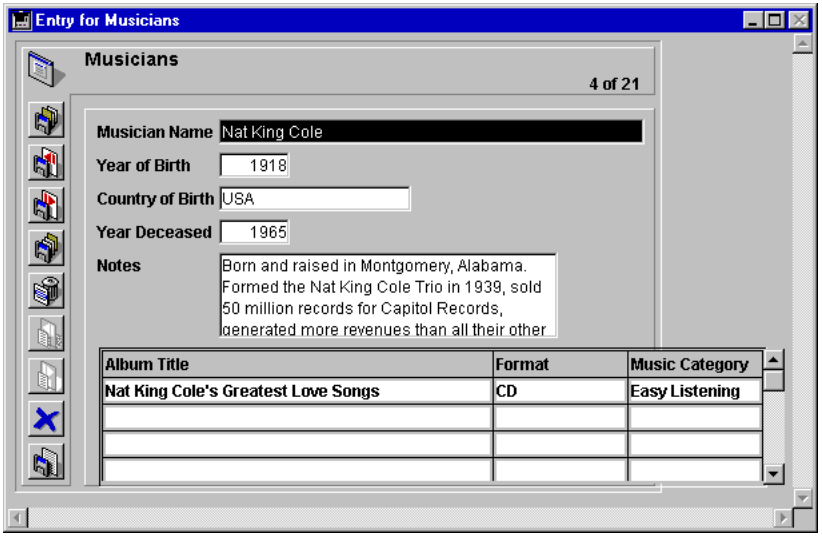
You jump to the [Musicians] Output form. 4D lists all the records.



4 Double-click the record for Nat King Cole.



The [Musicians] Input form appears. Note the included area subform showing the album information.



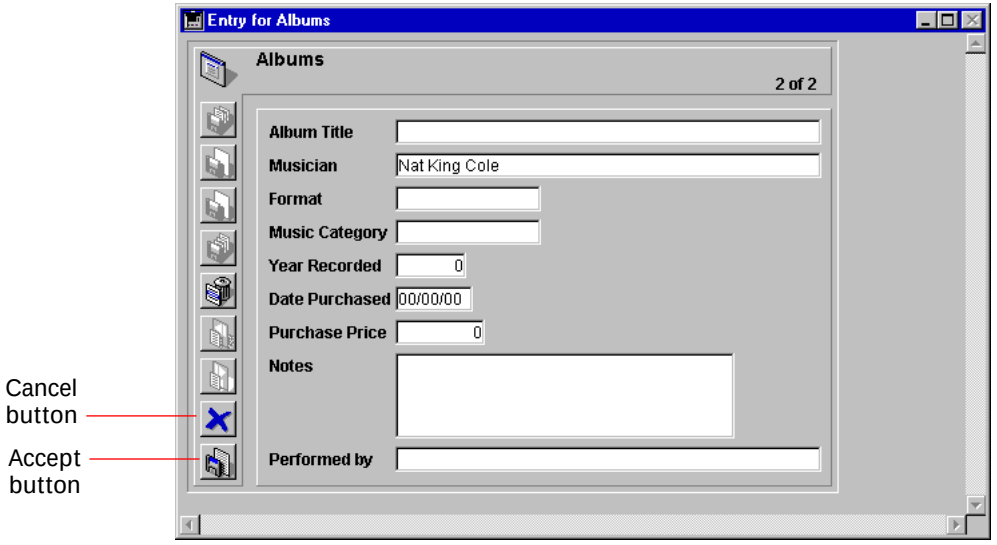
Adding a Record in the Subform

You can add more album information for this musician, using the [Albums] subform in the [Musicians] Input form. Remember, you associated the [Albums] Input form with this subform.

► To add another [Album] record:

1 Double-click on a blank line in the included area subform.

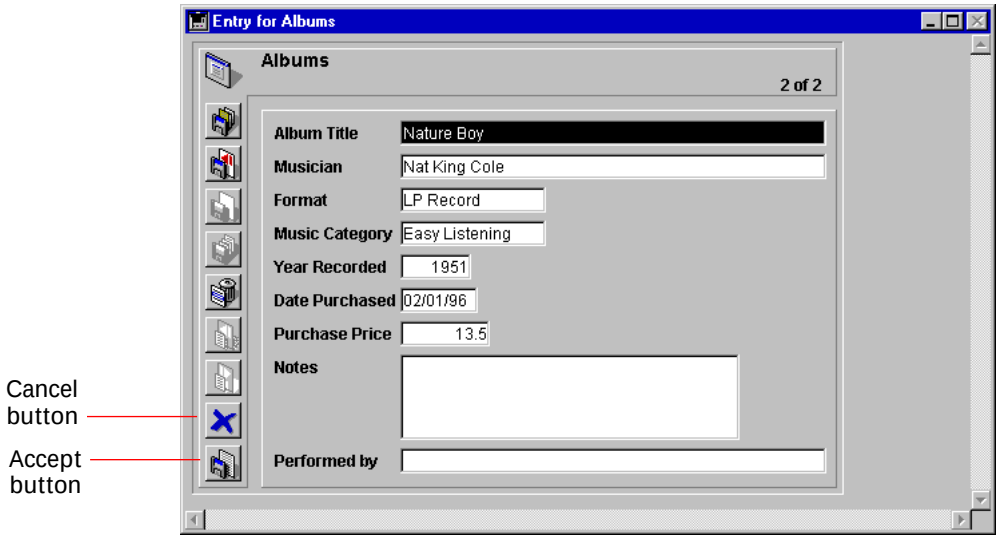
The [Albums] Input form appears. Note that the musician's name is already in the form.



2 Enter the following data.

Field Name	Data
Album Title	Nature Boy
Musician	Nat King Cole (tab through this field—it is already there)
Format	LP
Music Category	Easy Listening
Year Recorded	1951
Date Purchased	2/1/96
Purchase Price	13.50
Notes	
Performed by	

The [Album] Input form now looks like this:

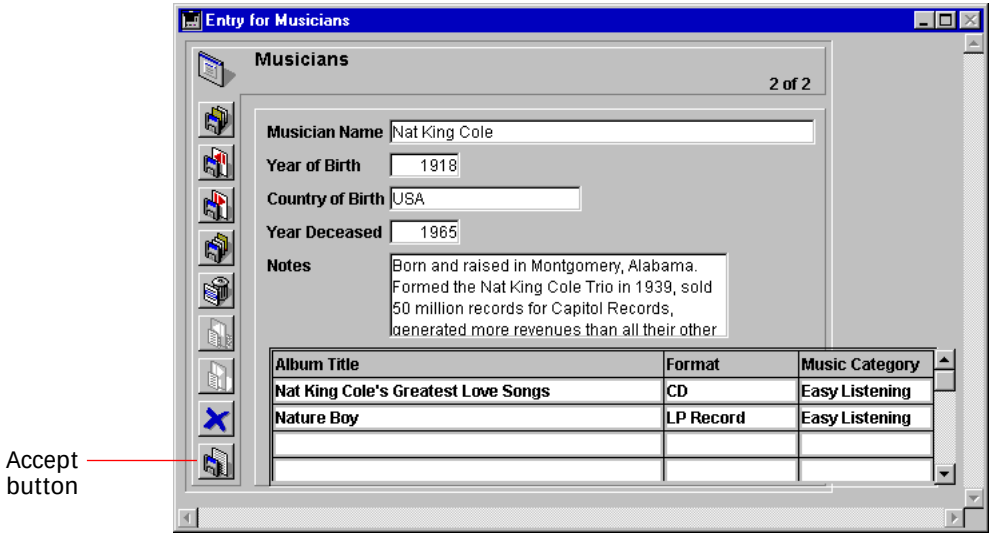


3 Click the Accept button.

Clicking Accept saves the new [Album] record. 4D brings up a blank record for you to continue entering data.

4 Click the Cancel button to return to the main [Musicians] Input form.

Both albums are now listed in the subform.



5 Click the Accept button in the [Musicians] Input form.

The record is saved. You return to the [Musicians] Output form.

What's Next?

Now that you have the basics, we will expand your knowledge. In the next chapter, you will learn to use some of the advanced features of 4th Dimension to create your own customized reports, labels, and charts.

Summary

Congratulations! In this chapter, you have learned how to:

- Create a [Musicians] table to store information about musicians.
- Define a relationship between the tables [Albums] and [Musicians].
- Use several advanced options of the Form Wizard.
- View and edit data from both tables on the same form.

If you want to take a break before going to the next chapter, be sure to Quit (Exit) 4D before turning off your computer.

3 Creating Reports, Labels, and Graphs

Estimated time to complete: 30 minutes

One of the purposes of every database is to generate reports. In this chapter, you will learn how to:

- Create a list of your albums, using the Quick Report Editor.
- Print labels for your album collection, using the Label Wizard.
- Create two and three-dimensional charts to see how much you have invested in your collection, using the Chart Wizard and 4D Chart.

Creating a Quick Report

Now that you have a database of your album collection, you want to print a report list of your albums. You do so using the Quick Report Editor.

► To get to the Quick Report Editor:

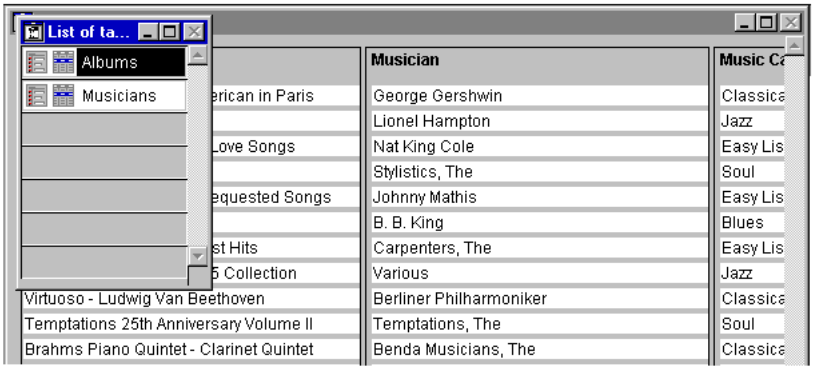
1 Display the List of tables dialog box.

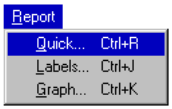
In the User environment, you can use the List of tables dialog box to "jump" to any table in your database. Here are the shortcut keys to present the List of tables dialog box:

Platform	To present the List of tables dialog box
Windows	Hold down the Ctrl key and press the Space bar
Macintosh	Hold down the Command key and press the Space Bar

2 Click the word Albums to go to the [Albums] table.

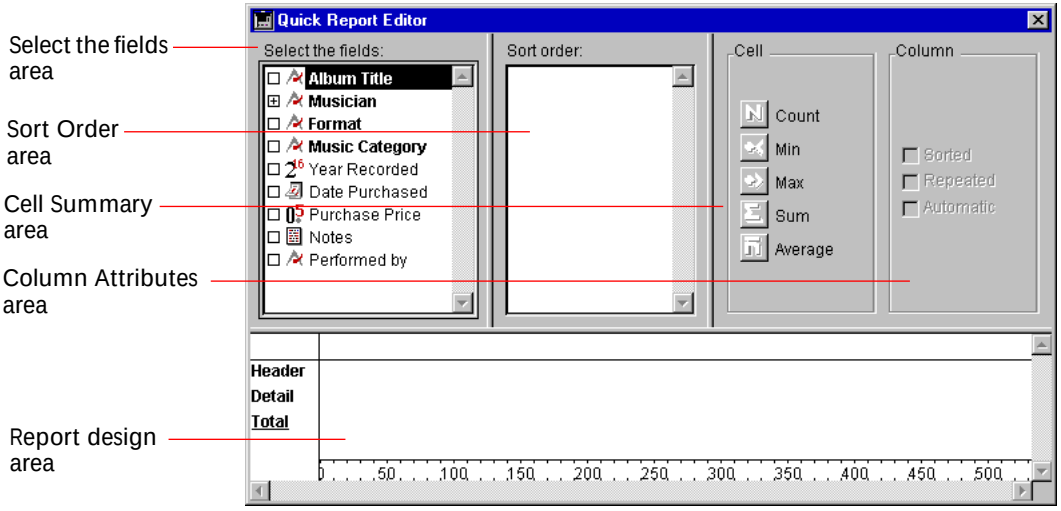
You jump to the [Albums] Output form. The form lists all the records.





3 Choose Quick... in the Report menu.

The Quick Report Editor appears.



The Quick Report Editor is divided into five areas.

- Select the fields area
- Sort area
- Cell summary area
- Column attributes area
- Report design area

Building the Report

Let's say that you want to print a report that contains the following fields: Album Title, Musician Name, Music Category, Format, and Purchase Price.

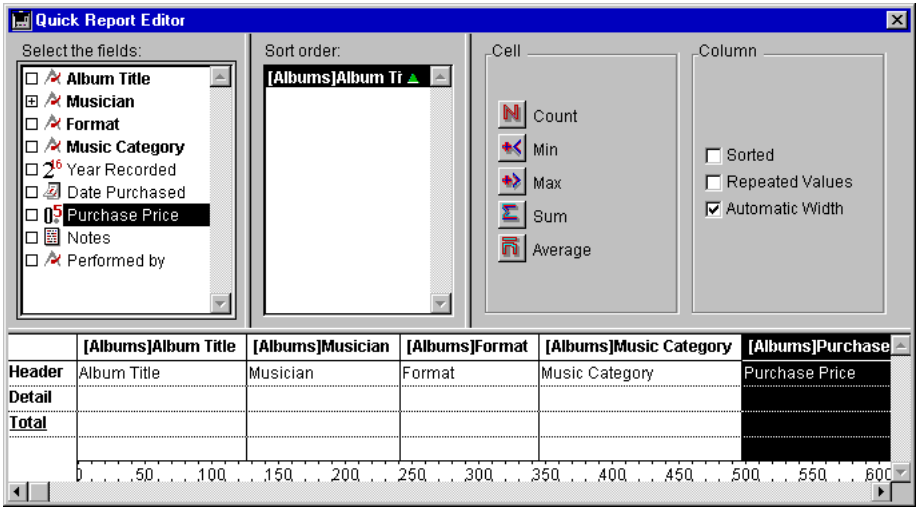
► To build the report:

1 **Double-click the field Album Title in the Select the fields area.**

2 **While the column is still highlighted, click the Sorted check box.**

3 **Double-click the following fields to add them to your report: Musician, Format, Music Category, Purchase Price.**

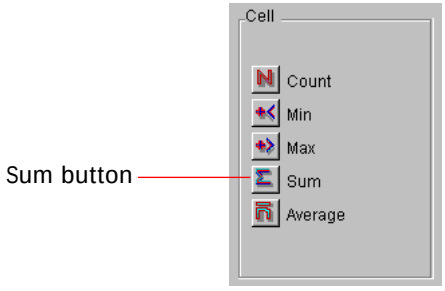
As you double-click each column, it is added to your report. Your report now looks like this:



4 **Click the Scroll Bar right arrow or expand the window so you can see the column Purchase Price.**

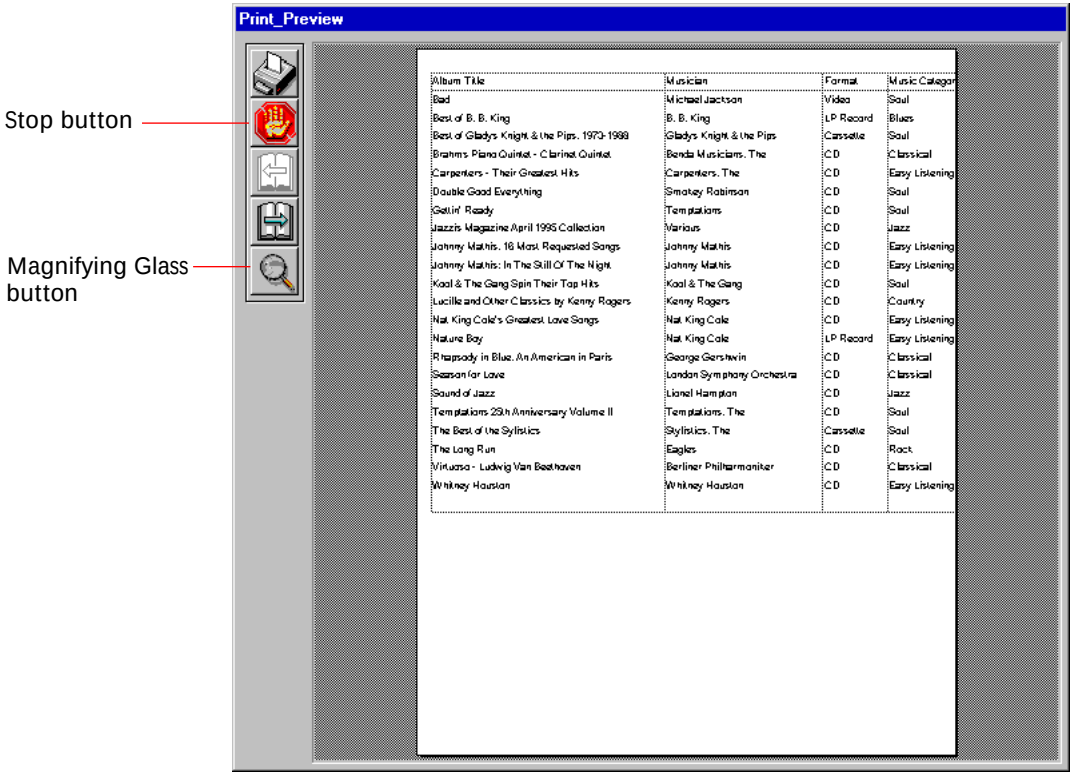
The Purchase Price column should already be highlighted. If it is not, click at the top of the column to highlight it.

5 **Click the Sum button in the Cell Summary area.**



6 Choose Print Preview in the File menu.

The Print Preview window appears.



7 Click the Magnifying Glass button if you want to examine the report closely.

8 Click the Stop button.

4D returns to the Quick Report Editor.

If you want to print this report from time to time, you could save this report and use it again. To print the report, you would simply load the report design and print it again. The printed output would reflect any changes you had made to the database in the meantime. For more information, refer to the *4th Dimension User Reference Manual*.

9 Choose Close in the File menu.

4D returns to the [Albums] Output form.

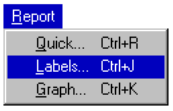
Printing Labels

Your next project is to create labels for your CD collection. Perhaps you noticed that some of the plastic cases were cracking, and you think that they take up too much room. You want to move your CD's into vinyl covers and soft plastic envelope pages. To keep track of the albums, you decide to print labels for the envelope pages.

Each label will contain the following information:

- Album Title
- Musician
- Music Category

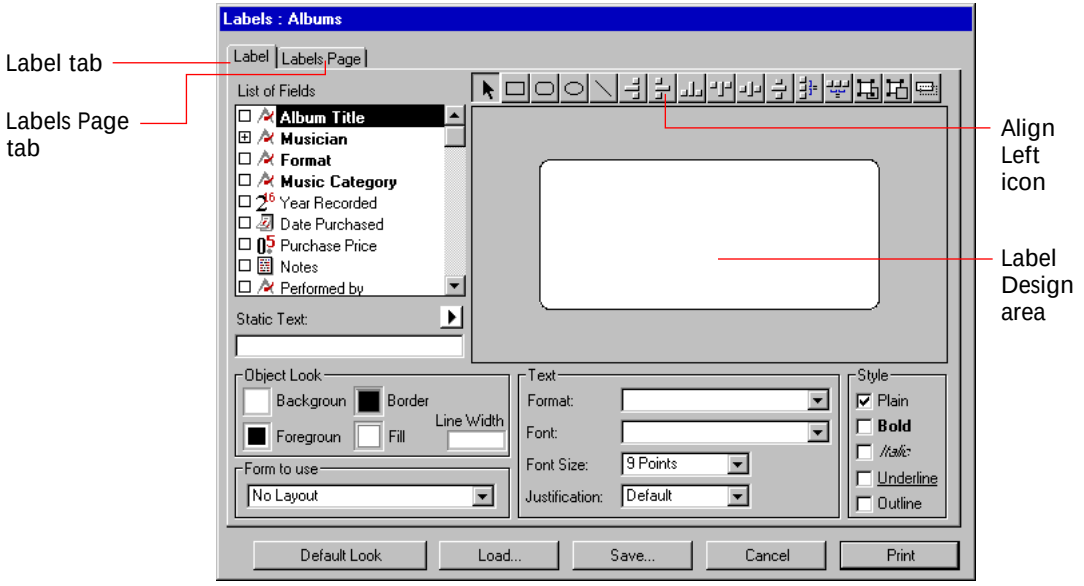
You can quickly and easily make these labels using the 4D Label Wizard.



► To get to the Label Wizard:

- **Choose Labels... in the Report menu.**

The Label Wizard appears, with the Label tab in front.



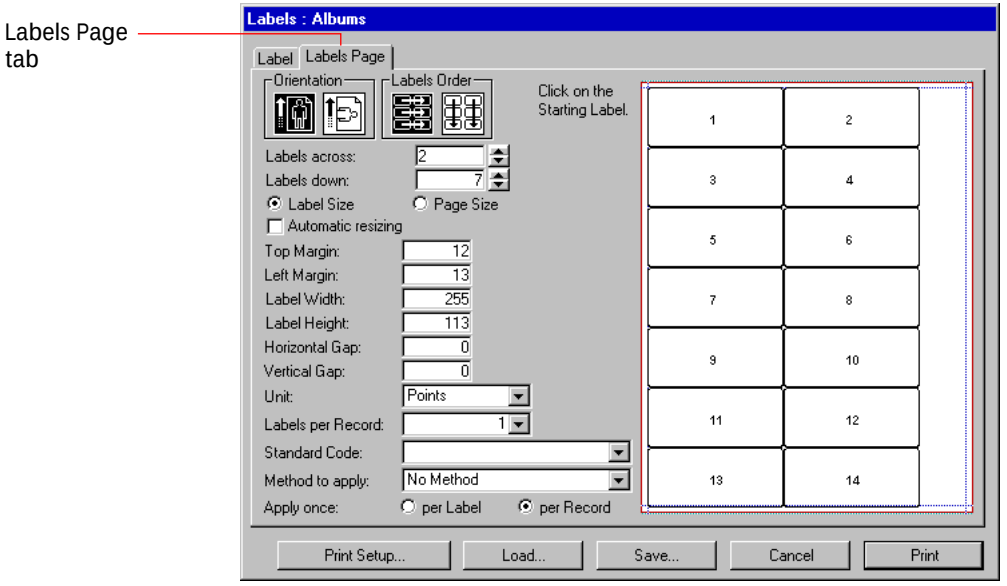
Setting Alignment Options

Before you put any objects on your labels, you need to set your alignment options so that you are working with the correct size label.

To set the alignment options:

1 Click the Labels Page tab in the Label Wizard.

The Labels Page window appears:



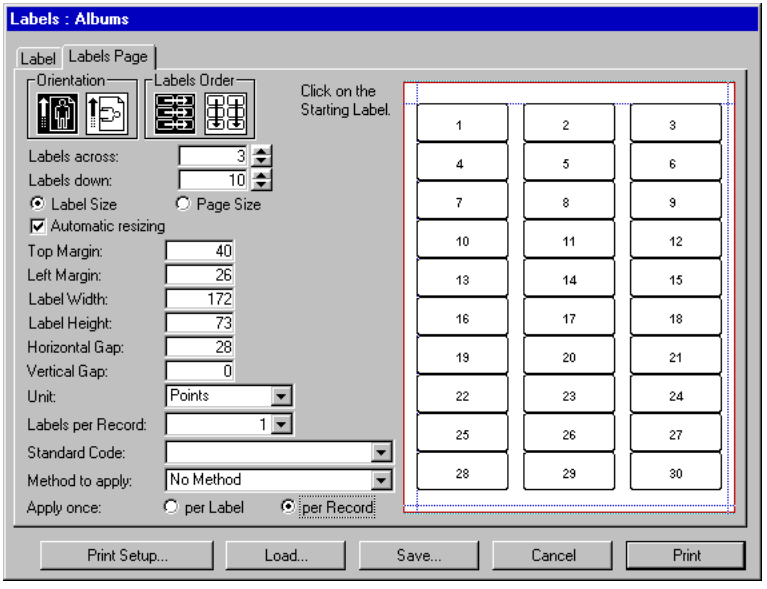
This window gives you every alignment option you need in order to print any label on any printer.

In our example, we will print Avery™ 5160 labels. These labels are 1” high by 2 5/8” wide, and there are 30 labels on a sheet

2 Starting from the top of the window, set the following options:

Option	Setting
Orientation	Portrait
Labels Order	Left to Right
Labels Across	3
Labels Down	10
Label Size	On
Page Size	Off
Automatic resizing	Yes
Top Margin	40
Left Margin	26
Label Width	Let the Wizard set this automatically.
Label Height	Let the Wizard set this automatically.
Horizontal Gap	28
Vertical Gap	0
Unit	Points
Labels per record	1
Standard code	(Leave blank)
Method to apply	No Method
Apply once	per record

Your settings look like this:



Now you are ready to actually design the labels.

Designing the Labels

► To design the labels:

1 **Click the Label tab to go back to the Label design page.**

2 **Drag the field Album Title so that it is positioned near the top of the label in the label design area.**

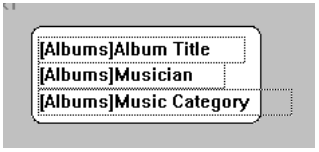
3 **Drag the field Musician to the label.**

4 **Drag the field Music Category to the label.**

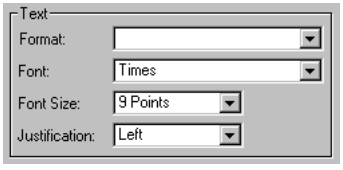
5 **Choose Select All in the Edit menu.**

6 **Click the Align Left icon.**

Your label looks like this:



7 **Choose Times in the Font pop up menu.**



8 **Click Left in the Justification pop-up menu.**

Printing the Labels

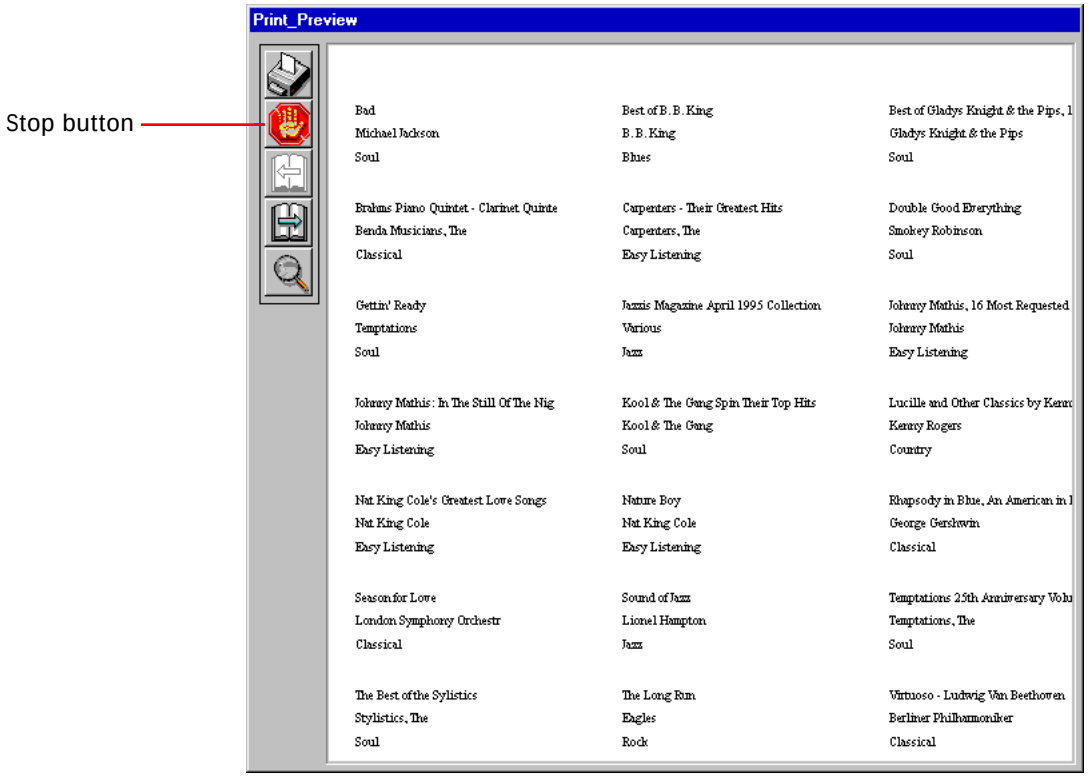
For this tutorial, we will just preview the page of labels on screen.

► To print the labels:

1 **Click the Print button.**

2 **In your operating system's Print dialog box, check to make sure that the Preview on Screen option is selected, and then click the Print button or OK.**

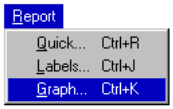
The page of labels is previewed on screen.



3 Click the Stop button to return to the [Albums] Output form.

Graphing Your Data

The 4D Chart Wizard enables you to examine your data with charts and graphs, using the built-in 4D Chart Plug-in. Let's take a look.



► To get to the Chart Wizard:

■ **Choose Graph... in the Report menu.**

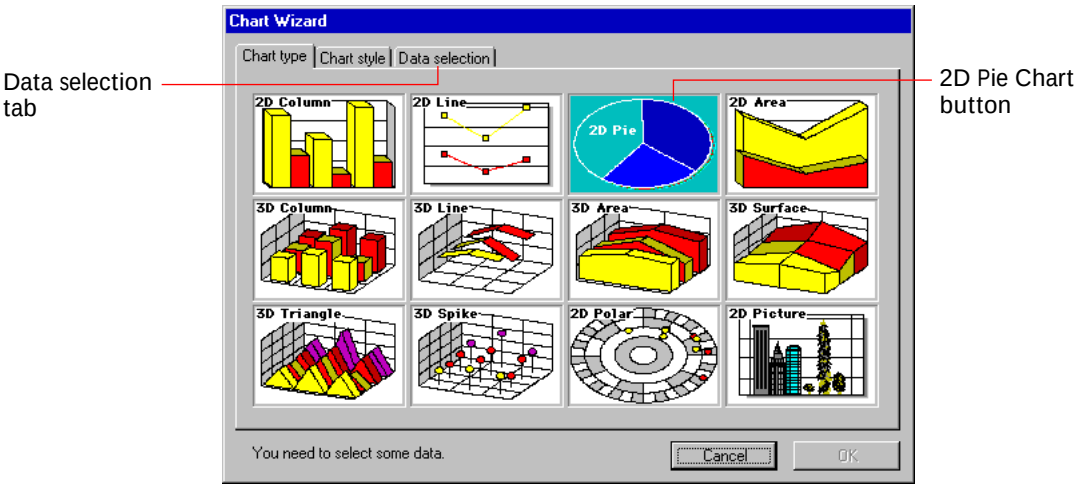
The Chart Wizard appears, showing the Chart type tab.

Creating a Pie Chart

Let's start with a simple, two-dimensional pie chart.

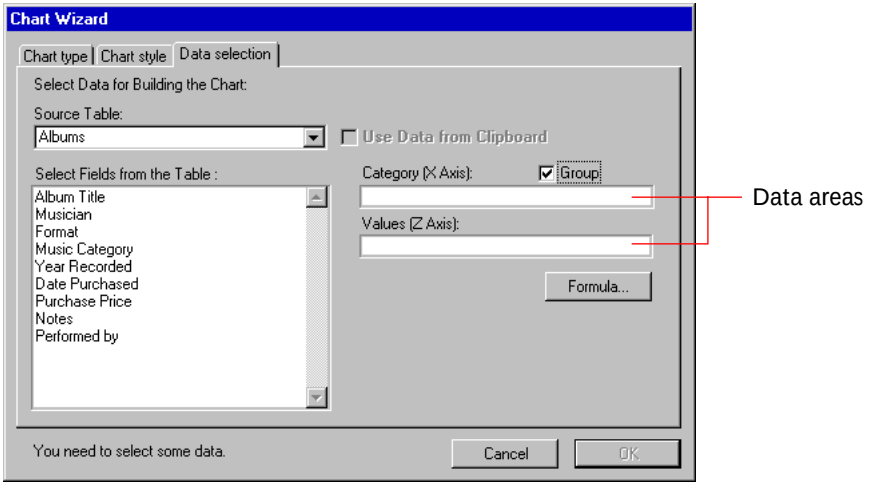
► To create a pie chart:

1 Click the 2D Pie Chart button in the Chart Type tab.



2 Click the Data Selection tab.

The Data Selection window appears.



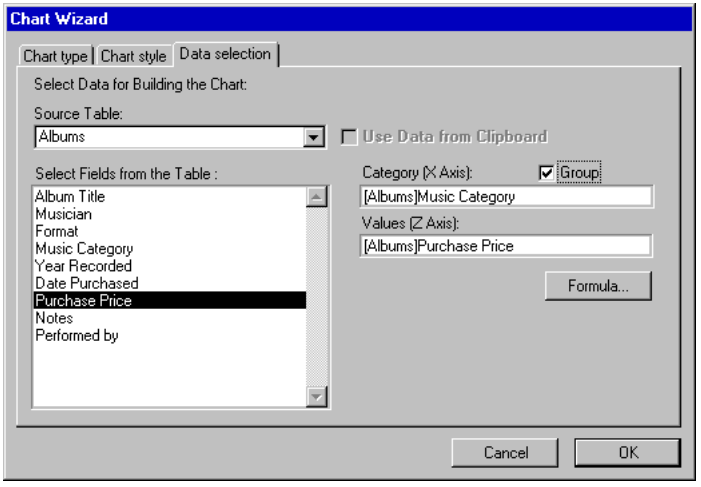
Since this a two-dimensional chart, note that there are two data areas.

You want to see the relative size of your investment in each category of your music collection, i.e., the percentage in Easy Listening, in Rock, in Soul, and so on.

3 Double-click the field [Albums] Music Category.

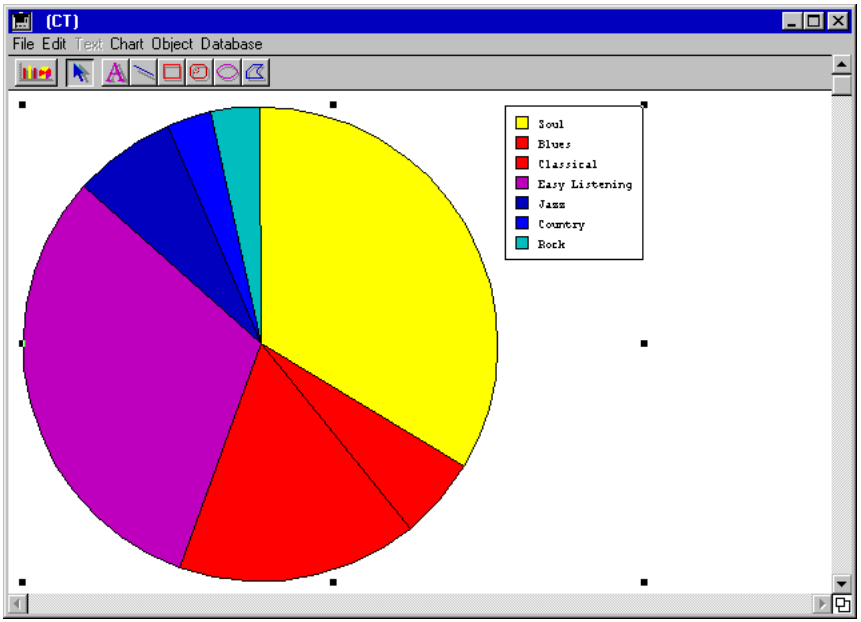
4 Double-click the field [Albums] Purchase Price.

Your choices are entered into the data areas:

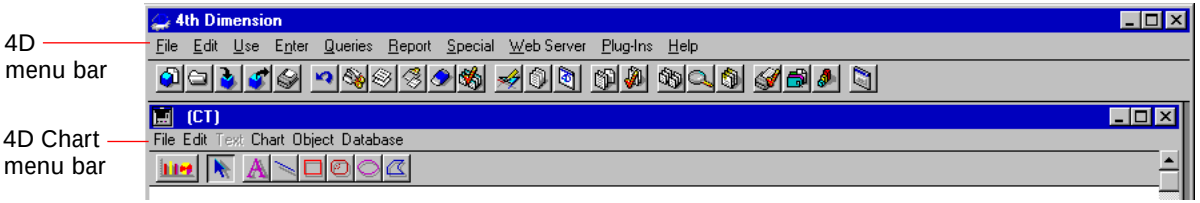


5 Click the OK button.

Your chart looks like this:



6 Choose New in the File menu of the Chart Wizard window.



4D asks if you want to save the changes to the chart.

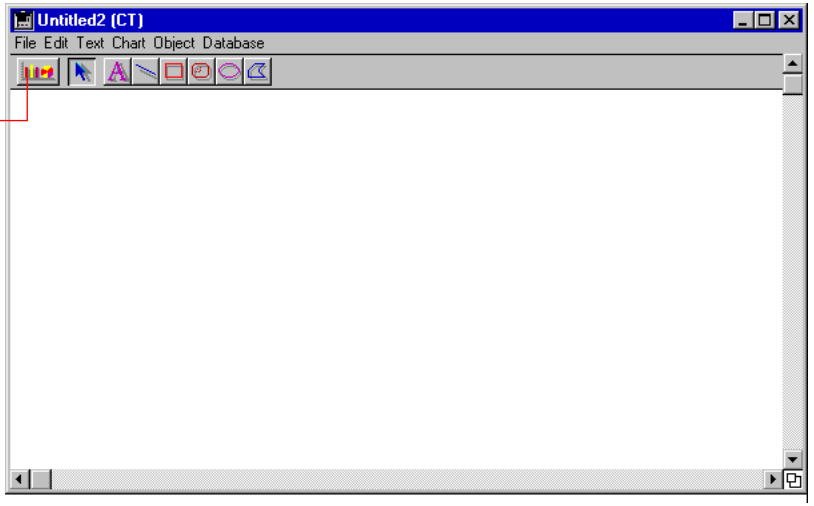
7 Click the Don't Save button.

We will now create another type of chart.

Creating a Three-Dimensional Chart

Suppose you want to create a chart of your dollar investment in your music collection, based on type of music and type of media. You want to see the total investment in rock videos, rock CD's, blues LP records, and so on. Now, you will create a three-dimensional triangle chart.

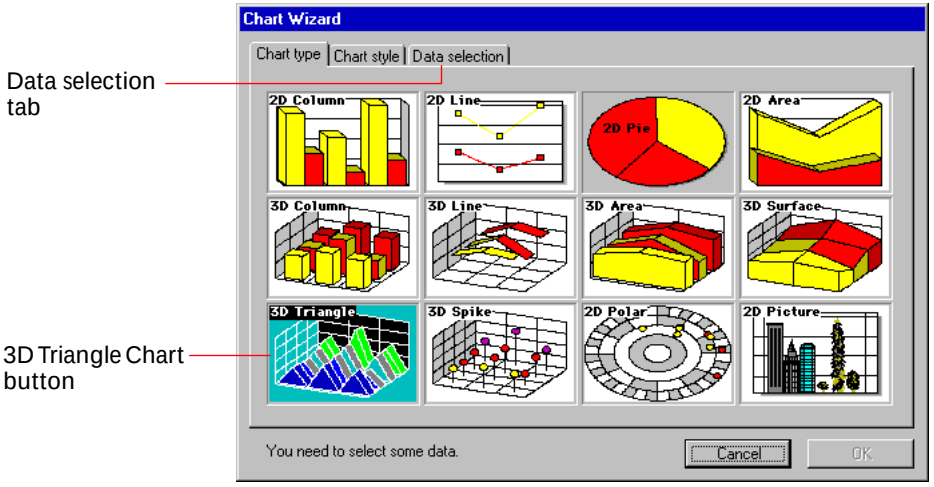
If you are continuing from the previous step, you have a blank chart window on your screen.



► To create a three-dimensional triangle chart:

1 Click the Chart Type icon.

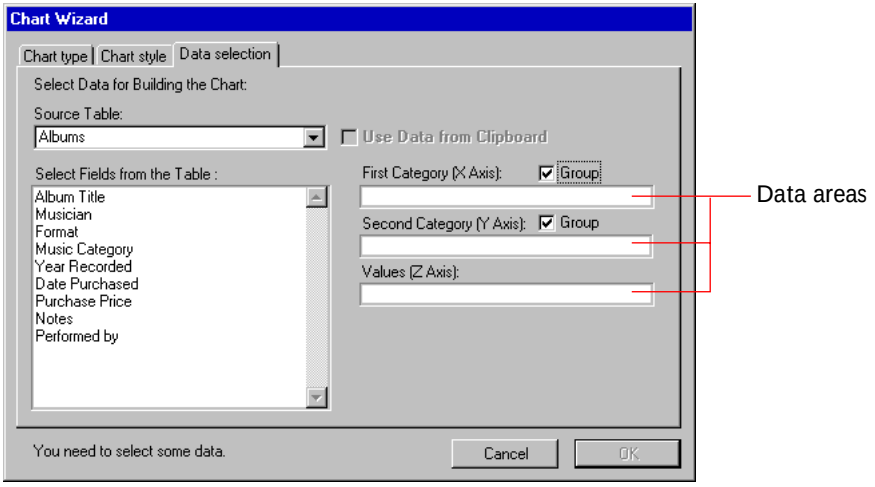
The Chart Wizard appears, showing the Chart Type window.



2 **Click the 3-D Triangle Chart button at the bottom left of the window.**

3 **Click the Data Selection tab.**

The Data Selection window appears. This time it looks different—because you are creating a 3-D chart, there are three data areas.

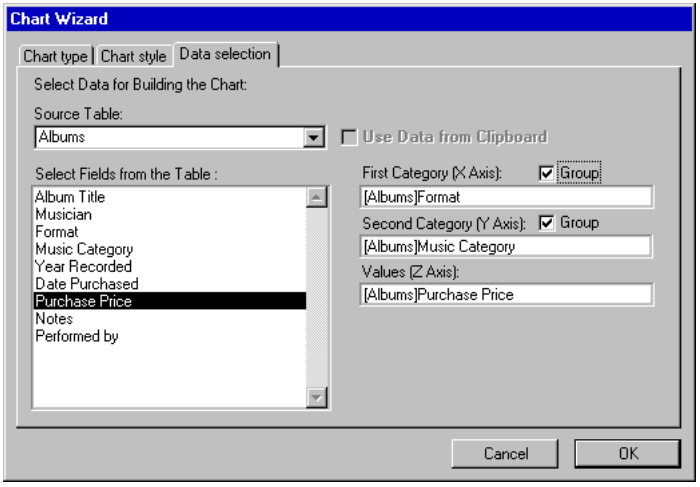


4 **Double-click the field [Albums] Format.**

5 **Double-click the field [Albums] Music Category.**

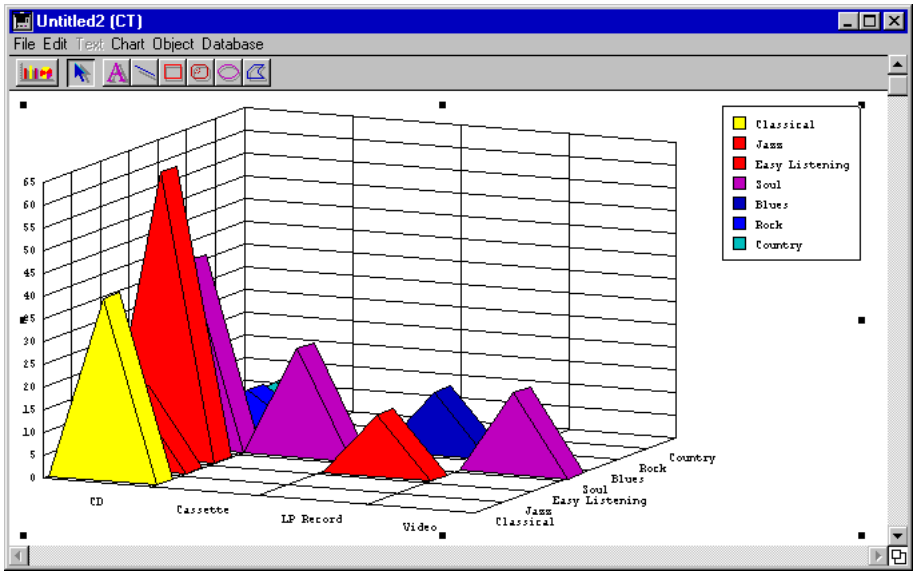
6 **Double-click the field [Albums] Purchase Price.**

Your choices are entered into the data areas.



7 **Click the OK button.**

Your 3-D chart looks like this:



Note Your chart may look somewhat different, depending on how your database categories are arranged.

8 Click the Close Box of the 4D Chart window.

The Close Box is at the top left of the 4D Chart window on the Macintosh, and at the top right of the window on Windows.

4D asks if you want to save the changes to the chart.

9 Click the Don't Save button.

We return to the [Albums] Output form.

Congratulations! You have created your first 2-D and 3-D charts in the 4D Chart Wizard.

May we suggest that you come back to this tool later and explore on your own. You will find that, like the other 4th Dimension Wizards, the Chart Wizard is powerful, flexible, and easy to use.

What's Next?

In the next chapter, you will learn how to publish your music collection on the Web.

Summary

Congratulations! In this chapter, you have learned how to:

- Create a list of your albums, using the Quick Report Editor.
- Print labels for your album collection, using the Label Wizard.
- Create two and three-dimensional charts to see how much you have invested in your collection, using the Chart Wizard and 4D Chart.

If you want to take a break before going to the next chapter, be sure to Quit (Exit) 4D before turning off your computer.

4 Publishing Your Database on the Web

Estimated time to complete: 30 minutes

In this chapter, you will publish your music collection database on the World Wide Web. When you have finished this chapter, you will know how to do the following:

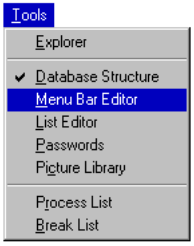
- Create a Custom Menu environment.
- Create web-aware forms.
- Publish the data on the Web.

Creating a Custom Menu Environment

Until now, you have worked in the 4D Design and User environments. Within a Custom Menu environment, you can use special menus that you create for special uses in your database. One of the uses of a custom menu is for publishing databases on the Web.

To publish a 4D database on the Web, you must first create a Custom Menu Environment that will enable you to list your albums by simply selecting a menu command. You create a custom menu item in the Menu Bar Editor; you then create the method for this item using the Method Editor.

Creating a Custom Menu Item

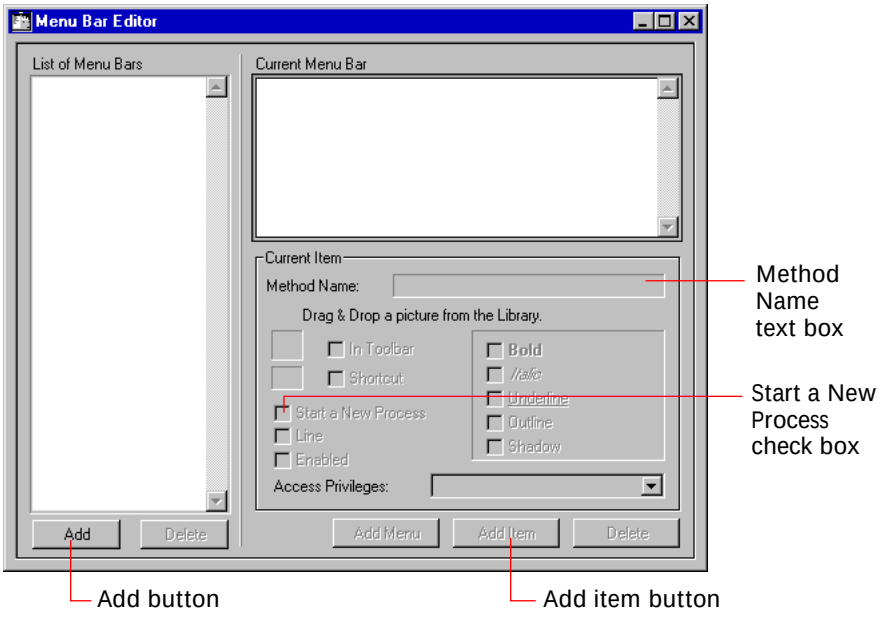


► To create the new menu item:

1 **Choose Design in the Use menu.**

2 **Choose Menu Bar Editor... in the Tools menu.**

The Menu Bar Editor appears.



Now you can create a custom menu item.

3 **Click the Add button in the List of Menu Bars area.**

The name “Menu Bar#1” appears in the list.

4 **Click the Add Item button.**

A text box appears, so you can add an item to the File menu.

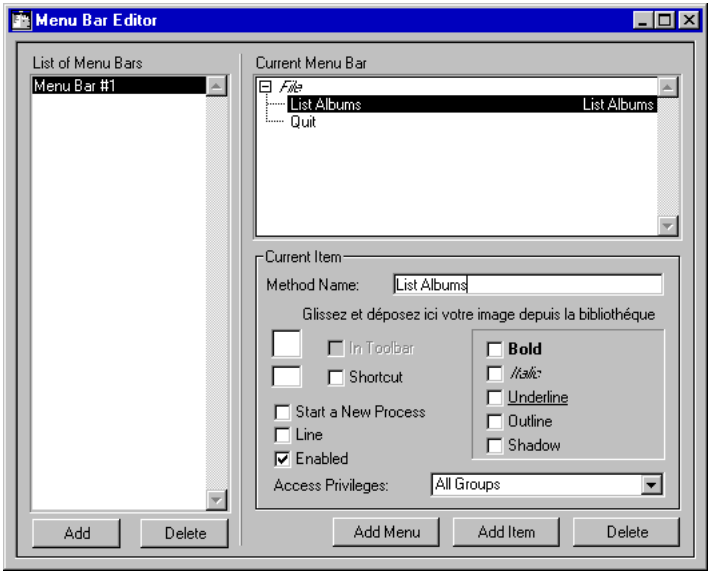
5 **Type the word “List Albums” to name this menu item.**

Now “List Items” is a menu item in the File menu.

6 **Click in the Method Name box and type “List Albums”.**

This associates the menu item with a method, which you will define.

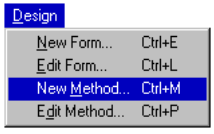
So far, your screen looks like this:



Creating the Method

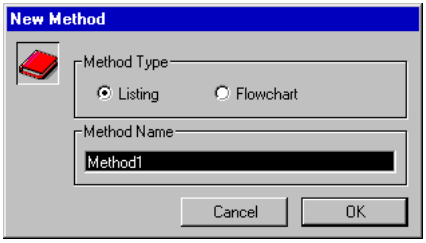
Now you can define the “List Albums” method corresponding to the “List Items” menu item you just created.

► To create the method for the custom menu item:



1 Leaving the Menu Bar Editor open, choose New Method... in the Design menu.

The New Method dialog box appears, so you can name the method. The default name “Method1” is in the text box.

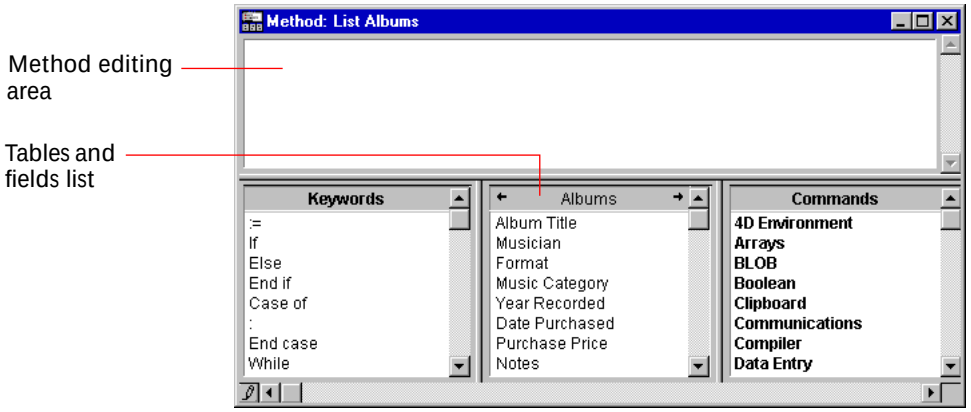


2 Name the method “List Albums”.

The method name must be exactly the same as the method name you type in the Menu Bar editor.

3 Click the OK button.

The Method Editor appears.



In the next few steps, you will create a simple, two-line 4D Method.

4 Type "All Records("

That is, the words "All Records" followed by an open parenthesis symbol.

5 Leave the cursor inserted (blinking) after the open parenthesis symbol, and click on the table name Albums in the Tables & Fields list.

4D inserts the table name [Albums].

6 Type a close parenthesis ")" symbol and press Enter (Windows) or Return (Macintosh).

So far, your method looks like this:

As you can see, 4th Dimension changed the style of the ALL RECORDS command to bold, upper-case.

7 Type "Modify Selection("

That is, the words "Modify Selection" followed by an open parenthesis symbol.

8 Leave the cursor inserted (blinking) after the open parenthesis symbol, and click on the table name Albums in the Tables & Fields area.

4D inserts the table name [Albums].

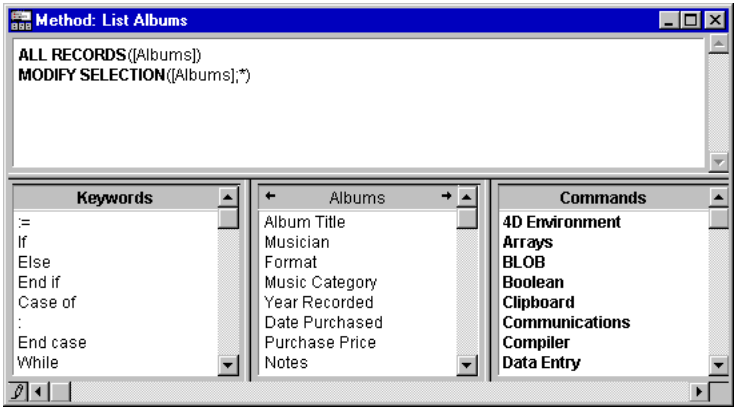
9 Type ";*)"

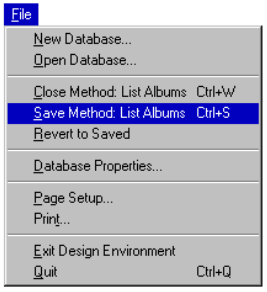
That is, a semicolon, an asterisk, and a close parenthesis symbol.

10 Press Enter (Windows) or Return (Macintosh).

4D changes the words MODIFY SELECTION to all upper-case.

The method editor now looks like this:





11 Choose Save Method: List Albums in the File menu.

12 Click the Close box to close the method window.

The close box is in the upper left on the Macintosh and the upper right on Windows.

13 Close the Menu Bar Editor.

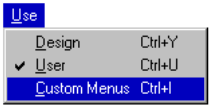
Congratulations! You have just created your first method in 4th Dimension! Now you can go to the Custom Menus environment and test your application.

Testing the Method

► To test your new application:

1 Choose User in the Use menu.

In the User environment, 4th Dimension adds another option to the Use menu—the Custom Menus option.



2 Choose Custom Menus in the Use menu.

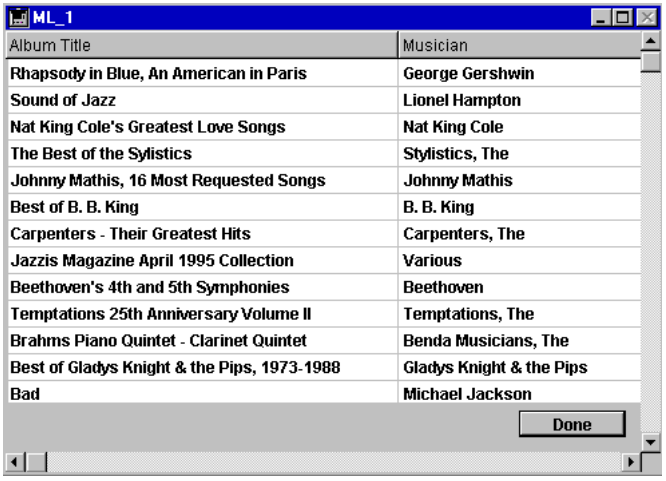
The Custom Menus window appears, showing the 4D logo.

Custom Menus window

3 Choose List Albums in the File menu.

This is your new menu item.

The [Albums] Output form appears.



4 Click the Done button to close the Output form.

4D returns you to the Custom Menus window.

Creating Web-Aware Forms

You can publish any 4th Dimension database on the Web. In this section, you will learn how easy it is to create web-aware forms using the Form Wizard. Any form that you create using the Form Wizard's Web-Aware" template will be optimized for display in Web browsers.

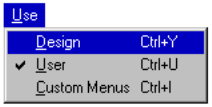
First you will create an Output form, then an Input form.

REMINDER: *The previous exercise left you in the Custom Menus window. In order to create the forms, you must first get back to the Structure window in the Design environment of your database.*

► To get to the Structure window:

1 Choose Quit from the File menu.

4D returns to the User environment.



2 Choose Design from the Use menu.

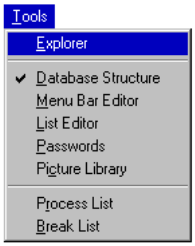
4D returns to the Design environment. The Structure window appears.

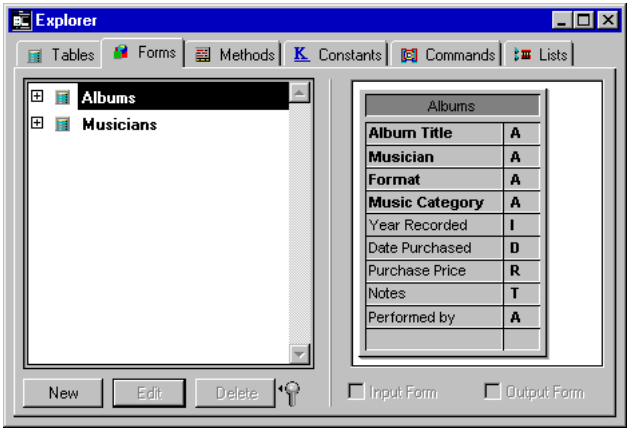
You can now create your web-enabled forms.

Creating a Web Aware Output Form

► To create a web-aware Output form:

1 Choose Explorer in the Tools menu to present the Explorer window.



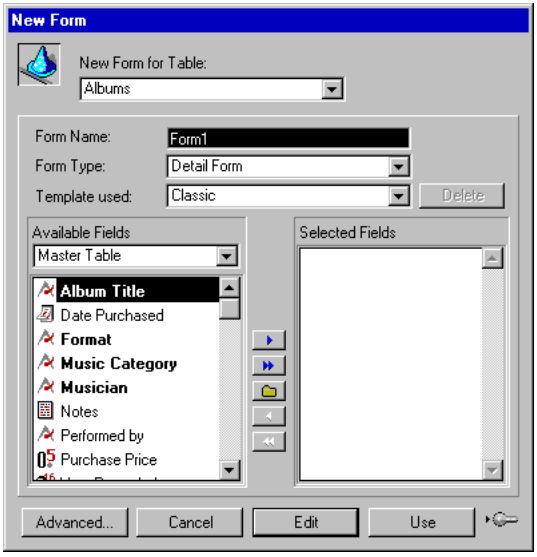


2 Click the Forms tab to bring it to the front.

[Albums] should already be selected.

3 Click the New button.

The Form Wizard appears.



4 Choose Albums in the New Form for Table pop-up menu.

The pop-up may already be set to Albums.

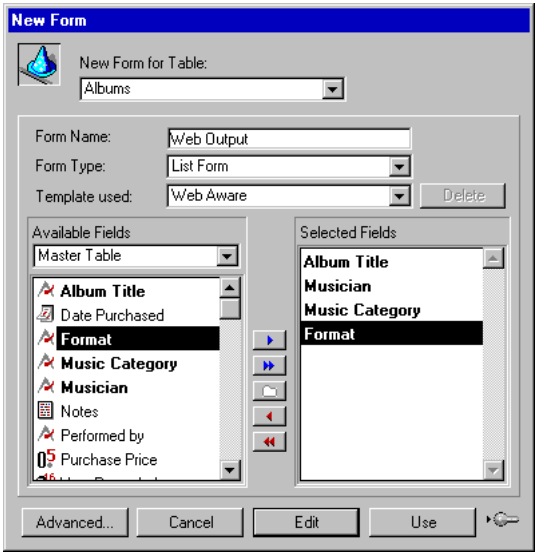
5 In the Form Name: text box, change the form name to "Web Output."

6 Choose List Form in the Form Type pop-up menu.

7 Choose Web Aware in the Template used: pop-up menu.

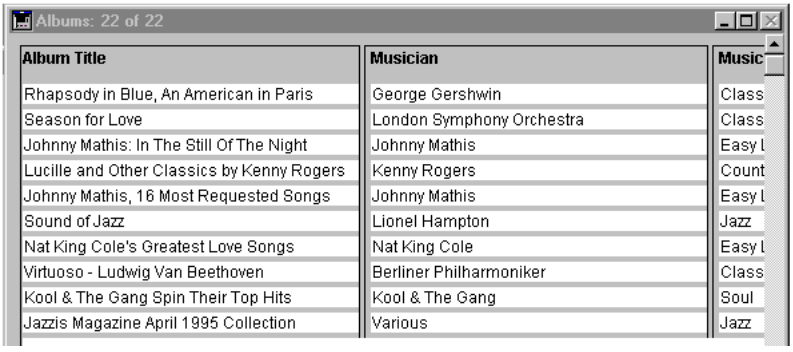
8 In the Available Fields list, double-click the following fields, in order, to add them to the form:
Album Title, Musician, Music Category, Format.

So far, your selections in the Form Wizard look like this:



9 Click the Use button.

4D takes you to the User environment and displays your new web-aware [Albums] Output form. 4D saves it as the current Output form for the [Albums] table.



Whenever you create a new form and click the Use button, 4D automatically takes you to the User environment and sets the form as the Output form or Input form, as applicable.

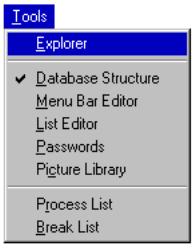
You do not have to be concerned about the width of the form. Any form that you create using the Form Wizard's Web-Aware template will be optimized for display in Web browsers. 4D automatically adjusts the width of the form to fit a standard Web browser when it publishes the form on the Web.

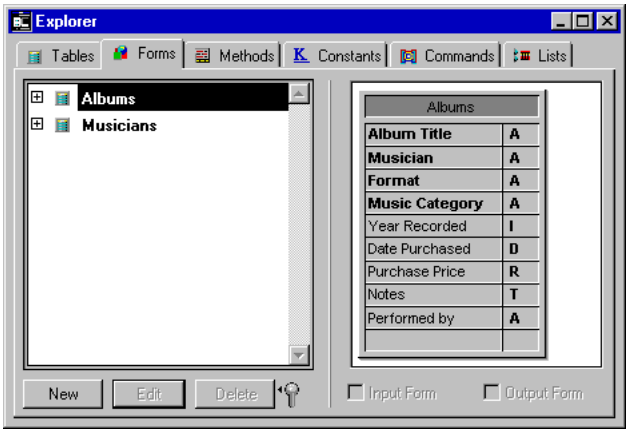
Creating a Web Aware Input Form

► To create a web-aware Input form:

1 Go to the Design environment by clicking on the Structure window or choosing Design in the Use menu.

2 Choose Explorer in the Tools menu to present the Explorer window.



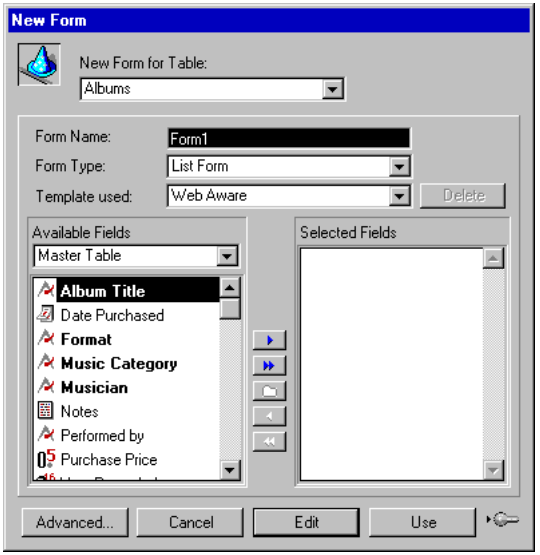


3 Click the Forms tab to bring it to the front.

[Albums] should already be selected.

4 Click the New button.

The Form Wizard appears.



5 Choose Albums in the New Form for Table pop-up menu.

It may already be selected.

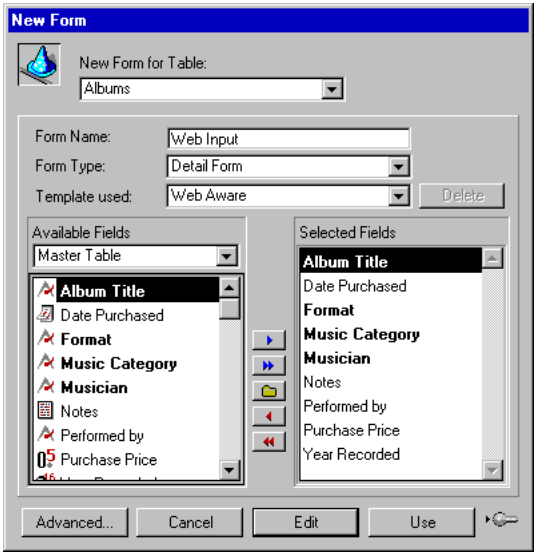
6 In the Form Name: text box, change the form name to "Web Input."

7 Choose Detail Form in the Form Type pop-up menu.

8 Choose Web Aware in the Template used: pop-up menu.

9 Click the Select All Fields button.

Your selections in the Form Wizard look like this:

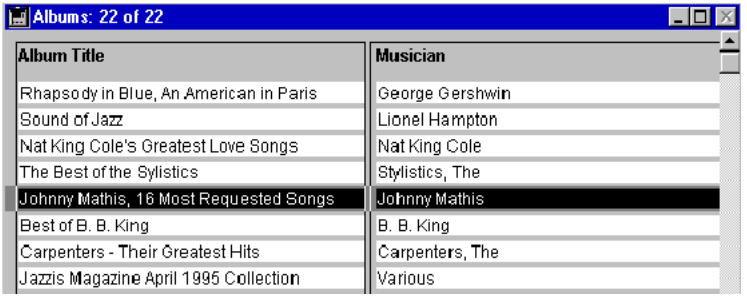


Note For this tutorial, we will use the form with the fields in their automatic order. However, if you want to rearrange the order of the fields on the form, you can do so by selecting a field in the Selected Fields list and dragging it to a different location in the list.

10 Click the Use button.

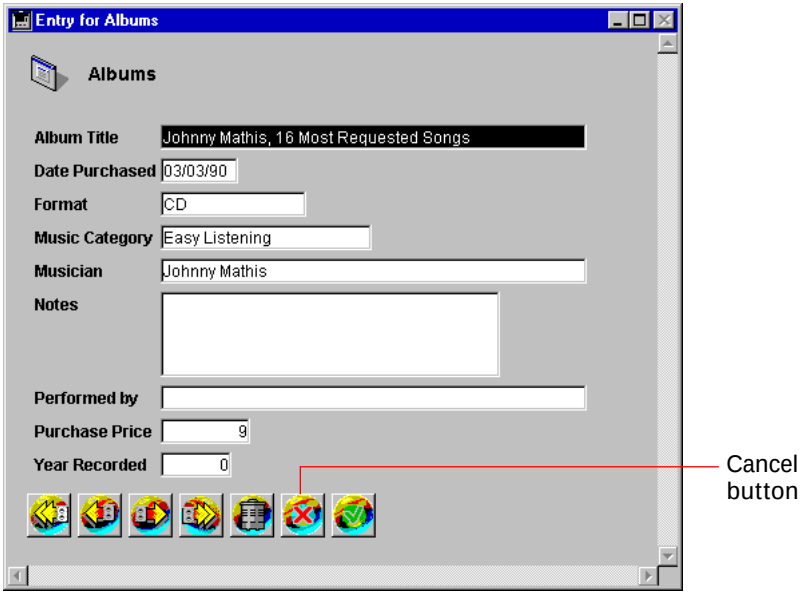
4D saves the form and sets it as your current Input form for the [Albums] table.

4D returns to the [Albums] Output form in the User environment.



11 Double-click an [Albums] record.

Your new web-aware [Albums] Input form appears.



12 Click the Cancel button to return to the [Albums] Output form.

Publishing a 4D Database on the Web

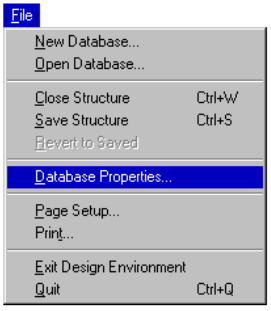
You are now ready to publish your 4th Dimension database on the Web. In order to publish any 4D database on the Web, there are three requirements:

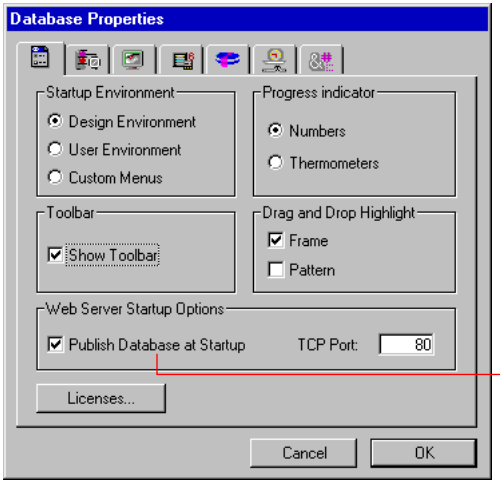
- **Create at least one Custom Menu.**
  You have already done this.
- **Create web-aware input and output forms.**
  You have already done this.
- **In the Database Properties window, select the Web Server Startup option, Publish Database at Startup.**
  4D did this automatically. If you go to the Design environment and choose Database Properties in the File menu, you will see that the Publish Database at Startup option is already selected. Whenever you create a new database in 4D, that Web Publish option is automatically turned on.

► To check the Database Properties.

1 **Go to the Design environment by clicking on any Design environment window, or by choosing Design in the Use menu.**

2 **Choose Database Properties in the File menu.**





3 **Click the Cancel button to return to the structure window.**

Basic Requirements of the TCP/IP Networking Protocol

In addition to the 4D requirements mentioned, there is another requirement in order to publish your 4D database on the Web. You must install the TCP/IP networking protocol into the operating system on your computer.

If you are running 4D on Macintosh, Windows 95, or Windows NT, the TCP/IP networking protocol comes as a part of the operating system. If it is not already installed, you can add TCP/IP to your configuration at no additional cost. If you are running a version of the Windows 3.1X operating system, you will have to purchase a "TCP/IP Stack."

If your TCP/IP connection is an "Intranet" connection (the computers are physically on the same network, perhaps within the same building), you will not need to go through any Internet Service Provider (ISP) in order to publish the database. You just need to set up a valid TCP/IP addressing system. This means that you should make sure that all workstations are in the same Subnet—the first three sets of numbers in the TCP/IP Addresses are identical.

Here is an example of valid TCP/IP addresses within the same Subnet:

Workstation	TCP/IP Address
Web Server	205.178.015.080
Workstation1	205.178.015.199
Workstation2	205.178.015.107

In this case, the Subnet is **205.178.015** and the Subnet Mask is **255.255.255.0**.

4th Dimension TCP/IP Network Component

In order for 4th Dimension to use TCP/IP for networking, the 4th Dimension TCP/IP Network Component must be installed. The following table tells you where the TCP/IP network component must be located.

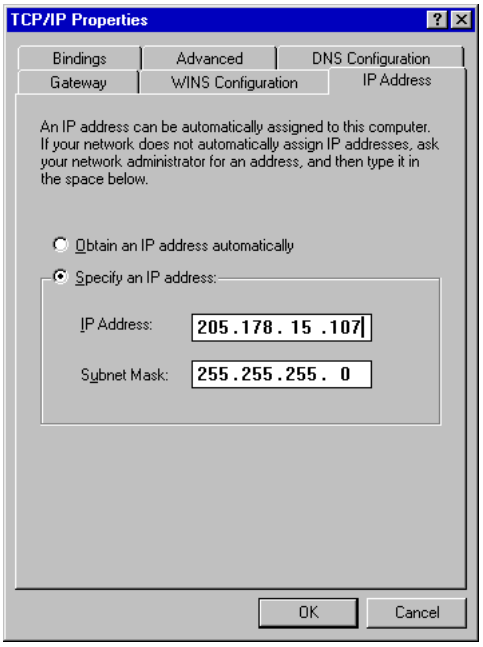
Platform	Location of TCP/IP Network Component
Windows	The C:\Windows\ACI\Network
Macintosh	Embedded inside the 4D application

If you did a normal installation of 4D (not a Custom install), then the TCP/IP Network Component was automatically installed.

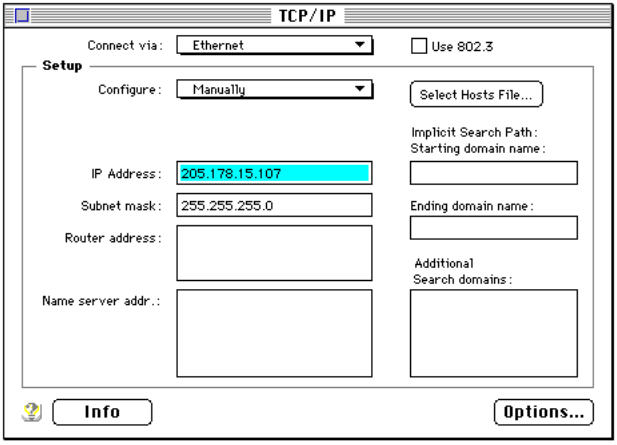
If you have problems with TCP/IP, refer to the *4th Dimension Network Components Addendum*.

If your TCP/IP network components are set up properly, your TCP/IP properties windows should look similar to this.

Windows



Macintosh



Checking Web Services

If you have the TCP/IP Networking Protocol and the 4th Dimension TCP/IP Network Component properly installed on your Web Server machine, then you will be able to use your data over the Web.

If web services are properly initialized as far as 4th Dimension is concerned, the Stop Web Server option in the Web Server menu is enabled and Start Web Server is disabled. If web services are not set properly, the Start Web Server option is enabled.

Publishing Your Data

► To access your data on the Web:

1 **Leave the database MyMusic running on your Web Server machine, and go to a second machine that already has a valid TCP/IP connection to the machine that is running 4D.**

2 **Launch a Web Browser on the second machine.**

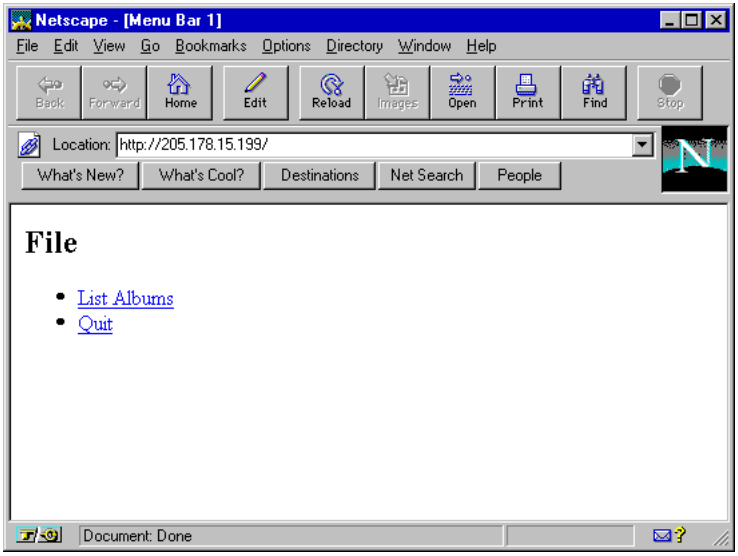
For our example, we will use Netscape Navigator™. Any Web browser will work just as well.

3 **in the browser, type the 4D Web Server's TCP/IP address in the following format: "http://NNN.NNN.NNN.NNN/".**

The "NNN" characters represent the numbers of the TCP/IP address of the Web Server. In our example, we are using the address 205.178.15.199.

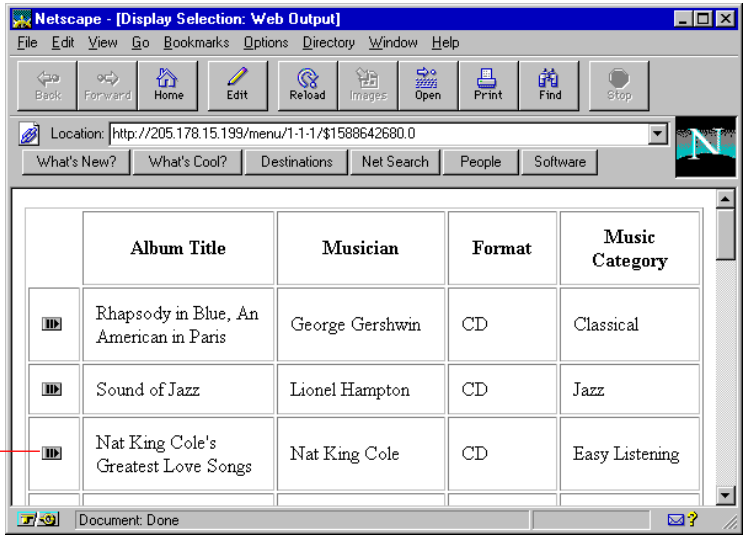
4 **Press the Enter key (Windows) or the Return key (Macintosh).**

In the Web browser, the File menu of your database looks like this:



5 **Click the List Albums menu item.**

The web-aware [Albums] Output form appears:

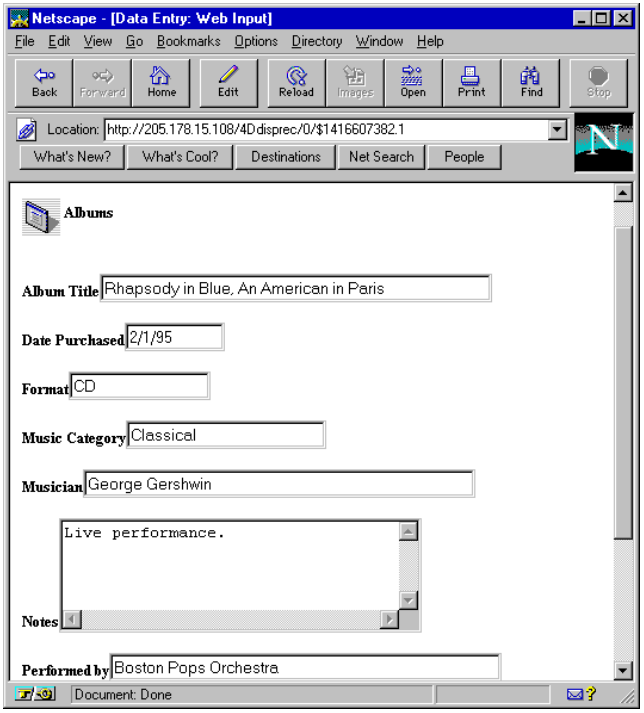


Drill-down button

Note how the columns have been adjusted for display in the Web browser. This is the benefit of using Web-Aware Templates.

6 Click on a record's drill-down button.

The [Albums] Input form appears.



Congratulations! You have published your data on the Web!

For more information about the many options you have when publishing 4D databases on the Web, see the *4th Dimension Design Reference Manual*.

Summary

Congratulations! In less than two hours of practice, you have successfully performed all of the following:

- Created a relational database to track your personal music collection.
- Created custom Input and Output forms to view the data.
- Imported sample data records.
- Created your own custom queries.
- Created a custom report to print a list of your albums.
- Designed your own labels for your CD holders.
- Printed two- and three-dimensional charts to analyze your collection.
- Created a multi-window, custom menu environment for your database.
- Created forms for viewing your data on the World Wide Web.
- Published your database on the Web.

If you want to learn about additional capabilities, refer to the other manuals provided with 4th Dimension.