

SXTWIN

SXT SOFTWARE EXPLORATION TOOLS FOR WINDOWS

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TABLE OF CONTENTS

1 Overview	3
2 Special Features	4
2.1 Integrated browser (32 bit versions only)	4
2.2 Source Code Viewing	8
2.3 Internal Source Code Viewer	9
2.3.1 Functionality	9
2.3.2 External help files	10
3 SXTWIN Versions	10
4 SXTNVIEW	11

1 Overview

All SXT programs (CXT, DXT, FXT, JXT and LXT) are also available in an MS-Windows version. The functionality of the SXT Windows versions is exactly the same as for the SXT command-line text mode versions. But the SXT Windows versions offer many additional features:

- user interface for interactive selection of files and options via pull down menus and dialog windows (double clicks, drag and drop from file manager, ...),
- message window to show user related information, warning and error messages, user can scroll the messages forward and backward with mouse or keyboard (home, end, page up, page down, up, down, left, right, shift left, shift right, control left, control right), output can be switched off to speed up analysis (popup menu 'Info', selection 'Show Messages'),
- related source code for warnings and errors displayed in the message window can be viewed by double clicking on the text,
- information window to show the analysis progress, output can be switched off to speed up analysis (popup menu 'Info', selection 'Show Progress Info'),
- the source code analysis process can be paused / continued, stopped (to continue with output file writing after current file finished) or safely aborted (all results are lost). See selections from popup menu 'Analyze',
- the analysis results can be displayed as a "function / data type call tree" that can be browsed with an integrated tree / list browser, many different views can be selected by context sensitive dynamic popup menus assigned to the right mouse button (Windows 95 / Windows NT version only),
- list browser contents can be exported to a text file or to the clipboard, from where other applications like Excel can import it and display it in a spread sheet
- source code viewing either with integrated viewer or with external application,
- integrated source code viewer is a complete source code browser, the user can navigate by double clicking on function / data type name or by using a caller / callee resp. inherited / derived types list box via right mouse button popup menu, include files can be directly opened,
- selected items in the source code viewer can be used as input for external help files, e.g. to get language specific help for keywords, library functions and so on,
- data tips with filename and line number are displayed for each function / data type in the integrated source code viewer and the tree view browser (note: filenames longer than 80 characters are truncated),
- integrated source code viewer displays colored source code (keywords, strings, comments, ...), colors can be user-defined (similar to the SCC Source Code Colorizer),
- COM / OLE automation interface to use Microsoft Developer Studio as source code viewer (Windows 95 / Windows NT version only),
- user defined working directory to store the analysis results (initialization files, output file, database, ...),
- selections (files, options, working directory, ...) can be stored in and retrieved from used defined initialization files, several initialization files for different projects are possible,
- SXT programs can run simultaneously with other Windows programs,

- the text in the message window can be selected and copied to the clipboard (menu 'Messages'), copying can also be done with key combination "Ctrl-C",
- command line option -BATCH provides batch mode like behavior (program starts, executes the specified commands and closes automatically),
- DLL interfaces to access the generated database from other windows applications, e.g. from your own C/C++ and Visual Basic programs, from MS-Word for Windows, MS-Excel, MS-Access, ...

The SXT Windows programs have version numbers which are different from those of the command line versions. The version number is a combination of two 'major.minor' numbers: the SXT Windows version number followed by the version number of the basic command line version. For example, CFTWIN 1.07-2.33 means: CFT for Windows version 1.07 based on CFT command line version 2.33. The version number is shown in the 'About' Dialog Box.

2 Special Features

2.1 Integrated browser (32 bit versions only)

Since version 1.14 every 32 bit SXTWIN program (CFTWIN, CSTWIN, ...) has an integrated tree / list browser to display functions / data type and file relationships and to view the source code of selected items. The browser can be invoked either after an analysis phase or directly for a selected previously generated database. There are two different browser views:

- **Tree view:** expandable tree view with functions / data types, files or directories, shows either call tree or include file relationships
- **List view:** report list view with functions / data types, files or directories, each of the item related columns can be used as sorting criteria (ascending, descending), an arrow in the column header indicates which column was sorted and in which direction

Each function / data type can be selected and directly viewed in its related source file. By pressing the right mouse button, a dynamically generated context sensitive popup menu appears which lets you select among several options. With this menu you can also switch between the "Tree View" and the "List View" style of the integrated browser.

Popup Menu Descriptions

Besides the menu items described here there are also others which are not described in detail because their meaning is obvious (like "Class Metrics" (CSTWIN / JCTWIN only), "Export", "Reset Tree", "List View", "Tree View" or "Stop Browse").

If a popup menu is related to a selected item (function, type, file), the top line contains the name of the selected item followed by another line with additional information (e.g. filename and line number for types / functions or size and lines for

files). If no item is selected, the top line displays the number of items in the tree view resp. list view. Note that the given number for items in a tree view also includes unexpanded tree nodes, therefore the number of items does usually not correspond to the visible items.

Navigating inside the browser depends on the type of the selected view. By default, the browser is invoked in the item (function / type) calltree view. Expanding such an item displays the CALLED items. If another view is selected, the results have to be interpreted in another way. For example, if "Show Calling Functions", "Show Using Types" or "Show Referencing Files" is selected for a specific item, the tree is reversed and shows the CALLING items (similar to command line option -R). If "Show Type Inheritance" is selected, the tree shows the subclasses (C++ class or struct types) for a selected data type. The results of "exploding" an item depends also on the selected view type. Therefore be sure to interpret the displayed Tree View results in the right way.

Note that not every of the following described popup menu items is valid for every SXTWIN program or in every view and will therefore not always displayed.

Message Window Popup Menu:

MENU ITEM	DESCRIPTION
Analyze	Start source code analysis
Analyze and Browse	Submenu for source code analysis and browse
Browse	Submenu for source code browse
Exit	Exit program

Besides these main selections there is also a status information (inactive, ...). The menu context changes during analysis (stop, continue, ...). If there is a directory selection dialog window, the directory search ALWAYS starts in the directory where the SXTWIN executable file is located!

Popup Submenu "Analyze":

MENU ITEM	DESCRIPTION
Tree View	Start source code analysis and browse results with tree browser
List View	Start source code analysis and browse results with list browser

Popup Submenu "Analyze and Browse":

MENU ITEM	DESCRIPTION
Tree View	Start source code tree browser for previous analysis results stored in a database resp. Browse Info File (extension '.BSC') generated by MS Visual C++ (only CFT / CST)
List View	Start source code list browser for previous

analysis results stored in a database resp.
Browse Info File (extension '.BSC') generated
by MS Visual C++ (only CFT / CST)

TreeView / ListView Window Popup Menus:

Depending on the Window contents there are several different popup menus with different contents.

Popup Submenu for Functions ("Functions ...")

(all SXTWIN programs except CSTWIN / JCTWIN)

MENU ITEM	DESCRIPTION
Show Functions	Show all functions
Show All Items *)	Show all items
Show Defined Functions	Show defined functions
Show Multiple Defined Functions	Show multiple defined functions
Show Undefined Functions	Show undefined functions
Show Used Functions	Show functions with callers
Show Unused Functions	Show functions without callers
Show Undefined Used Functions	Show undefined functions which are used (probably library functions)
Show Unused Defined Functions	Show functions which are defined but not used
Show Prototype-Only Functions	Show functions which are only prototyped but not defined or called
Show Topmost Functions	Show functions without user
Show Max.-Nested Functions	Show functions with maximum nesting level

*) "Show All Items" is only available in FFTWIN

Popup Submenu for Types ("Types ...")

(only CSTWIN / JCTWIN)

MENU ITEM	DESCRIPTION
Show Types	Show all types
Show Defined Types	Show only defined types
Show Multiple Defined Types	Show multiple defined types
Show Topmost Types	Show types without user
Show Max.-Nested Types	Show types without maximum nesting level
Show Class Types	Show classes
Show Structure Types **)	Show structures
Show Union Types **)	Show unions
Show Enumeration Types **)	Show enumerations
Show Interface Types ***)	Show interfaces
Show Type Inheritance *)	Show type inheritance relationships for classes and structures

Show Max.-Type Inheritance *)	Show types with maximum depth inheritance tree
Show Interface Inheritance *) ***)	Show interface inheritance relationships for classes and structures
Show Max.-Interface Inheritance *) ***)	Show interfaces with maximum depth inheritance tree

*) not available in ListView Window

***) only CSTWIN

****) only JCTWIN

Popup Submenu for Files ("Files ...")

MENU ITEM	DESCRIPTION
Show Files	Show all files
Show Processed Files	Show only processed files
Show Include Files	Show only include files
Show Max.-Nested Files	Show files with maximum nesting level for included files

Popup Submenu for selected Functions ("Selected Function ...")

(all SXTWIN programs except CSTWIN / JCTWIN)

MENU ITEM	DESCRIPTION
Show Source	Show related source code for the selected function
Show Related File	Show related file for the selected function
Show Related Directory	Show related directory for the selected function
Show Calling Functions	Show all calling functions of the selected function
Show Called Functions	Show all functions called by the selected function
Explode Function *)	Explode (expand) the complete tree for the selected function

*) "Explode Function" is not available in ListView Window

Popup Submenu for selected Types ("Selected Type ...")

(CSTWIN / JCTWIN only)

MENU ITEM	DESCRIPTION
Show Source	Show related source code for the selected type
Show Related File	Show related file for the selected type
Show Related Directory	Show related directory for the selected type

Show Using Types	Show all using types of the selected type
Show Used Types	Show all types used by the selected type
Explode Type *)	Explode (expand) the complete tree for the selected type

*) "Explode Type" is not available in ListView Window

Popup Submenu for selected File ("Selected File ...")

MENU ITEM	DESCRIPTION
Show File Source	Show related source code for the selected file
Show File Contents	Show all defined types / functions in the selected file
Show File Contents (all)	Show all types / functions found in the selected file
Show Included Files *) **)	Show all files which are included by the selected file
Show Including Files **)	Show all files which include the selected file
Show Files with Referencing Types	Show all files with types / functions using types / functions from the selected type
Show Files with Referenced Types	Show all files with types / functions being used by types / functions of the selected type
Explode File **)	Explode (expand) the complete include file tree for the selected file

*) "Show Included Files" is not available in TreeView Window

**) only CFTWIN, CSTWIN, FFTWIN

***) "Explode File" is not available in ListView Window

Popup Submenu for selected Directory ("Selected Directory ...")

MENU ITEM	DESCRIPTION
Show Related Files	Show all files in the selected directory
Show Related Functions / Types *)	Show all defined functions resp. types in the selected directory
Show Related Functions / Types (all) *)	Show all functions resp. types found in the selected directory

*) depends on SXTWIN application

2.2 Source Code Viewing

For source code viewing there is either an integrated built-in source code viewer with navigating and source code colorizing capabilities or there is the possibility to specify an external application like an editor or word processor for viewing. It is also possible to use Microsoft Developer Studio as source code viewer (Windows 95 / Windows NT only). Microsoft Developer Studio is directly accessed from the

SXTWIN programs via the COM / OLE automation interface to display the source file with the selected item.

Source code viewing can be chosen via the menu item "Browse" and its submenu item "Source View". From menu item 'Info', submenu item "Source View Options" one can either select the internal source code viewer, Microsoft Developer Studio or specify the necessary command line string to invoke an external viewer application. The name of the source code file and the target line number can be defined in C-like format with '%s' (file name) and '%d' (line number). The SXTWIN application builds a command line string by replacing the file name and the line number with the values for the selected item and invokes the application with this command line string.

Following are some examples for such a command line string:

- Command line to invoke the CODEWRIGHT editor (program 'cw32.exe', located in directory e:\prog\cw32):
e:\prog\cw32\cw32 %s -G%d
- Command line to invoke the BRIEF editor (program 'b.exe', running in a DOS box, BRIEF directory in PATH):
command.com /K b -m"goto_line %d" %s
- Command line to invoke WinWord (program 'winword.exe', located in directory 'c:\msoffice\winword '):
c:\msoffice\winword\winword %s

You may find many other applications which can be invoked with a file name and also with a target line number which can co-operate with the SXTWIN programs.

2.3 Internal Source Code Viewer

2.3.1 Functionality

The internal source code viewer is a full source code browser which supports navigating by double clicking on a function / data type name. Source code colorizing can be switched off also via the submenu "Source View". By default, source code colorizing is enabled. The colors can be user defined with option -font@file (similar to the SCC Source Code Colorizer). For best colorizing results use a screen color palette selection with more than 256 colors like high color (16 bit per pixel) or true color (24 bit per pixel).

The internal source code viewer displays only a small part of the source file. To move the view part inside the file to the beginning of the file or forward or backward relative to the current position, press the right mouse button to get a popup menu that lets you chose how to move (top, up, down, bottom). This popup menu provides also access to list boxes with callers / callees of the specific item the cursor is on and to go to these callers / callees. For data types, inherited and derived type list

boxes are displayed. Further, there is the possibility to copy selected lines to the clipboard or to close the source code view window. Selected lines can also be copied with the key combination "Ctrl+C".

2.3.2 External help files

The integrated source code viewer is not only able to display its own information but can also invoke external help files to be searched for information about a selected item. These external help files (extension ".hlp") can be selected via the menu item "Select Help Files" from the "Help" sub menu in the main menu. There is a maximum of 10 different help files that can be displayed (although more than 10 can be selected).

Since the help file names themselves give usually no descriptive information about the help file contents, there is an additional dialog by which it is possible to add manually a description string before the help file name, separated by a semi colon ';'. The popup sub menu then displays these descriptions instead of the help file names. An example could look like that:

```
C/C++ Language Help;d:\msvc15\help\mscxx.hlp
Microsoft Foundation Class Help;d:\msvc15\help\mfc.hlp
Java Development Kit 1.1.5 Help;d:\jdk115\doc\jdk115.hlp
```

If the mouse pointer is over an identifier or keyword and if there are any help files selected, then there is an additional menu item in the popup menu of the source code viewer window which offers these help files in a sub menu by their name. If the user selects one, the windows help system (winhelp.exe, winhlp32.exe) is invoked with that help file and with the selected item from the source code viewer window as a search key. If there is any information found, the help text is displayed. With this feature it is possible to use compiler or vendor specific help files as an additional source of information. Such useful help files are, for example, mfc.hlp (Microsoft Foundation Class Help), mscxx.hlp (Microsoft C/C++ Language and Library Help), win32wh.hlp (Microsoft Windows API Help) or freely available help files for the GNU C/C++ compiler, the Java Software Development Kit or the ISO C++ Standard.

3 SXTWIN Versions

Two types of Windows versions are available:

- 16 bit version for Windows 3.1 / Windows for Workgroups 3.11
- 32 bit version for Windows 95 and Windows NT

The main differences between the 16 bit and the 32 bit SXT versions are the functionality (only the 32 bit versions have integrated tree and list browsers) and the execution speed: the 32 bit versions are approximately 30% to 50% faster.

4 SXTNVIEW

The SXTNVIEW program is a Visual Basic 4.0 sample application (with full VB source code) that demonstrates the use of the DLL-interface for database access. It works with all SXT program databases. SXTNVIEW requires the Visual Basic Run-Time Library VB40016.DLL resp. VB40032.DLL (NOT included in the SXTWIN packages). For more information see the SXTNVIEW documentation.

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