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SIMATIC

ProC/C++ for M7-300 and M7–400 Debugging C Programs

User Manual

This manual is part of the documentation package

with the order number:

6ES7812–0CA01–8BA0

C79000–G7076–C520–01

Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:

Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

Caution

indicates that minor personal injury or property damage can result if proper precautions are not taken.

Note

draws your attention to particularly important information on the product, handling the product, or to a particular part of the documentation.

Qualified Personnel

The device/system may only be set up and operated in conjunction with this manual.

Only **qualified personnel** should be allowed to install and work on this equipment. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct Usage

Note the following:

Warning

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Trademarks

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Preface

Purpose

The information in this manual will enable you to debug programs using the Organon XDB Debugger.

Contents

This user manual describes the Organon XDB Debugger.

The manual provides you with information on the following subjects:

- Organon XDB User Interface
- Organon XDB Commands
- Organon XDB Error Messages

Audience

This manual is intended for STEP 7 users wishing to create and debug C and C++ application programs for SIMATIC M7.

In order to create and debug M7 applications using textual high language programming in C/C++, the following knowledge is required:

- using STEP 7

  A sound knowledge of the STEP 7 standard software is essential for project management, symbol editing and transferring new programs from the programming device to the PLC.

  You will find the relevant information in the STEP 7 User Manual.

- the programming languages C and C/C++

  Knowledge of the programming languages C and C++ is necessary for creating applications. You should also be familiar with the integrated development environment of Borland C/C++.

  You will find the required information in the documentation supplied with Borland C/C++.

Other Manuals

The following table contains a list of manuals you will require in addition to this user manual.

Title	Contents
Standard Software for S7 and M7 STEP 7 User Manual	Installing and using STEP 7
M7-300 and M7–400 Program Design, Programming Manual	Introduction to creating M7 applioca-tions in C/C++
System Software for M7-300 and M7–400 System and Standard Functions, Reference Manual	Descriptions of the RMOS system calls, M7–API library and standard CRUN library
System Software for M7-300 and M7–400 Installation and Operation User Manual	Installing, starting up and operating M7 PLCs
Pro C/C++ for M7–300/400 Writing C Programs	Using the optional Package M7–ProC/ C++ and the Symbol Import Editor
Borland C/C++ Documentation on CD ROM	● C/C++ Programming ● Using the integrated development en-vironment and tools

How to Use this Manual

To enable you to access specific information more easily, this manual con-tains the following access help:

- At the start of the manual you will find a complete list of contents.
- At the start of each chapter you will find an overview of the chapter.

Additional Assistance

If you have any questions regarding the products described in this manual, and cannot find the answers here, please contact the Siemens representative in your area. You can find the address of your local Siemens representative in the appendix “Siemens Companies and Representatives” in the *STEP 7 User Manual*.

If you have any questions or remarks on the manual, please fill out the re-marks format the end of the manual and return it to the address provided. We also invite you to enter your personal opinion of the manual in this remarks form.

We hold training courses to help introduce you to SIMATIC S7 program-mable controllers. For more information, please contact your regional train-ing center or the central training center in D–90327 Nuremberg Germany (Tel. +49 911 895-3154).

Up–To–Date Information

You can find up–to–date information on SIMATIC products from the following sources:

- On the Internet under http://www.aut.siemens.de/
- Via Fax – Polling number +49–8765–9300–5500

In addition, the SIMATIC Customer Support provides up–to–date information and download facilities for users of SIMATIC products:

- On the Internet under http://www.aut.siemens.de/simatic–cs
- Via SIMATIC Customer Support Mailbox under the following number: +49 (911) 895–7100

For dialing into the mailbox use a modem of up to V. 34 (28. 8 Kbps) and set the following parameters: 8, N, 1, ANSI, or alternatively use ISDN (x. 75, 64 Kbps).

The telephone and fax numbers of the SIMATIC Customer Support service are:
Tel: +49 (911) 895–7000
Fax: +49 (911) 895–7002

You may also ask questions directly using E–mail on the Internet or via the above mentioned mailbox.

Contents

Organon XDB User Interface

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1 Organon XDB User Interface

1.1 Starting Organon XDB

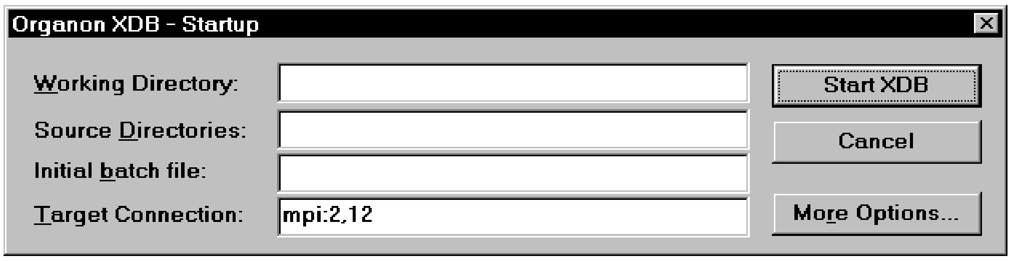
1.1.1 Start-up Dialog

The first thing **Organon XDB** does is reading the Windows registry, which contains information about the preferred window sizes and colors, the directories where the sources of your target program are located, and details of the connection to the target machine. If there are no entries **Organon XDB** starts anyway, using the built-in default values for size and color. The other informations **Organon XDB** needs must be entered by you into the start-up window (see below).

Now the start-up window appears where you enter the information the debugger needs to begin its work. Check the displayed information and modify if necessary.

To start **Organon XDB** click the **Start XDB** button. When you close the start-up window, the registry entries are updated (or created if not present) thereby saving the actual start-up data for the next session.

If you decide not to start, click the **Cancel** button which ends the start-up routine immediately and cancels the session, leaving the start-up data untouched.


Organon XDB - Startup

Working Directory:
Source Directories:
Initial batch file:
Target Connection: mpi:2,12

This is the start-up window. You can enter the following data:

- **Working Directory:** This is the directory **Organon XDB** works in.

- **Organon XDB** assumes all files it wants to read or write to be in the working directory, unless explicitly stated otherwise.

- **Source Directories:** In this field you specify the list of directories where **Organon XDB** looks for source files. The *working directory* is always searched first. So you don't have to enter the *working directory* here again. For all other directories you may write the complete directory path, or the path relative to the *working directory*. If you enter more than one directory, separate them with commas.

- **Initial batch file:** A batch file is a file containing **Organon XDB** commands (see the *Command Reference*). It is a convenient way to store a list of commands you usually issue. If a file name is entered in this line, **Organon XDB** will read and execute this file prior to any command you issue. If the initial batch file is not located in the *working directory*, you may write the complete directory path, or the path relative to the *working directory*.

- **Target Connection:** Here you tell **Organon XDB** how to connect to the target machine. **Organon XDB** expects this information in the following form:

  mpi:<H>,<T>

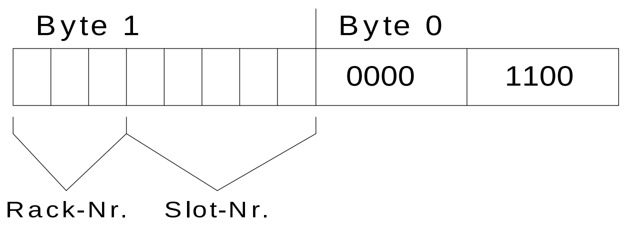
  <H> is the host address of the communication partner in the MPI segment.

  <T> is the TSAP-ID for communication with the terminal server.

  Typical values for all boards connected to MPI or partyline (CPU-4xx, CPU-3xx, FM-3xx) are:

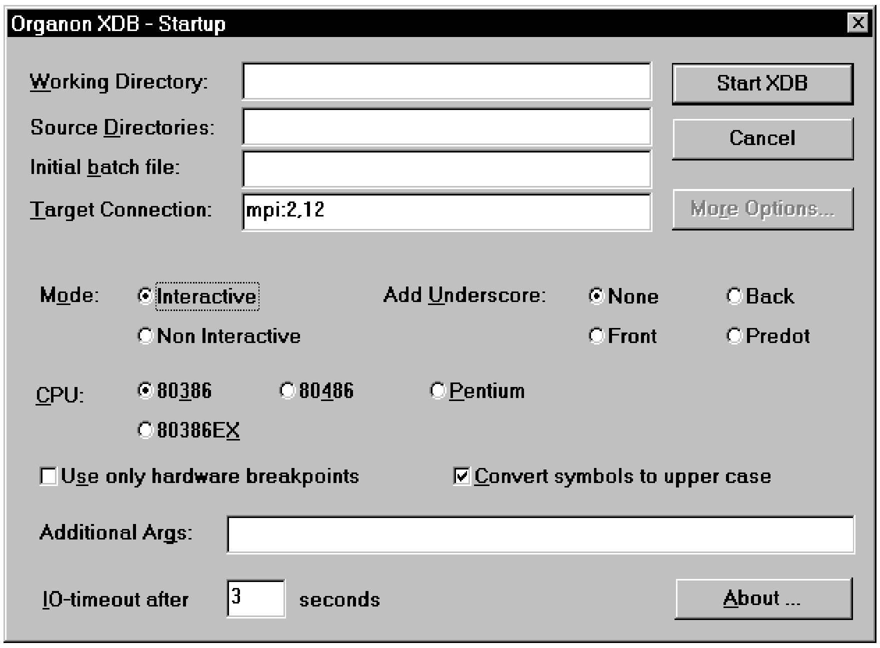
  ```
  mpi:2,12
  ```

  For other communication boards (for example FM-400) the TSAP-ID has to be modified as follows.



  A FM-400 in rack 1 at slot 4 (240CH) has to be addressed with `mpi:2,9228`.

If you click the button **More Options**, the window changes to this:



Organon XDB - Startup

Working Directory:

Source Directories:

Initial batch file:

Target Connection: mpi:2,12

Mode: [✓ Interactive] Non Interactive

Add Underscore: [✓ None] Back Front Predot

CPU: [✓ 80386] 80486 Pentium 80386EX

☐ Use only hardware breakpoints

☑ Convert symbols to upper case

Additional Args:

IO-timeout after 3 seconds

Now you can set or change the following options:

- **Mode:** You can choose between **Interactive** (which is the default value) and **Non Interactive**. In the interactive mode, **Organon XDB** expects you to issue commands, whereas the debugger finishes the session immediately after reading and executing the *initial batch file* if you switch to non-interactive mode.

- **Add Underscore:** Your compiler might change the symbol names by adding an underscore or dot to it, e.g. a procedure you named "init" might be called "init", "_init", "init_", or ".init" in the assembler code. You have to tell **Organon XDB** which way the compiler translating your program uses. The default value is **None**.

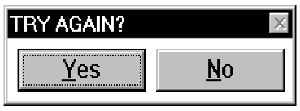
- **CPU: Organon XDB** disassembles opcode due to the instruction set of the chosen processor. During a debug session this option can be modified with the SET OPTION command.

- **Use only hardware breakpoints:** Breakpoints are points which can be set arbitrarily into your program, and whenever the execution of the program meets such a breakpoint, it is stopped at this point, enabling you to examine the state the program is in. **Organon XDB** can simulate breakpoints by maintaining a list of set breakpoints and looking whether the execution encountered one of them. But looking for breakpoint encounters before every step of execution is rather time-consuming, slowing down the execution speed. If you want to use debug register breakpoints only to enhance the performance, choose this option.

- **Convert symbols to upper case:** If you enter this option, **Organon XDB** does not distinguish between symbols written in lowercase and in uppercase. This setting is on by default and must not be changed.

- **Additional Args:** This line allows you to enter all options and arguments which are not displayed in this window.

- **IO-timeout after .. seconds:** If the connection cannot be built up within this amount of time, **Organon XDB** asks whether to try again or to end the session:

  Click **Yes** if you want to continue, or **No** to quit.
  If the connection is established but the target machine does not respond to a request within the amount of time given in this field, **Organon XDB** assumes the connection to be lost and quits the session, issuing an error message in the *command window*.

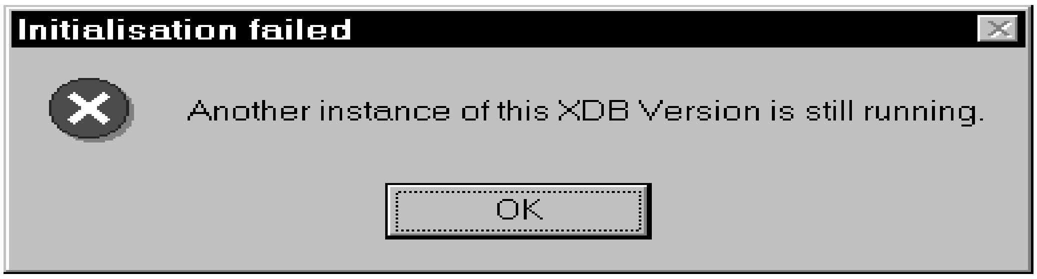
- **About:** Displays the version of **Organon XDB** without the need to start **Organon XDB** and establish a target connection.

When you dismiss the start-up window by clicking **Start XDB**, the debugger will read and execute **your** *initial batch file* (if such a file was specified). Now the file "startup.xdb" is read and executed. This file is located in the installation directory, and it is assumed to be written in the **Organon XDB** command language (see *Command Reference*), like the *initial batch file*. After this file is processed, **Organon XDB** waits for your commands if the mode was set to **Interactive**, or exits if in **Non Interactive** mode.

1.1.2 Starting problems

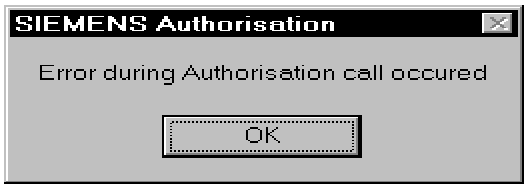
During the start of **Organon XDB** the following problems can occur.

First is when you try to start **Organon XDB** a second time. Doing so the following window appears. In this case exit the running **Organon XDB**.


Initialisation failed

Another instance of this XDB Version is still running.

If Organon XDB can not find the authorization for software package ProC/C++ the following window appears. Check the ProC/C++ installation.


SIEMENS Authorisation

Error during Authorisation call occured

1.2 Description of the Main Window

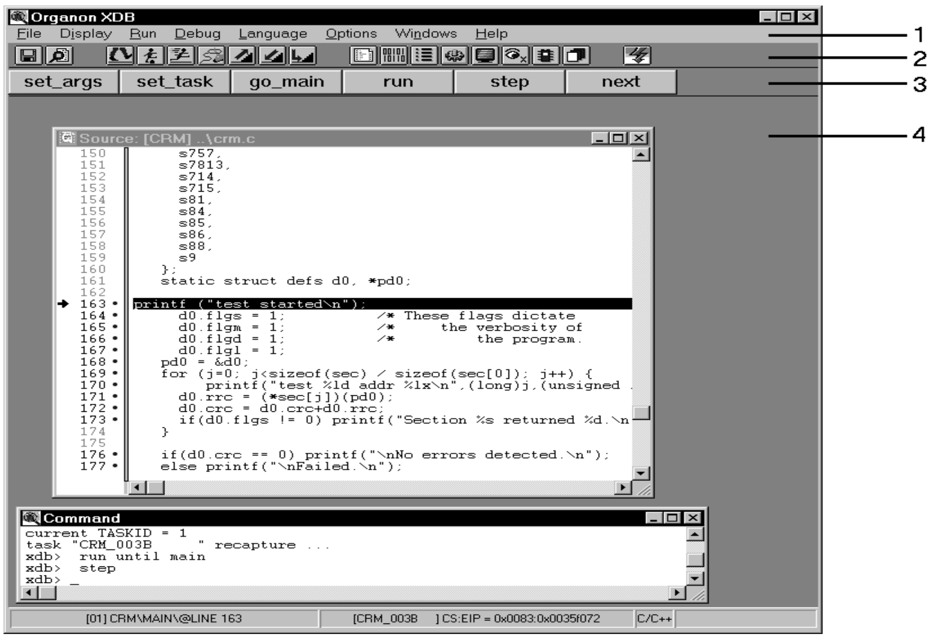
When **Organon XDB** is ready, its main window will appear on the screen. This main window consists of four parts whose elements and functions are described in the following chapters. These parts are:

(1) the menu panel

(2) the tool bar

(3) a panel with user-defined buttons — this panel exists only if there are such buttons

(4) and the subwindow area.



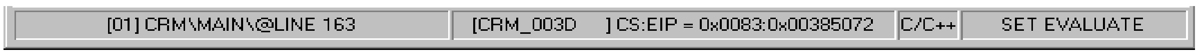
```
 150       s757,
 151       s7813,
 152       s714,
 153       s715,
 154       s81,
 155       s84,
 156       s85,
 157       s86,
 158       s88,
 159       s9
 160     };
 161     static struct defs d0, *pd0;
 162
➔ 163 • printf ("test started\n");
 164 •     d0.flgs = 1;           /* These flags dictate
 165 •     d0.flgm = 1;           /*     the verbosity of
 166 •     d0.flgd = 1;           /*         the program.
 167 •     d0.flgl = 1;
 168 •   pd0 = &d0;
 169 •   for (j=0; j<sizeof(sec) / sizeof(sec[0]); j++) {
 170 •         printf("test %ld addr %lx\n",(long)j,(unsigned
 171 •     d0.rrc = (*sec[j])(pd0);
 172 •     d0.crc = d0.crc+d0.rrc;
 173 •     if(d0.flgs != 0) printf("Section %s returned %d.\n
 174     }
 175
 176 •   if(d0.crc == 0) printf("\nNo errors detected.\n");
 177 •   else printf("\nFailed.\n");
```

```
current TASKID = 1
task "CRM_003B      " recapture ...
xdb>  run until main
xdb>  step
xdb> _
```

```
[01] CRM\MAIN\@LINE 163 | [CRM_003B    ] CS:EIP = 0x0083:0x0035f072 | C/C++ |
```

Chapter 1.2 contains a detailed explanation of the menu items, followed by a description of the tool bar. The subwindows are covered in chapter 1.3.

The status bar at the bottom of the main window shows some general information about the status of the target task and the debugger:



```
[01] CRM\MAIN\@LINE 163 | [CRM_003D    ] CS:EIP = 0x0083:0x00385072 | C/C++ | SET EVALUATE
```

The first field contains the debug info number and the position of the execution (source file name, function name, line number).

The second field shows the task name and the contents of the program counter.

The third field indicates the execution mode **Organon XDB** is in: **C/C++** or **PAS** for source code mode, and **Asm** for assembler mode. If the display is stopped (e.g. by typing <ctrl-S>), the mode field changes to **hold**.

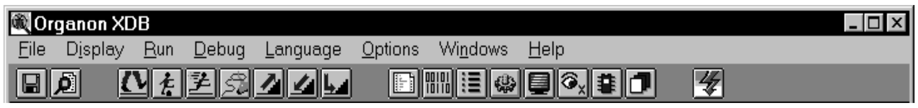
The last field is the status field, telling what **Organon XDB** is doing at the moment.

1.2.1 Menu Panel

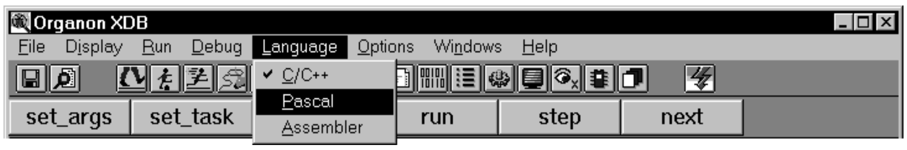
The keywords in this panel give access to the menus listed below. To enter any of these menus, click the appropriate keyword, or type <Alt x>, *x* being the underlined letter in the keyword.

Example:

Organon XDB supports the high level languages C/C++ and Pascal as well as the assembly language. To switch between these languages, perform the following steps:

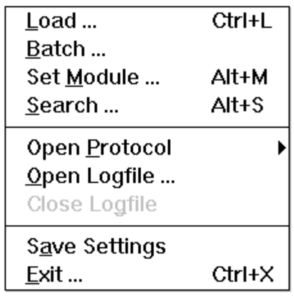


Hit <Alt L>, or click the word "Language" with the left mouse button, to get the language menu.



Now choose one language by clicking it.

1.2.1.1 File



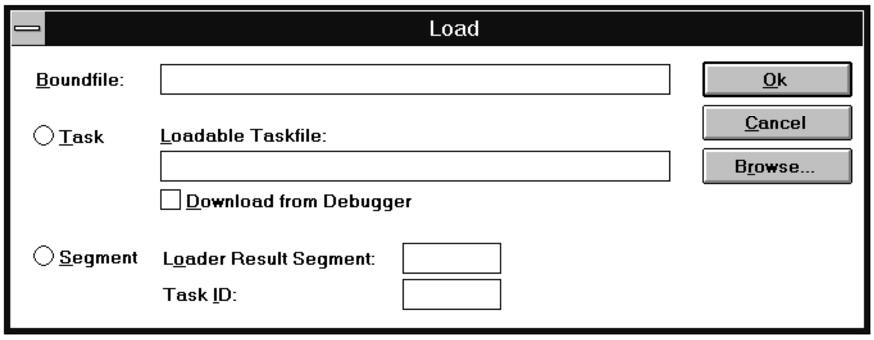
The menu **File** offers the commands you see above. Most of them deal with the handling of files on the host system or the target system. Using this menu, you can load tasks, run **Organon XDB** command files, and load additional modules of the target program. All your activities and the informations **Organon XDB** shows can be written to protocol files for further examination. A quick method to search for certain strings and patterns in the source code of the target program is offered, too. If you have changed the appearance of the **Organon XDB** windows according to your personal taste, you can save these changes for subsequent sessions. And if your work is done, you can end the **Organon XDB** session using the last item of the menu.

You can issue these commands by clicking them, or by hitting the underlined letter while pushing down the <Alt> key. Some commands are linked to "hot keys" so that they can be issued without opening the menu. You see these hot keys on the right side of the menu. For example, you can start a search without opening the file menu just by hitting <Alt S>.

- **Load**

loads the task to be debugged into the debugger. Assuming your next **Organon XDB** session will deal with the same task, the information which files to load are stored in the Windows registry and is read at the beginning of every **Organon XDB** session. In other words, the values you enter now will be the default values for the next **Load**.

The pop-up window that asks for the boundfile and task to be loaded looks like this:



The boundfile is the file which contains the debug information. It is created by the converter and has the suffix ".bd". Enter the boundfile name and the taskfile name, then click **Ok**. You can quit the load mode anytime by clicking the **Cancel** button.

If you are not sure which file to load, the **Browse** button gives you the opportunity to check the existing files. You find a detailed description of the file browser in chapter 1.2.2.

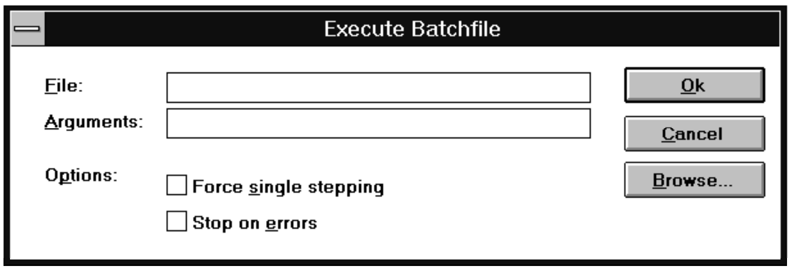
To load a task click the **Task** button and enter the name of the taskfile. The task is supposed to be on the target machine unless you activate the **Download from Debugger** button in which case **Organon XDB** locates the taskfile on the host and downloads it to the target.

You can connect to a task already loaded by clicking the **Segment** button and entering the **Loader Result Segment** (which was displayed when loading or is available through `tcb` low-level debugger command) and the RMOS **Task ID** (see also LOAD in the *Command Reference*).

- **Batch**

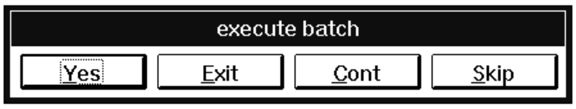
asks for the batch file to be executed, and the arguments to provide it with.

A batch file is a file containing **Organon XDB** commands (see *Command Reference*). It is a convenient way to store a list of commands you usually issue (for example, you always set a breakpoint at the call of a certain subroutine, then let the execution run). As the **Organon XDB** command language can deal with parameters, the batch file can be given arguments these parameters are set to. The commands in the file are executed as if they were typed into the *command window*; however, the **EXIT** command makes **Organon XDB** leave the batch file rather than quit the session altogether.



Enter the file name into the **File** field, and the batch file arguments (if the batch file expects them) into the **Arguments** field. When the **Ok** button is clicked, the execution starts.

If the option **Force single stepping** is activated, the execution stops before every command, and you are asked whether to continue:



The next line of the batch file is displayed (batch arguments and macros are already expanded) in the *command window.* Click **Yes** (or hit <Alt Y>) to execute it, or click **Exit** (resp. hit <Alt E>) to quit the execution of the batch file. **Cont** (or <Alt C>) ends the single step mode, i.e. the rest of the batch file is executed without further questions. If you want **Organon XDB** not to execute the command on display but to continue the single step execution with the next command of the batch file, click **Skip** (or hit <Alt S>).

If the command **Organon XDB** reads from the file is syntactically wrong, you are not asked whether to execute it. Instead, **Organon XDB** tries to find the next correct command in the file and continues the single step execution here. Depending on the sort of error in the batch file, **Organon XDB** might skip one or more correct commands until it finds a point to recover.

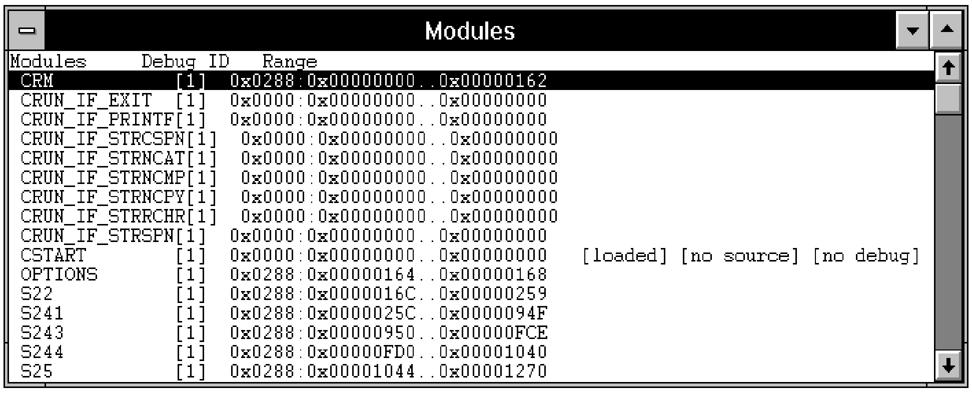
If an error occurs during the execution of the batch file, the rest of the batch file is still executed, unless the option **Stop on errors** was activated. In this case, **Organon XDB** skips the rest of the batch file.

Anyway, if an error is detected in the batch file, **Organon XDB** issues an error message in the *command window*, telling you the batch file line where this error was found, and the sort of error detected.

You can choose among the existing batch files by clicking the **Browse** button. You find a detailed description of the file browser in chapter 1.2.2.

- **Set Module**

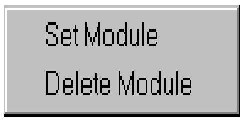
shows a list of the modules of the task to be debugged.



```
Modules      Debug ID   Range
 CRM              [1]   0x0288:0x00000000..0x00000162
 CRUN_IF_EXIT     [1]   0x0000:0x00000000..0x00000000
 CRUN_IF_PRINTF[1]      0x0000:0x00000000..0x00000000
 CRUN_IF_STRCSPN[1]      0x0000:0x00000000..0x00000000
 CRUN_IF_STRNCAT[1]      0x0000:0x00000000..0x00000000
 CRUN_IF_STRNCMP[1]      0x0000:0x00000000..0x00000000
 CRUN_IF_STRNCPY[1]      0x0000:0x00000000..0x00000000
 CRUN_IF_STRRCHR[1]      0x0000:0x00000000..0x00000000
 CRUN_IF_STRSPN[1]      0x0000:0x00000000..0x00000000
 CSTART           [1]   0x0000:0x00000000..0x00000000   [loaded] [no source] [no debug]
 OPTIONS          [1]   0x0288:0x00000164..0x00000168
 S22              [1]   0x0288:0x0000016C..0x00000259
 S241             [1]   0x0288:0x0000025C..0x0000094F
 S243             [1]   0x0288:0x00000950..0x00000FCE
 S244             [1]   0x0288:0x00000FD0..0x00001040
 S25              [1]   0x0288:0x00001044..0x00001270
```

The display shows the names of the available modules and their memory addresses. By a double-click the module is loaded. The *source window* (see chapter 1.3.2) shows the source code of this module, and the scope is set appropriately.

If you click the window with the right mouse button the following menu appears.



- **Search**

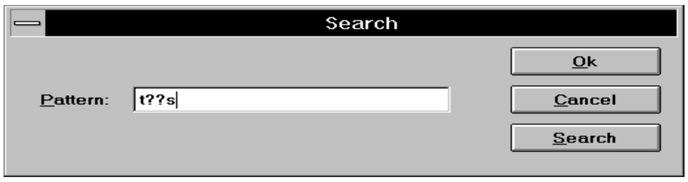
This menu item searches for a specified pattern in the source code of the module displayed in the *source window*. If the end of the module is encountered, a message is issued in the *command window*, and the search starts at the top again. The metacharacters "**?**" (matches any character) and "*****" (matches any string) are recognized.

The *source window* displays the appropriate part of the source code, coloring the line containing the matching string in the *enhanced color* (see menu item "*Options / Edit Colors*", chapter 1.2.1.6).

Note that the search always starts at the beginning of the source code unless you search again for the same pattern (in which case the search starts at the line after the one where the last matching string was found).

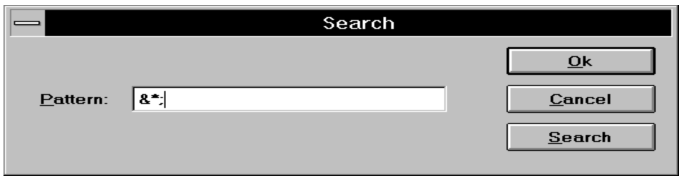
The search algorithm distinguishes between uppercase and lowercase unless **Organon XDB** was started with the option **Convert symbols to upper case**.

Examples:



Pattern: t??s

Search for all strings starting with "t", followed by two unspecified characters and a "s". This search will find the strings "this", "those", "it is", for example.



Pattern: &*;

Search for an ampersand ("&") and a semicolon which are separated by an unknown number (possibly 0) of unknown characters, i.e. letters, digits, spaces, etc. The following strings (and many more) match this search pattern:

```
&;
&x;
& pointer_7 ;
```

- **Open Protocol**

opens an output file to protocol the debug session. This feature enables you to write important informations into files for further examination. Choose between the following protocol modes:

All to get a complete protocol. All information is just written into this protocol, even if some of the other protocols are opened.

Command to protocol the commands given in the *command window* (see chapter 1.3.1).

Source to copy the source code lines executed into the protocol file.

Assembler to protocol the executed line of the *assembler window* (see chapter 1.3.3).

Trace to copy the contents of the *trace window* (see chapter 1.3.9).

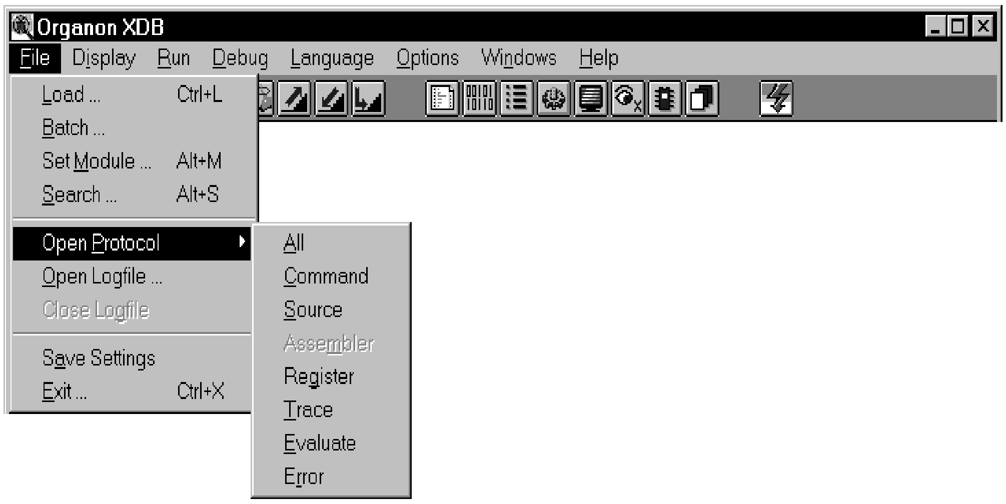
Evaluate to protocol general information messages (as opposed to error messages) as shown in the *command window* (see chapter 1.3.1).

Error to protocol all error messages.

Click the type of protocol you want, and the *file browser* (see chapter 1.2.2.1) is invoked. Choose the directory where you want the protocol file to be in, then enter the file name.

Example:

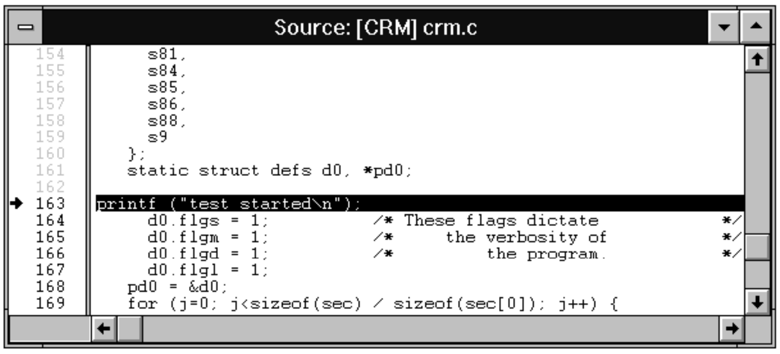
You have already opened an assembler protocol. Now you wish to protocol the commands you want to issue. After hitting <Alt F> and <Alt P> (or clicking the appropriate keywords), you see this:



You see the menu **File** and its submenu **Open Protocol**. The keyword **Assembler** is disabled because this protocol is opened already.

Now click the keyword **Command** or type <Alt C> to open the protocol file.

Imagine the *source window* looking like this:



```
      s81,
      s84,
      s85,
      s86,
      s88,
      s9
    };
    static struct defs d0, *pd0;

printf ("test started\n");
      d0.flgs = 1;          /* These flags dictate         */
      d0.flgm = 1;          /*     the verbosity of        */
      d0.flgd = 1;          /*         the program.        */
      d0.flgl = 1;
    pd0 = &d0;
    for (j=0; j<sizeof(sec) / sizeof(sec[0]); j++) {
```

Now you perform the following steps:

You open a source code protocol file by hitting <Alt F> <Alt P> <Alt S> before you type

```
step;  eval d0
```

into the *command window*. After examining the value of the variable d0 you click the line 168 in the *source window*, then you hit <ctrl-N> (shortcut for **Run until**) to let the execution continue to this line. After you end the session by typing "exit", the command protocol file looks like this:

```
! ! creation date: Thu Feb  9 14:23:51 1995
SET PROTFILE/WINDOW=SOURCE/OVERWRITE  "C:/ORGANON/CHECK/PROT.SRC"
step; eval d0
run until @line 168
exit
```

The source protocol file contains the lines where the execution stopped:

```
!(SRC) creation date: Thu Feb  9 14:24:41 1995
!
!(SRC)  CRM\@line 164
!(SRC)      d0.flgs = 1;          /* These flags dictate            */
!(SRC)  CRM\@line 168
!(SRC)    pd0 = &d0;
```

The assembler protocol contains the assembler instructions where the execution stopped (or nothing if the *assembler window* was hidden):

```
!(ASM) creation date: Thu Feb  9 14:20:16 1995
!
!(ASM) 0188:0000001D: C7 05 70 00     MOV  DWORD PTR DS:MAIN+$00000070,$00000001
!(ASM) 0188:00000045: C7 05 90 00     MOV  DWORD PTR DS:MAIN+$00000090,$00000054
```

- **Open Logfile**

All commands written into the *command window* are copied into the logfile so that it can be used later as a *batch file* to repeat the session. Some restrictions apply when using logfiles as *batch files* if **XDB** works in the multitasking mode. If you issue this command, the *file browser* (see chapter 1.2.2.1) is invoked. Choose the appropriate directory, then enter a file name. Because opening a logfile that existed already will destroy the contents of the old file, you will be asked to confirm this.

- **Close Logfile**

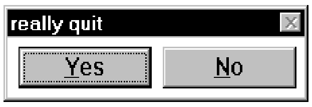
Closes the logfile. None of the following commands will appear in the logfile.

- **Save Settings**

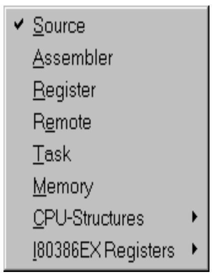
Saves the colors, fonts, and window positions for subsequent sessions. These informations are written into the Windows registry. You are asked to confirm this to avoid an accidental change.

- **Exit**

Ends the **Organon XDB** session, closing all output files still open. You are asked to confirm the exit to assure you really want to leave **Organon XDB**.



1.2.1.2 Display



This menu allows the opening (or closing, if already open) of several subwindows. For a detailed description of these windows see chapter 1.3. Windows are checkmarked in this menu if they are currently open.

You can open/close these subwindows by clicking their names in the menu, or by hitting the underlined letter while pushing down the <Alt> key. For example, hit <Alt A> to open the *assembler window*.

- **Source**

Displays or hides the *source window* which shows the source code of the task you debug.

- **Assembler**

Displays or hides the *assembler window* which shows the assembly code of the task you debug.

- **Register**

Displays or hides the *register window*.

- **Remote**

Displays or hides the *remote system window* which gives access to the target system.

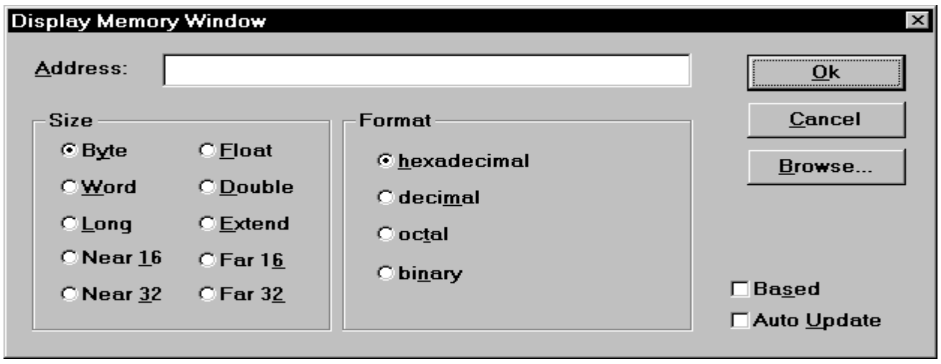
- **Task**

Displays or hides the *task window* which shows all the tasks **XDB** knows about.

- **Memory**

Choosing this item causes the creation of a new *memory window*. Note that more than one *memory window* may be open.

When you select the item „Memory", the following dialog box pops up:



Enter the memory address and choose the size and the format the memory contents are to be displayed in. The **Browse** button summons the **XDB** symbol browser. You find a detailed description of the symbol browser in chapter 1.2.2.

Updating the *memory window* automatically whenever the contents of the memory are changed might reduce the performance; thus you can choose whether the *memory window* is to be updated automatically by activating the **Auto Update** checkbutton.

If the start address of the *memory window* is not a constant expression, you may want the memory window to follow whenever the value of the expression changes. In this case, activate the **Based** checkbutton to set the *memory window* to the so-called *based mode*.

Example:
Define a debugger variable called `MEMSTART` with the initial value 3 by issuing the following line in the *command window*:

```
DEFINE SYMBOL /VALUE=3 MEMSTART
```

Now create a *memory window* in based mode with the start address

```
0x1000 * @MEMSTART
```

and the new *memory window* starts at address 0x3000. Now change the value of the variable by typing

```
SET VALUE @MEMSTART = 5
```

into the *command window*, and the *memory window* displays the memory starting at address 0x5000.

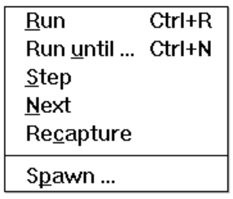
- **CPU-Structures**

This item enables you to manipulate some CPU-specific data. This feature is available for Intel processor targets only. See chapter 1.4 for a detailed description.

- **I80386EX Registers**

This item enables you to manipulate some CPU-specific data. This feature is available for Intel 386EX targets only.

1.2.1.3 Run



This menu offers several ways to execute the target program. The execution can be continuous or stepwise. You can also issue commands to the host system. If the connection between host and target is noisy, it can be reestablished.

You can issue these commands by clicking them, or by hitting the underlined letter while pushing down the <Alt> key. Some commands are linked to "hot keys" so that they can be issued without opening the menu. You see these hot keys on the right side of the menu. For example, you can start the execution without opening the **Run** menu just by hitting <ctrl-R>.

- **Run**

Execute the target program. The execution stops if a breakpoint or watchpoint is encountered.

- **Run until ...**

Executes the target program until a certain condition is true. Possible conditions are

Line: The execution reaches the specified line of code (Note that this line is not executed).

Expression: The location denoted by the expression is reached. The execution stops immediately before this location is executed. For example, if the *current line* (i.e. the next line to be executed) is line 100, the expression

```
@LINE ( @SOURCELINE + 10 )
```

makes **Organon XDB** continue the execution until line 110 is reached.

Blockend: The end of the block is reached. A block is a number of statements which are bundled together, e.g. statements enclosed in braces ("**{}**") in a C program.

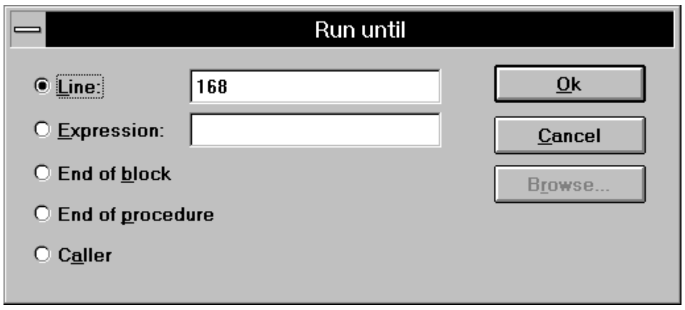
Procend: The end of the procedure is reached. The next step of execution will be the jump back to the calling routine. If this command is issued while the execution is in the main routine, it continues until the end of the program is reached.

Caller: Run until the calling routine is reached (useful in subroutines only).

If the condition is true already when you issue this command (e.g. run until line 50 when the *current line* is line 50), the execution stops immediately, i.e. nothing is done.

Note that the execution stops if a breakpoint or a watchpoint is encountered regardless of the condition you chose.

Example:



As the line pointer of the *source window* marks the source code line 168, **Organon XDB** suggests to execute until this line. You can confirm this by clicking the **Ok** button or hitting <Return>, or you can enter another line number or choose any other condition. **Browse** invokes the symbol browser which is explained in chapter 1.2.2.2.

By default, the **Line** checkbutton is activated. You can enter the line number and click the **Ok** button, or choose one of the other conditions. **Browse** invokes the symbol browser which is explained in chapter 1.2.2.2.

- **Step**

Execute the next instruction. If a subroutine call is encountered, the execution stops at the first instruction of the subroutine. If **Organon XDB** is in assembler mode, “instruction“ means “assembler instruction“, otherwise the next source code instruction is executed.

- **Next**

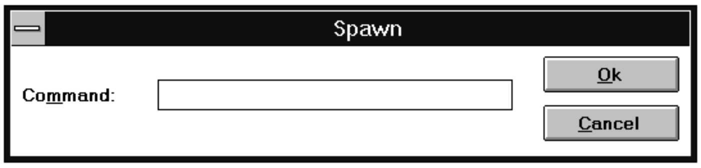
Execute until the next line of code. If a subroutine call is encountered, the whole subroutine is executed. If **Organon XDB** is in assembler mode, “line of code“ means “assembler instruction“, “source code line“ otherwise.

- **Recapture**

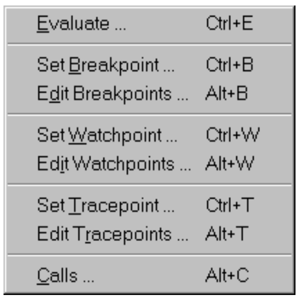
Organon XDB tries to restore the current situation. Therefore **Organon XDB** disregards the current status information (e.g. register values, task states) and does an update from the target. Useful if the connection between host and target is noisy. This functionality is also available via the command SET TASK /SET (see *Command Reference*).

- **Spawn**

Opens a window in which a command to the host system can be issued. Type the command into the pop-up window, then click **Ok**, and the command will be transferred to the command interpreter of your host machine.



1.2.1.4 Debug


Evaluate ... Ctrl+E
Set Breakpoint ... Ctrl+B
Edit Breakpoints ... Alt+B
Set Watchpoint ... Ctrl+W
Edit Watchpoints ... Alt+W
Set Tracepoint ... Ctrl+T
Edit Tracepoints ... Alt+T
Calls ... Alt+C

The menu items described in this chapter allow you to evaluate expressions (and watch the variables of the target program), display the stack of procedure calls, and to manipulate breakpoints, watchpoints, and tracepoints (features which are explained also in this chapter).

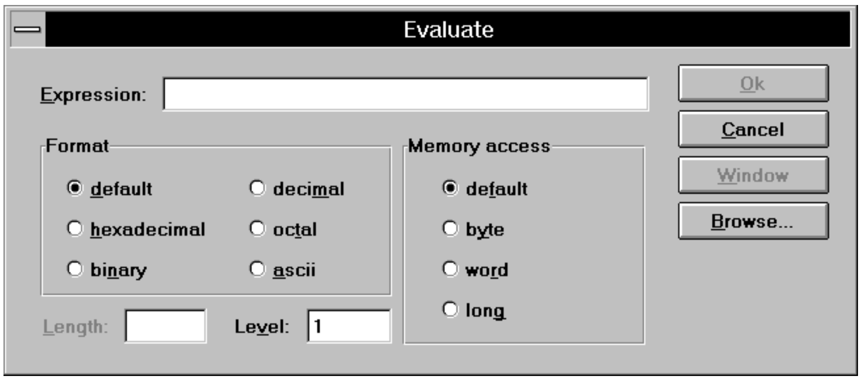
You can issue these commands by clicking them, or by hitting the underlined letter while pushing down the <Alt> key. Some commands are linked to "hot keys" so that they can be issued without opening the menu. You see these hot keys on the right side of the menu. For example, you can set a breakpoint without opening the **Debug** menu just by hitting <ctrl-B>.

- **Evaluate**

The user is asked to enter an expression to be evaluated. The result is shown either in the *command window* or in an *evaluation window* (see chapters 1.3.1 and 1.3.7). In the former case the evaluation takes place only once while in the latter case every subsequent change of the result is visible.

The symbols known at this time and scope can be obtained with the **Browse** button. You find a detailed description of the symbol browser in chapter 1.2.2.

Organon XDB allows you to write expressions in more than one language. Open the "*Language*" menu to see which languages are available. The language **Organon XDB** expects is checkmarked. To change to another language, click the language name.



Expression:

Format: [✓ default] decimal hexadecimal octal binary ascii

Memory access: [✓ default] byte word long

Length:

Level: 1

Enter the expression you want to be evaluated, using the *current language*. Choose the **format** you like the result to be in. If the expression denotes a pointer to a character string or a character array, **ascii** might be useful. If you choose **ascii**, you may enter the number of characters to be displayed into the **Length** field.

Memory access: Some processors allow byte-wise or word-wise memory access only. If your target processor behaves this very restrictive way, click the sort of access it accepts. In most cases, **default** works fine.

Level: If the expression denotes a structure containing sub-structures, you can specify how many levels to step down into the structure.

Note that arrays may be evaluated partially, e.g. if A is an array of appropriate length, A[2..5] denotes the elements 2, 3, 4, and 5.

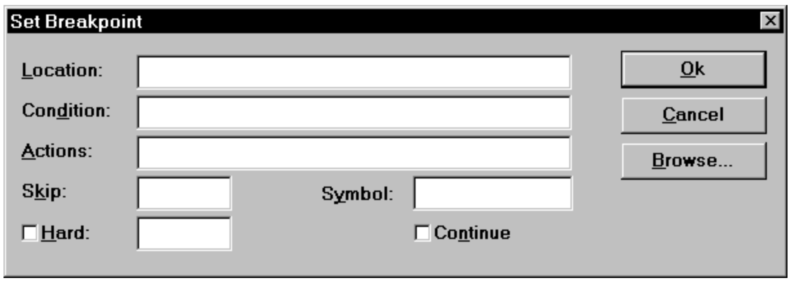
If you click the **Ok** button, the result is printed to the *command window*. If you click the **Window** button instead, an *evaluation window* is created.

- **Set Breakpoint**

When debugging a program, you may wish the program to stop at a certain line of code so you can examine the state it is in (e.g. the value of a variable). This stopping is done by setting a breakpoint.

Similar to the **SET BREAKPOINT** command described in the *Command Reference*, a breakpoint can be defined by giving its **Location** (default: *current line*), possibly followed by a **Condition** (identical to SET BREAKPOINT option WHEN), a list of

Actions, and a **Skip** number. The condition must be written in the *current language* (see chapter 1.2.1.5).



The execution of the target program stops when the location denoted by the expression in the **Location** field is reached and the **Condition** is true. If a positive **Skip** number was specified, every (n+1)st encounter of the breakpoint only will cause a stop (n being the **Skip** number). For example, a breakpoint with the **Skip** number 2 would stop the execution when encountered for the third, sixth, ninth, ... time.

Actions may contain a list of **Organon XDB** commands. When the execution is stopped by the breakpoint, these commands are processed. If the **Continue** checkbutton is activated, the execution of the target program will continue after processing the **Actions** list.

Symbol: The breakpoint can be given a symbolic name which can be used as a debugger variable in commands.

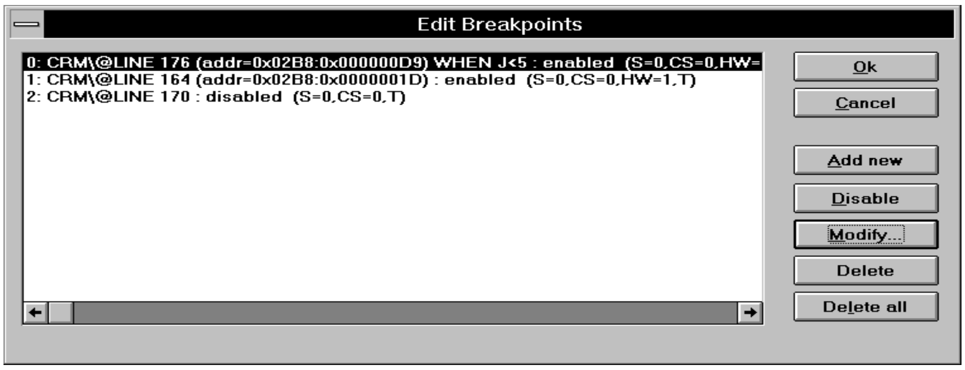
Note that the breakpoint is supposed to be at the beginning of the line. For example, a breakpoint at source code line 100 will stop the program after line 99 was executed.

By default, **Organon XDB** implements breakpoints by software interrupts, which are inserted into the code. If you want to use processor-maintained breakpoints only, choose the **Hard** option. This is especially useful when the program code to be debugged is stored in EPROM.

Browse shows, as usual, a list of the known symbols. You find a detailed description of the symbol browser in chapter 1.2.2. Click **Ok** to create the breakpoint, or **Cancel** to cancel the operation.

- **Edit Breakpoints**

This is useful when details of existing breakpoints are to be changed. The pop-up window shows all existing breakpoints:



```
0: CRM\@LINE 176 (addr=0x02B8:0x000000D9) WHEN J<5 : enabled  (S=0,CS=0,HW=
1: CRM\@LINE 164 (addr=0x02B8:0x0000001D) : enabled  (S=0,CS=0,HW=1,T)
2: CRM\@LINE 170 : disabled  (S=0,CS=0,T)
```

The breakpoints are displayed in the following form:

<*n*> **:** <*p1*> **(**<*p2*>**)** [**WHEN** <*cond*>] **:** <*status*>
(S=<*skip*>**, CS=**<*current_skip*>**,** [**A,**] [**C,**] [**HW=**<*hard*>**,**] <*scope*>**)**
[**(@SYMBOL=**<*name*>**)**] [**THEN** <*actions*> **END**]

where <*n*> is the id number of the breakpoint.

<*p1*> and <*p2*> are the location in the source code resp. assembler code.

<*cond*> is the condition (if a condition was specified).

<*status*> may be **enabled**, **disabled**, or **current**. The latter indicates that the execution is halted due to this breakpoint.

<*skip*> is the skip number.

<*current_skip*> indicates how many times this breakpoint will be skipped until it stops the execution. I.e. whenever this breakpoint is encountered, <*current _skip*> is decremented by one until it reaches zero. Now the execution is halted, and <*current _skip*> is set to <*skip*> again.

A indicates that a non-empty list of actions is attached to the breakpoint.

C is displayed if the option “Continue“ is set.

<*hard*>: If the breakpoint is a hardware breakpoint, this is its internal number.

<*scope*> is **S** for space usually. <*scope*> can be **T** for task or **G** for global, too.

<*name*>: If a symbolic name was given to the breakpoint, it is displayed here.

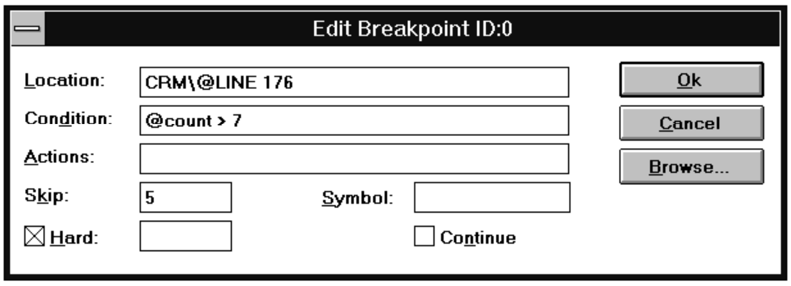
<*actions*>: If a list of actions is attached to the breakpoint, it is displayed here.

Note that the condition of a breakpoint, if existent, is always written in the *current language* (see chapter 1.2.1.5) no matter in which language it was entered in the creation of the breakpoint.

Disable disables the breakpoint, i.e. while the breakpoint still remains existent, the execution does not stop here. Of course, disabled breakpoints can be enabled again by clicking the **Enable** button (which is visible only if you click a disabled breakpoint).

Delete and **Delete all** delete the breakpoint marked by inverted color display resp. all existing breakpoints.

Modify allows the change of the details of the specified breakpoint. Just click the item you want to change and edit it. Note that the condition, if existent, must follow the rules of the *current language* (see chapter 1.2.1.5).


Edit Breakpoint ID:0

Location: CRM\@LINE 176
Condition: @count > 7
Actions:
Skip: 5
Symbol:
☒ Hard:
☐ Continue

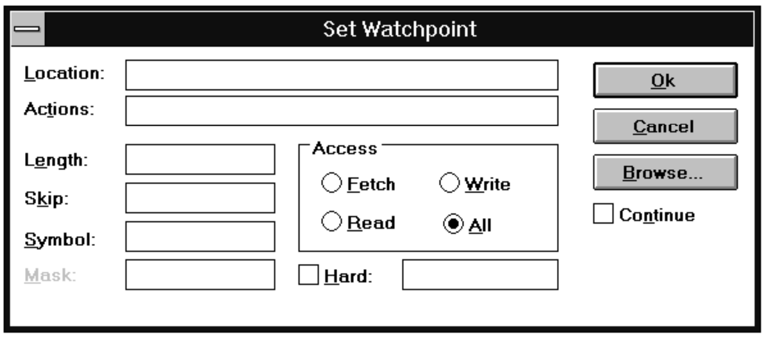
Like in *Set Breakpoint* (see above), the ability to **Browse** is given. You find a detailed description of the symbol browser in chapter 1.2.2.

- **Set Watchpoint**

When debugging a program, you may wish the program to stop whenever a certain piece of memory is accessed. This stopping is done by setting a watchpoint.

A watchpoint is set by specifying its symbolic address (the **Location**), the **Length** of the memory in bytes to be watched (4 by default), and the **Access** mode (default: All). A **Skip** number can also be issued (see below). **Browse** gives a list of usable symbolic addresses (see chapter 1.2.2 for a detailed description of the symbol browser). The watchpoint can be given a **Symbol**, or name, for easy access in commands.

If the hardware interface supports real time watchpoints including all the specified conditions, the program runs on full execution speed. If not, **XDB** must simulate them by maintaining a list of watched memory pieces and looking whether they are accessed. If you want to use processor-maintained watchpoints only, choose the **Hard** option.



Access: ( ) Fetch ( ) Write ( ) Read [✓ All]

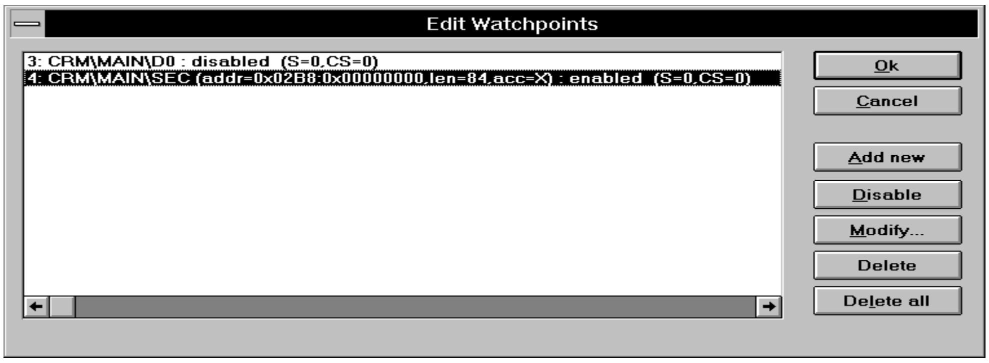
The execution of the target program stops when the watched piece of memory is accessed in the specified way. If the **Skip** number is n, n > 0, the execution stops at every (n+1)st access. For example, a watchpoint with the **Skip** number 2 and the access mode "write" would stop the execution at the third, sixth, ninth, ... attempt to write into the watched memory. If a list of **Organon XDB** commands was entered into the **Actions** field, these commands are processed upon the encounter of the watchpoint. If the checkbutton **Continue** was activated, the execution continues after the processing of the **Actions** list (see also SET WATCHPOINT command in the *Command Reference*).

- **Edit Watchpoints**

This item shows the list of existing watchpoints. To change them, choose one and click the **Modify** button.

Disable disables the watchpoint, i.e. while the watchpoint still remains existent, the execution does not stop when the watched piece of memory is accessed. Of course, disabled watchpoints can be **enabled** again (The **Enable** button is visible only if you click a disabled breakpoint).

Delete and **Delete all** delete the watchpoint marked by inverted color display resp. all existing watchpoints.



```
3: CRM\MAIN\D0 : disabled  (S=0,CS=0)
4: CRM\MAIN\SEC (addr=0x02B8:0x00000000,len=84,acc=X) : enabled  (S=0,CS=0)
```

The watchpoints are displayed in the following form:

> <*n*> **:** <*pos1*> **(addr=**<*pos2*>**, len=**<*length*>**, acc=**<*access*>**) :** <*status*>
> **(S=**<*skip*>**, CS=**<*current_skip*>**,** [**A,**] [**C,**] [**HW=**<*hard*>**,**] **)**
> [**(@SYMBOL=**<*name*>**)**] [**THEN** <*actions*> **END**]

where <*n*> is the id number of the watchpoint.

<*pos1*> and <*pos2*> are the location in the source code resp. assembler code.

<*length*> is the length (in bytes) of the watched memory.

<*access*> can be **R** for read, **W** for write, **F** for fetch, or **X** for all.

<*status*> may be **enabled**, **disabled**, or **current**. The latter indicates that the execution is halted due to this watchpoint.

<*skip*> is the skip number.

<*current_skip*> indicates how many times this watchpoint will be skipped until it stops the execution. I.e. whenever this watchpoint is encountered, <*current _skip*> is decremented by one until it reaches zero. Now the execution is halted, and <*current _skip*> is set to <*skip*> again.

A indicates that a non-empty list of actions is attached to the watchpoint.

C is displayed if the option “Continue“ is set.

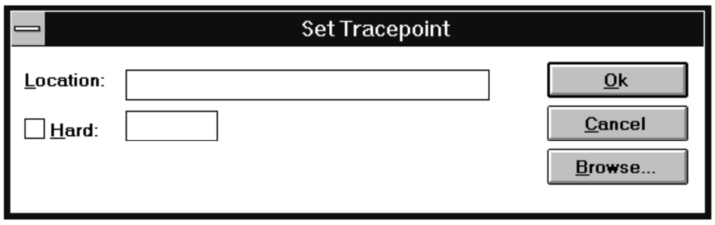
<*hard*>: If the watchpoint is a hardware maintained watchpoint, this is its internal number.

<*name*>: If a symbolic name was given to the watchpoint, it is displayed here.

<*actions*>: If a list of actions is attached to the watchpoint, it is displayed here.

- **Set Tracepoint**

Similar to watchpoints, tracepoints can be used to watch a piece of memory, e.g. a variable. A *trace window* is opened for every tracepoint, and the value stored in the memory to be traced is displayed. Unlike breakpoints or watchpoints, the encounter of a tracepoint does not stop the execution.



Enter the location into the **Location** field.

If the hardware interface supports real time tracepoints including all the specified conditions, the program runs on full execution speed. If not, **XDB** must simulate them by maintaining a list of set tracepoints and looking whether the execution changed one of them. But looking for these events at every step of execution is rather time-consuming, slowing down the execution speed. If you want to use processor-maintained tracepoints only to enhance the performance, click the **Hard** checkbutton (see also SET TRACEPOINT command in the *Command Reference*).

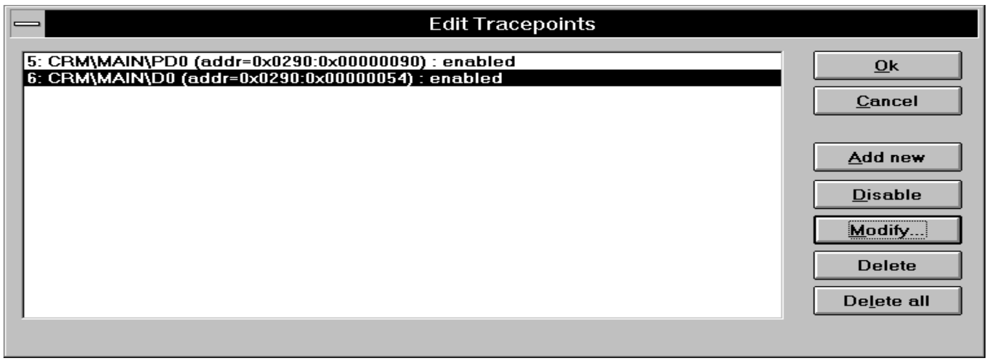
As always, **Browse** shows all known symbols. You find a detailed description of the symbol browser in chapter 1.2.2.

- **Edit Tracepoints**

This menu item shows all existing tracepoints and offers the opportunity to **Modify** them.

Disable disables the tracepoint, i.e. while the tracepoint still remains existent, a change of the traced memory is not displayed. Of course, disabled tracepoints can be enabled again by clicking the **Enable** button (which is visible only if you click a disabled tracepoint).

Delete and **Delete all** delete the tracepoint marked by inverted color display resp. all existing tracepoints.



```
5: CRM\MAIN\PD0 (addr=0x0290:0x00000090) : enabled
6: CRM\MAIN\D0 (addr=0x0290:0x00000054) : enabled
```

The tracepoints are displayed in the following form:

<*n*> **:** <*pos1*> [**(addr=**<*pos2*>**)**] **:** <*status*> [**(HW=**<hard>**)**]

where <*n*> is the id number of the tracepoint.

<*pos1*> is the symbolic address to be traced.

<*pos2*> is the memory address.

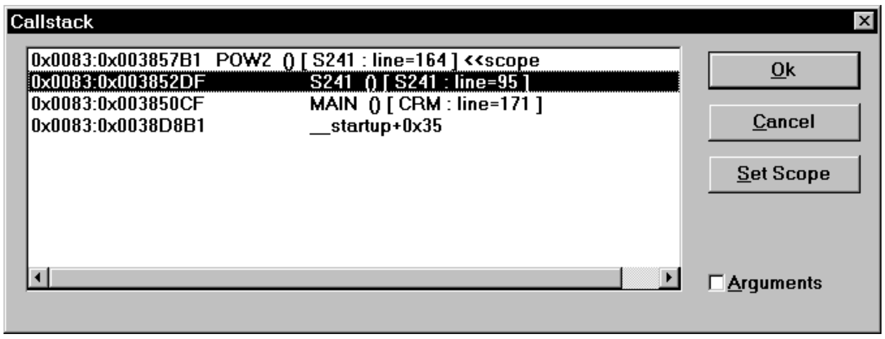
<*status*> is either **enabled** or **disabled**.

<*hard*>: If the tracepoint is a hardware maintained one, this is its internal number.

- **Calls**

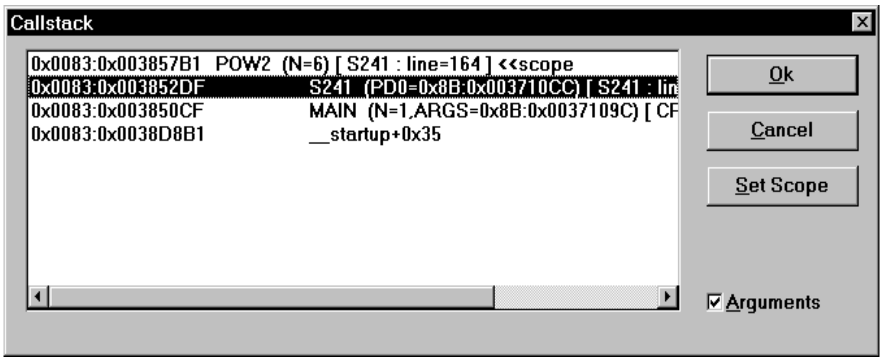
The stack of procedure calls is displayed. The procedures are listed with their names, addresses, and arguments.

To change the scope of symbols visible to **Organon XDB**, click one of the procedures, then click the **Set Scope** button. An alternative way to set the scope is to doubleclick the procedure line. Note that continuing the execution changes the scope back to the procedure being executed.



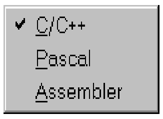
```
0x0083:0x003857B1  POW2  () [ S241 : line=164 ] <<scope
0x0083:0x003852DF          S241  () [ S241 : line=95 ]
0x0083:0x003850CF          MAIN  () [ CRM : line=171 ]
0x0083:0x0038D8B1          __startup+0x35
```

For performance reasons, the procedure arguments are shown only if you ask for them. Click the **Arguments** button, and the windows changes to:



```
0x0083:0x003857B1  POW2  (N=6) [ S241 : line=164 ] <<scope
0x0083:0x003852DF          S241  (PD0=0x8B:0x003710CC) [ S241 : lin
0x0083:0x003850CF          MAIN  (N=1,ARGS=0x8B:0x0037109C) [ CF
0x0083:0x0038D8B1          __startup+0x35
```

1.2.1.5 Language



The expressions entered for evaluation as well as the breakpoint conditions are, by default, assumed to be C expressions. You can switch to another language by clicking it, or by hitting the underlined letter while pushing down the <Alt> key (for example, hit <Alt P> to set the language to Pascal). This menu allows you to change to the following languages:

- **C/C++**

Note that expressions with side effects (like "++i") don't make much sense in this context, and are not supported. Apart from that, **Organon XDB** follows the ANSI standard.

- **Pascal**

Organon XDB follows the standard as described by K. Jensen and N. Wirth.

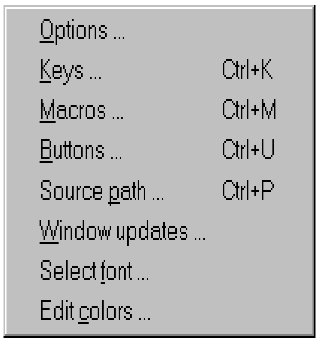
- **Assembler**

When setting the language to Assembler, the *assembler window* is displayed automatically.

The checkmark in the menu window marks the language **Organon XDB** expects.

Note that **Organon XDB** works in either source code mode or assembler mode. The mode influences e.g. the execution of the command **STEP** (see chapter 1.2.1.3 or *Command Reference*). The only way to switch to assembler mode is to set the language to Assembler. To switch back to source code mode, change the language to any of the high level languages.

1.2.1.6 Options

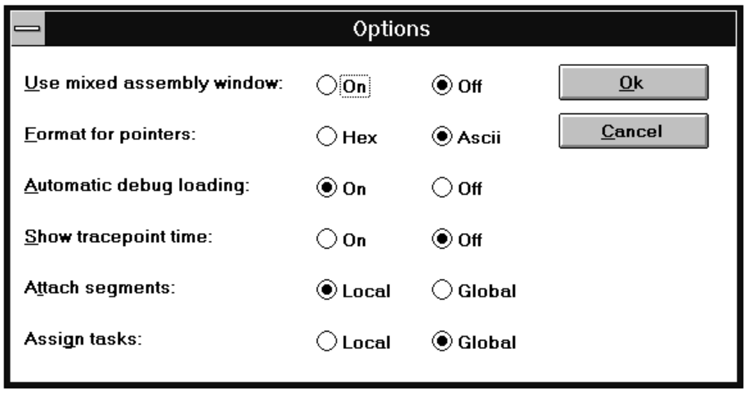


This set of commands allows you to customize and adapt **Organon XDB**, according to your taste and needs. You can change the size and color of texts displayed, create new buttons, or redefine the function keys of your keyboard. The advanced user will find a quick and convenient way to manipulate the command language macros, and to change some details in the behaviour of **Organon XDB**.

You can issue these commands by clicking them, or by hitting the underlined letter while pushing down the <Alt> key. Some commands are linked to "hot keys" so that they can be issued without opening the menu. You see these hot keys on the right side of the menu. For example, you can create a button without opening the **Options** menu just by hitting <ctrl-U>.

- **Options**

You can switch on/off the following options:



Use mixed assembly window: On [✓ Off]

Format for pointers: Hex [✓ Ascii]

Automatic debug loading: [✓ On] Off

Show tracepoint time: On [✓ Off]

Attach segments: [✓ Local] Global

Assign tasks: Local [✓ Global]

Use mixed assembly window

The mixed *assembly window* does not only show the assembler code but also the next source code line to be executed. This option is switched off by default.

Format for pointers

When displaying a character pointer in an *evaluation window*, the value it points to can either be displayed as a hexadecimal number or as a character (which is the default).

Automatic debug loading

When the execution steps into another module, this module is loaded automatically if this option is switched on (which is the default value). Otherwise, you are asked whether to load it. If you refuse to load it, the step command will execute until the next line of the currently loaded module.

Show tracepoint time

If this option is switched on, the actual time is shown whenever the memory watched by a tracepoint is changed. The option is switched off by default.

Attach segments

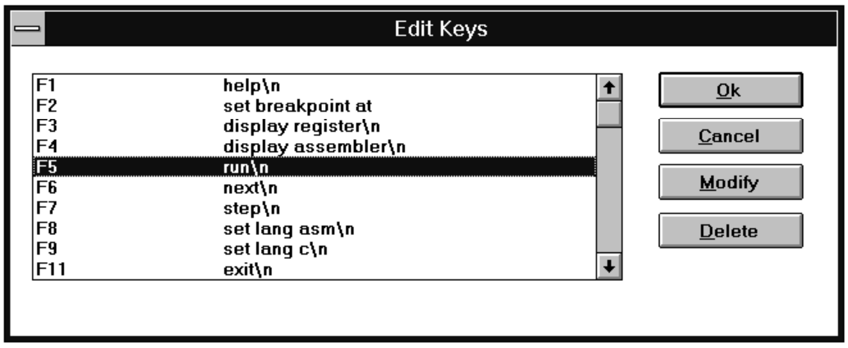
Can be set to **Local** (default) or **Global**. In the latter case, all segments specified at initial load (or loaded with the menu item "*File / Load*") are attached to the global segment map. Otherwise, loaded segments are attached to the current task.

Assign tasks

Can be set to **Local** or **Global** (default). In the **Global** mode, all target system tasks are assigned to one virtual debugger task; otherwise, all tasks are monitored separately.

- **Keys**

You can use the function keys to store commands. The menu item "*Options / Keys*" shows the strings connected to the function keys so far. You can change them by using the **Modify** button. If you want the string to contain a newline, write "\n" instead. To delete a key, mark it by clicking it, then click **Delete**.

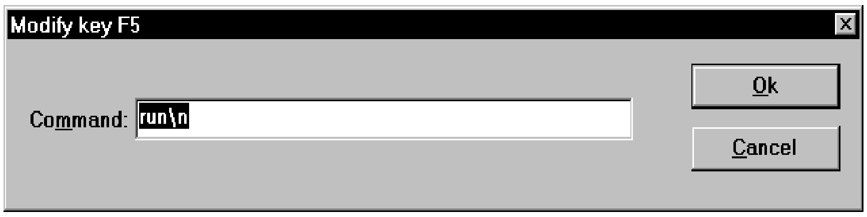


Edit Keys

F1	help\n
F2	set breakpoint at
F3	display register\n
F4	display assembler\n
F5	run\n
F6	next\n
F7	step\n
F8	set lang asm\n
F9	set lang c\n
F11	exit\n

Whenever you hit a function key, the text connected to it is written into the *command window*.

To create a new key assignment select an unused key from the list and klick the **Modify** button. The F10 function key is assigned with the default Windows key definition and may not be changed. The following window appears.



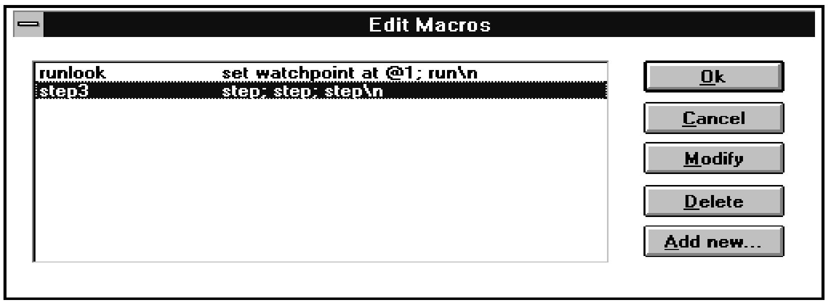
Modify key F5

Command: run\n

Enter the command into the **Command** field. When you are finished, click **Ok**.

- **Macros**

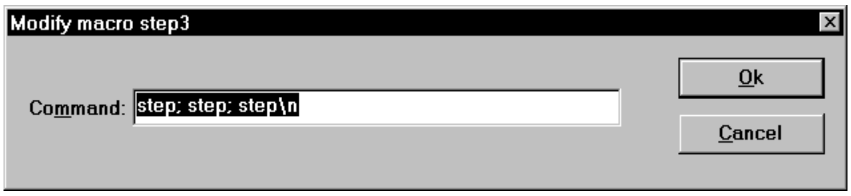
The **Organon XDB** command language is a powerful tool, containing features like loops and macros. This menu item allows the convenient manipulation of macros. Mark the macro you wish to modify or delete by using the mouse or the cursor keys, then click the **Delete** resp. **Modify** button. See *Command Reference* for a description of macros in the command language.



Edit Macros

runlook	set watchpoint at @1; run\n
step3	step; step; step\n

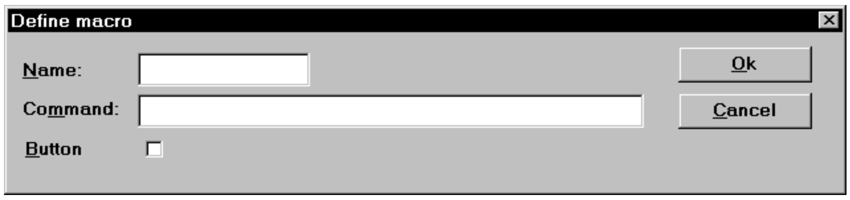
Modify allows you to change the command list connected to the macro.



Modify macro step3

Command: step; step; step\n

To create a new macro, click the **Add new** button (or hit <Alt A>). The following window appears:



Define macro

Name:

Command:

Button ☐

Enter the macro name into the **Name** field and the macro body into the **Command** field. When you are finished, click **Ok**.

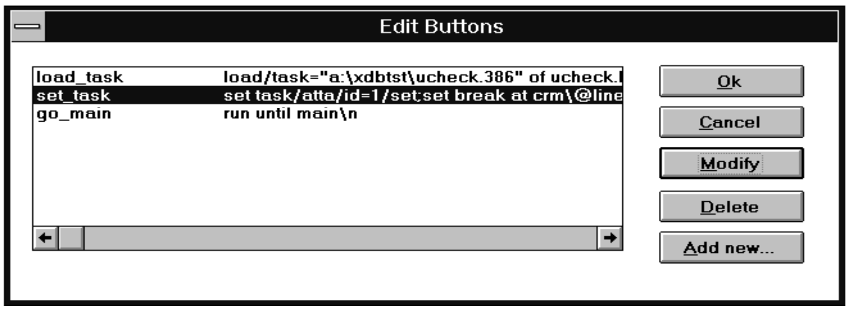
Button:

When adding a new macro to the list, you have the option to create a button with the same name. To do so, click the checkbutton **Button**. If the macro contains parameters, you will be asked to provide them upon activation of the button.

Note that modification or deletion of the macro deletes the appropriate button while manipulation of the button (see below, menu item "*Options / Buttons*") has no effect on the macro.

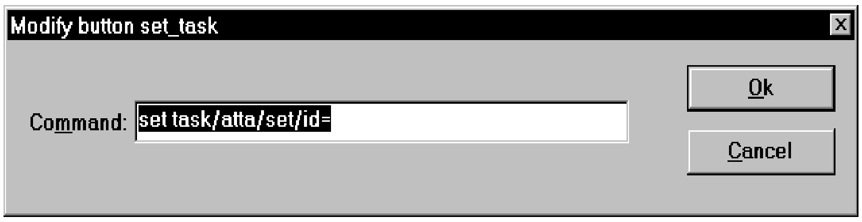
- **Buttons**

Organon XDB allows you to define additional buttons and to link them to lists of commands. Whenever one of these user-defined buttons is clicked, its command list is issued into the *command window* and processed as if it was typed there. The menu item "*Options / Buttons*" shows the names of all user-defined buttons and their respective command lists, and gives you opportunity to delete or modify them, or to create a new button. To delete or modify an existing button, mark it with a mouse click or with the cursor keys, then click the **Delete** resp. **Modify** button.



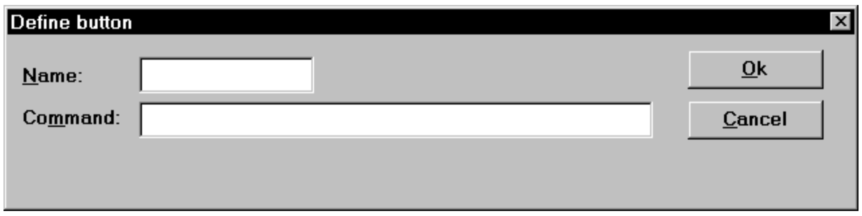
```
load_task      load/task="a:\xdbtst\ucheck.386" of ucheck.
set_task       set task/atta/id=1/set;set break at crm\@line
go_main        run until main\n
```

Modify allows you to change the command list connected to the button.



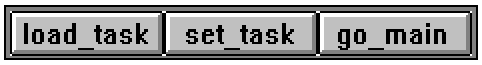
Command: set task/atta/set/id=

Add new asks for the name and command list of a button to be created:



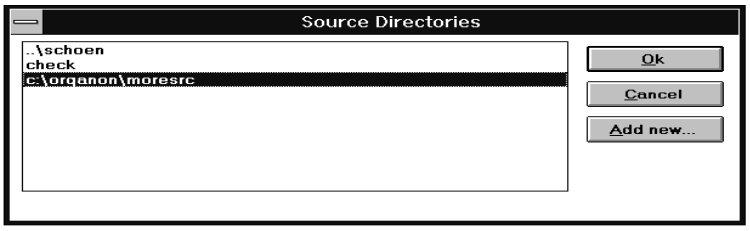
Enter the name of the button to be created into the first field. Type the command list in the second field. If you try to write a newline into the command list, **Organon XDB** takes this as a signal that the creation or modification is completed. If you want the command list to end with a newline, write "\n" instead. If the list contains more than one command, separate them by a semicolon rather than a newline or "\n".

The resulting buttons are placed in the bar below the tool bar:

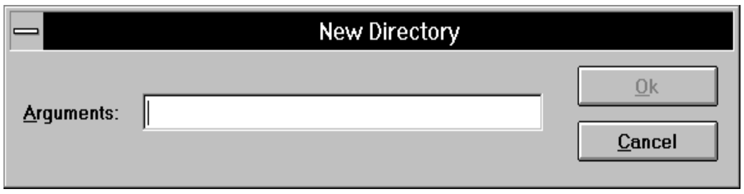


- **Source path**

Organon XDB assumes the source files of the task to be debugged to be in the *working directory*. If this is not the case, or if the sources are placed in different directories, you can tell **Organon XDB** where to look for them.



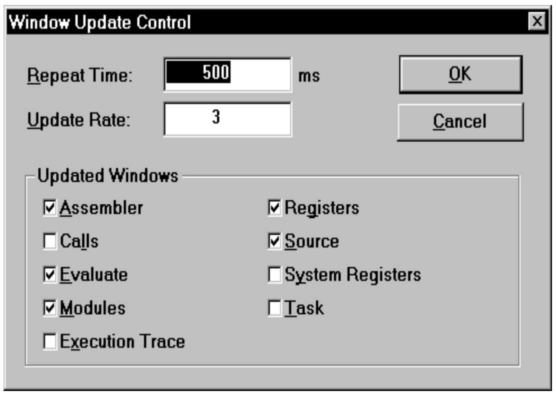
Click **Add new** to enter another source path.



You can enter the complete path (i.e. the whole way from the root directory down); otherwise, the path is assumed to be relative to the *working directory* you specified when you started **Organon XDB**.

- **Window updates**

This menu item allows you to determine when to check the content of *Evaluation or Memory Window* and when to update it. This item is applicable only in asynchronous mode. **Repeat Time** specifies the period after which **XDB** checks the window contents. **Update Rate** specifies the number of check operations after which a recognized change will be updated.



Window Update Control

Repeat Time: 500 ms

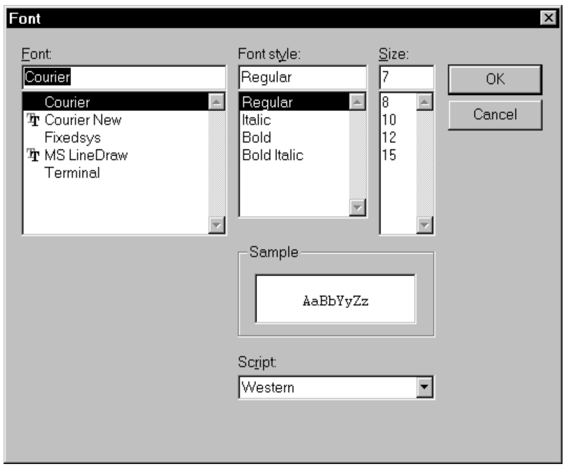
Update Rate: 3

Updated Windows

- [✓] Assembler
- [ ] Calls
- [✓] Evaluate
- [✓] Modules
- [ ] Execution Trace
- [✓] Registers
- [✓] Source
- [ ] System Registers
- [ ] Task

- **Select font**

As the name implies, this menu item allows you to change the font and the size of the displayed text. This change is effective in this session only unless you make it permanent by activating the menu item "*File / Save Settings*".



Font

Font: Courier

Courier
Courier New
Fixedsys
MS LineDraw
Terminal

Font style: Regular

Regular
Italic
Bold
Bold Italic

Size: 7

8
10
12
15

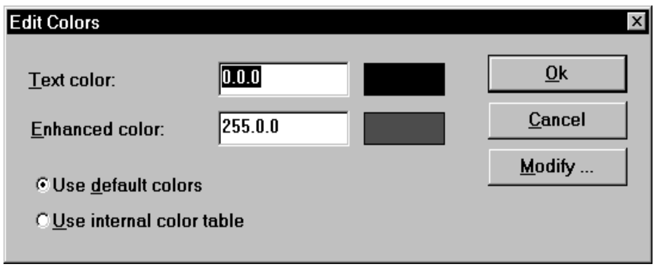
Sample: AaBbYyZz

Script: Western

- **Edit colors**

You don't like the color of the texts in the subwindows? Choose this menu item, and change to your favorite color. This change is effective in this session only unless you make it permanent by activating the menu item "*File / Save Settings*".

Some texts are written in a different color to get your attention, e.g. a register value that changed during the last instruction. This is called the enhanced color, and you can change it, too.



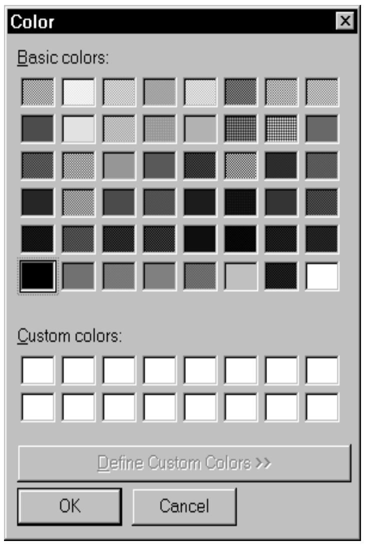
Edit Colors

Text color: 0.0.0

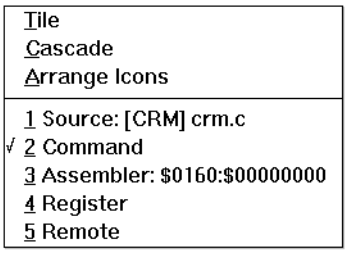
Enhanced color: 255.0.0

[✓ Use default colors]

Use internal color table



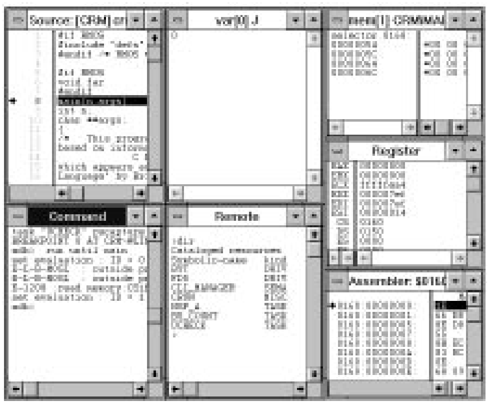
1.2.1.7 Windows



While you are free to move the subwindows in the subwindow area, this menu enables you to arrange them quickly in one of these ways:

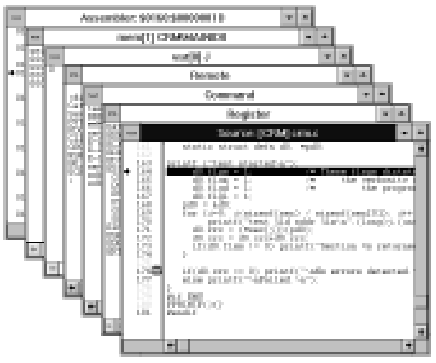
- **Tile**

All windows are visible, no window is fully or partially hidden by another one.



- **Cascade**

The windows are resized and positioned along the diagonal across the area, one on top of the other, so that their upper left corners are visible.



- **Arrange Icons**

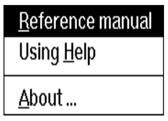
Like all windows, the subwindows can be iconized. While you are free to arrange the icons everywhere within the subwindow area, this menu item rearranges them along the lower edge of the subwindow area. Note that icons of windows being open in the moment are rearranged, too.

- **Other Subwindows**

The lower part of the menu shows a list of all subwindows being on display, open or iconized, in the moment. The *active* subwindow is checkmarked in the list. If you click the name of a subwindow, this window is activated, i.e. positioned on top (and opened if it was iconized).

You can issue these commands by clicking them, or by hitting the underlined letter or digit while pushing down the <Alt> key. For example, hitting <Alt A> rearranges the subwindow icons while hitting <Alt 3> would *activate* the third subwindow (in the picture at the beginning of this chapter, this would be the *assembler window*).

1.2.1.8 Help



While working with **Organon XDB**, you can get online help. Choose one of the following items by clicking it or by hitting <Alt *x*>, *x* being the underlined letter in the menu. For example, hitting <Alt H> has the same effect as clicking **Using Help**.

- **Reference manual**

Invokes the interactive help mechanism which corresponds to the *Command Reference*.

- **Using Help**

Choose this if you have no experience with online help. It offers a good introduction how to work with this feature.

- **About**

General information about **Organon XDB**.

Organon XDB386 250C
HLL-Debugger
for RMOS-3

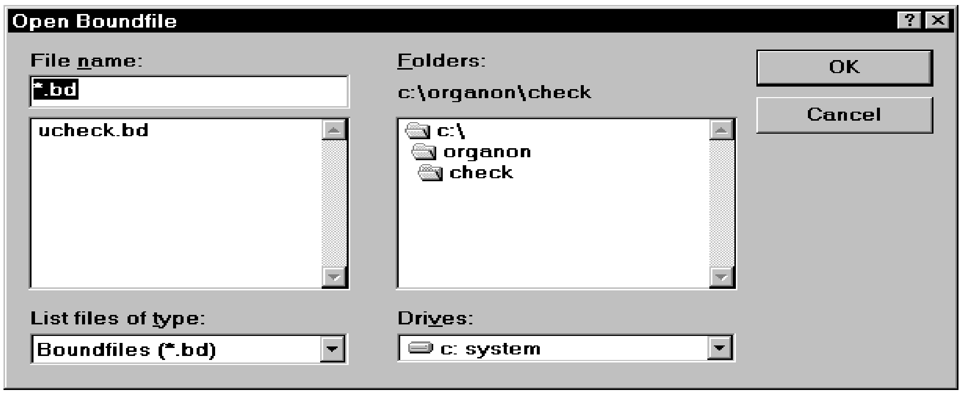
(c) Copyright CAD-UL GmbH 1994

1.2.2 Browsers

Browsers are mechanisms that help you to look over a set of items, and to choose one of them. Several features of **Organon XDB** allow you to browse e.g. the files of your host system. These browse mechanisms are described in this chapter.

1.2.2.1 The Windows® File Browser

Some commands, like reading a batch file, require you to enter a file name. If you are unsure which file is the one to use, you can use the **Browse** function to get a list of available files. Note that this function is not a **Organon XDB** builtin but a **Windows®** library function.



This is the pop-up window you see after clicking the **Browse** button. The three fields on the left side help you to choose among the files in the directory you browse. The lower left field shows the suffix **Browse** looks for. You can change this suffix by clicking the arrow on the right side of the subwindow, then clicking the appropriate suffix (or "*.*", matching all suffixes) in the menu that appears. Now the middle left field shows all files with the suffix you chose. Click the file you want to load, or enter the file name into the upper left field. As a last step, click the **OK** button, and the chosen file will be loaded.

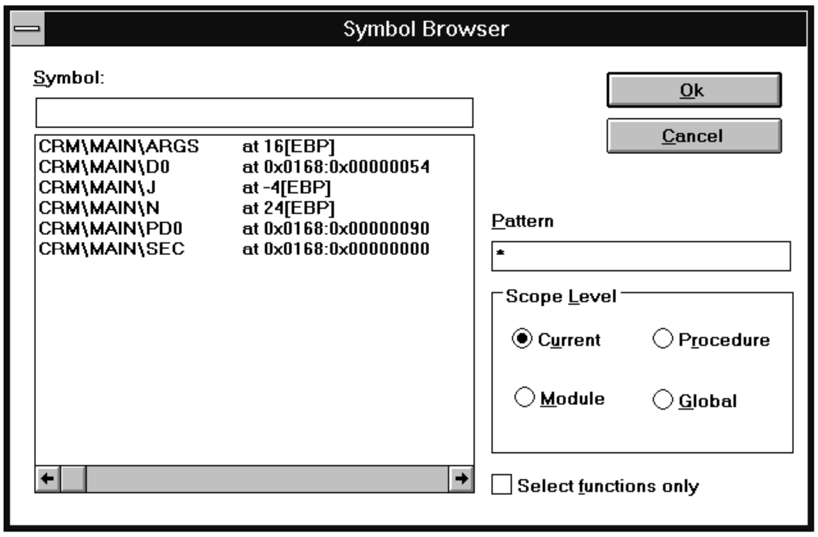
Maybe the file you look for is in another directory, maybe even on another disk. In this case, you have to find the correct directory first, using the fields on the right side. Choose the disk drive in the lower right field (first click the arrow, then click the appropriate disk drive). The upper right field shows the available directories. Doubleclick a directory to open it. When you have found the right directory, perform the steps described above to select the right file.

Note that opening an existing file for writing will destroy the contents of this file; therefore, the browser asks you to confirm this to avoid accidental destruction of important data.

1.2.2.2 The Organon XDB Symbol Browser

When the compiler transforms your program into assembler code, it marks some of the more interesting points (e.g. subroutine entry points, or the location of a variable) by giving them an internal name, or symbol. In the case of variables and subroutines, these symbolic names are derived from the names you use in the source code.

Sometimes **Organon XDB** expects you to enter a symbol name. The symbol browser can give you an overview over the known symbols, and helps you to choose one. The symbols are shown with their task, module, and symbol name, together with their addresses.



Symbol:

```
CRM\MAIN\ARGS      at 16[EBP]
CRM\MAIN\D0        at 0x0168:0x00000054
CRM\MAIN\J         at -4[EBP]
CRM\MAIN\N         at 24[EBP]
CRM\MAIN\PD0       at 0x0168:0x00000090
CRM\MAIN\SEC       at 0x0168:0x00000000
```

Pattern: *

Scope Level: [✓ Current] Procedure Module Global

☐ Select functions only

The fields on the right side help you to change the set of visible symbols.

You can change the scope level by clicking the scope level you want: **Procedure** for all symbols within this subroutine, **Module** for all symbols within the current module, and **Global** for all symbols. **Current** (which is the default value) sets the scope level according to the current state of execution. You can also set the scope level by hitting the <Alt> key and the underlined letter, e.g. <Alt R> for **Procedure**.

To reduce the set of symbols displayed on the left side, you may write a pattern into the **Pattern** field. Finish the pattern entry by pressing <Tab>. Similar to the menu item "*File / Search*", a pattern consists of characters (letters, digits, etc) which are recognized as such, and meta-characters which have a special meaning. In this case, the metacharacters "**?**" (matches any character) and "*****" (matches any string) are recognized. For example, the symbols "PD0", "PD1", and "PDX" match the pattern "PD?", while "*D0" is matched by "D0" and "PD0". The default pattern, "*", matches every symbol.

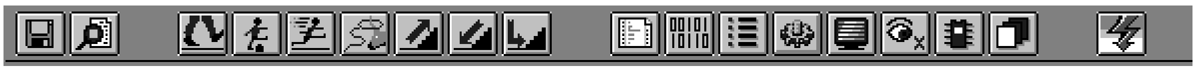
If you click the **Select functions only** box, only symbols denoting subroutines are shown.

Now enter the symbol name into the **Symbol** field, or click the symbol on display, then click the **Ok** button (or hit <Alt O>). You can dismiss the symbol browser anytime you want by clicking the **Cancel** button (or hitting <Alt C>).

1.2.3 Buttons

While you can use the full capacity of **Organon XDB** by typing commands into the *command window*, some of the most important commands are attached to pre-defined buttons; thus, you can issue them by a single click. Clicking a button with your left mouse button activates the command while a click with the right mouse button summons a brief explanation text.

Organon XDB checks whether the use of the buttons is meaningless in the current situation (e.g. search for a pattern when the *source window* is not visible), and disables buttons whose use would make no sense in the moment.



Tool Bar

1.2.3.1 Load

This button is identical to the menu item "*File / Load*" which is explained in detail in chapter 1.2.1.1.

1.2.3.2 Search

This button is identical to the menu item "*File / Search*".

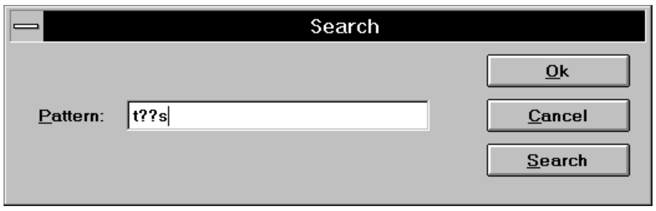
This command searches for a specified pattern in the source code of the module displayed in the *source window*. If the end of the module is encountered, a message is issued in the *command window*, and the search starts at the top again. The metacharacters "**?**" (matches any character) and "*****" (matches any string) are recognized.

The *source window* displays the appropriate part of the source code, coloring the line containing the matching string in the *enhanced color* (see menu item "*Options / Edit Colors*", chapter 1.2.1.6).

Note that the search always starts at the beginning of the source code unless you search again for the same pattern (in which case the search starts at the line after the one where the last matching string was found).

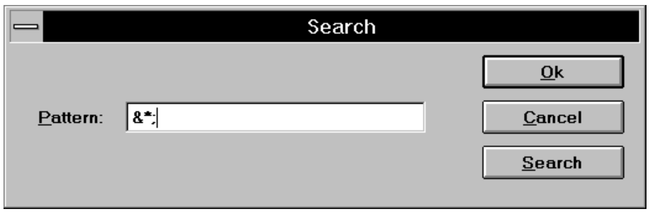
The search algorithm distinguishes between upper case and lower case unless **Organon XDB** was started with the option **Convert symbols to upper case**.

Examples:



Pattern: t??s

Search for all strings starting with "t", followed by two unspecified characters and a "s". This search will find the strings "this", "those", "it is", for example.



Pattern: &*;

Search for an ampersand ("&") and a semicolon which are separated by an unknown number (possibly 0) of unknown characters, i.e. letters, digits, spaces, etc. The following strings (and many more) match this search pattern:

```
&;
&x;
& pointer_7 ;
```

1.2.3.3 Step

This button is identical to the menu item "*Run / Step*". It tells **Organon XDB** to execute the next instruction. If this instruction is a subroutine call, the execution stops at the first instruction of the subroutine.

1.2.3.4 Next

This button is identical to the menu item "*Run / Next*". **XDB** continues the execution until the next line of code. If a subroutine call is encountered, the whole subroutine is executed.

1.2.3.5 Run

The execution of the target program is continued, beginning with the *current line* (the line printed in inverted color in the *source window*). The execution stops if a breakpoint or watchpoint is encountered.

This button is identical to the menu item "*Run / Run*".

1.2.3.6 Recapture

This button is identical to the menu item "*Run / Recapture*". **Organon XDB** tries to restore the current situation. Therefore **Organon XDB** disregards the current status information (e.g. register values, task states) and does an update from the target.

1.2.3.7 Set Scope Up

If the execution enters a subroutine, the scope is set to this subroutine, i.e. the *source window* shows the source code of this subroutine, and only the symbols (variable names etc.) visible within this subroutine are accessible by the *symbol browser* (see chapter 1.2.2.2). Clicking this button moves the scope one level upward, i.e. to the calling routine. The symbols known there are accessible now, and the *source window* shows the text of this calling routine, the line containing the subroutine call being the *current line*.

1.2.3.8 Set Scope Down

If the execution enters a subroutine, the scope is set to this subroutine, i.e. the *source window* shows the source code of this subroutine, and only the symbols (variable names etc.) visible within this subroutine are accessible by the *symbol browser* (see chapter 1.2.2.2). The scope can be changed by the menu item "*Debug / Calls*". Clicking this button moves the scope one level downward, i.e. from the calling routine to the called one. The symbols known there are accessible now, and the *source window* shows the text of this routine.

1.2.3.9 Set Scope Here

If the execution enters a subroutine, the scope is set to this subroutine, i.e. the *source window* shows the source code of this subroutine, and only the symbols (variable names etc.) visible within this subroutine are accessible by the *symbol browser* (see chapter 1.2.2.2). The scope can be changed by the menu item "*Debug / Calls*". Clicking this button moves the scope back to the active subroutine, i.e. the one being executed in the moment. The symbols known there are accessible now, and the *source window* shows the text of this calling routine, the line to be executed next being the *current line*.

1.2.3.10 Display/Hide Source Window

As the name suggests, this button displays the *source window* if it is hidden, or hides it if it is displayed already. Identical to the menu item "*Display / Source*". The *source window* is explained in chapter 1.3.2.

1.2.3.11 Display/Hide Assembler Window

Hides or displays the *assembler window*. See chapter 1.3.3 for a description of this window.

1.2.3.12 Display/Hide Register Window

Like the menu item "*Display / Register*", this button hides or displays the *register window* (which is explained in chapter 1.3.4).

1.2.3.13 Display/Hide Task Window

Like the menu item "*Display / Task*", this button hides or displays the *task window .*

1.2.3.14 Display/Hide Remote System Window

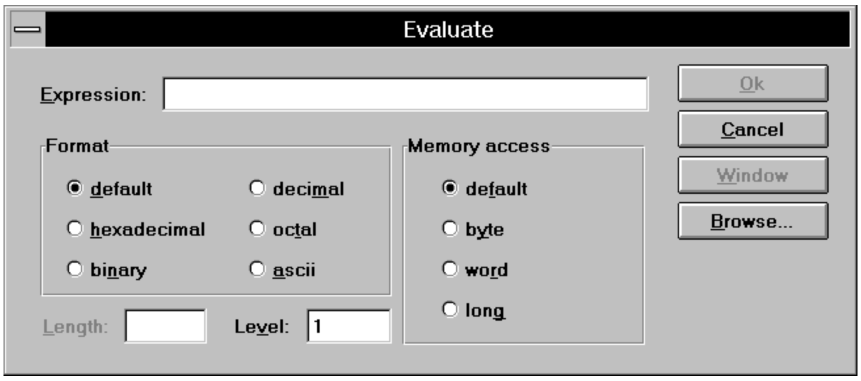
Displays or hides the *remote system window* (see chapter 1.3.6), like the menu item "*Display / Remote*".

1.2.3.15 Evaluate

Does the same as the menu item "*Debug / Evaluate*". The user is asked to enter an expression to be evaluated. The result is shown either in the *command window* or in an *evaluation window* (see chapters 1.3.1 and 1.3.7). In the former case the evaluation takes place only once while in the latter case every subsequent change of the result is visible.

The symbols known at this time and scope can be obtained with the **Browse** button. You find a detailed description of the symbol browser in chapter 1.2.2.

Organon XDB allows you to write expressions in more than one language. Open the "*Language*" menu to see which languages are available. The language **Organon XDB** expects is checkmarked. To change to another language, click the language name.



Expression:

Format: [✓ default] decimal hexadecimal octal binary ascii

Memory access: [✓ default] byte word long

Length:

Level: 1

Enter the expression you want to be evaluated, using the *current language*. Choose the **Format** you like the result to be in. If the expression denotes a pointer to a character string or a character array, **ascii** might be useful. If you choose **ascii**, you may enter the number of characters to be displayed into the **Length** field.

Memory access: Some processors allow byte-wise or word-wise memory access only. If your target processor behaves this very restrictive way, click the sort of access it accepts. In most cases, **default** works fine.

Level: If the expression denotes a structure containing sub-structures, you can specify how many levels to step down into the structure.

Note that arrays may be evaluated partially, e.g. if A is an array of appropriate length, A[2..5] denotes the elements 2, 3, 4, and 5.

If you click the **Ok** button, the result is printed to the *command window*. If you click the **Window** button instead, an *evaluation window* is created.

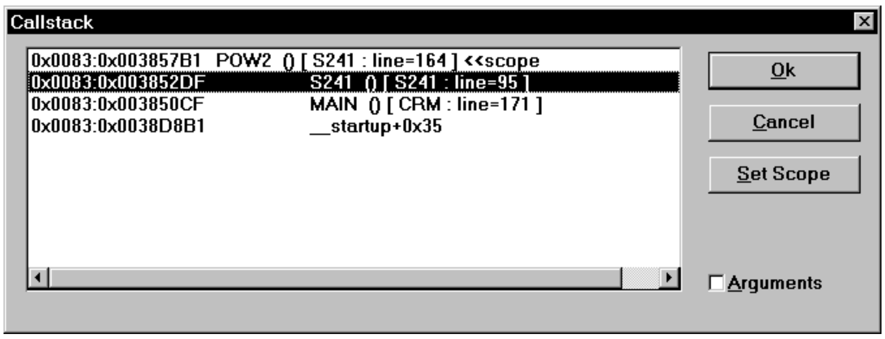
1.2.3.16 Create Memory Window

This button is identical to the menu item "*Display / Memory*". It causes the creation of a new *memory window.* The **Browse** button shows the addresses of all symbols visible within this scope. You find a detailed description of the symbol browser in chapter 1.2.2. More than one *memory window* may be open.

1.2.3.17 Display Callstack

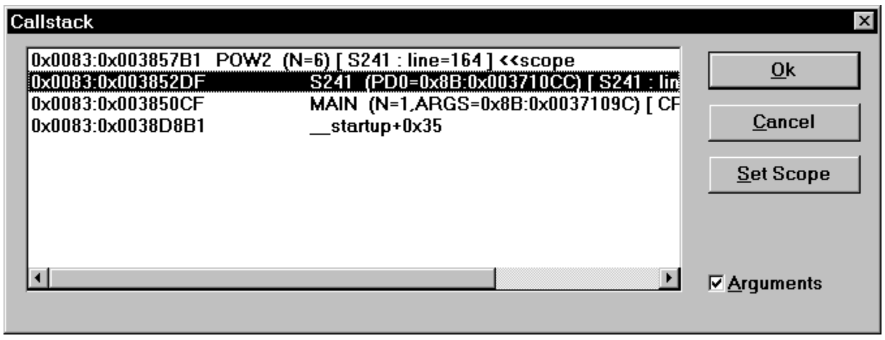
This button is identical to the menu item "*Debug / Calls*". The stack of procedure calls is displayed. The procedures are listed with their names, addresses, and arguments.

To change the scope of symbols visible to **Organon XDB**, click one of the procedures, then click the **Set Scope** button. An alternative way to set the scope is to doubleclick the procedure line. Note that continuing the execution changes the scope back to the procedure being executed.



```
Callstack
0x0083:0x003857B1  POW2  () [ S241 : line=164 ] <<scope
0x0083:0x003852DF        S241  () [ S241 : line=95 ]
0x0083:0x003850CF        MAIN  () [ CRM : line=171 ]
0x0083:0x0038D8B1        __startup+0x35
```

For performance reasons, the procedure arguments are shown only if you ask for them. Click the **Arguments** button, and the window changes to:



```
Callstack
0x0083:0x003857B1  POW2  (N=6) [ S241 : line=164 ] <<scope
0x0083:0x003852DF        S241  (PD0=0x8B:0x003710CC) [ S241 : lin
0x0083:0x003850CF        MAIN  (N=1,ARGS=0x8B:0x0037109C) [ CF
0x0083:0x0038D8B1        __startup+0x35
```

1.2.3.18 Break

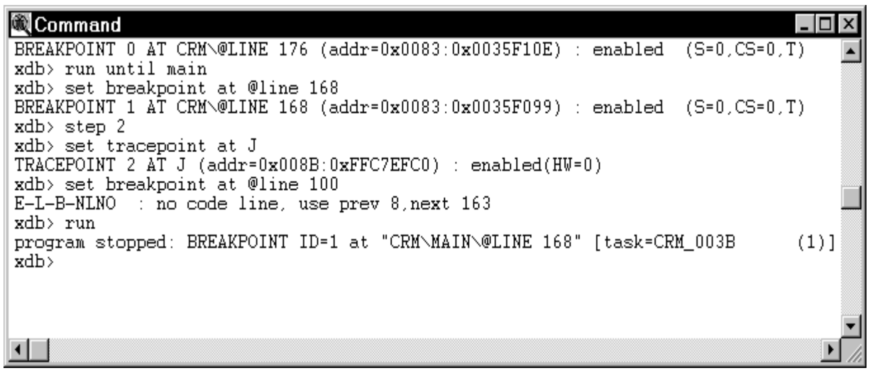
This button tries to stop the current action so that new commands can be entered. Useful if the **XDB** waits for some event that takes too long or that never happens.

1.3 Description of the Subwindows

The most informative part of **Organon XDB** is the subwindow area where different sorts of subwindows may appear. As usual, all windows can be iconized and reopened. Subwindows can also be hidden, (i.e. completely invisible), with the exception of the *command window* which is always visible. Closing the *command window* exits the **XDB**.

The uppermost subwindow is called the active subwindow. Depending on the sort of subwindow being active, the behaviour of **Organon XDB** changes in some details which are described in the following chapters. To activate another subwindow, just click this window.

1.3.1 Command Window



```
BREAKPOINT 0 AT CRM\@LINE 176 (addr=0x0083:0x0035F10E) : enabled  (S=0,CS=0,T)
xdb> run until main
xdb> set breakpoint at @line 168
BREAKPOINT 1 AT CRM\@LINE 168 (addr=0x0083:0x0035F099) : enabled  (S=0,CS=0,T)
xdb> step 2
xdb> set tracepoint at J
TRACEPOINT 2 AT J (addr=0x008B:0xFFC7EFC0) : enabled(HW=0)
xdb> set breakpoint at @line 100
E-L-B-NLNO  : no code line, use prev 8,next 163
xdb> run
program stopped: BREAKPOINT ID=1 at "CRM\MAIN\@LINE 168" [task=CRM_003B     (1)]
xdb>
```

In this window, you are prompted for commands as described in the *Command Reference*. All diagnostics and error messages are written here.

1.3.1.1 Command Window Editor

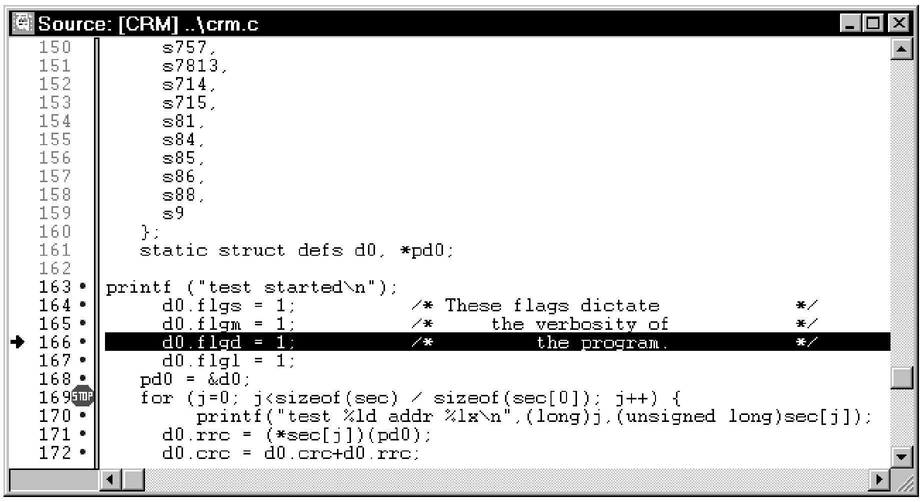
All the commands you give in the current session (including commands read from *batch files* or issued by user-defined buttons) are kept in a buffer, enabling you to repeat and edit them. The following commands are available:

Key	Command
<Cursor up>	go up one line
<Cursor down>	go down one line
<Cursor left>	move cursor left
<Cursor right>	move cursor right
<PgUp>	one page up
<PgDown>	one page down
<Home>	go to beginning of line
<End>	go to end of line
<Delete>	delete character at cursor position
<Backspace>	delete character left of cursor
<Escape>	delete whole line

Everything else you type is inserted into the line. When you hit <Return>, the command is issued and executed.

You can change from insert mode to overstrike mode (and back again) by hitting the <Insert> key.

1.3.2 Source Window



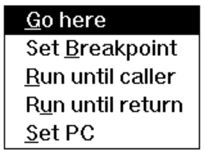
```
    s757,
    s7813,
    s714,
    s715,
    s81,
    s84,
    s85,
    s86,
    s88,
    s9
  };
  static struct defs d0, *pd0;

printf ("test started\n");
    d0.flgs = 1;          /* These flags dictate           */
    d0.flgm = 1;          /*     the verbosity of          */
    d0.flgd = 1;          /*         the program.          */
    d0.flgl = 1;
  pd0 = &d0;
  for (j=0; j<sizeof(sec) / sizeof(sec[0]); j++) {
      printf("test %ld addr %lx\n",(long)j,(unsigned long)sec[j]);
    d0.rrc = (*sec[j])(pd0);
    d0.crc = d0.crc+d0.rrc;
```

This window shows the source code of the target program. Unless you switch to another module by using the menu item "*File / Set Module*", the module being executed is displayed. The left part of the *source window* shows the line numbers; the source lines are displayed in the right part. A line number marked with a stop sign indicates that this line contains a breakpoint. The current line, i.e. the line of code to be executed next, is displayed inverted, i.e. white on black background. The environment variable XDBTABLEN controls the position of the tabstops for adjusting the source code. To mark a line for further manipulation (e.g. to set a breakpoint), position the line pointer (the black arrow left of the line numbers) by clicking the line. You can also move the line pointer by hitting the <Cursor up> and <Cursor down> keys. To scroll up or down in the *source window*, you can use the <PgUp> and <PgDown> keys.

Note: Not every line of code contains information useful for debugging purposes, e.g. comment lines. The line numbers of such lines are written in a different color and a blue point is placed behind the line number.

If you click the left part of the window (i.e. a line number) with the right mouse button, the line pointer is set to this line, and the following menu appears:



You can click one of these items (or hit <Alt> + the underlined letter), and **Organon XDB** will react as follows:

- **Go here**: Execute the program until the line pointer is reached. The line you clicked is not executed.

- **Set Breakpoint**: Set a breakpoint at the specified line. This menu item is not visible if a breakpoint exists already at this position. An alternative way to set a breakpoint is to doubleclick the line number.

- **Delete Breakpoint**: Delete the breakpoint in this line. This menu item is visible only if a breakpoint exists at this position. An alternative way to delete a breakpoint is to doubleclick the line number.

- **Run until caller**: Useful in subroutines only. The execution is continued until it returns to the calling routine. If the line containing the call is completely processed upon the return, the next line becomes the current line. Otherwise the calling line remains the current line. Example: The calling line stores the return value of the subroutine in the variable a, viz:

  ```
              a = sub( x, y);
  ```

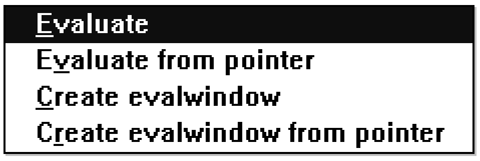
  When the execution is inside the subroutine `sub()`, you click **Run until caller**, and the rest of `sub()` is processed. Now the line above is still the current line; `sub()` was processed but its return value is not yet stored in a.

- **Run until return**: Execute until the routine is left but still remain in this routine. The current line is the last source line of the routine. If the execution is in the main routine, it continues until the end of the program is reached.

- **Set PC**: The program counter is set to the line marked by the line pointer i.e. the execution will continue by processing this line. This feature enables you to jump over pieces of the program, leaving them unprocessed, or to repeat the execution of a piece of the program. As this feature forces the program to behave in a way its author has never intended, it should be used carefully.

If some of the menu items cannot be applied to the source code line you clicked (e.g. setting the program counter into a comment), these items are disabled.

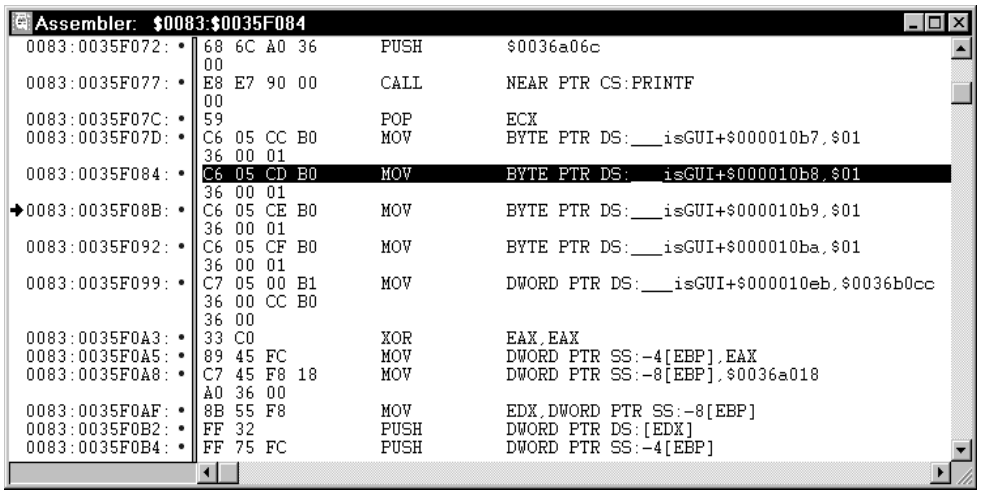
If you mark a piece of source text with the left mouse button, then click the window with the right mouse button, the following menu appears:



If you click one of these items (or hit <Alt> + the underlined letter), **Organon XDB** will react as follows:

- **Evaluate:** The marked text is taken as an expression to be evaluated, as if you issued the command **EVALUATE**. The result is printed to the *command window*.
- **Evaluate from pointer:** The marked text is taken as an expression to be evaluated, as if you issued the command **EVALUATE**. The result of the evaluation is taken as a pointer, and the contents of the memory this pointer points to are displayed in the *command window*.
- **Create evalwindow:** The marked text is evaluated, and an *evaluation window* which displays the result appears.
- **Create evalwindow from pointer:** Same as **Evaluate from pointer**, but the result is displayed in an *evaluation window*.

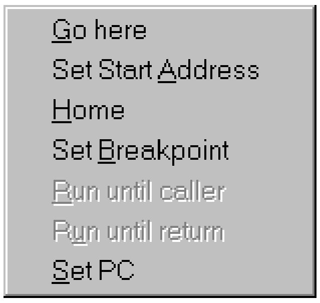
1.3.3 Assembler Window



```
Assembler:  $0083:$0035F084
 0083:0035F072: • 68 6C A0 36   PUSH     $0036a06c
                  00
 0083:0035F077: • E8 E7 90 00   CALL     NEAR PTR CS:PRINTF
                  00
 0083:0035F07C: • 59            POP      ECX
 0083:0035F07D: • C6 05 CC B0   MOV      BYTE PTR DS:___isGUI+$000010b7,$01
                  36 00 01
 0083:0035F084: • C6 05 CD B0   MOV      BYTE PTR DS:___isGUI+$000010b8,$01
                  36 00 01
➔0083:0035F08B: • C6 05 CE B0   MOV      BYTE PTR DS:___isGUI+$000010b9,$01
                  36 00 01
 0083:0035F092: • C6 05 CF B0   MOV      BYTE PTR DS:___isGUI+$000010ba,$01
                  36 00 01
 0083:0035F099: • C7 05 00 B1   MOV      DWORD PTR DS:___isGUI+$000010eb,$0036b0cc
                  36 00 CC B0
                  36 00
 0083:0035F0A3: • 33 C0         XOR      EAX,EAX
 0083:0035F0A5: • 89 45 FC      MOV      DWORD PTR SS:-4[EBP],EAX
 0083:0035F0A8: • C7 45 F8 18   MOV      DWORD PTR SS:-8[EBP],$0036a018
                  A0 36 00
 0083:0035F0AF: • 8B 55 F8      MOV      EDX,DWORD PTR SS:-8[EBP]
 0083:0035F0B2: • FF 32         PUSH     DWORD PTR DS:[EDX]
 0083:0035F0B4: • FF 75 FC      PUSH     DWORD PTR SS:-4[EBP]
```

This window shows the assembler code of the loaded task. Similar to the *source window*, the current assembler instruction (i.e. the next to be executed) is displayed inverted.

If you click the left part of the window (i.e. an address) with the right mouse button, the line pointer is set to this line, and the following menu appears:



You can click one of these items (or hit <Alt> + the underlined letter), and **Organon XDB** will react as follows:

- **Go here**: Execute the program until the line pointer is reached. The line you clicked is not executed.

- **Set Start Address**: Start Address for the *assembler window*.

- **Home**: Choosing this item makes the assembler window go back to the start address.

- **Set Breakpoint**: Set a breakpoint at the specified line. This menu item is not visible if a breakpoint exists already at this position. An alternative way to set a breakpoint is to doubleclick the address.

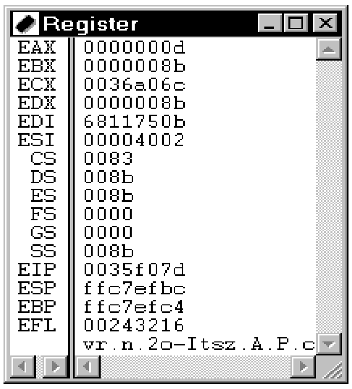
- **Delete Breakpoint**: Delete the breakpoint in this line. This menu item is visible only if a breakpoint exists at this position. An alternative way to delete a breakpoint is to doubleclick the address.

- **Run until caller**: This item is useful only if the menu is called from the *source window*. Thus, it is disabled.

- **Run until return**: This item is useful only if the menu is called from the *source window*. Thus, it is disabled.

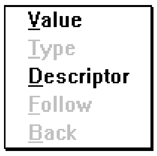
- **Set PC**: The program counter is set to the line marked by the line pointer i.e. the execution will continue by processing this line. This feature enables you to jump over pieces of the program, leaving them unprocessed, or to repeat the execution of a piece of the program. As this feature forces the program to behave in a way its author has never intended, it should be used carefully.

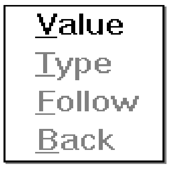
1.3.4 Register Window


```
EAX  0000000d
EBX  0000008b
ECX  0036a06c
EDX  0000008b
EDI  6811750b
ESI  00004002
 CS  0083
 DS  008b
 ES  008b
 FS  0000
 GS  0000
 SS  008b
EIP  0035f07d
ESP  ffc7efbc
EBP  ffc7efc4
EFL  00243216
     vr.n.2o-Itsz.A.P.c
```

This window allows you to examine the contents of the registers. Registers which were changed by the last instruction executed are displayed in a different color, the so-called *enhanced color* (see menu item "*Options / Edit Colors*", chapter 1.2.1.6).

If you click the *register window* with the right mouse button, the following menu appears:

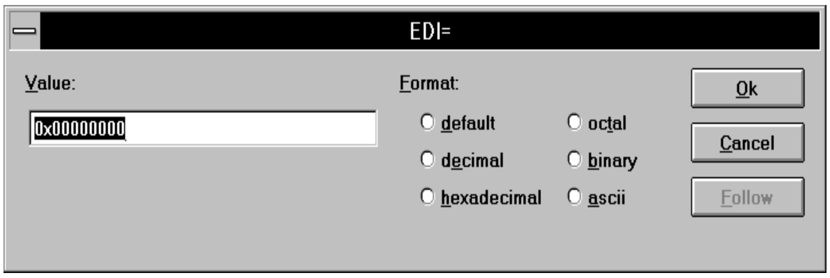




Selector register or other registers

- **Value**

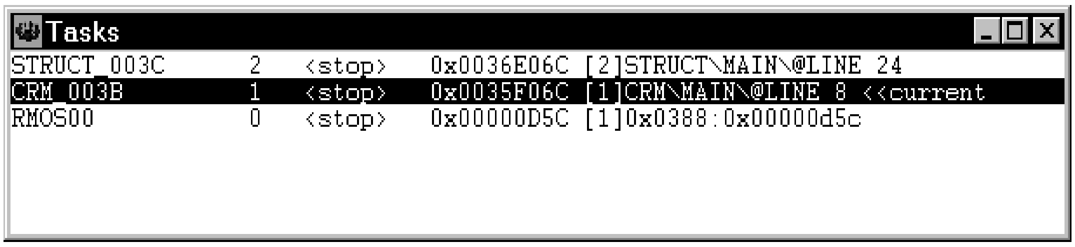
You can change arbitrarily the value of the register in the *register window*. Just click the word “Value“ in the context menu or doubleclick the value part of *the register window* to make the **Value** window pop up. Enter an expression into the "Value" field, then choose the appropriate **Format**. When you click **Ok**, the expression is evaluated and its result is assigned to the register in the *register window*.


EDI=

Value: 0x00000000

Format: ○ default ○ octal ○ decimal ○ binary ○ hexadecimal ○ ascii

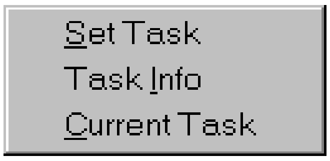
1.3.5 Task Window



```
STRUCT_003C      2   <stop>   0x0036E06C [2]STRUCT\MAIN\@LINE 24
CRM_003B         1   <stop>   0x0035F06C [1]CRM\MAIN\@LINE 8 <<current
RMOS00           0   <stop>   0x00000D5C [1]0x0388:0x00000d5c
```

This window displays all currently active tasks. It shows the task names, **XDB** task IDs, and the scope information of the tasks. You can doubleclick any task to make it the current task for **XDB**. The scope info of this task is set and the source window is updated to reflect this task's source code.

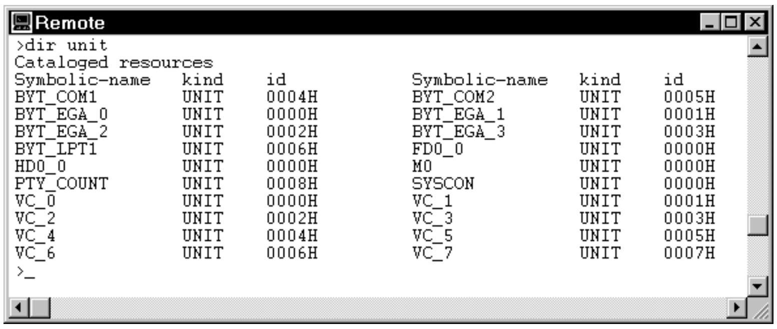
If you click the *task window* with the right mouse button, this popup window appears:



You can select each of these items to get the following actions:

- **Set Task:** Sets the scope of the currently highlighted task; this is equal to doubleclicking this task.
- **Task Info:** Displays the output of the command "SHOW TASK /ID=<*task_id*>" in the command window, where <*task_id*> is the ID of the highlighted task.
- **Current Task:** Sets the currently active task. As in RMOS the active task is the current task, this is a "no operation". This menu item exists for compatibility reasons only.

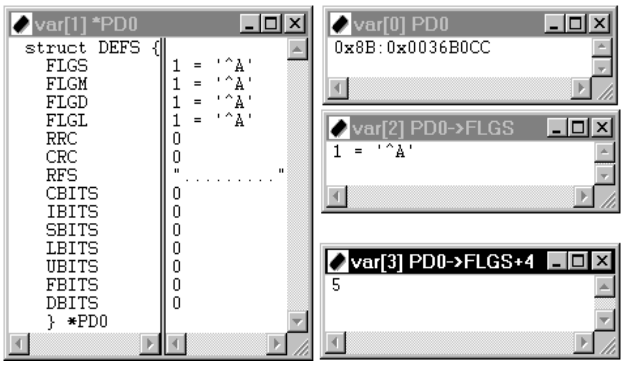
1.3.6 Remote System Window



```
>dir unit
Cataloged resources
Symbolic-name    kind    id          Symbolic-name    kind    id
BYT_COM1         UNIT    0004H       BYT_COM2         UNIT    0005H
BYT_EGA_0        UNIT    0000H       BYT_EGA_1        UNIT    0001H
BYT_EGA_2        UNIT    0002H       BYT_EGA_3        UNIT    0003H
BYT_LPT1         UNIT    0006H       FD0_0            UNIT    0000H
HD0_0            UNIT    0000H       M0               UNIT    0000H
PTY_COUNT        UNIT    0008H       SYSCON           UNIT    0000H
VC_0             UNIT    0000H       VC_1             UNIT    0001H
VC_2             UNIT    0002H       VC_3             UNIT    0003H
VC_4             UNIT    0004H       VC_5             UNIT    0005H
VC_6             UNIT    0006H       VC_7             UNIT    0007H
>_
```

This window offers you access to the target system. Within the *remote system window* you can’t use shortcuts (for example ^X,^R). Only the escape-character is active and closes the *remote window*.

1.3.7 Evaluation Windows



```
struct DEFS {   1 = '^A'
  FLGS          1 = '^A'
  FLGM          1 = '^A'
  FLGD          1 = '^A'
  FLGL          0
  RRC           0
  CRC           "........."
  RFS           0
  CBITS         0
  IBITS         0
  SBITS         0
  LBITS         0
  UBITS         0
  FBITS         0
  DBITS
  } *PD0
```

```
0x8B:0x0036B0CC
```

```
1 = '^A'
```

```
5
```

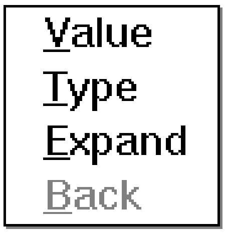
These windows are opened when you evaluate an expression (see the menu item "Debug / Evaluate", chapter 1.2.1.4, and the command SET EVALUATE in the *Command Reference*). If the expression denotes a complex structure, like a record or an array, all components are shown together with the declaration of the structure.

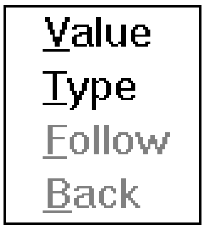
Whenever the result of the expression changes, the new value is displayed in a different color, the so-called *enhanced color* (see menu item "Options / Edit Colors", chapter 1.2.1.6). You can open as many *evaluation windows* as you want.

If the expression denotes a complex structure, like a record or an array, you can get information about its type declaration by doubleclicking the left part of the *evaluation window*.

If you want to change the value of the expression, just doubleclick the value displayed, and a pop-up window appears which allows you to manipulate the memory, assuming the expression has a memory address.

If you click the window with the right mouse button, the cursor is set to this line, and the following menu appears:



or


(if on a structure) (otherwise)

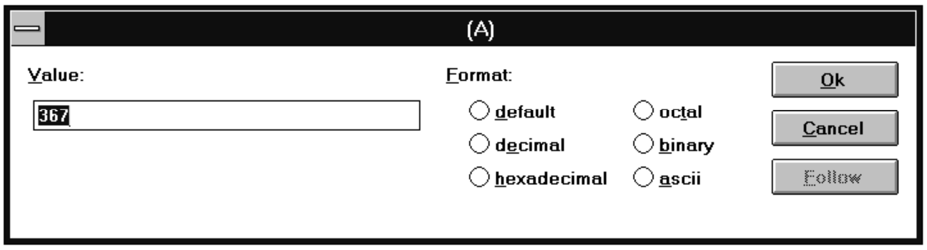
You can click one of these items (or hit <Alt> + the underlined letter), and **XDB** will react as follows:

- **Value**

You can change arbitrarily the value of the expression in the active *evaluation window*. Just click the word “Value“ in the context menu or doubleclick the value part of the *evaluation window* to make the **Value** window pop up. Enter an expression into the "Value" field, then choose the appropriate **Format**. When you click **Ok**, the expression is evaluated and its result is assigned to the address of the expression in the active *evaluation window*.

If the expression has no address (e.g. "i+1"), **Organon XDB** will issue an error message.

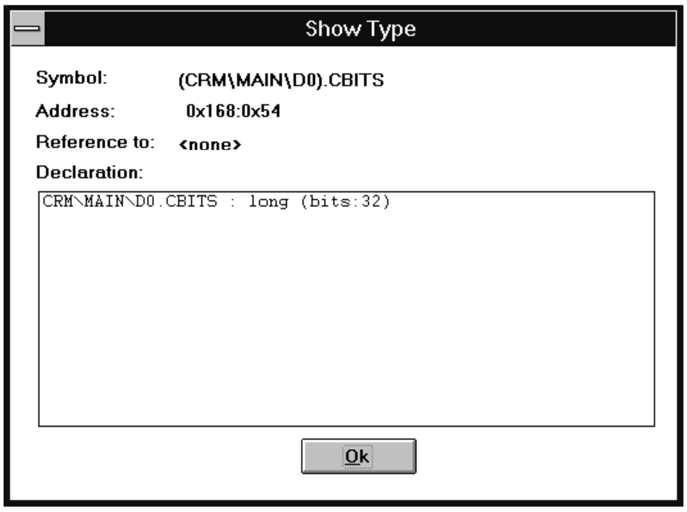
If the expression denotes a structured variable, you can change only one component at a time. First click the component in the *evaluation window*, then choose the item **Value**.



- **Type**

Clicking this item or doubleclicking the type part of the *evaluation window* makes the **Type** window pop up, showing some information about the expression of the active *evaluation window*, like its address and type declaration. Note that an expression like "i+1" has a type but not an address.

You can summon this pop-up window by doubleclicking the left (i.e. component name) part of the *evaluation window*.



Symbol: (CRM\MAIN\D0).CBITS
Address: 0x168:0x54
Reference to: <none>
Declaration:

```
CRM\MAIN\D0.CBITS : long (bits:32)
```

- **Follow**

If the expression denotes a pointer, the **Follow** button makes the *evaluation window* follow it and show the structure the pointer references to. **Follow** is disabled if the expression is not a pointer.

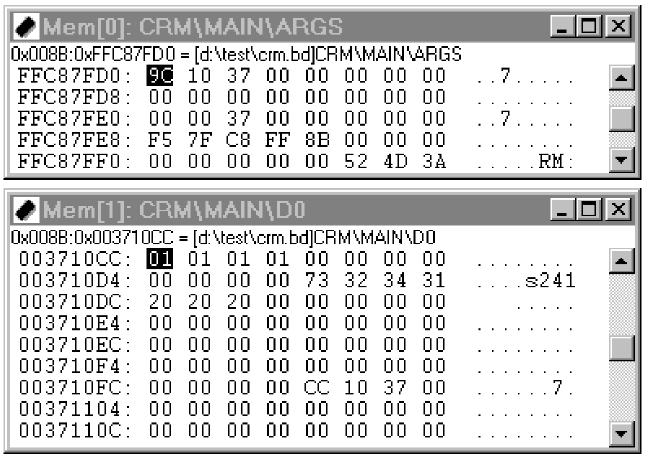
- **Expand**

If the expression denotes a structure, the **Expand** button replaces the current *evaluation window* content with the detailed listing of the structure.

- **Back**

If the evaluation window followed a pointer or expanded a structure (see below, menu item "Value"), this item makes it go back again.

1.3.8 Memory Windows



```
Mem[0]: CRM\MAIN\ARGS
0x008B:0xFFC87FD0 = [d:\test\crm.bd]CRM\MAIN\ARGS
 FFC87FD0: 9C 10 37 00 00 00 00 00   ..7.....
 FFC87FD8: 00 00 00 00 00 00 00 00   ........
 FFC87FE0: 00 00 37 00 00 00 00 00   ..7.....
 FFC87FE8: F5 7F C8 FF 8B 00 00 00   ........
 FFC87FF0: 00 00 00 00 00 52 4D 3A   .....RM:

Mem[1]: CRM\MAIN\D0
0x008B:0x003710CC = [d:\test\crm.bd]CRM\MAIN\D0
 003710CC: 01 01 01 01 00 00 00 00   ........
 003710D4: 00 00 00 00 73 32 34 31   ....s241
 003710DC: 20 20 20 00 00 00 00 00      .....
 003710E4: 00 00 00 00 00 00 00 00   ........
 003710EC: 00 00 00 00 00 00 00 00   ........
 003710F4: 00 00 00 00 00 00 00 00   ........
 003710FC: 00 00 00 00 CC 10 37 00   ......7.
 00371104: 00 00 00 00 00 00 00 00   ........
 0037110C: 00 00 00 00 00 00 00 00   ........
```

A memory window displays a certain piece of the memory. Values that were changed by the last instruction executed are displayed in a different color, the so-called *enhanced color* (see menu item "Options / Edit Colors", chapter 1.2.1.6). Memory windows are opened by the menu item "Display / Memory" or by the button **Create Memory Window**. You can open as many memory windows as you want.

The title bar contains the name of the memory window. The text "**[based]**" is displayed if the window is in based mode. The string "**[?]**" indicates that the window is not updated automatically and something happened since the last update which possibly changed the memory on display.

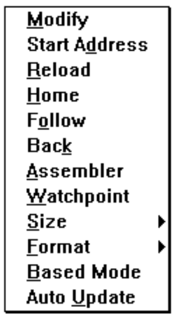
The first line of the *Memory Windows* contains the start address. If the *Memory Window* cursor is located at the address of a (program or **XDB**) symbol, the first line of the window displays the symbol name inclusively the path of the respective debug information.

In bytewise display, the contents of the memory are not only displayed numerically but also interpreted as characters and written on the right side of the memory window. Invisible characters are replaced by a dot.

Note that a window in based mode always displays the memory denoted by the start address expression and, therefore, cannot be scrolled.

1.3.8.1 Memory Window Context Menu

If you click the memory part of the window (i.e. not the title bar, scroll bar or first line) with the right mouse button, the following menu pops up:

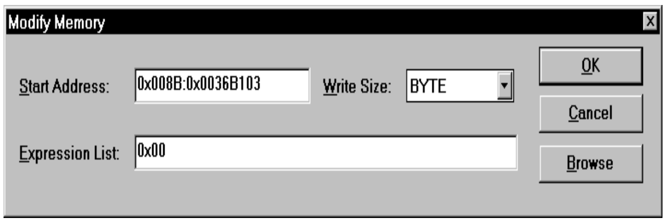


The menu can also be summoned by typing <ctrl-Return> into the window.

You can choose an item from the menu by either clicking it or by typing the underlined letter.

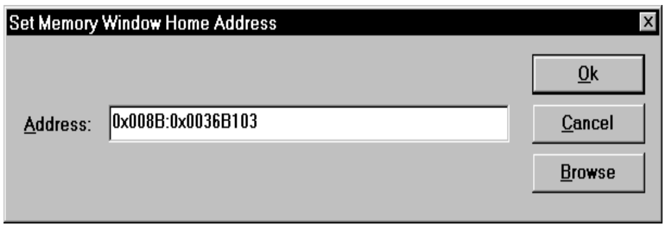
- **Modify**

Select this item if you want to change the memory contents. The following dialog box pops up:



You can enter the address where the modification starts (the memory window cursor location is the default value for the address) and choose the size of the information to be written. Click the **Browse** button to invoke the symbol browser which helps you getting the addresses of program symbols. Enter the value to be written into the **Expression List** field. As the name implies, you can enter a list of expressions here, separated by commas. The amount of memory being accessed is the size times the number of expressions. For example, if you enter "1000" into the **Start Address** field and the list "1, 0, 1, 1" into the **Expression List** field and select the size "BYTE", the bytes 1000 through 1003 are modified. The same operation with the size "WORD" would affect the bytes 1000 through 1007.

- **Start Address**



You can change the start address of the memory window by selecting this item. Enter the new start address in the dialog box popping up. This dialog box also offers the ability to invoke the symbol browser which helps you getting the addresses of program symbols.

- **Reload**

  This menu item updates the window contents. This is especially useful if the memory window is not updated automatically.

- **Home**

  Choosing this item makes the window go back to the start address.

- **Follow**

  If the format is one of the pointer types "Near 16", "Far 16", etc., this menu item makes the memory window follow the pointer marked by the memory window cursor, i.e. the contents of the marked piece of memory are interpreted as memory address which becomes the new start address. This menu item is disabled if the format is not a pointer type.

- **Back**

  If the start address is changed by **Start Address** or **Follow**, the old start address is saved. By selecting the menu item **Back** you reset the start address to its previous value. Note that not only the last change but all changes done by **Start Address** or **Follow** can be undone; in other words, you can go back to the initial start address after an arbitrary number of address changes. If no previous address exists, this menu item is disabled.

- **Assembler**

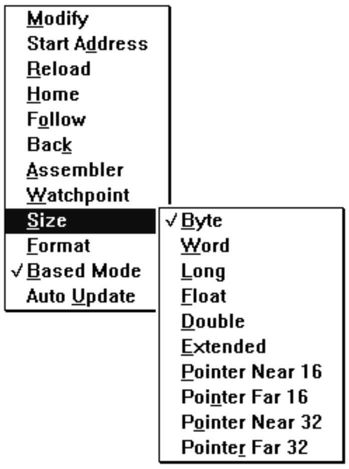
  This menu item opens the *assembler window* (unless it is open already). The *assembler window* is set to the address marked by the memory window cursor.

- **Watchpoint**

  Select this item to set a watchpoint to the location marked by the memory window cursor. The dialog box popping up is the same as invoked by the main menu item "*Debug / Set Watchpoint*" described in chapter 1.2.1.4.

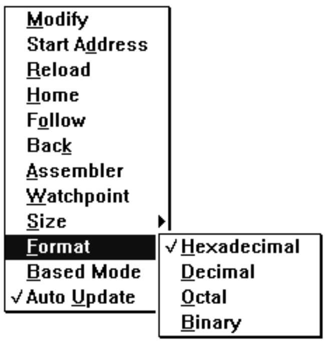
- **Size**

  You can tell **XDB** how to group the array of bits it extracts from the memory. Click the size you want or hit the underlined letter. The current size is checkmarked.



- **Format**

  This menu item enables you to change the display format of the memory window. Click the format you want or hit the underlined letter. The current format is checkmarked.



- **Based Mode**

  If the start address of the memory window is not a constant expression, you may want the memory window to follow whenever the value of the expression changes. This is the so-called *based mode*. You can toggle between based mode and constant mode by selecting this item. The menu item is checkmarked if the memory window is in based mode. Note that the automatical start address change of a based memory window cannot be undone by means of the item **Back**.

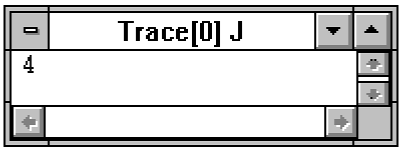
- **Auto Update**

  If this item is checkmarked, the window is updated automatically whenever the memory on display is changed. Otherwise, it is updated only when you select the menu item **Reload**. You can toggle between these two update modes by selecting **Auto Update**.

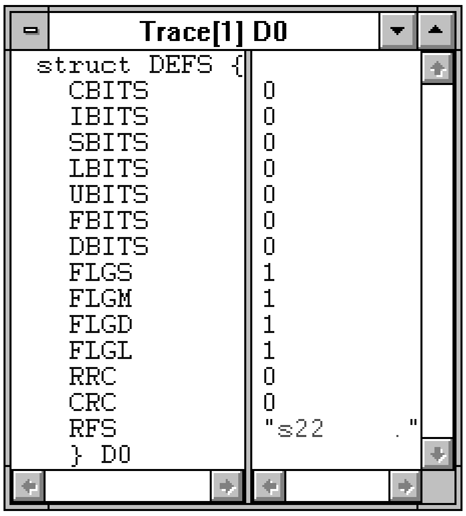
1.3.9 Trace Windows

Tracepoints can be used to watch a piece of memory, e.g. a variable. You can set a tracepoint using the Debug menu in the tool bar (see chapter 1.2.1.4), or you can issue the SET TRACEPOINT command in the command window. A trace window is opened for every tracepoint, and the value stored in the memory to be traced is displayed.

If a value has changed in the last execution step, it is displayed in a different color, the so-called *enhanced color* (see menu item "Options / Edit Colors", chapter 1.2.1.6) to catch your attention.



```
Trace[0] J
4
```



```
Trace[1] D0
struct DEFS {
   CBITS        0
   IBITS        0
   SBITS        0
   LBITS        0
   UBITS        0
   FBITS        0
   DBITS        0
   FLGS         1
   FLGM         1
   FLGD         1
   FLGL         1
   RRC          0
   CRC          0
   RFS          "s22     ."
   } D0
```

Here you see two trace windows which were named "trace[0]" and "trace[1]" by the debugger. trace[0] was set on the integer variable J which has the value 4 at the moment. The variable D0 is a compound structure, thus **Organon XDB** shows the structure component names in the left part of the trace window while displaying the values of these components in the right part. The value of the component RFS is displayed in *enhanced color* because it was changed in the last execution step.

The handling of trace windows is - excepted the missing Pop-Up menues available by pressing the the right mouse button - exactly the same as the handling of evaluation windows.

1.3.10 Copy and Paste

It is possible to transfer text from one subwindow to another by using the mouse. Just brush over the text with the mouse while pressing down the left mouse button. To paste the copied text into another window, move the mouse into this window and click the right mouse button. Note that the text copied into the copy-and-paste buffer remains there until you mark another text.

You can copy text from the following subwindows:

> *Command window*, *source window*, *assembler window*, *remote window*.

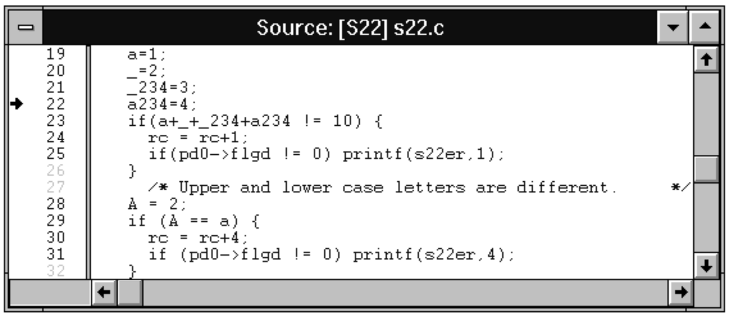
You can paste the copied text into the following subwindows:

> *Command window, remote window*.

When you choose the menu item "*Debug / Evaluate*" or click the **Evaluate** button, a pop-up window appears where you enter the expression to be evaluated. If you have copied text into the copy-and-paste buffer, this text is the default value for the expression. The same holds for the **Search** command which can be issued by clicking the **Search** button or choosing the menu item "*File / Search*": When the search window pops up, the content of the copy-and-paste buffer is in the pattern field already.

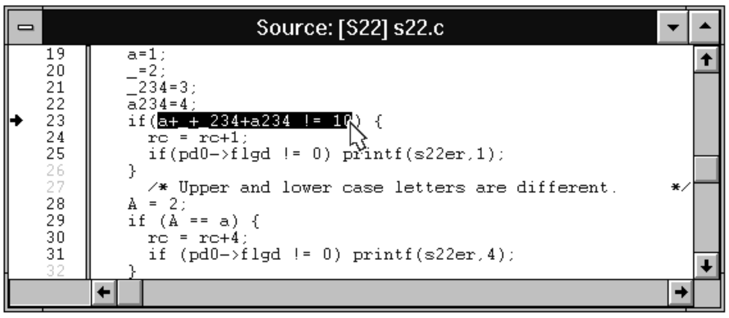
Example:

Examining the C program displayed in the *source window*, you wonder whether the condition in the if-statement on line 23 is true in the moment:



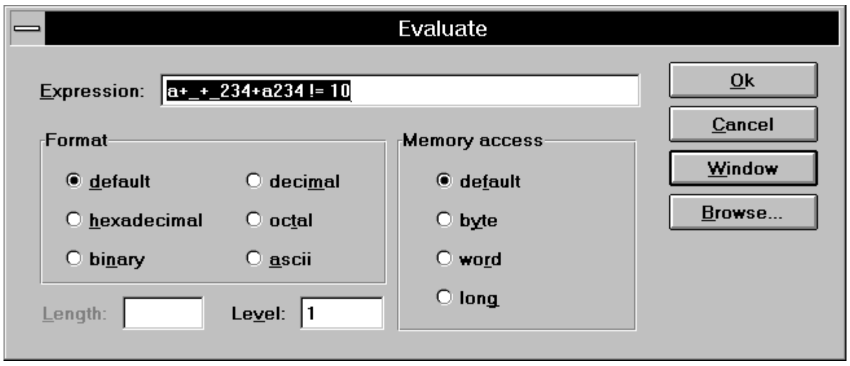
```
   19    a=1;
   20    _=2;
   21    _234=3;
➜  22    a234=4;
   23    if(a+_+_234+a234 != 10) {
   24      rc = rc+1;
   25      if(pd0->flgd != 0) printf(s22er,1);
   26    }
   27      /* Upper and lower case letters are different.     */
   28    A = 2;
   29    if (A == a) {
   30      rc = rc+4;
   31      if (pd0->flgd != 0) printf(s22er,4);
   32    }
```

You place the mouse at the beginning of the condition, press down the left mouse button, and drag the mouse across the condition, marking it:



```
a=1;
_=2;
_234=3;
a234=4;
if(a+_+_234+a234 != 10) {
  rc = rc+1;
  if(pd0->flgd != 0) printf(s22er,1);
}
  /* Upper and lower case letters are different.     */
A = 2;
if (A == a) {
  rc = rc+4;
  if (pd0->flgd != 0) printf(s22er,4);
}
```

Now you click the tool bar button **Evaluate**, and this window pops up:



Expression: a+_+_234+a234 != 10

Format: [✓ default] decimal hexadecimal octal binary ascii

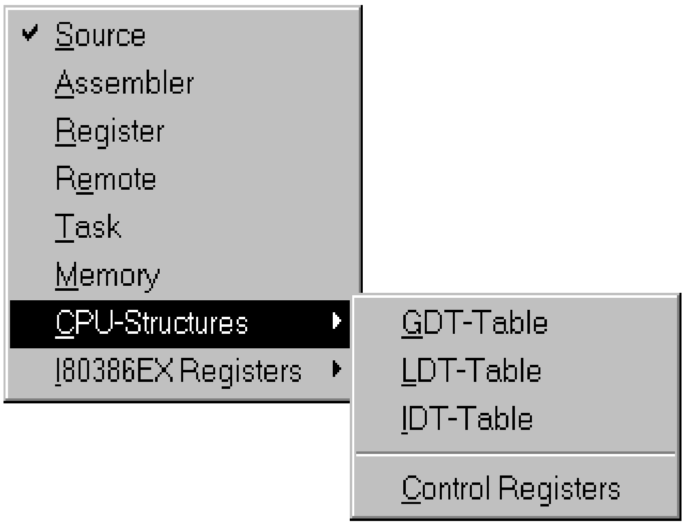
Length: Level: 1

Memory access: [✓ default] byte word long

The expression you marked is already in the **Expression** field. All you have got to do is to click the **Ok** button, and the result appears in the *command window*.

1.4 Descriptor and Register Tables

The menu item "*Display / CPU-Structures*" gives access to the CPU structures used by the processors Intel386 and upward. Open the menu and choose the table you want to manipulate by clicking it (or by hitting <Alt> and the underlined letter).



If one of these tables is displayed already, its name is checkmarked. Clicking this name is the appropriate way to dismiss the table.

1.4.1 Descriptor Tables

If you choose to display the GDT (Global Descriptor Table) or the IDT (Interrupt Descriptor Table), the following dialog box pops up:

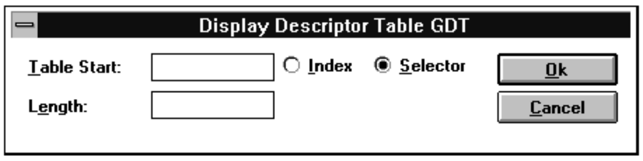
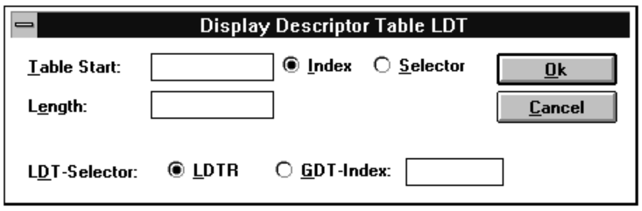


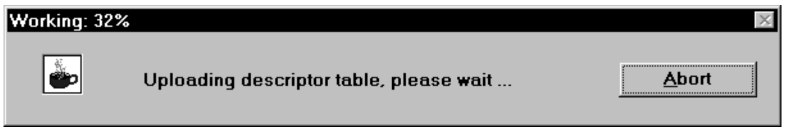
Table Start: ( ) Index [✓ Selector]

Enter the number of the first table item to be displayed into the **Table Start** field and activate the button **Index** or enter the selector into the **Table Start** field and activate the button **Selector** (The **Selector** option makes sense only in the case of a GDT and is therefore disabled in the IDT case). Write the number of items to be displayed into the **Length** field, then click **Ok** or hit <Return>.

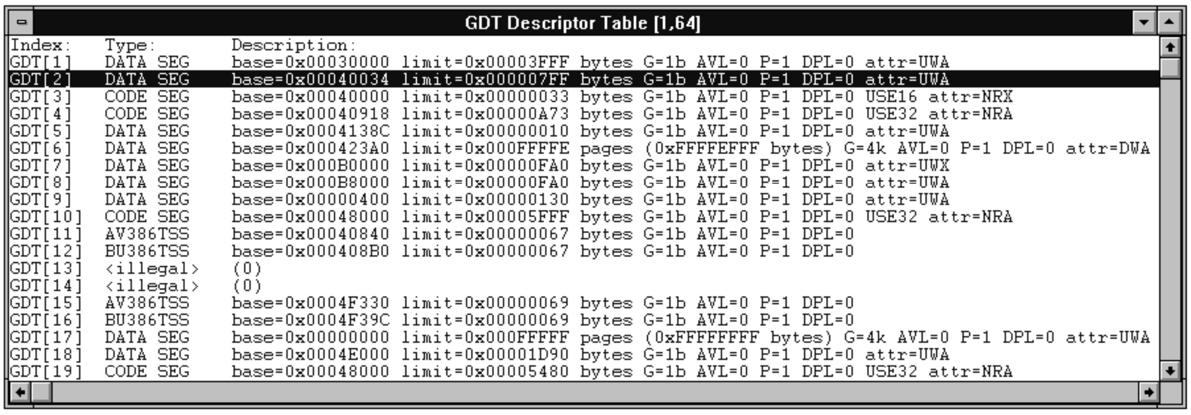
A similar dialog box appears when you choose to display an LDT (Local Descriptor Table). Additionally to the items mentioned above, you have to choose which LDT to display by entering the appropriate GDT index number; to display the LDT of the current task (which is referenced to by the LDTR register), activate the LDTR button.



Now, the descriptor table is loaded from the target. During loading the following is displayed:



Afterwards the descriptor table is displayed:



```
Index:    Type:        Description:
GDT[1]    DATA SEG     base=0x00030000 limit=0x00003FFF bytes G=1b AVL=0 P=1 DPL=0 attr=UWA
GDT[2]    DATA SEG     base=0x00040034 limit=0x000007FF bytes G=1b AVL=0 P=1 DPL=0 attr=UWA
GDT[3]    CODE SEG     base=0x00040000 limit=0x00000033 bytes G=1b AVL=0 P=1 DPL=0 USE16 attr=NRX
GDT[4]    CODE SEG     base=0x00040918 limit=0x00000A73 bytes G=1b AVL=0 P=1 DPL=0 USE32 attr=NRA
GDT[5]    DATA SEG     base=0x0004138C limit=0x00000010 bytes G=1b AVL=0 P=1 DPL=0 attr=UWA
GDT[6]    DATA SEG     base=0x000423A0 limit=0x000FFFFE pages (0xFFFFEFFF bytes) G=4k AVL=0 P=1 DPL=0 attr=DWA
GDT[7]    DATA SEG     base=0x000B0000 limit=0x00000FA0 bytes G=1b AVL=0 P=1 DPL=0 attr=UWX
GDT[8]    DATA SEG     base=0x000B8000 limit=0x00000FA0 bytes G=1b AVL=0 P=1 DPL=0 attr=UWA
GDT[9]    DATA SEG     base=0x00000400 limit=0x00000130 bytes G=1b AVL=0 P=1 DPL=0 attr=UWA
GDT[10]   CODE SEG     base=0x00048000 limit=0x00005FFF bytes G=1b AVL=0 P=1 DPL=0 USE32 attr=NRA
GDT[11]   AV386TSS     base=0x00040840 limit=0x00000067 bytes G=1b AVL=0 P=1 DPL=0
GDT[12]   BU386TSS     base=0x000408B0 limit=0x00000067 bytes G=1b AVL=0 P=1 DPL=0
GDT[13]   <illegal>    (0)
GDT[14]   <illegal>    (0)
GDT[15]   AV386TSS     base=0x0004F330 limit=0x00000069 bytes G=1b AVL=0 P=1 DPL=0
GDT[16]   BU386TSS     base=0x0004F39C limit=0x00000069 bytes G=1b AVL=0 P=1 DPL=0
GDT[17]   DATA SEG     base=0x00000000 limit=0x000FFFFF pages (0xFFFFFFFF bytes) G=4k AVL=0 P=1 DPL=0 attr=UWA
GDT[18]   DATA SEG     base=0x0004E000 limit=0x00001D90 bytes G=1b AVL=0 P=1 DPL=0 attr=UWA
GDT[19]   CODE SEG     base=0x00048000 limit=0x00005480 bytes G=1b AVL=0 P=1 DPL=0 USE32 attr=NRA
```

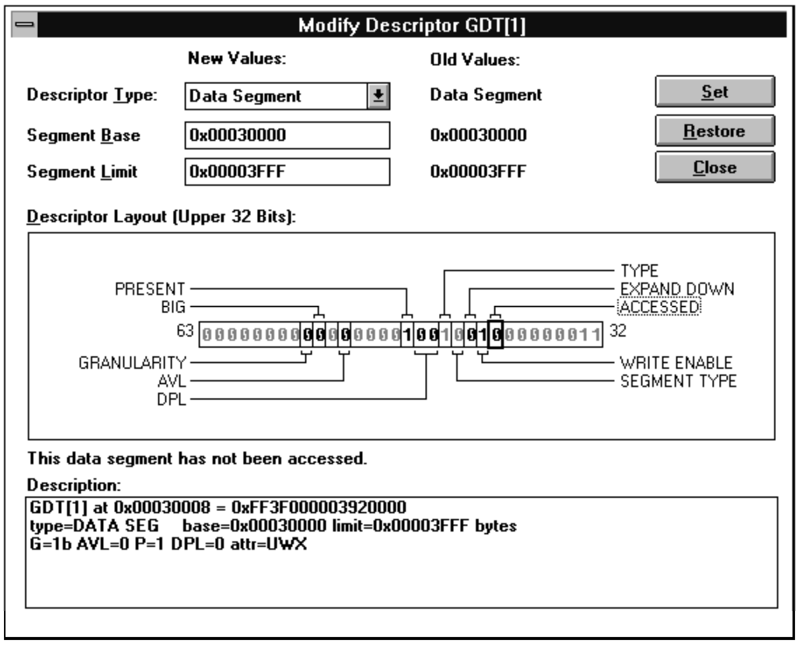
If you want to change the table or examine an item in detail, click it with the right mouse button to summon this pop-up menu:

Choose one of the items by clicking it or by hitting <Alt> and the underlined letter. The items are described in the following chapters.

If you hit <Return> while the descriptor table window is active, **Organon XDB** directly goes into the modify mode, skipping the pop-up menu. The descriptor to be modified is the one being displayed in inverted colors in the descriptor table window.

1.4.1.1 Modify

The following dialog box enables you to examine or modify the chosen item of the GDT, LDT, or IDT:



Modify Descriptor GDT[1]

	New Values:	Old Values:
Descriptor Type:	Data Segment	Data Segment
Segment Base	0x00030000	0x00030000
Segment Limit	0x00003FFF	0x00003FFF

Descriptor Layout (Upper 32 Bits):

This data segment has not been accessed.

Description:

```
GDT[1] at 0x00030008 = 0xFF3F000003920000
type=DATA SEG    base=0x00030000 limit=0x00003FFF bytes
G=1b AVL=0 P=1 DPL=0 attr=UWX
```

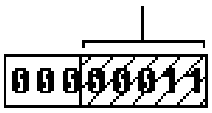
The modification becomes effective when you click the **Set** button. The **Close** button dismisses the dialog box, discarding all changes you made. Clicking the

Restore button discards all changes made since the opening, but the dialog box remains open.

To change the type of the descriptor, open the **Descriptor Type** pull-down menu and choose one of the offered types. You can modify the values of the segment base address and the segment limit by entering a number (octal, decimal, or hex).

The **Descriptor Layout** field helps you modifying the contents of the descriptor bit for bit. Click the bit or bit group (or its name displayed in the field) to set the focus on it. The focused bit or bit group can be altered by a click or by hitting the space bar. This increases the value of the bit group by 1 (wrapping around the maximal value). The focus can be moved left or right with the "cursor left" and "cursor right" keys.

Some bit groups are so large that changing them in the manner described above would be cumbersome. Thus, a different mechanism to change their contents was implemented: Just doubleclick the bit group (or its name displayed in the layout field), then enter the new value as a decimal, octal or hex number. Bit groups with this change mechanism are displayed hatched, viz:



You find a short description of the focused bit group and its current value below the **Descriptor Layout** field. The **Description** field at the bottom of the box shows a summary of the contents of the descriptor.

Changed bits are displayed in enhanced color in the **Descriptor Layout** field.

Bits which are not accessible directly (i.e. by clicking them in the **Descriptor Layout** field) are displayed in gray, indicating they are "disabled".

1.4.1.2 Reload Table

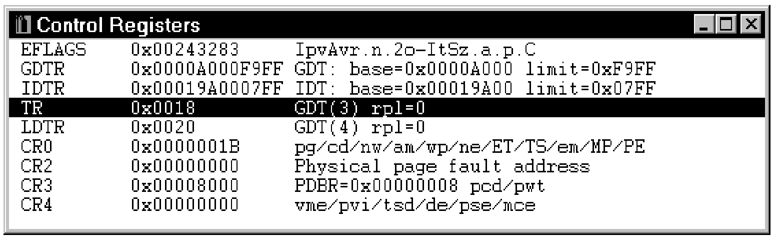
The descriptor table is not updated automatically when the target memory is changed (e.g. by performing a step). Choose this menu item to update the table on display. Note that the whole table on display is updated; it does not matter which line was clicked to summon the pop-up menu.

1.4.1.3 Set Range

This menu item enables you to change the range of the list of descriptors on display. Enter the number of the first table item to be displayed and the number of items to be displayed, then click **Ok** or hit <Return>.

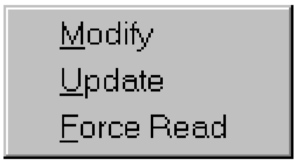
1.4.2 Control Registers

If you choose to display the control registers, the following window appears:



```
EFLAGS     0x00243283      IpvAvr.n.2o-ItSz.a.p.C
GDTR       0x0000A000F9FF GDT: base=0x0000A000 limit=0xF9FF
IDTR       0x00019A0007FF IDT: base=0x00019A00 limit=0x07FF
TR         0x0018          GDT(3) rpl=0
LDTR       0x0020          GDT(4) rpl=0
CR0        0x0000001B      pg/cd/nw/am/wp/ne/ET/TS/em/MP/PE
CR2        0x00000000      Physical page fault address
CR3        0x00008000      PDBR=0x00000008 pcd/pwt
CR4        0x00000000      vme/pvi/tsd/de/pse/mce
```

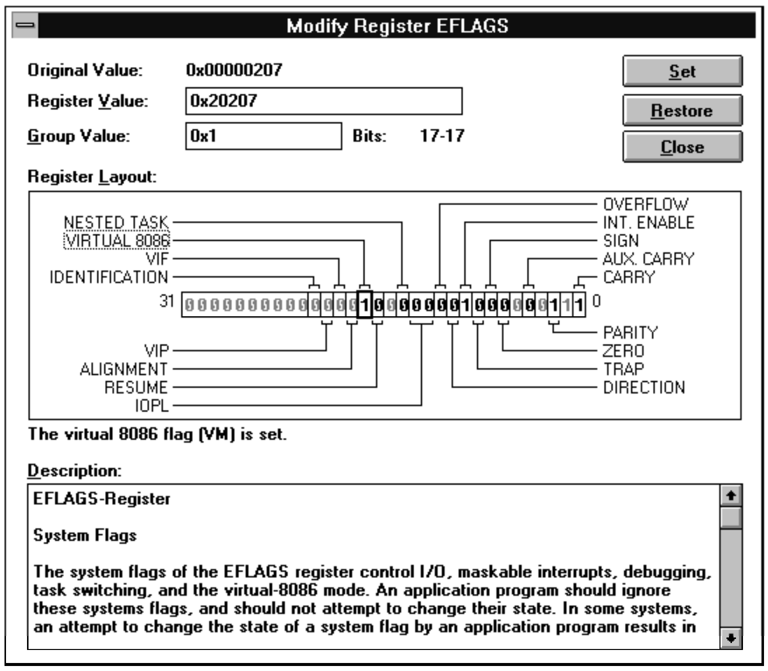
Clicking a line with the right mouse button summons the following menu whose items are explained in the chapters below:



If you hit <Return> while the control register table window is active, **Organon XDB** directly goes into the modify mode, skipping the pop-up menu. The register to be modified is the one being displayed in inverted colors in the register table window.

1.4.2.1 Modify

The following dialog box enables you to examine or modify the selected register:



Original Value: 0x00000207
Register Value: 0x20207
Group Value: 0x1 Bits: 17-17
Register Layout:

The virtual 8086 flag (VM) is set.

Description:

EFLAGS-Register

System Flags

The system flags of the EFLAGS register control I/O, maskable interrupts, debugging, task switching, and the virtual-8086 mode. An application program should ignore these systems flags, and should not attempt to change their state. In some systems, an attempt to change the state of a system flag by an application program results in

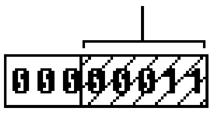
The modification becomes effective when you click the **Set** button. The **Close** button dismisses the dialog box, discarding all changes you made. Clicking the **Restore** button discards all changes made since the opening, but the dialog box remains open.

You can change the whole register value by entering a number (octal, decimal or hex) into the **Register Value** field.

You can change the value of a bit group by clicking it (or its name) in the **Register Layout** field, then set the focus to the **Group Value** field and enter a number (octal, decimal or hex). The **Bits** field shows which bits belong to this group.

The **Register Layout** field helps you modifying the contents of the descriptor bit for bit. Click the bit or bit group (or its name displayed in the field) to set the focus on it. The focused bit or bit group can be altered by a click or by hitting the space bar. This increases the value of the bit group by 1 (wrapping around the maximal value). The focus can be moved left or right with the "cursor left" and "cursor right" keys.

Some bit groups are so large that changing them in the manner described above would be cumbersome. Thus, a different mechanism to change their contents was implemented: Just doubleclick the bit group (or its name displayed in the layout field), then enter the new value as a decimal, octal or hex number. Bit groups with this change mechanism are displayed hatched, viz:

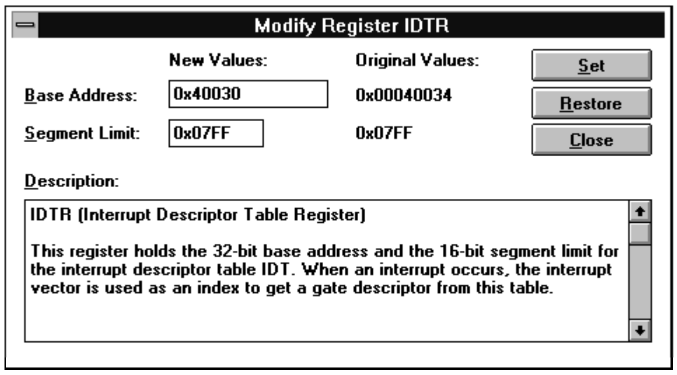


You find a short description of the focused bit group and the meaning of its current value below the **Register Layout** field. The **Description** field at the bottom of the box shows a detailed explanation of the contents of the register.

Changed bits are displayed in enhanced color in the **Register Layout** field.

Bits which are not accessible directly (i.e. by clicking them in the **Register Layout** field) are displayed in gray, indicating they are "disabled".

Some registers contain only numerical values rather than single and independent bits. These registers are displayed without the **Register Layout** field, e.g. the register IDTR:


Modify Register IDTR

	New Values:	Original Values:
Base Address:	0x40030	0x00040034
Segment Limit:	0x07FF	0x07FF

Description:

IDTR (Interrupt Descriptor Table Register)

This register holds the 32-bit base address and the 16-bit segment limit for the interrupt descriptor table IDT. When an interrupt occurs, the interrupt vector is used as an index to get a gate descriptor from this table.

To change the register value, set the focus to one of the value fields (i.e. click the field or hit <Alt> and the underlined letter), then enter a number (octal, decimal or hex).

1.4.2.2 Update

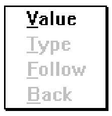
The control register table is not updated automatically when the target CPU registers change (e.g. by performing a step). Choose this menu item to update the table on display. Note that the whole table on display is updated; it does not matter which line was clicked to summon the pop-up menu.

1.4.3 Register Window

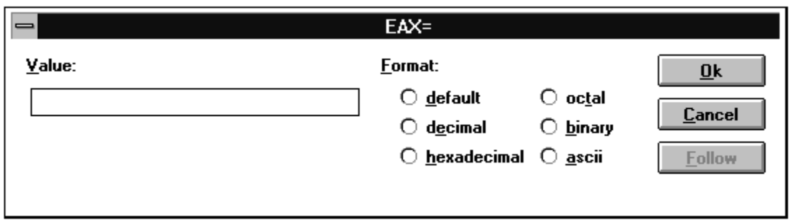
The **Organon XDB386** offers the ability to manipulate the register contents. This feature is explained in this chapter.

1.4.3.1 General Registers

If you click a register name or register value with the right mouse button, this menu appears:



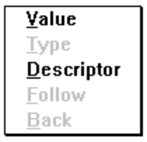
Only the first item, **Value**, is enabled. Select it to summon the following dialog box. This dialog box also pops up if you doubleclick the register value, circumventing the menu.



The **Format** radio buttons determine the display format of the value. You can change the register value by entering an expression into the **Value** field. The change takes place if you click **Ok** or hit <Return>. Note that the **Follow** button is always disabled.

1.4.3.2 Segment Registers

The behaviour of the segment registers CS, ES, DS, etc, is somewhat different. Clicking one of them with the right mouse button summons this menu:



Only the items **Value** and **Descriptor** are enabled. The item **Value** is described in the previous chapter. Selecting **Descriptor** activates the descriptor modification mechanism described in chapter 1.4.1.1.

Both menu items can be selected without summoning the menu. Doubleclick the segment register name to activate the descriptor modification mechanism or doubleclick the segment register value to activate the value modification mechanism.

Organon XDB Command Set 2

2 Organon XDB Command Set

Organon XDB contains a rich set of commands. These commands are listed in alphabetical order below:

BATCH	EXIT	REMOTE
BREAK	GOTO	RUN
CLOSE	HELP	SCAN
CONTINUE	IF	SEARCH
DEFINE	Label	SET
DELETE	LINE	SHOW
DISABLE	LOAD	SPAWN
DISPLAY	MESSAGE	STEP
ENABLE	NEXT	WHILE
ERASE	PAGE	
EVALUATE	PRINT	

Note that commands and keywords may be abbreviated as long as they are unambiguous. E.g., "DEF" is recognized as "DEFINE" while "DIS" is illegal because it could mean "DISABLE" as well as "DISPLAY".

2.1 BATCH

Syntax

```
BATCH [/STEP] [/ERROR] [/NOOUT] [/ARGUMENTS = "arg1[,arg2...]"] "<filename>"
```

Description

<filename>

The name of the batch file. To avoid problems with path names including special characters, the file name must be enclosed in double quotes.

/STEP

This option forces single-stepping through the batch file (and its possible recursive descendants), asking for every command to be executed. The command is shown at the command window.

There are four choices for each command:

Choice	Description
y	execute the command
s	skip the command
c	continue without asking anymore
e	exit batch mode and return to interactive mode

/ERROR

This option stops the execution of commands if **XDB** detects an error, and returns to interactive mode.

/NOOUT

This option switches off any update of windows except the error window during execution of a BATCH file.

/ARGUMENTS="arg1[,arg2...]"

This option allows to pass arguments to BATCH files. Up to 40 arguments are allowed. An argument is referenced with &<*argument-number*>. The argument 0 contains the name of the BATCH file. To suppress the expansion of a positional parameter use a '\' (backslash) character as prefix. Undefined parameters are treated as empty strings. The parameters are passed as textual strings.

The qualifiers */STEP*, */NOOUT*, and */ERROR* are propagated through nested batch file calls.

Examples

```
BATCH /STEP "cmdfile"
BATCH /ERROR "validate"
BATCH /STEP /ERROR "test"
BATCH "..\cmddir\setup"
```

2.2 BREAK

Syntax

```
BREAK
```

Description

BREAK terminates the current WHILE loop. This command has no effect if called outside a loop.

Example

```
WHILE  i > 10
    THEN
    EVAL j
    IF  j < 20
          THEN
          BREAK
    END
END
```

References

WHILE
CONTINUE

2.3 CLOSE

Syntax

```
CLOSE LOGFILE
CLOSE PROTFILE/WINDOW = <window>
CLOSE PROTFILE/ALL
```

Description

CLOSE stops writing into the specified logfile or protocol file. If the last window of a protocol file is closed, the file itself is closed, too.

<*window*> may have the following names:

ASSEMBLER	EVALUATE	TRACEPOINT
COMMAND	REGISTER	
ERROR	SOURCE	

/ALL closes all protocol files immediately.

Examples

```
CLOSE LOGFILE "session"
CLOSE PROTFILE /WINDOW=EVAL
CLOSE PROTFILE /ALL
```

References

SET LOGFILE
SET PROTFILE
SHOW LOGFILE
SHOW PROTFILE

2.4 CONTINUE

Syntax

```
CONTINUE
```

Description

CONTINUE skips the remaining part of a loop and resumes at the test expression.

Example

```
WHILE  i > 10
    THEN
    EVAL i
    IF j < 10
        THEN
        CONTINUE
    END
    EVALUATE j
END
```

References

BREAK
WHILE

2.5 DEFINE Commands

Syntax

```
DEFINE <item>
```

The item <*item*> to be defined can be one of the following:

BUTTON
KEY
MACRO
SYMBOL

2.6 DEFINE BUTTON

Syntax

```
DEFINE BUTTON [/OVERWRITE] <name> "<text>"
```

Description

The *DEFINE BUTTON* command creates a new button in the toolbar of the command window. Whenever this button is pressed, the string *<text>* is sent to the command line processor.

/OVERWRITE

Redefining an existing button causes an error message. But it is possible to redefine a button if the qualifier */OVERWRITE* is used. In this case only a warning message appears.

Examples

```
DEFINE BUTTON step "step\n"
DEFINE BUTTON break "SET breakpoint at "
DEFINE BUTTON Assem "SET language assembler\n"
DEFINE BUTTON /OVERWRITE oldbutton "newcommand"
```

References

DELETE BUTTON
SHOW BUTTON

2.7 DEFINE KEY

Syntax

```
DEFINE KEY [ /OVERWRITE ] <key> "<text>"
```

Description

The function key with the symbolic code <*key*> is defined to send the text <*text*>.

Unlike the other DEFINE commands redefining an existing key causes no error or warning message.

/OVERWRITE

Although redefining a key without the qualifier /OVERWRITE causes no warning message it is good practice to use this qualifier for redefining.

Currently possible key codes are:

Key Code	Name
F1	function key
:	:
F9	function key
F11	function key
:	:
F20	function key
F21	function key
:	:
F24	function key

Function Key F10 is reserved for Windows.
A defined key does not send the newline character automatically; thus, a command can be combined by pressing a couple of function keys. If a string is to be sent to the debugger immediately, add the newline escape "\n" (backslash -n) to the end of the string.

XDB does not check whether the key is really available on your current terminal.

Examples

```
DEFINE KEY F1 "set break at"
DEFINE KEY /OVERWRITE F2 "step\n"
DEFINE KEY F3 "/ALL"
```

References

SHOW KEY
DELETE KEY

2.8 DEFINE MACRO

Syntax

```
DEFINE MACRO [/OVERWRITE] [/BUTTON] <name> "<text>"
```

Description

<name>

The macro <*name*> is defined. <*name*> is a name consisting of letters and digits. The first character has to be a letter. The names of internally predefined variables and macro functions must not be used (see SET VALUE). <*text*> is the replacement text of the macro. <*text*> can contain more than one line. The maximum number of parameters for a macro is 20. These parameters can be addressed by @<*number*>. The macro may contain any text. Macros cannot be used recursively.

The execution of the macro on the command level is done by:

```
@name (parameter1,...,parameter9)
```

Only the parameters actually used must be specified. The others are replaced by empty strings. The macro is replaced, and the replacement text is interpreted like any other input. Macros can be nested and used as parameters to other macros. The parameters are expanded during the scanning of the parameter list. If no parameters are given, the parentheses may be omitted. Macros must not be recursive!

Macros and debugger variables use the same designations. In case of equal names, the macro definition is used.

/OVERWRITE

Redefining an existing macro causes an error message. But it is possible to redefine a macro if the qualifier */OVERWRITE* is used. In this case only a warning message appears.

/BUTTON

It is possible to define toolbar buttons for the macro by using the */BUTTON* qualifier. The macro is executed whenever the associated button is pressed.

If a macro body spans more than 1 line, a '\' (backslash) character must be entered immediately before the newline character. If the macro contains more than one command, the commands must be separated by semicolons.

Examples

```
DEFINE MACRO MAC0 "SET BREAK AT @1"
DEFINE MACRO CONTINUE "RUN"
DEFINE MACRO FILENAM "testset.@1"
DEFINE MACRO /OVERWRITE OLDMAC "parr@1[@2]"
DEFINE MACRO /BUTTON Symbols "SHOW ACTIVE @1"
```

Some macro invocations:

```
@MAC0 (@LINE20)
SET LOGFILE @FILENAM(log)
@MAC1 (BREAKPOINT,main)
```

References

DELETE MACRO
SHOW MACRO
SHOW BUTTON

2.9 DEFINE SYMBOL

Syntax

```
DEFINE SYMBOL [ /OVERWRITE ]
              [ /ADDRESS = <expression> ]
              [ /TYPE = "<type>" ]
              [ /VALUE = <expression> ]
              <symbol-name>
```

Description

This command generates a symbol called <*symbol-name*> which behaves like a debugger variable or a program symbol. The optional parameter */TYPE* can be used to define a type for the symbol. To store an initial value, use the */VALUE* option.

/ADDRESS = <expression>

This optional parameter specifies the address of the symbol. If no address is given, the symbol is taken to be a debugger variable.

/OVERWRITE

By default, overwriting an existing symbol causes an error message. If this option is set, only a warning message is issued, and the old symbol is destroyed.

Examples

```
DEFINE SYMBOL /TYPE="int" /VALUE=-1 n
DEFINE SYMBOL /OVERWRITE /ADDRESS=2000 main
```

2.10 DELETE Commands

Syntax

```
DELETE <item>
```

The item to be deleted, <*item*>, may be one of the following:

BREAKPOINT	KEY
BUTTON	MACRO
DEBUG	MODULE
DIRECTORY	TRACEPOINT
EVALUATE	WATCHPOINT

2.11 DELETE BREAKPOINT

Syntax

```
DELETE BREAKPOINT AT <expression>
DELETE BREAKPOINT /ID = <halt-id>
DELETE BREAKPOINT /ALL
```

Description

A breakpoint is deleted. It can be selected by the ID number or the location where it is set.

AT <expression>

The expression which yields the address of the breakpoint to be deleted.

/ID=<halt-id>

This is a decimal number or a debugger variable. <*halt-id*> is the number of the breakpoint to be deleted.

The ID number and expression of the deleted breakpoint are displayed in the command window.

/ALL

This option deletes all specified breakpoints.

Examples

```
DELETE BREAKPOINT AT main\@LINE 256
DELETE BREAKPOINT /ID=5
DELETE BREAKPOINT /ALL
DELETE BREAKPOINT AT main
```

References

DISABLE BREAKPOINT
ENABLE BREAKPOINT
SHOW BREAKPOINT

2.12 DELETE BUTTON

Syntax

```
DELETE BUTTON <name>
DELETE BUTTON /ALL
```

Description

This command can be used to delete a user-defined button. <*name*> is the name of the button to be deleted. The option */ALL* deletes all user-defined buttons in the tool bar.

Examples

```
DELETE BUTTON break
DELETE BUTTON /ALL
```

References

DEFINE BUTTON
SHOW BUTTON

2.13 DELETE DEBUG

Syntax

```
DELETE DEBUG <debug-id>
```

Description

This command deletes the debug information tree addressed by <*debug-id*>. This is useful if a loaded module is changed and compiled again. By deleting and reloading the debug info the changed version can be debugged without a restart of the debugger.

Example

```
DELETE DEBUG 12
```

References

LOAD /DEBUG
SET DEBUG
SHOW DEBUG

Note

The debug id 0 cannot be deleted.

2.14 DELETE DIRECTORY

Syntax

```
DELETE DIRECTORY "<name>"
```

Description

The directory named <*name*> is deleted from the list of directories in the search path.

Example

```
DELETE DIRECTORY "oldsrcs"
```

References

SET DIRECTORY
SHOW DIRECTORY

2.15 DELETE EVALUATE

Syntax

```
DELETE EVALUATE <expression>
DELETE EVALUATE /ID = <eval-id>
DELETE EVALUATE /ALL
```

Description

Removes a member from the list of expressions which are to be evaluated at every program halt.

<expression>

Deletes all items with an equal expression stored.

/ID = <eval-id>

The expression with the ID number <*eval-id*> is selected.

/ALL

All expressions from the list are deleted.

Examples

```
DELETE EVALUATE globstat
DELETE EVALUATE /ID = 3
```

References

DISABLE EVALUATE
ENABLE EVALUATE
SET EVALUATE
SHOW EVALUATE

2.16 DELETE KEY

Syntax

```
DELETE KEY <name>
DELETE KEY /ALL
```

Description

<name>

Deletes the user-definition of the specified key <*name*>.

/ALL

All user-defined function keys are deleted.

Examples

```
DELETE KEY F1
DELETE KEY /ALL
```

References

DEFINE KEY
SHOW KEY

2.17 DELETE MACRO

Syntax

```
DELETE MACRO <name>
DELETE MACRO /ALL
```

Description

<name>

Delete the macro <*name*>. The macro <*name*> must be specified without the leading '@'. Otherwise the content of <*name*> is considered to be the macro to be deleted.

/ALL

All currently defined macros are deleted.

Examples

```
DELETE MACRO getid
DELETE MACRO /ALL
```

References

DEFINE MACRO
SHOW MACRO

2.18 DELETE MODULE

Syntax

```
DELETE MODULE <name>
DELETE MODULE /ALL
```

Description

This command frees all dynamic memory space needed by the debug information of the selected module(s). All symbol and line number information for the selected module are deleted. To regain the information, the module must be reloaded using the command SET MODULE.

<name>

The module <*name*> of the internal module list is deleted. This name is not the file name of the source module. It contains no path name and extension.

/ALL

All modules from the module list are deleted.

The command is invoked internally by **XDB** when it runs out of heap space. The current module of the program cannot be deleted.

Use the command SHOW DEBUG to obtain the current status of the modules.

Examples

```
DELETE MODULE fileio
DELETE MODULE /ALL
```

References

SET MODULE
SHOW DEBUG

2.19 DELETE TRACEPOINT

Syntax

```
DELETE TRACEPOINT AT <expression>
DELETE TRACEPOINT /ID = <halt-id>
DELETE TRACEPOINT /ALL
```

Description

A tracepoint is deleted. It can be selected by the ID number or the location where it is set.

AT <expression>

The expression which yields the address where the tracepoint to be deleted is located.

/ID=<halt-id>

This is a decimal number or a debugger variable. <*halt-id*> is the number of the tracepoint to be deleted.

The ID number and the expression of the deleted tracepoint are displayed in the command window.

/ALL

This option deletes all specified tracepoints.

Examples

```
DELETE TRACEPOINT AT main\buffercount
DELETE TRACEPOINT AT globptr
DELETE TRACEPOINT /ID=5
DELETE TRACEPOINT /ALL
```

References

DISABLE TRACEPOINT
ENABLE TRACEPOINT
SHOW TRACEPOINT

2.20 DELETE WATCHPOINT

Syntax

```
DELETE WATCHPOINT AT <expression>
DELETE WATCHPOINT /ID = <halt-id>
DELETE WATCHPOINT /ALL
```

Description

A watchpoint is deleted. It can be selected by the ID number or the location where it is set.

AT <expression>

The expression which yields the address where the watchpoint to be deleted is located.

/ID=<halt-id>

This is a decimal number or a debugger variable. <*halt-id*> is the number of the watchpoint to be deleted.

The ID number and the expression of the deleted watchpoint are displayed in the command window.

/ALL

This option deletes all specified watchpoints.

Examples

```
DELETE WATCHPOINT AT main\buffercount
DELETE WATCHPOINT AT globptr
DELETE WATCHPOINT /ID=5
DELETE WATCHPOINT /ALL
```

References

DISABLE WATCHPOINT
ENABLE WATCHPOINT
SHOW WATCHPOINT

2.21 DISABLE Commands

Syntax

```
DISABLE <item>
```

The item <*item*> can be one of the following:

BREAKPOINT
EVALUATE
TRACEPOINT
WATCHPOINT

2.22 DISABLE BREAKPOINT

Syntax

```
DISABLE BREAKPOINT AT <expression>
DISABLE BREAKPOINT /ID = <halt-id>
DISABLE BREAKPOINT /ALL
```

Description

A breakpoint is set inactive. This means that a program does not stop at such a haltpoint. However, **XDB** preserves all information about the selected haltpoints in the internal tables. Therefore it is easy to activate them again. This is very useful if you want to reuse haltpoints with complex conditions and actions later.

<expression>

This is the expression which yields the address where a breakpoint is located.

/ID= <halt-id>

This is the number of the breakpoint to be set inactive. It is a decimal number or a debugger variable containing the ID number.

/ALL

All breakpoints are set inactive.

On the target system this breakpoint is really cleared. The resources (like debug registers) used by the disabled breakpoint can be reused.

Examples

```
DISABLE BREAKPOINT AT putrecord
DISABLE BREAKPOINT AT calculate\erg0
DISABLE BREAKPOINT AT @LINE 170
DISABLE BREAKPOINT /ALL
```

References

DELETE BREAKPOINT
ENABLE BREAKPOINT
SET BREAKPOINT
SHOW BREAKPOINT

Note

The option /HARD is lost by using ENABLE or DISABLE BREAKPOINT command.

2.23 DISABLE EVALUATE

Syntax

```
DISABLE EVALUATE <expression>
DISABLE EVALUATE /ID = <id>
DISABLE EVALUATE /ALL
```

Description

The denoted expression is not evaluated anymore but still remains in the list of expressions to be evaluated.

<expression>

The item with this expression is disabled. Note that <*expression*> has to match literally the expression to be disabled, e.g. "a+b" does not match "b+a".

/ID = <eval-id>

The expression with the ID number <*eval-id*> is disabled.

/ALL

All expressions from the list are disabled.

Examples

```
DISABLE EVALUATE globstat
DISABLE EVALUATE /ID = 3
```

References

DELETE EVALUATE
ENABLE EVALUATE
SET EVALUATE
SHOW EVALUATE

2.24 DISABLE TRACEPOINT

Syntax

```
DISABLE TRACEPOINT AT <expression>
DISABLE TRACEPOINT /ID = <halt-id>
DISABLE TRACEPOINT /ALL
```

Description

A tracepoint is set inactive. This means that **XDB** does no longer check the memory location until this tracepoint is set active again by the ENABLE TRACEPOINT command. However, **XDB** preserves all information about the selected tracepoints in the internal tables. Therefore it is easy to activate them again.

<expression>
This expression yields the address where a tracepoint is located.

/ID= <halt-id>
This is the number of the tracepoint to be set inactive. It is a decimal number or a debugger variable containing the ID number.

/ALL
All tracepoints are set inactive.

On the target system this tracepoint is really cleared. The resources (like debug registers) used by the disabled tracepoint can be reused.

Examples

```
DISABLE TRACEPOINT AT putrecord
DISABLE TRACEPOINT AT calculate\erg0
DISABLE TRACEPOINT /ID=@BRKSYM1
DISABLE TRACEPOINT /ALL
```

References

DELETE TRACEPOINT
ENABLE TRACEPOINT
SET TRACEPOINT
SHOW TRACEPOINT

2.25 DISABLE WATCHPOINT

Syntax

```
DISABLE WATCHPOINT AT <expression>
DISABLE WATCHPOINT /ID = <halt-id>
DISABLE WATCHPOINT /ALL
```

Description

A watchpoint is set inactive. This means that a program does not stop at such a haltpoint. However, **XDB** preserves all information about the selected haltpoints in the internal tables. Therefore it is easy to activate them again. This is very useful if haltpoints with complex conditions and actions are to be deleted temporarily.

<expression>

This is the expression which yields the address where a watchpoint has been set.

/ID= <halt-id>

This is the number of the watchpoint to be set inactive. It is a decimal number or a debugger variable containing the ID number.

/ALL

All watchpoints are set inactive.

On the target system this watchpoint is really cleared. The resources (like debug registers) used by the disabled watchpoint can be reused.

Examples

```
DISABLE WATCHPOINT AT putrecord
DISABLE WATCHPOINT AT calculate\erg0
DISABLE WATCHPOINT /ID=@BRKSYM1
DISABLE WATCHPOINT /ALL
```

References

DELETE WATCHPOINT
ENABLE WATCHPOINT
SET WATCHPOINT
SHOW WATCHPOINT

2.26 DISPLAY

Syntax

`DISPLAY <`*`window`*`>`

Description

With this command, it is possible to display additional windows. These windows can be displayed (and erased) at any time during the debugging session.

DISPLAY <window>

<window> may have the following values:

ASSEMBLER	MODULE	SYSREG
GDT	REGISTER	TASK
IDT	REMOTE	
LDT	SOURCE	

DISPLAY ASSEMBLER

Displays the assembler window.

DISPLAY MODULE

Displays the module window. This window shows all modules which are mentioned in the debug information.

DISPLAY REGISTER

Displays the register window.

DISPLAY REMOTE

Displays the remote window which works like a terminal and shows the output of the RMOS low level debugger. For details see REMOTE.

DISPLAY SOURCE

Displays the source window.

DISPLAY TASK

Displays the task window.

DISPLAY GDT
DISPLAY IDT
DISPLAY LDT
DISPLAY SYSREG

These commands are described in the sections following.

Examples

```
DISPLAY ASSEMBLER
DISPLAY REMOTE
```

Reference

ERASE

REMOTE

2.27 DISPLAY Descriptor Table

Syntax

```
DISPLAY GDT [ /REPEAT = <count> ] [<first>]
DISPLAY IDT [ /REPEAT = <count> ] [<first>]
DISPLAY LDT [ /REPEAT = <count> ] [ /GDT = <index> ] [<first>]
```

Description

A window displaying one of the descriptor tables GDT (Global Descriptor Table), LDT (Local Descriptor Table) or IDT (Interrupt Descriptor Table) is opened.

<first>

This optional expression denotes the number of the first table entry to be displayed. The default value is 1 for the GDT and 0 otherwise.

/REPEAT=<count>

The expression <*count*> specifies the number of table entries to be displayed. If this option is not specified, 64 entries will be displayed.

/GDT=<index>

The expression <*index*> denotes the number of the GDT entry. This entry must be an LDT selector. If this option is not specified, the register LDTR is taken so that the descriptor table of the current task will be displayed.

Examples

```
DISPLAY IDT
DISPLAY GDT /REPEAT = 20 1
DISPLAY LDT /REPEAT=5 /GDT=1
```

Reference

ERASE

2.28 DISPLAY SYSREG

Syntax

```
DISPLAY SYSREG /<register>
```

Description

DISPLAY SYSREG displays the system register windows. <*register*> may have the following value:

CONTROL

/CONTROL
The 80386 control register window is displayed.

Example

```
DISPLAY SYSREG /CONTROL
```

Reference

ERASE SYSREG

2.29 ENABLE Commands

Syntax

```
ENABLE <item>
```

The item <*item*> can be one of the following:

BREAKPOINT
EVALUATE
TRACEPOINT
WATCHPOINT

2.30 ENABLE BREAKPOINT

Syntax

```
ENABLE BREAKPOINT /ID <halt-id>
ENABLE BREAKPOINT /ALL
```

Description

The breakpoint that was set inactive by DISABLE BREAKPOINT is reactivated.

<halt-id>

This is the number of the breakpoint to be reactivated. It is a decimal number or a debugger variable containing the ID number of the breakpoint.

/ALL

All currently inactive breakpoints are set active again.

Examples

```
ENABLE BREAKPOINT /ID=15
ENABLE BREAKPOINT AT @LINE 170
ENABLE BREAKPOINT AT location
ENABLE BREAKPOINT /ALL
```

References

DELETE BREAKPOINT
DISABLE BREAKPOINT
SET BREAKPOINT
SHOW BREAKPOINT

2.31 ENABLE EVALUATE

Syntax

```
ENABLE EVALUATE <expression>
ENABLE EVALUATE /ID = <eval-id>
ENABLE EVALUATE /ALL
```

Description

The expression which was prevented from evaluation by DISABLE EVALUATE is to be evaluated again.

<expression>

The item with this expression is enabled. Note that <*expression*> has to match literally the expression to be enabled, e.g. "a+b" does not match "b+a".

/ID = <eval-id>

The expression with the ID number <*eval-id*> is enabled.

/ALL

All disabled expressions from the list are enabled.

Examples

```
ENABLE EVALUATE globstat
ENABLE EVALUATE /ID = 3
```

References

DELETE EVALUATE
DISABLE EVALUATE
SET EVALUATE
SHOW EVALUATE

2.32 ENABLE TRACEPOINT

Syntax

```
ENABLE TRACEPOINT /ID <halt-id>
ENABLE TRACEPOINT /ALL
```

Description

The tracepoint that was set inactive by DISABLE TRACEPOINT is reactivated.

<halt-id>

This is the number of the tracepoint to be reactivated. It is a decimal number or a debugger variable which contains the ID number of the tracepoint.

/ALL

All currently inactive tracepoints are set active again.

Examples

```
ENABLE TRACEPOINT /ID=15
ENABLE TRACEPOINT /ID=@BPID
ENABLE TRACEPOINT AT location
ENABLE TRACEPOINT /ALL
```

References

DELETE TRACEPOINT
DISABLE TRACEPOINT
SET TRACEPOINT
SHOW TRACEPOINT

2.33 ENABLE WATCHPOINT

Syntax

```
ENABLE WATCHPOINT /ID <halt-id>
ENABLE WATCHPOINT /ALL
```

Description

The watchpoint that was set inactive by DISABLE WATCHPOINT is reactivated.

<halt-id>

This is the number of the watchpoint to be reactivated. It is a decimal number or a debugger variable which contains the ID number of the watchpoint.

/ALL

All currently inactive watchpoints are set active again.

Examples

```
ENABLE WATCHPOINT /ID=15
ENABLE WATCHPOINT /ID=@BPID
ENABLE WATCHPOINT AT location
ENABLE WATCHPOINT /ALL
```

References

DELETE WATCHPOINT
DISABLE WATCHPOINT
SET WATCHPOINT
SHOW WATCHPOINT

2.34 ERASE

Syntax

```
ERASE <window>
ERASE SYSREG /<window>
```

Description

<window>

This command closes the window <*window*>. <*window*> may have the following values:

ASSEMBLER	MODULE	SYSREG
GDT	REGISTER	TASK
IDT	REMOTE	
LDT	SOURCE	

SYSREG /<window>

This command is explained in the chapter ERASE SYSREG.

Example

```
ERASE REGISTER
```

Reference

DISPLAY
ERASE SYSREG

2.35 ERASE SYSREG

Syntax

```
ERASE SYSREG /<window>
```

Description

This command closes the system register window <*window*>. <*window*> may have the following value:

CONTROL

Example

```
ERASE SYSREG /CONTROL
```

Reference

DISPLAY SYSREG

2.36 EVALUATE

Syntax

```
EVALUATE [<format>] [<size>] [/ADDRESS] [/LEVEL[=<nr>]] [/WINDOW[=<nr>]]
<expr>
```

Description

<expr>

The given expression *<expr>* is evaluated, and the result is displayed in the command window. <*expr*> has to be in the notation of the currently selected language. If no qualifier is supplied, the output is formatted according to the type of the result.

All members of structured data types are shown with their member names. The value of a union is shown in the format of all union members. All elements of arrays are displayed.

As a default, scalar values are in decimal and all pointers are in hexadecimal notation.

If a pointer has the value 0, the string "(NIL)" is printed. In case of function pointers, the name of the procedure which is referenced by the pointer is printed.

<format>

The option <*format*> may be one of the following:

/ASCII [:<*length*>]	*/DEC*	*/OCTAL*
/BINARY	*/HEX*	

/BINARY
/DEC
/HEX
/OCTAL

Values are shown in binary, decimal, hexadecimal, or octal notation if you use the */BINARY*, */DEC*, */HEX*, or */OCTAL* qualifier.

/ASCII[:<length>]

The qualifier */ASCII* is used to show a char pointer or a char array as a readable string enclosed in double quotes ("). Nonprintable characters are shown as '.' signs. By default, a string is shown up to the first 0-byte. This can be avoided by giving a length declaration after the */ASCII* qualifier separated by ':' (*/ASCII:<length>*). Then up to <*length*> bytes are shown where <*length*> is any expression.

/ADDRESS

The qualifier */ADDRESS* shows the address where the result of the expression is stored. If the expression refers to a register, the register name is printed. Note that this option is rather meaningless when applied to expressions like "42" or "i+1" which do not have a memory address.

/LEVEL[=<nr*>]*

If the expression to be evaluated, *<expr>*, denotes a structure containing sub-structures, the */LEVEL* qualifier limits the depth of the evaluation to the number <*nr*>. If the depth number is omitted, the complete substructure is taken. This is also the case if the option */LEVEL* is omitted.

/WINDOW[=<nr*>]*

<nr> denotes the ID number of the evaluation window. Using an ID number not in use at the moment creates a new window. If an evaluation window with the ID *<nr>* exists already, this window now evaluates *<expr>* instead of its old expression. If no window number is given, a new window is created.

/<size>

The type of memory access is defined by the qualifier *<size>*. Possible values are:

/BYTE /WORD /LONG

The amount of memory read from the target must be a multiple of the selected size. The default is /BYTE. The */<size>* option can be used with any *<format>* qualifier. It is ignored when */ASCII* is used which forces byte access.

Examples

```
EVALUATE struct1.member1
EVALUATE (i%5) - 10 + (x * i - b)
EVALUATE ptr->pmember.a[2]
EVALUATE struct1.array[i]
EVALUATE i*10 + struct1.member2 - x
EVALUATE /DEC   pointer1
EVALUATE /DEC   structa
EVALUATE /BIN   ptr->pmember
EVALUATE /OCTAL   i
EVALUATE /HEX struct1.member1
EVALUATE &i
EVALUATE /ADDRESS i
EVALUATE /ADDRESS  struct1
EVALUATE /ADDRESS  struct1.member1
EVALUATE /ADDRESS  ptr->pmember->next->next
EVALUATE /ASCII *char_array[0]
EVALUATE /ASCII:10      *char_pointer
EVALUATE @DBVPTR->next[idx]
```

References

SET EVALUATE
SET OPTION

2.37 EXIT

Syntax

```
EXIT
```

Description

EXIT terminates the execution of the actual batch file. If *EXIT* is used interactively on command level, the debug session is finished.

To avoid leaving **XDB** by mistake, this command must be confirmed by the user. The message

```
really quit ?
```

appears in a pop-up window. If the *Yes* button is selected, **XDB** quits. In any other cases the command is ignored, and **XDB** resumes execution.

Example

```
IF @quit
THEN exit
END
```

Reference

BATCH

2.38 GOTO

Syntax

```
GOTO <label>
```

Description

This command can be used in a batch file only. It is not allowed to use this command in interactive mode. The command makes the command execution continue at the batch file line marked with *<Label>*. Forward references to currently undefined labels are allowed, but labels cannot be referenced from outside of the batch file where they are defined.

<label>

A label is a sequence of letters followed by a ':'.

Example

```
line       text
1          SET BREAK AT fune
2          label:RUN
3          EVALUATE I+J
4          GOTO label
```

Reference

Label

2.39 HELP

Syntax

```
HELP
```

Description

You can enter *HELP* to activate the Windows online help mechanism for **XDB**. By default the F1 key is defined as "HELP\n" in the startup.xdb file, so that you can also press F1 to activate the online help.

Example

```
HELP
```

2.40 IF

Syntax

```
IF <expression>
      THEN <commandlist>
     [ELSE <commandlist>]
END
```

Description

<expression>

<*expression*> is evaluated. If the result of <*expression*> is not zero, the command list between *THEN* and *ELSE* (or *THEN* and *END* if *ELSE* is omitted) is executed. If the result of <*expression*> is zero, the optional *ELSE*-part or the command after the *END* keyword is executed.

<commandlist>

The <*commandlist*> is an arbitrary list of commands separated by command delimiters. The command delimiter is the ';' character.

The *IF* command can be nested.

In batch files it is additionally possible to separate commands with the newline character.

The whole sequence between *IF* and *END* is one command. If it is itself a member of a command list, the command delimiter must follow the *END* keyword.

Example

```
IF commandtype == 4
    THEN
        EVALUATE/ASCII  *commandname
    ELSE
        EVALUATE  commandclass
END
```

References

WHILE
GOTO
Label

2.41 Label

Syntax

`<label>`:

Description

The actual line is marked by the label *<label>*. This command is allowed in batch files only. Labels must start with an alphabetic character.

Labels can be used as jump targets of the GOTO command.

Example

```
line      text
1         SET BREAK AT fune
2         Label:RUN
3         EVALUATE I+J
4         GOTO Label
```

References

GOTO
BATCH

2.42 LINE

Syntax

```
LINE UP [ <lines> ]
LINE DOWN [ <lines> ]
LINE <line-number>
LINE CURRENT
```

Description

With the *LINE* command, you can scroll up or down in the source window.

UP [<lines>]
DOWN [<lines>]

UP or *DOWN* specifies the direction of the movement. The <*lines*> parameter is optional. The default value is 1. The movement is relative to the currently displayed line.

<line-number>

If *UP* or *DOWN* is omitted, <*line-number*> denotes an absolute line in the shown source file.

CURRENT

The cursor is positioned at the current location of the program.

Examples

```
LINE DOWN
LINE UP 20
LINE 127
LINE CURRENT
```

Reference

PAGE

Notes

This command is **not** available in assembler mode because it is tied to the source window.

2.43 LOAD

Syntax

```
LOAD /ARGUMENTS = "<string>"
LOAD /BINARY
     /DEBUG[ = <debug-id>]
     /GLOBAL
     /SEGMENT = "<Loader Result Segment>,<RMOS-Task-ID>"
     /TASK[ = <tname>]
     OF "<file>"
```

Description

Load parts of an executable file <*file*>. The options specify which part of *<file>* is to be loaded.

/ARGUMENTS="<string>"

The loaded program gets <*string*> as parameter list. Blanks are used to split <*string*> into several parameters. During a set task /attach command, this string is passed to the target process.

/BINARY

Binary download of an executable file.

/DEBUG[=<debug-id>]

Debug information of <*file*> is loaded. If the optional argument <*debug-id*> is omitted, a new debug id is created, else the symbols are added to the symbols of <*debug-id*>.

/GLOBAL

The segment is assigned to global level, thus the information is not bound to any task. This means global sharing of segment information.

/SEGMENT="<Loader Result Segment>,<RMOS-Task-ID>"

This option allows you to load the debug information of a file already loaded. The segment specifier must be included in quotation marks.

/TASK[=<tname>]

The segment information is assigned to the specified task <*tname*>. The taskname must be included in quotation marks. If the task name is omitted, the current task of the debugger is used.

Note: the debugger searches for a file named *tname.BD* which contains the corresponding debug information. This file can be generated using the **PE32BND** converter which is part of the XDB distribution. The PE32 file (output of the Borland **TLINK**) is converted to a bound file using the syntax:

```
pe32bnd pe32file
```

Single tasks can be loaded from the PC file system with the /TASK="<task>" command of the LOAD command or using the Load requester.

All host versions of **XDB386** accept the load command given on the command line:

```
LOAD /TASK="c:\rmos\test\test1.386" of test1
LOAD /TASK="a:test2.386" of test2
```

The second way to load a task is the **download method**. The following commands imply that the task resides on floppy disk or on hard disk in the target:

```
LOAD /BINARY /TASK="c:\rmos\test\test1.386" of test1
LOAD /BINARY /TASK="a:test2.386" of test2
```

If the task was loaded successfully, the debugger returns a *task-id*. To attach that task to the debugger, enter

```
set task /attach /set /id=<task-id>
```

This command is available via the button „set_task“.
Now the task is started on the target and the CS:EIP is at the entry point.

Examples

```
LOAD /ARGUMENTS = "-f machine.dat" of "simulate.bd"
LOAD /TASK="c:\rmos\test\test1.386" of test1
LOAD /BINARY /TASK="a:test2.386" of test2
LOAD /SEGMENT = "3F8,4D" of "simulate.bd"
```

References

DELETE DEBUG
SET DEBUG
SET OPTION
SHOW DEBUG
SHOW SEGMENT

2.44 MESSAGE

Syntax

```
MESSAGE <string>
```

Description

A new window is created which displays the message <*string*>. This command is especially useful in batch files.

Examples

```
MESSAGE loading
MESSAGE "loading file, please wait ..."
```

2.45 NEXT

Syntax

```
NEXT [<count>]
```

Description

NEXT continues the execution of the program. If **XDB** is in HLL mode, the next <*count*> source lines are executed. If a subroutine call occurs, it is executed, but the line counter is not affected.

On assembler language level, the next <*count*> instructions are executed. Subroutines are called, but counted as one instruction.

<count>

If <*count*> runs to zero, the program is stopped. The default value for <*count*> is 1. Note that <*count*> is not an expression but a number.

Examples

```
NEXT
NEXT 10
```

References

RUN
STEP

2.46 PAGE

Syntax

```
PAGE [/<window>] <window-direction>
```

Description

This command is used to scroll in the specified window <*window*> or in the current active window.

/<window>

The following values are allowed for <*window*>:

ASSEMBLER	SOURCE

The active window is the assembler window if the current language is set to assembler. Otherwise the active window is the source window.

<window-direction>

<*window-direction*> may have the following values:

<expression>	assembler window only
UP <*pages*>	
DOWN <*pages*>	
TOP	
BOTTOM	
LEFT <cols>	source window only
RIGHT <cols>	source window only
NULL	source window only

<*expression*> is allowed for the assembler window only. The disassembly is set to the address given by <*expression*>.

UP and DOWN scroll up/down the specified number of pages.
TOP and BOTTOM scroll to the first/last line.

LEFT, RIGHT and NULL are allowed for the source window only (In this case the qualifier /SOURCE is not allowed). The window is scrolled to column 0 or to the specified number of columns into the specified direction.

Examples

```
PAGE TOP
PAGE DOWN
PAGE /ASSEMBLER 0x12400
PAGE interface
PAGE LEFT 5
PAGE RIGHT 10
PAGE NULL
```

References

LINE

2.47 PRINT

Syntax

```
PRINT "mask" [, <expression>,...]
```

Description

PRINT formats the results of the optional listed expressions according to the format specifications in the string "*mask*". The output is shown in the command window and is written to an optional opened protocol file. No output takes place until the newline symbol "\n" is encountered in "*mask*". Subsequent calls of *PRINT* may be used to build up one line of output. In this case no other command may be interspersed, because the already stored output would be lost.

The interpretation of the "*mask"* string follows the conventions defined by the ANSI C standard of the library function *printf()*. Some restrictions to the ANSI definitions for formatting requests are made:

- the '#' flag is not supported
- the sequence "%n" is ignored, no expression argument should be given

Examples

```
PRINT "Current array settings\n"
PRINT "input=%04d \t"
PRINT "result: %f \"%s\"\n", outfl*10.0,sval
```

Reference

EVALUATE

2.48 REMOTE

Syntax

```
REMOTE
```

Description

The remote window is displayed, and the input and output is directed directly to the low level debugger on the target.

A simple terminal emulation supporting backspacing, tabs, and newlines is done.

Typing <ctrl-L>, the remote window is closed and you get back to the command mode. <ctrl-L> is the default escape sequence. The escape sequence can be changed using the command SET ESCAPE.

For further information about the low level debugger see in *System Software for M7-300 and 400, Installation and Operation, User Manual*.

Example

```
REMOTE
```

References

DISPLAY REMOTE
ERASE REMOTE
SET ESCAPE
SET INTERFACE
SHOW ESCAPE

2.49 RUN

Syntax

```
RUN
RUN UNTIL <expression>
RUN UNTIL BLOCKEND
RUN UNTIL PROCEND
RUN UNTIL CALLS
```

Description

RUN

The execution of the program is done up to a break- or watchpoint, or up to the end of the program.

RUN UNTIL <expression>

The execution of the program is done up to a break- or watchpoint, or until the program reaches the location denoted by <*expression*>*.*

RUN UNTIL BLOCKEND

The execution of the program is done up to a break- or watchpoint, or up to the end of the actual block.

The option *UNTIL BLOCKEND* is not allowed in the assembler mode. If no debug information is available, an error message is issued.

RUN UNTIL BLOCKEND cannot work if the function uses non-local jumps in the corresponding code part, like the function longjmp() in the programming language C.

RUN UNTIL PROCEND

The execution of the program is done up to a break- or watchpoint, or up to the end of the function. The option *UNTIL PROCEND* is not allowed in the assembler mode. If no debug information is available, an error message is issued.

RUN UNTIL PROCEND cannot work if the function uses non-local jumps in the corresponding code part, like the function longjmp() in the programming language C.

RUN UNTIL CALLS
This stops execution after returning from the current procedure.

This is also true for own assembler subroutines which effect the execution of the program in a similar way.

Examples

```
RUN UNTIL PRINT\@LINE 10
RUN UNTIL callback
RUN UNTIL PROCEND
```

References

NEXT
STEP

2.50 SCAN

Syntax

```
SCAN [/HEADER = "<header>"] "<string>", <address> [<address> ...]
```

Description

This command is used to read values from the command window and to store the read values into the memory of the target program. <*string*> is a control string following the rules of the C function scanf(). The addresses following the format string are C-style memory addresses (viz. &<*name*>).

/HEADER="<header>"

You are prompted for input with the string <*header*> in the command window. If no header is given, the string "SCAN>" is used.

Examples

```
SCAN "%c", &ch
SCAN /HEADER="Set i and j to:" "%d %d", &i, &j
SCAN /HEADER = "a=" "%s", @a
```

2.51 SEARCH

Syntax

```
SEARCH "<regexp>"
```

Description

In the source file of the active module, a character sequence which matches the regular expression <*regexp*> is searched. The environment of the matched text appears in the source window. If no text is found, the source window remains unchanged.

<*regexp*> may contain the wildcard characters '?' for “any character“ and '*****' for “any string of characters“.

Examples

```
SEARCH "*output"
SEARCH "main"
SEARCH "put??out"
```

2.52 SET Commands

Syntax

```
SET <set_modes>
```

The following <*set_modes*> are available:

BREAKPOINT	LANGUAGE	SCROLL
DEBUG	LOGFILE	TASK
DESCRIPTOR	MODULE	TRACEPOINT
DIRECTORY	OPTION	VALUE
ESCAPE	PROTFILE	WATCHPOINT
EVALUATE	REGISTER	
INTERFACE	SCOPE	

2.53 SET BREAKPOINT

Syntax

```
SET BREAKPOINT AT <expression>
                  [WHEN <expression>]
                  [SKIP <count>]
                  [CONTINUE]
                  [SYMBOL <bid>]
                  [HARD <number>]
                  [THEN <actions> END]
```

Description

AT <expression>

A breakpoint is set at the address specified by <*expression*>. This can be:

- a line number in a source module denoted as “module\@LINE xx“ or “@LINE xx“
- a global name of a procedure
- an address

WHEN <expression>

If a *WHEN* clause is used, the expression is evaluated after the stop of the program at the breakpoint. If the result is FALSE (zero), the execution of the program continues. In this case an optional SKIP count remains unchanged.

SKIP <count>

If a *SKIP-count* is specified, the execution of the program stops first if this breakpoint is reached for the (*count*+1)-th time (and the WHEN clause is true).

CONTINUE

The *CONTINUE* qualifier forces **XDB** to continue execution after processing the <*action*>-list. The debugger variable @ERROR is checked. If it has a non-zero value, the loop is stopped and the next command is executed.

SYMBOL <bid>

The *SYMBOL* qualifier directs **XDB** to store the ID number of the breakpoint into the debugger variable <*bid*>. This variable can be used in expressions or to enable, disable, show, or delete this breakpoint.

HARD <number>

The *HARD* qualifier forces the hardware interface to select the hardware specific breakpoint specified by <*number*>. If this breakpoint is not available, an error message is issued.

With this option the i80386 debug registers can be used directly if they are not set. Each of the four debug registers can serve as a trace-, watch- or breakpoint.

XDB issues a warning message if the requested breakpoint cannot be executed in real time. This is true if a WHEN clause is used.

THEN <actions> END

<*actions*> is an optional command list, enclosed by the keywords *THEN* and *END*. It is executed if the program stops at this breakpoint. If more than one action is specified, they must be separated by a delimiter (;).

Examples

```
SET BREAKPOINT AT calculate\@LINE 10
SET BREAKPOINT AT rundown
SET BREAKPOINT AT server\hidden

SET BREAKPOINT AT txtofil WHEN outcount > 10

SET BREAKPOINT AT @LINE17 WHEN loop > end+5  THEN
     EVALUATE temp1
     EVALUATE erg
     END

SET BREAKPOINT AT toggle SKIP 20
SET BREAKPOINT AT checkpoint CONTINUE
     THEN
     EVAL  counter
     END

SET BREAKPOINT AT fun2 SYMBOL DBID
```

References

DELETE BREAKPOINT
DISABLE BREAKPOINT
ENABLE BREAKPOINT
SHOW BREAKPOINT

2.54 SET DEBUG

Syntax

```
SET DEBUG <debug-id>
```

Description

Select between multiple debug information trees.

If more than one image was loaded by the debugger, the corresponding debug information is stored in separate so-called debug trees which are addressed by a unique number called <*debug-id*>.

The debugger selects the right debug tree after every program halt automatically, according to the current location of the application.

With *SET DEBUG* this selection can be changed, so that the symbols and types of all other regions of the program can be accessed. After the next execution of a command as STEP, NEXT or RUN, the debugger switches to the right <*debug-id*> automatically.

This allows concurrent debugging of independently linked modules which decreases the size of the images and allows a finer granularity of application modules.

The actual <*debug-id*> is shown enclosed in square brackets ("[]") at the left field of the baseline of the main window.

Example

```
SET DEBUG 3
```

References

DELETE DEBUG
LOAD /DEBUG
SHOW DEBUG
SHOW SCOPE

2.55 SET DESCRIPTOR

Syntax

```
SET DESCRIPTOR [/LENGTH = <length>] /GDT <GDT-index> <address>
SET DESCRIPTOR [/LENGTH = <length>] /IDT <IDT-index> <address>
SET DESCRIPTOR [/LENGTH = <length>] /LDT [ = <GDT-LDTsel> ] <LDT-index>
<address>
SET DESCRIPTOR [/LENGTH = <length>] /MEMORY <address> <address>
SET DESCRIPTOR [/LENGTH = <length>] /SELECTOR <selector-value> <address>
```

Description

This command copies a piece of memory, starting at the address <*address*>, formatted as INTEL segment descriptor. The location of the descriptor can be specified in several ways:

/GDT <GDT-index>

The given expression <*GDT-index*> is used as index into the GDT of the target system. The GDTR register is used to get the base address of the GDT and to check whether the index is inside the current GDT-limit.

/IDT <IDT-index>

The given expression <*IDT-index*> is used as index into the IDT of the target system. The IDTR register is used to get the base address of the IDT and to check whether the index is inside the current IDT-limit.

/LDT[=<GDT-LDTsel>] <LDT-index>

The given expression <*LDT-index*> is used as index into the LDT of the target system. The LDTR register is used to get the base address of the LDT and to check whether the index is inside the current LDT-limit. If the optional expression <*GDT-LDTsel*> is specified, this value is used as index into the GDT to obtain an LDT-descriptor. The value is checked against the current GDT-limit, and the selected descriptor must be an LDT-descriptor.

/MEMORY <address>

The given expression <*address*> yields the memory location where the descriptor is written.

/SELECTOR <selector-value>

The expression <*selector-value*> is used as index into the GDT or LDT, according to the TI-bit of the selector.

/LENGTH = <length>

If this option is specified, <*length*> descriptors are copied. The default value is 1.

Examples

```
SET DESCRIPTOR /GDT 5 0x3000
SET DESCRIPTOR /MEMORY 0x1000 /GDT 5 @address
SET DESCRIPTOR /SELECTOR cs 0x3000
```

Reference

SHOW DESCRIPTOR

2.56 SET DIRECTORY

Syntax

```
SET DIRECTORY "<directory>"
SET DIRECTORY @<var>
```

Description

The name <*directory*> (or the contents of the debugger variable @<*var*>) is added to the list of search paths for source files. These are used if a source file cannot be found under the path name stored within the debug information of the program.

Up to 30 alternative search directories are possible. By setting the environment variable XDBMAXSRCDIRS to a value >30 this limit can be increased.

Example

```
SET DIRECTORY "c:\usr\src\local"
```

References

DELETE DIRECTORY
SHOW DIRECTORY
SHOW DEBUG

Notes

Disk drive specifications in front of a directory name are accepted.

2.57 SET ESCAPE

Syntax

```
SET ESCAPE "<esc_sequence>"
SET ESCAPE @<var>
```

Description

SET ESCAPE "<esc_sequence>"

The escape sequence to finish the transparent mode is defined. All inputs from the keyboard are given to the remote system. The input of <*esc_sequence*> terminates this state.

SET ESCAPE @<var>

As above, but the contents of the debugger variable @<*var*> is taken as the new escape sequence.

The default sequence is '^L' ("ctrl-L"). Control characters are denoted as "^char". The control characters ^C and ^S must not be used.

Examples

```
SET ESCAPE "^A"
SET ESCAPE "^Xc"
```

References

REMOTE
SHOW ESCAPE

2.58 SET EVALUATE

Syntax

```
SET EVALUATE [<format>] [<size>] [/ADDRESS] [/LEVEL[=<nr>]]
[/WINDOW[=<nr>]] <expr>
```

Description

The mentioned <*expression*> is stored in an internal list. After every STEP, NEXT or RUN command, all expressions from this list are evaluated, and the results are written to the command window.

If local variables are monitored, they are evaluated only if they are valid at the current point of the program.

As a default, scalar values are in decimal and all pointers are in hexadecimal notation.

If a pointer has the value 0, the string “(NIL)“ is printed. In case of function pointers, the name of the procedure which is referenced by the pointer is printed.

format

The option <*format*> may be one of the following:

/ASCII [:<*length*>]	*/DEC*	*/OCTAL*
/BINARY	*/HEX*	

/BINARY
/DEC
/HEX
/OCTAL

Values are shown in binary, decimal, hexadecimal, or octal notation if you use the */BINARY*, */DEC*, */HEX*, or */OCTAL* qualifier.

/ASCII[:<length>]

The qualifier */ASCII* is used to show a char pointer or a char array as a readable string enclosed in double quotes ("). Nonprintable characters are shown as '**.**' signs. By default, a string is shown up to the first 0-byte. This can be avoided by giving a length declaration after the */ASCII* qualifier separated by '**:**' (*/ASCII:<length>*). Then up to <*length*> bytes are shown where <*length*> is any expression.

/ADDRESS

The qualifier */ADDRESS* shows the address where the result of the expression is stored. If the expression refers to a register, the register name is printed. Note that this option is rather meaningless when applied to expressions like "42" or "i+1" which do not have a memory address.

/LEVEL=<nr*>*

If the expression to be evaluated, <expr>, denotes a structure containing sub-structures, the */LEVEL* qualifier limits the depth of the evaluation to the number <*nr*>. If the depth number is omitted, the complete substructure is taken. This is also the case if the option */LEVEL* is omitted.

/WINDOW [=<nr>]

<*nr*> denotes the ID number of the evaluation window. Using an ID number not in use at the moment creates a new window. If an evaluation window with the ID <*nr*> exists already, this window now evaluates <*expr*> instead of its old expression. If no window number is given, a new window is created.

<size>

The type of memory access is defined by the qualifier *<size>*. Possible values are:

/BYTE /WORD /LONG

The amount of memory read from the target must be a multiple of the selected size. The default is /BYTE. The *<size>* option can be used with any <format> qualifier. It is ignored when */ASCII* is used which forces byte access.

Examples

```
SET EVALUATE statusflag
SET EVALUATE iomode\write\arglen
SET EVALUATE token[type]->t_base
```

Notes

This is not a tracepoint which monitors the expression continuously. No special services are requested from the target system.

References

DELETE EVALUATE
DISABLE EVALUATE
ENABLE EVALUATE
EVALUATE
SET OPTION
SET TRACEPOINT
SHOW EVALUATE

2.59 SET INTERFACE

Syntax

```
SET INTERFACE "<string>"
SET INTERFACE @<var>
```

Description

The string <*string*> (or the contents of the debugger variable @<*var*>) is given to the hardware interface. This enables the user to set special target commands without using the REMOTE feature. Control characters are denoted as "^char", or as "\n", "\t" or "\f".

For further information about the low level debugger see in *System Software for M7-300 and 400, Installation and Operation, User Manual*.

Examples

```
SET INTERFACE "dir task \n"
SET INTERFACE "calc 1+7 \n"
```

References

REMOTE

2.60 SET LANGUAGE

Syntax

```
SET LANGUAGE <language>
```

Description

The language mode is switched to the given language. The language names must be fully qualified. This switches the scanning of expressions and the style of output to that of the specified language.

<language>

Legal values for <*language*> are:

ASSEMBLER	ASM	C	PASCAL

"ASM" is shorthand for "ASSEMBLER".

Example

```
SET LANGUAGE pascal
```

Reference

SHOW LANGUAGE

Notes

SET LANGUAGE C also enables the use of C++ constructs.

2.61 SET LOGFILE

Syntax

```
SET LOGFILE [/APPEND] [/OVERWRITE] "<file>"
```

Description

All commands given after the command *SET LOGFILE* are stored in the logfile <*file*>. <*file*> can be used as a batch file for further debug sessions. Some restrictions apply when using logfiles as *batch files* if **XDB** works in the multitasking mode. If the file <*file*> already exists, this command aborts, issuing an error message.

/APPEND

If the file <*file*> already exists, the commands following are written to the end of the file without destroying the old contents.

/OVERWRITE

If the file <*file*> already exists, only a warning message is issued and the file is overwritten.

Example

```
SET LOGFILE "reuse.bat"
```

References

BATCH
CLOSE LOGFILE
SET PROTFILE
SHOW LOGFILE

2.62 SET MODULE

Syntax

```
SET MODULE <module_name>
SET MODULE /ALL
```

Description

<module_name>

The module <*module_name*> is loaded into the debugger and displayed in the source window. Now all symbolic information and all line information of this module are available. The scope is set to this module.

/ALL

MODULE/ALL activates all modules of the loaded program. The last loaded module is displayed.

Examples

```
SET MODULE main
SET MODULE /ALL
```

References

DELETE MODULE
SET OPTION
SHOW DEBUG
SHOW MODULE

Notes

The debugger loads the necessary information automatically. A breakpoint at a procedure inside a module can be set, even if the debug information of this module is not loaded.

2.63 SET OPTION

Syntax

```
SET OPTION /AUTOLOAD = [ON|OFF]
SET OPTION /TASK = [GLOBAL|LOCAL]
SET OPTION /SEGMENT = [GLOBAL|LOCAL]
SET OPTION /TIME = [ON|OFF]
SET OPTION /POINTER = [ASCII|HEX]
SET OPTION /ASSEMBLER = [ON|OFF]
SET OPTION /ASM = [ON|OFF]
SET OPTION /CODE = [USE16|USE32]
SET OPTION /EVALUATE = [BINARY|OCTAL|DEC|HEX|DEFAULT]
SET OPTION /<processor_type> = [ON|OFF]
SET OPTION /MULTITASK = [ON|OFF]
SET OPTION /NOWAIT = [ON|OFF]
```

Description

Each *SET OPTION* command enables the setting of one of the global debugger flags described below.

/AUTOLOAD=[ON|OFF]

If *AUTOLOAD* is set to ON, **XDB** loads automatically any required debug information. Otherwise the user is asked for every module to load. This option is set to *ON* by default.

/TASK=[GLOBAL|LOCAL]

If *TASK* is set to *GLOBAL*, all target system tasks are assigned to one virtual debugger task. If *TASK* is set to *LOCAL*, all tasks are monitored separately by **XDB**. The default value is *GLOBAL*.

/SEGMENT=[GLOBAL|LOCAL]

The value *GLOBAL* forces **XDB** to attach all segments specified at initial load or *LOAD* commands to the debugger's global segment map. If *LOCAL* is used, segments are attached to task. The default value is *LOCAL*.

/TIME=[ON|OFF]

If *TIME* is set to *ON*, **XDB** shows for evaluated tracepoints the current time in the format *hh:mm:ss* after the actual address/line. This option is set to *OFF* by default.

/POINTER=[ASCII|HEX]

If a character pointer is referenced, the result can be displayed in hexadecimal or in ASCII, depending on this option.

/ASSEMBLER=[ON|OFF]
/ASM=[ON|OFF]

If this option is set to *ON*, the assembler window shows not only the assembler code but also the appropriate source code lines.

/CODE=[USE16|USE32]

This option determines the way the code segments are interpreted.

/EVALUATE=[BINARY|OCTAL|DEC|HEX|DEFAULT]

This option sets the default display mode for evaluations. The default for this option is *DEC*.

/<processor_type>=[ON|OFF]

The selected <*processor_type*> forces **XDB** to disassemble opcode due to the instruction set of the chosen processor. The default for all these options is *OFF*. Then disassembly is done for an 80386 processor. <*processor_type*> may be one of the following processors:

I80486
PENTIUM

/MULTITASK=[ON|OFF]

This option allows toggling between *multitasking mode* and c*ompatible mode.* If the option is set to *ON* **XDB** works in *multitasking mode*. If the option is set to *OFF* **XDB** works in c*ompatible mode*. This option is set to *ON* by default.

/NOWAIT=[ON|OFF]

If this option is set to *ON* **XDB** works in the original asynchronous mode. This is the default. If this option is set to *OFF* the **XDB** waits until a RUN, NEXT or STEP command has been finished.

Examples

```
SET OPTION /AUTOLOAD=ON
SET OPTION /PENTIUM=ON
SET OPTION /SEGMENT=LOCAL
SET OPTION /TASK=GLOBAL
SET OPTION /EVALUATE=HEX
```

References

EVALUATE
LOAD
SET EVALUATE
SHOW OPTION
SHOW SEGMENT

2.64 SET PROTFILE

Syntax

```
SET PROTFILE [/APPEND] /WINDOW = <window> "<file>"
SET PROTFILE [/OVERWRITE] /WINDOW = <window> "<file>"
SET PROTFILE [/APPEND] /ALL "<file>"
SET PROTFILE [/OVERWRITE] /ALL "<file>"
```

Description

"<file>"

Switch on the protocol mechanism for a set of windows. The output of the window[s] is copied to this file.

/WINDOW=<window>

<*window*> specifies which window output is to be directed to the protocol file.

The following values are allowed for <*window*>:

ASSEMBLER	EVALUATE	TRACEPOINT
COMMAND	REGISTER	
ERROR	SOURCE	

All selected inputs to the system and all outputs of the system are recorded in the file <*file*>. The outputs of the system are recorded as comments. The source of the output is shown with a parenthesed shorthand of the window name after the comment character. Every window can be tied together to one protocol file, but several protocol files can receive any combination of window outputs.

/ALL

If */ALL* is used, all in- and outputs are recorded just in the ALL protocol file, even if other protocol files are opened.

/APPEND

With this option, the output is appended to the selected file, instead of overwriting it.

/OVERWRITE

With this option, no warning is issued if a protocol file exists already.

Examples

```
SET PROTFILE /WINDOW=ASSEMBLER "bericht.prt"
SET PROFFILE /ALL "\log\session.prt"
```

References

CLOSE PROTFILE
SHOW PROTFILE

2.65 SET REGISTER

Syntax

```
SET REGISTER [/SIZE = <size>] <register> = <expr>
```

Description

<register> = <expr>

The specified hardware register <*register*> is filled with the value of the expression <*expr*>.

/SIZE = <size>

The optional qualifier */SIZE* defines the number of bytes which are changed in the register.
The following values are allowed for <*size*>:

Value	**Description**
BYTE	1 byte is written
WORD	2 bytes are written
LONG	4 bytes are written

By default, the whole register is set. The result of <*expr*> is converted according to the type and size of the register.

Register	**Legal Sizes**
AH	BYTE
AL	BYTE
AX	WORD
BH	BYTE
BL	BYTE
BP	WORD
BX	WORD
CH	BYTE
CL	BYTE

Register	**Legal Sizes**
CR0	LONG
CR2	LONG
CR3	LONG
CR4	LONG [3)]
CS	WORD
CX	WORD
DH	BYTE
DI	WORD
DL	BYTE
DS	WORD
DX	WORD
EAX	BYTE, WORD, LONG
EBP	BYTE, WORD, LONG
EBX	BYTE, WORD, LONG
ECX	BYTE, WORD, LONG
EDI	BYTE, WORD, LONG
EDX	BYTE, WORD, LONG
EFL	LONG
EIP	BYTE, WORD, LONG
ES	BYTE
ESI	BYTE, WORD, LONG
ESP	BYTE, WORD, LONG
FS	WORD
GDTR	(no */SIZE* allowed) [1)]
GS	WORD
IDTR	(no */SIZE* allowed) [1)]
LDTR	WORD
SI	WORD
SP	WORD
SS	WORD
TR	WORD
TR3 [4)]	LONG
TR4 [4)]	LONG
TR5 [4)]	LONG

Register	**Legal Sizes**
TR6 [2)]	LONG
TR7 [2)]	LONG

[1)] read-only (only for SHOW REGISTER.
[2)] only if SET OPTION /PENTIUM=off
[3)] only if SET OPTION /PENTIUM=on
[4)] only if SET OPTION /I80486=on (and /PENTIUM=off)

Examples

The following examples are valid for language = ASSEMBLER.

```
SET REGISTER  EAX = $0000001f
SET REGISTER /SIZE = WORD ESI=$0017
SET REGISTER AL = $45
SET REGISTER DI = $0786
```

References

DISPLAY REGISTER
SHOW REGISTER

2.66 SET SCOPE

Syntax

```
SET SCOPE /DOWN[ = <levels>]
SET SCOPE /UP[ = <levels>]
SET SCOPE /CURRENT
SET SCOPE <expression>
SET SCOPE @@
```

Description

Set the scope of the debugger. The term scope means the current visibility of symbols and types. The source window and the assembler window are updated to show the corresponding source lines and machine statements respectively.

The location fields of the program are enclosed in brackets ("[]") to signal that the address shown is not the current program address.

/DOWN[=<levels>]

With this qualifier, the scope can be moved forward along the current call stack to show the dynamic call structure of the program. The value of <*levels*> defaults to 1.

/UP[=<levels>]

With this qualifier, the scope can be moved backwards along the current call stack to show the dynamic call structure of the program. The value of <*levels*> defaults to 1.
If you set the scope to a procedure not using */UP* or */DOWN*, its local stack and register variables cannot be evaluated because they are not addressable.

<expression>

The scope can be set to a static position in your program. Allowed <*expressions*> are:

<*module*>\<*procedure*>   <*procedure*>

/CURRENT,
@@

The scope is set to the location where the program currently halts.

Examples

```
SET SCOPE /UP=2
SET SCOPE /DOWN
SET SCOPE main\function7
SET SCOPE procedure
SET SCOPE /CURRENT
```

References

SHOW SCOPE
SHOW CALLS

Notes

The qualifiers */UP* and */DOWN* can work correctly only if the list of nested procedure calls contains only procedures with normal function prologue/epilogue sequences. These sequences maintain a linked list on the user stack which is used by **XDB** to walk up and down. If some procedures do not place themselves into this list, or do not execute their prologue codes, they are not visible to the debugger. The latter case happens if a breakpoint is set on a procedure name and the debugger stops there, and the command SHOW CALLS is used immediately. In this case the last procedure is missing in the list of nested procedures.

2.67 SET SCROLL

Syntax

```
SET SCROLL <mode> [PAGE|CONTINUE]
```

Description

<mode>

The scroll mode of the command window is set. In the current version, <*mode*> can only be EVALUATE.

PAGE

If this qualifier is selected, the output of an EVALUATE command to the command window stops when it is completely filled. Then the debugger asks whether to continue or not.

CONTINUE

If this qualifier is selected, the output scrolls without automatic stop. This mode is the default.

Example

```
SET SCROLL EVALUATE PAGE
```

Reference

EVALUATE

2.68 SET TASK

Syntax

```
SET TASK /ATTACH [ /ID=<task_id> ]
SET TASK /DETACH [ /ID=<task_id> ]
SET TASK /STEP
SET TASK /SET [ /ID=<task_id> ]
SET TASK /DEBUG = <debug_id> [ /ID=<task_id> ]
SET TASK /KILL
```

Description

The purpose of this command is task manipulation. Tasks can be switched, killed, attached and detached.

/ATTACH [*/ID=<task_id>*]

With this option, a task is started on the target and attached to the debugger. If no task is specified by */ID,* the current task is attached.

/DETACH [*/ID=<task_id>*]

With this option, a task can be detached from the debugger. If no task is specified by */ID*, the current task is detached.

The Organon XDB attempts to exit and then delete the current task with the command `set task/detach` as well as enabling assigned memory and resources.

/STEP

This option modifies the state of the currently monitored task. This allows to unlock tasks which run into an unpredictable state. The task state is modified to a normal halted state. The current location of the application is not changed.

/SET [/ID=<task_id>]

With this option, the current task is set to the task specified by <task_id>.

/DEBUG=<debug_id> [*/ID=<task_id>*]

With this option, the debug information specified by <*debug_id*> is assigned to a task. If no task is specified by /ID, the current task is used.

/KILL

Sends a FREETASK command with the current RMOS task ID to the target, deletes the task and frees the memory on the target. This option works only if the task is in state DORMANT (RMOS) / INIT (XDB).

Examples

```
SET TASK /ATTACH /ID=4
SET TASK /DETACH
SET TASK /SET /ID=1
```

References

SHOW TASK

2.69 SET TRACEPOINT

Syntax

```
SET TRACEPOINT AT <expression> [HARD <number>]
```

Description

AT <expression>

The result of <*expression*> is monitored by a tracepoint. When the value of <*expression*> is changed, it is displayed in the appropriate window, and the program continues execution.

HARD <number>

This qualifier forces the hardware interface to select the internal tracepoint specified by <*number*>. If this tracepoint is not available, an error message is issued.

With this option the i80386 debug registers can be used directly if they are not set. Each of the four debug registers can serve as a trace-, watch- or breakpoint.

If there is no debug register left or the expression can not be controlled by a single debug register, the tracepoint is simulated by **XDB**. In this case **XDB** will perform single steps through the program, which causes a very slow execution of your application task. Therefore **XDB** issues a warning message

```
(CAUTION !! : trace- or watchpoint not maskable must be simulated)
```

which has to be confirmed by the user. The expression is computed and the result is stored in an internal buffer as a reference value to compare with.

Examples

```
SET TRACEPOINT AT main\buffercount
SET TRACEPOINT AT globptr HARD 3
```

References

DELETE TRACEPOINT
DISABLE TRACEPOINT
ENABLE TRACEPOINT
SET EVALUATE
SET WATCHPOINT

2.70 SET VALUE

Syntax

```
SET VALUE [/SIZE = <size>] [/REPEAT = <number>] address = <expression>
SET VALUE [/SIZE = <size>] [/REPEAT = <number>] address = <list>
```

Description

<address>=<expression>

The value of <*expression*> is evaluated and written to the address given by *expression <address>*. If there is no */SIZE* parameter given, the written data width is equal to the width of the object referenced by <address>. If there is a */SIZE* parameter given, the result is converted unsigned to the size which is given by <*size*>, and written. If structured data types are used, only complete member identifications are allowed.
If <address> is *@name,* the debugger variable *@name* is set to the value of <*expression*>. Debugger variables inherit the type of the assigned result.

<address>=<list>

<*list*> is a list of expressions separated by commas. As above, the expressions are evaluated, converted to the size given by */SIZE*, and written into the memory, starting at address <*address*>. The amount of memory accessed is the number of expressions in the list times the length determined by the option */SIZE*. If no */SIZE* is given, the written data width is equal to the width of the object referenced by <*address*> times the number of expressions in the list.

/SIZE=<size>

This optional parameter defines the number of bytes to be written.
The following values are allowed for <*size*>:

Value	**Description**
BYTE	1 byte is written
WORD	2 bytes are written
LONG	4 bytes are written

Value	**Description**
FLOAT	a floating point number is written
EXTEND	an extended number is written
DOUBLE	a double number is written
NEAR16	a near 16 pointer is written
NEAR32	a near 32 pointer is written
FAR16	a far 16 pointer is written
FAR32	a far 32 pointer is written
CONSTANT <*number*>	number of bytes specified by <*number*> are written

/REPEAT=<number>

If this option is specified, the value of <*expression2*> is written not only into the address denoted by <*expression1*> but also to the following <*number*> pieces of memory. If, e.g., <*number*> equals 3, the value of <*expression2*> is written four times altogether.

There are internal predefined debugger variables and macro functions. Their names must not be used to define new **XDB** variables. If these names are used for macro definition the predefined function is overwritten and is available again after deleting the user-defined macro.

The following internal variables are predefined:

Variable	Meaning	Remark
@BWID	last ID of Break- or Watchpoint	read-only
@CS	code selector	read-only
@CURRLINE	current line	read-only
@EFL	flags	read-only
@EIP	instruction pointer	read-only
@ERROR	last error message number	writable
@ERRORTEXT	last error message	read-only
@INSTANCE	incarnation of the actual process	read-only
@LEVEL	active scope level	read-only
@MODULE	active (where the PC is) module	read-only
@NEST	nesting level	read-only
@PC	actual PC	read-only
@PROCEDURE	active procedure	read-only
@PROCESS	actual process number	read-only
@SOURCEFILE	current file	read-only
@SOURCELINE	source line	read-only
@STACK	0 = "CURRENT" 32 ="WIND" 64 ="TOP"	read-only
@STOPREASON	last reason of program stop	read-only

The following macro functions are predefined (The macro functions offer the functionality of the C Runtime library function with the same name.):

Function	Arguments
@ACOS	double
@ASIN	double
@ATAN	double
@ATAN2	double, double
@COS	double
@EXEC	char *

Function	**Arguments**
@EXP	double
@FABS	double
@GETCHAR	void
@GETS	char *
@ISALNUM	int
@ISALPHA	int
@ISASCII	int
@ISCNTRL	int
@ISDIGIT	int
@ISLOWER	int
@ISPRINT	int
@ISPUNCT	int
@ISSPACE	int
@ISUPPER	int
@ISXDIGIT	int
@LOG	double
@LOG10	double
@OPRINTF	char *, ...
@POW	double, double
@PRINTF	char *, ...
@PUTCHAR	char
@PUTS	char *
@REG	register name [1)]
@SCANF	char *, ...
@SIN	double
@SQRT	double
@STRCAT	char *, char *
@STRCMP	char *, char *
@STRCPY	char *, char *
@STRLEN	char *
@STRNCAT	char *, char *, int
@STRNCMP	char *, char *, int
@STRNCPY	char *, char *, int
@TAN	double

Function	**Arguments**
@TOASCII	int
@TOLOWER	int
@TOUPPER	int

1) Valid register names see SET REGISTER

Examples

```
SET VALUE loop = 10
SET VALUE angle = -1.271e-13
```

References

EVALUATE

SET REGISTER

2.71 SET WATCHPOINT

Syntax

```
SET WATCHPOINT [/LENGTH = <bytes>]
               [/ACCESS = [FETCH|READ|WRITE|ALL]]
               AT <expression>
               [SKIP <count>]
               [SYMBOL <dbid>]
               [HARD <number>]
               [CONTINUE]
               [THEN <actions> END]
```

Description

If the location of <*expression*> is accessed in a way specified by */ACCESS* and */LENGTH*, and the *SKIP* counter decrements to zero, the program stops.

The default value for <*count*> is 1, for */LENGTH* the size of the result of <*expression*>, and for */ACCESS* it is WRITE.

If there is no debug register left or the expression can not be controlled by a single debug register the watchpoint is simulated by **XDB**. This slows down the speed dramatically, so that **XDB** issues a warning message

```
(CAUTION !! : trace- or watchpoint not maskable must be simulated)
```

which must be confirmed by the user. Under simulation, only *WRITE* is possible as */ACCESS* value. Respectively *WRITE* is possible only if **XDB** detects an access, because **XDB** compares against a reference value.

SKIP <count>

The *SKIP* qualifier allows to specify a value which delays the stop of execution until this counter <*count*> decrements to zero.

CONTINUE

This qualifier lets the program continue after the detection of a watched condition and after execution of the optional action list. This will not take place if the debugger variable @ERROR has a non-zero value.

SYMBOL <dbid>

The SYMBOL qualifier forces **XDB** to place the ID number of this watchpoint into the debugger variable <*dbid*>.

HARD <dbid>

The HARD qualifier forces the hardware interface to select the internal watchpoint specified by <*number*>. If this watchpoint is not available, an error message is issued.

With this option the i80386 debug registers can be used directly if they are not set. Each of the four debug registers can serve as a trace-, watch- or breakpoint.

THEN <actions> END

<*actions*> is an optional command list enclosed between *THEN* and *END*. These commands are executed at every stop at this watchpoint.

/ACCESS=[FETCH|READ|WRITE|ALL]

With the /ACCESS qualifier, the type of memory access can be specified.

Type	**Remark**
FETCH	code fetch
READ	data read
WRITE	data write
ALL	any

/LENGTH=<bytes>

With this qualifier, the size of the monitored memory region can be specified. This overrides the default which is the size of the result of <*expression*>.

For restrictions introduced by the low level hardware interface, refer to the command SET TRACEPOINT.

Examples

```
SET WATCHPOINT AT array[10]
SET WATCHPOINT AT badloc HARD 1
SET WATCHPOINT /ACCESS=WRITE AT deadzone
SET WATCHPOINT /ACCESS=READ AT box1 CONTINUE
THEN
     PRINT "fetch mailbox %5d" box1
     END
```

References

DELETE WATCHPOINT
DISABLE WATCHPOINT
ENABLE WATCHPOINT
SET TRACEPOINT

Notes

XDB issues a warning message if the requested watchpoint cannot be executed in real time.

2.72 SHOW Commands

Syntax

```
SHOW <show_modes>
```

The following <*show_modes*> are available:

ACTIVE	INFO	SEGMENT
BREAKPOINT	KEY	SCOPE
BUTTON	LANGUAGE	SOURCE
CALLS	LEVEL	STATUS
DBVAR	LOGFILE	SYMBOL
DEBUG	MACRO	TASK
DECLARATOR	MEMORY	TRACEPOINT
DESCRIPTOR	MODULE	TYPE
DIRECTORY	OPTION	VERSION
ESCAPE	PROTFILE	WATCHPOINT
EVALUATE	REGISTER	

2.73 SHOW ACTIVE

Syntax

```
SHOW ACTIVE <level> ["<regexp>"]
SHOW ACTIVE GLOBAL ["<regexp>"]
SHOW ACTIVE MODULE ["<regexp>"]
SHOW ACTIVE CURRENT ["<regexp>"]
```

Description

<level>

All current active (visible) variables of the debugged program with static level greater than or equal to <*level*> are displayed. A procedure has a higher scope level than a module. <*level*> = 0 displays all currently active variables.

GLOBAL
MODULE
CURRENT

The symbolic values GLOBAL, MODULE and CURRENT respond to the scope levels, program global, module global and the current scope of the program.

<regexp>

If the regular expression <*regexp*> is specified, only the symbols whose names match the regular expression <*regexp*> are displayed.
<*regexp*> may contain the wildcard characters '?' for “any character“ and '*' for “any string of characters“.

Examples

```
SHOW ACTIVE 0
SHOW ACTIVE CURRENT "*ptr*"
SHOW ACTIVE MODULE
```

References

SHOW LEVEL
SHOW SCOPE

2.74 SHOW BREAKPOINT

Syntax

```
SHOW BREAKPOINT AT <expression>
SHOW BREAKPOINT /ID = <halt-id>
SHOW BREAKPOINT /ALL
```

Description

The status and the count-, expression- and action-parameters for the breakpoints and their ID numbers are displayed.

The status can be ENABLE, DISABLE, or CURRENT. The status CURRENT means that the last program stop is caused by this haltpoint.

AT <expression>

The breakpoint at the address denoted by <*expression*> is displayed.

/ID=<halt-id>

The breakpoint with the ID number <*halt-id*> is displayed.

/ALL

All existing breakpoints are shown.

Examples

```
SHOW BREAKPOINT /ID=13
SHOW BREAKPOINT AT @LINE 170
SHOW BREAKPOINT /ALL
```

References

SET BREAKPOINT

2.75 SHOW BUTTON

Syntax

```
SHOW BUTTON <name>
SHOW BUTTON /ALL
```

Description

This command shows the current mappings of the user-defined button <*name*>, or of all currently defined buttons, if */ALL* was specified.

Example

```
SHOW BUTTON restart
```

References

DEFINE BUTTON
DELETE BUTTON
DEFINE MACRO

2.76 SHOW CALLS

Syntax

```
SHOW CALLS [ /ARGUMENTS ] [/LEVEL = <number> ]
```

Description

A list of all current active functions is displayed.
The output is written to the command window. The first column contains the address where the procedure was called from. The second one contains the symbolic name of the address. The module name and the source line the address in the first column belongs to is shown at the end of the line.

The procedure which matches the current scope setting of the debugger is marked with

```
<<< scope
```

at the end of the line.

/ARGUMENTS

If this option is used, the function arguments are displayed, too. Note that there are restrictions, because if parameters are stored in registers, they are hidden by later calls. There are also restrictions if the top level function has not passed its prologue code which moves the parameters from the stack into their registers.

/LEVEL=<number>

With /LEVEL only the first <*number*> of nested calls are displayed.

Examples

```
SHOW CALLS
SHOW CALLS/ARGUMENTS
SHOW CALLS/LEVEL=3/ARGUMENTS
```

Reference

SET SCOPE

2.77 SHOW DBVAR

Syntax

```
SHOW DBVAR <regexpr>
```

Description

All debugger variables which match the regular expression <*regexpr*> are printed to the command window. <*regexpr*> may contain wildcard characters as '*' or '?'. The regular expression may be enclosed in "" to protect them from the keyword scanner.

Examples

```
SHOW DBVAR "s*"
SHOW DBVAR *
```

Notes

The @-character is not a part of the variable names and must not be used in the regular expression.

2.78 SHOW DEBUG

Syntax

```
SHOW DEBUG [ /ID [=<debug-id>] ["<module>"] ]
```

Description

/ID[=<debug-id>]

With the optional /ID parameter a special debug tree can be selected. If the <*debug-id*> value is omitted, all available debug IDs with their modules are displayed. The current ID is enclosed in square brackets.

"<module>"

All or the selected modules are displayed in the command window. They are marked with “[loaded]“ if their debug information is read in. If there is no source file found, the module is marked with “[no source]“. Modules of source files that have a more recent modification date than the program image are marked with “[modified]“. The optional "<*module*>" argument can include wildcard characters such as '*' and '?'.

Examples

```
SHOW DEBUG
SHOW DEBUG "io*"
SHOW DEBUG "data"
SHOW DEBUG/ID
SHOW DEBUG/ID=1 "*link"
```

References

DELETE DEBUG
LOAD /DEBUG
SET DEBUG
SET MODULE
SET DIRECTORY

2.79 SHOW DECLARATOR

Syntax

```
SHOW DECLARATOR <expression>
```

Description

The type definition of the result of the expression <*expression*> is displayed. Sub-array or member specifications are allowed.

Examples

```
SHOW DECLARATOR strsok.type
SHOW DECLARATOR array[0]
SHOW DECLARATOR *pointer
```

References

SHOW INFO
SHOW TYPE

2.80 SHOW DESCRIPTOR

Syntax

```
SHOW DESCRIPTOR [ /REPEAT = <times> ] /GDT <GDT-index>
SHOW DESCRIPTOR [ /REPEAT = <times> ] /IDT <IDT-index>
SHOW DESCRIPTOR [ /REPEAT = <times> ] /LDT [ = <GDT-LDTsel> ] <LDT-index>
SHOW DESCRIPTOR [ /REPEAT = <times> ] /MEMORY <address>
SHOW DESCRIPTOR [ /REPEAT = <times> ] /SELECTOR <selector-value>
```

Description

This command shows pieces of 64 bits of memory formatted as INTEL segment descriptor. The location of the descriptor can be specified in several ways:

/GDT <GDT-index>

The given expression <*GDT-index*> is used as index into the GDT of the target system. The GDTR register is used to get the base address of the GDT and to check whether the index is inside the current GDT-limit.

/IDT <IDT-index>

The given expression <*IDT-index*> is used as index into the IDT of the target system. The IDTR register is used to get the base address of the IDT and to check whether the index is inside the current IDT-limit.

/LDT[=<GDT-LDTsel>] <LDT-index>

The given expression <*LDT-index*> is used as index into the LDT of the target system. The LDTR register is used to get the base address of the LDT and to check whether the index is inside the current LDT-limit. If the optional expression <*GDT-LDTsel*> is specified, this value is used as index into the GDT to obtain an LDT-descriptor. The value is checked against the current GDT-limit, and the selected descriptor must be an LDT-descriptor.

/MEMORY <address>

The given expression <*address*> yields the memory location where the descriptor is read.

/SELECTOR <selector-value>

The expression <*selector-value*> is used as index into the GDT or LDT, according to the TI-bit of the selector.

/REPEAT=<times>

The expression <*times*> specifies how many descriptors are to be displayed. The default value is 1.

The output shows the memory address, the table where it resides, and a hexadecimal dump of the addressed memory.

The descriptor fields are decoded and formatted. Based on the type of the descriptor, various fields are displayed:

Field	**Description**
base	The base address of the segment
limit	The limit of the segment
sel	The target selector of the gate descriptor
off	The target offset of the gate descriptor
dwcnt	The argument count of the call-gate descriptor
G (granularity)	The granularity of the segment. 1b means that the limit value is used as byte count, 4k means that the limit value is used as 4kb page count.
P (present)	Shows the status of the present bit
dpl	The value of the privilege level
attr	The segment attributes

If *attr* is a CODE-segment, following abbreviations are used:

Symbol	Description
USE32	USE32 segment
USE16	USE16 segment
C	conforming segment
N	non-conforming segment
R	read-execute segment
E	execute-only segment
A	segment accessed
X	segment not accessed

If *attr* is a DATA-segment, following abbreviations are used:

Symbol	Description
D	expand down
U	expand up
W	writeable segment
R	read-only segment
A	segment accessed
X	segment not accessed

Examples

```
SHOW DESCRIPTOR/GDT 5
SHOW DESCRIPTOR/REPEAT=6 /GDT 5
SHOW DESCRIPTOR/IDT idtsel
SHOW DESCRIPTOR/MEMORY 0x1000
SHOW DESCRIPTOR/SEL cs
SHOW DESCRIPTOR/LDT=10 ldtsel
```

References

SET DESCRIPTOR
SHOW REGISTER

2.81 SHOW DIRECTORY

Syntax

```
SHOW DIRECTORY
```

Description

The current list of alternative search directories for source files is shown.

Example

```
SHOW DIRECTORY
```

References

DELETE DIRECTORY
SET DIRECTORY

2.82 SHOW ESCAPE

Syntax

```
SHOW ESCAPE
```

Description

The escape sequence to switch off the transparent mode is displayed.

Example

```
SHOW ESCAPE
```

References

REMOTE
SET ESCAPE

2.83 SHOW EVALUATE

Syntax

```
SHOW EVALUATE
```

Description

All currently monitored expressions are displayed in the command window.

Example

```
SHOW EVALUATE
```

References

DELETE EVALUATE
DISABLE EVALUATE
ENABLE EVALUATE
SET EVALUATE

2.84 SHOW INFO

Syntax

```
SHOW INFO "<regexp>"
```

Description

SHOW INFO searches through the internal symbol table for type names which match the regular expression pattern "<*regexp*>". This pattern may contain wildcard characters as '*' and '?'. The type tables are searched from the current scope level upwards.

The types found are displayed in the command window with their scope levels and full descriptions.

Examples

```
SHOW INFO "int"
SHOW INFO "struct *"
SHOW INFO "struct s_abc"
```

References

SHOW DECLARATOR
SHOW TYPE

2.85 SHOW KEY

Syntax

```
SHOW KEY <key>
SHOW KEY /ALL
```

Description

<key>

Displays the definition of the user-defined key <*key*>.

/ALL

All currently defined keys are displayed.

Examples

```
SHOW KEY F2
SHOW KEY /ALL
```

References

DEFINE KEY
DELETE KEY

2.86 SHOW LANGUAGE

Syntax

```
SHOW LANGUAGE
```

Description

Displays the current language setting of the debugger in the command window.

Example

```
SHOW LANGUAGE
```

Reference

SET LANGUAGE

2.87 SHOW LEVEL

Syntax

```
SHOW LEVEL
```

Description

This command shows the static nesting level of the current position. The static nesting level defines the visibility of symbols and types. 0 stands for global, 1 for module local, 2 and higher for procedure local.

The debugger displays information if and how this level was reached via the SET SCOPE command: “[wind]“ means /UP or /DOWN was used, “[walk]“ means <*expression*> was used.

Example

```
SHOW LEVEL
```

References

SET SCOPE
SHOW ACTIVE

2.88 SHOW LOGFILE

Syntax

```
SHOW LOGFILE
```

Description

If a logfile is open, this command shows the name and directory. Otherwise, you are told that no logfile is used currently.

Example

```
SHOW LOGFILE
```

References

CLOSE
SET LOGFILE

2.89 SHOW MACRO

Syntax

```
SHOW MACRO "<name>"
SHOW MACRO /ALL
```

Description

"<name>"

Displays the selected macros and their replacement texts. The <*name*> argument may contain wildcard characters as '*' and '?'.

/ALL

With /ALL, all currently defined macros are shown.

Examples

```
SHOW MACRO /ALL
SHOW MACRO "MAC"
SHOW MACRO "*DEF"
```

References

DEFINE MACRO
DELETE MACRO

2.90 SHOW MEMORY

Syntax

```
SHOW MEMORY [/LENGTH = <length>] [/SIZE = <size>] [/WINDOW] [/<format>]
           <expression>
```

Description

The contents of the memory are shown in hexadecimal and ASCII notation starting at the address specified by <*expression*>.

/LENGTH=<length>

The optional parameter */LENGTH* defines the number of bytes to be displayed. The default is 16 bytes.

/SIZE=<size>

The optional parameter */SIZE* defines the grouping of the bits in the memory. The size defaults to BYTE. The following values are allowed for <*size*>:

Size	**Description**
BYTE	The contents are displayed as a sequence of byte values
WORD	The contents are displayed as a sequence of 16-bit words
LONG	The contents are displayed as a sequence of 32-bit long words
FLOAT	The contents are displayed as a sequence of 32bit IEEE floating point variables
DOUBLE	The contents are displayed as a sequence of 64bit IEEE floating point variables
EXTENDED	The contents are displayed as a sequence of 96bit IEEE floating point variables

/WINDOW

The memory is displayed in a memory window rather than in the command window.

/<format>

This option defines the format of the output. Following values are allowed for <*format*>: BINARY, OCTAL, DEC, HEX (which is the default).

Examples

```
SHOW MEMORY buffer
SHOW MEMORY /SIZE = WORD action.statetab
SHOW MEMORY /SIZE = LONG /WINDOW ivttab
SHOW MEMORY /SIZE = DOUBLE tschebytab
SHOW MEMORY /LENGTH = 256 area
```

References

EVALUATE
SET VALUE

2.91 SHOW MODULE

Syntax

```
SHOW MODULE <name>
```

Description

The source of the module <*name*> is displayed in the source window. This does not change the scope of the debugger or load any symbol or debug information.

Example

```
SHOW MODULE mainloop
```

References

SET MODULE
SHOW DEBUG

2.92 SHOW OPTION

Syntax

```
SHOW OPTION /<option>
SHOW OPTION /ALL
```

Description

Displays the current setting of global options.
The set of legal values for <*option*> depends on the configuration. See the command SET OPTION for further details.

Examples

```
SHOW OPTION /ALL
SHOW OPTION /SEGMENT
```

Reference

SET OPTION

Notes

SHOW OPTION lists the item TIME as TRACETIME.

2.93 SHOW PROTFILE

Syntax

```
SHOW PROTFILE
```

Description

This command tells you which protocol files are currently open (complete with file name and path name).

Example

```
SHOW PROTFILE
```

References

SET PROTFILE
CLOSE

2.94 SHOW REGISTER

Syntax

```
SHOW REGISTER <register>
```

Description

The value of register <*register*> is displayed in the command window. General purpose registers are shown in hexadecimal and decimal notation.

Floating point registers are shown as floating point numbers. Special register values are encoded and shown in symbolic form. The states of status bits are shown in an abbreviated manner. Lower case letters mean that the bit is not set, upper case letters indicate that the option is set.

For valid register names see SET REGISTER.

Examples

```
SHOW REGISTER EAX
SHOW REGISTER ES
SHOW REGISTER EBP
SHOW REGISTER DI
```

References

SET REGISTER
DISPLAY REGISTER

2.95 SHOW SCOPE

Syntax

```
SHOW SCOPE
```

Description

Display the current scope of the debugger. If this is not the scope of the program, this is marked via [*wind*] or [*walk*].

Example

```
SHOW SCOPE
```

References

SET SCOPE
SHOW LEVEL

2.96 SHOW SEGMENT

Syntax

```
SHOW SEGMENT
```

Description

Displays the global segment map of the debugger.

The address ranges for logical and physical addresses and the segment attributes are shown.

Example

```
SHOW SEGMENT
```

Reference

LOAD /GLOBAL

2.97 SHOW SOURCE

Syntax

```
SHOW SOURCE
```

Description

The complete file name of the module currently displayed in the source window is printed. This means you can check which source code is displayed. This is very useful if several search directories are specified.

Example

```
SHOW SOURCE
```

References

SHOW DIRECTORY
SET DIRECTORY

2.98 SHOW STATUS

Syntax

```
SHOW STATUS
```

Description

Displays the current task as well as all debug-IDs loaded by the debugger.

Example

```
SHOW STATUS
```

References

SET DEBUG
SHOW DEBUG

2.99 SHOW SYMBOL

Syntax

```
SHOW SYMBOL <expression>
```

Description

The expression <*expression*> is evaluated, and the result is taken as the address of a symbol. The nearest global symbol with an optional offset is displayed.

Examples

```
SHOW SYMBOL ptrtab[4]
SHOW SYMBOL *funptr
```

References

EVALUATE /ADDRESS

2.100 SHOW TASK

Syntax

```
SHOW TASK /ID[=<task-id>] ]
SHOW TASK ["<taskname>"]
```

Description

All or the selected tasks are displayed in the command window. Their task names assigned by the target system, their command line arguments, and their internal task IDs are displayed.

"<taskname>"

This optional argument can include wildcard characters such as '*' and '?'.

/ID[=<task-id>]

With the optional */ID* parameter a particular task can be selected. If the <*task-id*> value is omitted, all available task IDs are displayed. The current ID is enclosed in square brackets.

Examples

```
SHOW TASK
SHOW TASK "io*"
SHOW TASK "data"
SHOW TASK/ID
SHOW TASK/ID=1
```

Reference

SET TASK

Notes

The shown states have a different meaning than the states of RMOS tasks.

2.101 SHOW TRACEPOINT

Syntax

```
SHOW TRACEPOINT AT <expression>
SHOW TRACEPOINT /ID = <halt-id>
SHOW TRACEPOINT /ALL
```

Description

The status and count-, expression-, and action-parameters for the tracepoints and their ID numbers are displayed.

The status can be ENABLE or DISABLE.

AT <expression>

The tracepoint at the address denoted by <*expression*> is displayed.

/ID=<halt-id>

The tracepoint with the ID number <*halt-id*> is displayed.

/ALL

All existing tracepoints are shown.

Examples

```
SHOW TRACEPOINT /ID=13
SHOW TRACEPOINT /ID=@DBID
SHOW TRACEPOINT /ALL
```

References

DELETE TRACEPOINT
SET TRACEPOINT

2.102 SHOW TYPE

Syntax

```
SHOW TYPE "<regexp>"
```

Description

The type definitions of all symbols whose names match the regular expression <*regexp*> are displayed.

<*regexp*> may contain wildcard characters as '*' and '?'.

Only basic types and declarators are used to print the type. If a structured mode like struct, union or enum is used, their members are expanded recursively until any non-structured type is found.

Examples

```
SHOW TYPE "*table"
SHOW TYPE "p?io"
```

References

SHOW DECLARATOR
SHOW INFO

2.103 SHOW VERSION

Syntax

```
SHOW VERSION
```

Description

This command displays the version number of your **XDB** version in the command window.

Example

```
SHOW VERSION
```

2.104 SHOW WATCHPOINT

Syntax

```
SHOW WATCHPOINT AT <expression>
SHOW WATCHPOINT /ID = <halt-id>
SHOW WATCHPOINT /ALL
```

Description

The status and count-, expression- and action-parameters for the watchpoints and their ID numbers are displayed.

The status can be ENABLE, DISABLE or CURRENT. The status CURRENT means that the last program stop is caused by this watchpoint.

AT <expression>

The watchpoint at the address denoted by <*expression*> is displayed.

/ID=<halt-id>

The watchpoint with the ID number <*halt-id*> is displayed.

/ALL

All existing watchpoints are shown.

Examples

```
SHOW WATCHPOINT /ID=13
SHOW WATCHPOINT /ID=@DBID
SHOW WATCHPOINT /ALL
```

References

DELETE WATCHPOINT
SET WATCHPOINT

2.105 SPAWN

Syntax

```
SPAWN <command> [<arguments>...]
```

Description

Executes the specified command and passes the optional arguments to it. Reserved words must be enclosed in double quotes "". Arguments with non-alphanumeric characters except '+' and '-' must be enclosed in double quotes, too. If the argument <*command*> or <*arguments*> consists of a macro name or a debugger variable not being protected by double quotes, the macro is expanded, or the value of the debugger variable is used.

For executing DOS- or Windows programs the extension „.com“ or „.exe“ has to be specified. Built-In commands of the COMMAND.COM (dir, copy) require a special syntax. For the DIR command it is:

```
SPAWN COMMAND.COM /K DIR
```

For further details on DOS command processor enter `help command` on a DOS prompt.

Example

```
SPAWN  notepad.exe "d:\\tmp\\notes.txt"
```

2.106 STEP

Syntax

```
STEP [<count>]
STEP /RETURN
STEP /INTO
```

Description

The next code line of the loaded program is executed. If you are debugging in assembler level, the next opcode is executed. If a subroutine is called, the execution of the program stops at the first command of the subroutine.

<count>

With the optional <*count*> argument, more than 1 line/instruction can be stepped. The default value for <*count*> is 1.

/RETURN

Using */RETURN*, the actual value on the stack top is interpreted as return address. At this address a temporary breakpoint is set. There is no check done whether this address is valid or not. Then the execution is continued. You should use */RETURN* only if the program execution has stopped at the first command of a subroutine, and the program stack is unchanged.

/INTO

If the step leads to a part of the program the debugger has no debug information about (e.g. a jump to a system routine), the execution runs through this part by performing a NEXT. If the option */INTO* is specified, **XDB** also performs single-steps inside such code.

Examples

```
STEP 8
STEP /RETURN
STEP /INTO
```

References

NEXT

RUN

2.107 WHILE

Syntax

WHILE <*expression*> THEN <*commandlist*> END

Description

As long as the result of <*expression*> has a value different from 0, the <*commandlist*> is executed.

Example

```
WHILE  crashvalue != 0x1FF
          THEN
          STEP
          END
```

References

BREAK
CONTINUE
GOTO

3 Organon XDB Error Messages

3 Error Messages

The following table lists the error messages of **Organon XDB**. The error message you get represents the letters of the columns CLASS + CODE. Note that the code of the messages is sorted in alphabetical order.

CODE	CLASS	TEXT	DESCRIPTION
D-D-DIAR	E	address out of sync	The shown address lies between two opcodes. The task walks through garbage.
H-H-HWAS	E	hardware breakpoint already set	The real hardware break point is set already.
H-H-HWNB	E	too many hardware breakpoints	The internal table for real hardware breakpoints overflows.
H-H-HWUB	E	unknown breakpoint at	The program halts at a breakpoint which is not found in the internal tables of the debugger. Anyone has written the opcode of the breakpoint into the target memory.
L-B-ADRR	E	unary & not for register-variables	The address operator is not applicable to variables stored in registers.
L-B-APGNO	E	no line in ASM-buffer, use PAGE <addr>	The lines up are not in the assembler buffer; an address is needed for new disassembly.
L-B-AWND	E	no code displayed	There is no code displayed. Therefore you cannot move up or down.

CODE	**CLASS**	**TEXT**	**DESCRIPTION**
L-B-AWPG	E	no PAGE in assembler window	The PAGE command is not allowed in the assembler window.
L-B-BDBG	E	bad debug information for	This symbol contains corrupt debug data.
L-B-BDMU	E	debug info already loaded	The debug information is loaded already.
L-B-BEVEX	E	evaluation expression not found	The entered expression was not found in the internal tables.
L-B-BEVID	E	evaluation ID not found	This evaluation ID was not found in the internal tables.
L-B-BID	E	bad id number	IDs must be positive numbers.
L-B-BPNA	E	specified halt not found, no action done	The specified break-, watch- or tracepoint can not be found; the commands DELETE, ENABLE or DISABLE are impossible.
L-B-BPOE	E	another breakpoint at this address already enabled	Another breakpoint at this address is already enabled.
L-B-BPSA	E	breakpoint not identified by address	More than one breakpoint at the specified address.
L-B-BPU	W	breakpoint already on this location	This source location is already monitored by a breakpoint. It is set only once.
L-B-BRTP	E	bad range type	It is not allowed to prefix the shown type with a range definition.

CODE	CLASS	TEXT	DESCRIPTION
L-B-BWN	E	invalid window	This command is not allowed in this window.
L-B-COMT	E	unary ~(bitwise not) not allowed for	The bitwise not operator is not allowed for this type.
L-B-CSOP	E	not allowed implicit cast	The necessary cast of the operands for this operator is not allowed for their types.
L-B-CSTW	W	can't cast	The first type cannot be cast to the second one.
L-B-CSTY	E	can't cast	The first type cannot be cast to the second one.
L-B-CUMT	E	not current module	The program currently resides in another module. Use the command SET MODULE first.
L-B-DBDC	E	create debug-image descriptor	The set-up of the descriptor for the shown debug-image failed.
L-B-DBFM	E	bad debug format	The debug information of this file is corrupt.
L-B-DBID	E	no such debug-id available	The debugger does not know the requested debug-id.
L-B-DBND	E	may not delete debug-id	This debug-id must not be deleted.
L-B-DBNE	E	undefined debugger-variable	The shown debugger variable is not defined.
L-B-DBNM	E	can't build debug-image name	The shown file name cannot be converted to a debug-image name.

CODE	CLASS	TEXT	DESCRIPTION
L-B-DBRD	E	debug info error at	An error occurred during reading and interpreting the debug information. Possible errors are corrupt file systems or disk overflow during compilation.
L-B-DBRO	E	readonly debugger variable	Try to assign a value to a read-only debugger variable.
L-B-DBSY	E	bad debug symbol	The debug information of a symbol in this file is corrupt. You can go on with your debug session, but the information of this symbol is lost.
L-B-DBTP	E	no printable type	The type of the shown debugger variable cannot be converted into a string word.
L-B-DBVU	E	undefined debugger variable, get ID	The debugger variable used in an expression /ID=@.. is not defined.
L-B-DBVUN	E	undefined debugger variable	There is no debugger variable defined with the issued name.
L-B-DBWR	E	wrong debug info	Wrong debug info is used or no debug info is loaded.
L-B-DID	E	invalid debug-id#	The shown debug-id# is invalid. Only numbers greater or equal to zero are allowed.
L-B-DITG	E	different tag names	The tag name of the symbol-item is different from that of the type information.

CODE	CLASS	TEXT	DESCRIPTION
L-B-DIVZ	E	division by zero	The current evaluated expression contains a division by zero.
L-B-DRNF	E	directory not found	The specified directory was not found.
L-B-DVRD	E	readonly variable	This debugger variable is predefined. The user cannot set the value of a predefined debugger variable.
L-B-ERANS	E	can't erase ASSEMBLER without SOURCE	At least one of the two windows must be displayed.
L-B-ERSNA	E	can't erase SOURCE without ASSEMBLER	At least one of the two windows must be displayed.
L-B-EVIX	E	invalid index-type	The shown value is not allowed as an array-index.
L-B-EVMX	E	evaluation string too long	The string for evaluation window is too long.
L-B-EVRI	E	invalid range selection	These two values do not form a valid range. The start value exceeds the end value.
L-B-FXCV	E	unknown type in 'cast'-expression	The shown tag is not found at the current scope level.
L-B-HIID	E	no history id	This history-id is not in the history-pool.
L-B-HIST	E	no history string	No command in the history string matches this string.

CODE	CLASS	TEXT	DESCRIPTION
L-B-HXNM	E	can't build hex-file name	The shown file name cannot be converted to a hex-file name.
L-B-ILLOP	E	invalid operator for evaluation	This operator is not a valid identifier for the command EVALUATE.
L-B-ILLP	E	illegal pointer sub/add	These pointers cannot be added or subtracted because they point to different types.
L-B-ILTG	E	illegal tag reference	The tag name of the forward reference is illegal.
L-B-LDHX	E	can't open hex-file	The file with the shown name cannot be opened.
L-B-LDIS	E	invalid segment number	A segment number consists of decimal numbers 0-9 only.
L-B-LDMB	E	missing debug-image file	The command LOAD needs a debug-image file to load segments.
L-B-LDNS	E	invalid segment number	A segment number must be in the range [0..max].
L-B-LDNT	E	for task DEBUG- and SEGMENT-option needed	The option TASK is not allowed without the options DEBUG and SEGMENT.
L-B-LDSA	E	invalid segment loadaddress	The address must be a decimal or hexadecimal (which is prefixed with a '$') number.
L-B-LDSF	E	invalid segment flag	The segment flag can be built up by the letters A,P,R,W and C.

CODE	**CLASS**	**TEXT**	**DESCRIPTION**
L-B-LDSL	E	invalid segment length	The length must be a decimal or hexadecimal (which is prefixed with a '$') number.
L-B-LDSP	E	invalid CPU-space	The CPU-space qualifier can have the values UD, UP,UX,SP,SD,SX,XX and CP
L-B-LDSS	E	i/o error	A disk-error occured during loading an image from the host system to the target.
L-B-LDTG	E	missing /TASK or /GLOBAL qualifier	An attempt to download segments is made without a task or global specification. The global-task qualifier is set to ON, but **XDB** has currently no task under control.
L-B-LDTN	E	missing task name for load	There is no task name specified, and the TASK option is not set to global.
L-B-LDUS	E	segment already used	The shown segment is already used during the command LOAD.
L-B-LMAL	E	out of memory, stopped at	There is not enough memory to load the debug information of all modules. The load process stopped at the issued name, but does not include this module.
L-B-LNCU	E	no current line	The program stops at an invalid source line.

CODE	CLASS	TEXT	DESCRIPTION
L-B-LOGOP	E	can't open logfile	The mentioned file cannot be opened. Check its name and your access privileges.
L-B-MBID	E	no such member	The structure/union does not contain this member.
L-B-MBRK	E	too many breakpoints	No more breakpoints available.
L-B-MCUR	E	current module	This module is the current location of the program.
L-B-MLIN	E	multiple lines for this address, used line:	There are more than one lines associated with the evaluated address.
L-B-MMPU	E	too many memory pushes	An internal buffer overflows. Your entered expression is too complex.
L-B-MNLD	E	module not loaded	The debug information of the requested module is not loaded into the debugger.
L-B-MODZ	E	modulo by zero	The current evaluated expression contains a modulo operation by zero.
L-B-MOVE	E	Bad move coordinate	The given X/Y-position is a bad position for a window.
L-B-N2PT	E	no pointer left and right for	This operator does not allow operands of type pointer on both sides.
L-B-NADB	E	no active debug tables	The program halts at an address where no debug information is available.

CODE	CLASS	TEXT	DESCRIPTION
L-B-NADE	E	no addressible expression	The expression cannot be used as an address.
L-B-NADR	E	expression not addressible	The expression cannot be referenced with a pointer.
L-B-NARR	E	no array type for	This operator does not allow operands of type array.
L-B-NBEA	E	no physical address for end of block	The logical end-address of the current local block cannot be converted to a physical address.
L-B-NBLK	E	no valid block	The program is not inside a debugged block or function.
L-B-NCON	E	string constant not allowed	String constants are not addressible.
L-B-NCTK	E	no current task	There is no task attached to the debugger.
L-B-NDIX	E	cannot address as subarray	The equivalence between pointers and arrays is only possible for the first-index stage.
L-B-NEGT	E	unary - not allowed for	The unary - operator is not allowed for this type.
L-B-NFLT	E	no float/double type for	This operator does not allow operands of type float or double.
L-B-NFNC	E	no procedure type for	This operator does not allow operands of type procedure.
L-B-NIDX	E	no index allowed	The expression is not of type array or pointer. An index (offset) specification is not allowed.

CODE	**CLASS**	**TEXT**	**DESCRIPTION**
L-B-NIND	E	no indirection allowed	The expression is usable for dereferencing or indexing.
L-B-NLNO	E	no code line, use	The given line number does not point to a real code location. Use the shown alternatives.
L-B-NMAIN	E	MAIN-symbol not found for	The language specific entry point cannot be found for the current language ore one the other possible debugger languages.
L-B-NMB	E	not a struct/union member for	The term following the “member-of“ operator is not of type member-of anything.
L-B-NMOF	E	no offset address	The left-side expression is not suitable to enter using an offset (no structure/array).
L-B-NOBD	E	boundfile not found	No bound file found for this debug-id.
L-B-NOEV	E	not a enum-member	The shown string is not a member of the given enumeration constant.
L-B-NOEX	E	missing expression	An expression node is required. Check your input.
L-B-NOHXNM	E	missing filename of hex-record	The file name of the hex-record has not been specified.
L-B-NOLV	E	no lvalue	The entered expression is not usable to form an address.
L-B-NOMV	E	MOVE not allowed	This version of **XDB** does not allow the movement of windows.

CODE	**CLASS**	**TEXT**	**DESCRIPTION**
L-B-NOP	E	no binary operator	The operator is not usable for an expression with 2 operands.
L-B-NOSP	E	no SPAWN command	This version of **XDB** does not support the command SPAWN.
L-B-NOTG	E	no target type	This type is not a structure/union or enum.
L-B-NOTK	E	no task to reset	There is no task known for the debugger.
L-B-NOTT	E	unary ! not allowed for	The unary !-operator is not allowed for this type.
L-B-NOTY	E	command not yet implemented	This command is not usable in this release. Check the release notes of further updates.
L-B-NPEA	E	no physical address for end of procedure	The logical end-address of a procedure cannot be converted to a physical address.
L-B-NPRC	E	no valid procedure	XDB is currently not inside a debugged function.
L-B-NPTR	E	no pointer type for	This operator does not allow operands of type pointer.
L-B-NSGA	E	no segment list	There is no segment list available.
L-B-NSMO	E	no source module displayed	The source window does not contain a source module. Use the command SHOW or SET MODULE first.
L-B-NSNF	E	segment name not found	The given segment name was not found in the segment list.

CODE	CLASS	TEXT	DESCRIPTION
L-B-NSTC	E	no struct/union referenced by	The left side of the expression is neither a structure nor a union.
L-B-NSUE	E	no struct/enum/union types for	This operator does not allow structured types.
L-B-NTKS	E	no segments for task	The shown task contains no physical segments.
L-B-NTP	E	no type information	The operands have no type information.
L-B-NTSK	E	no task for PC=	None of the assigned address spaces of the task matches the given PC value.
L-B-NUSP	E	no struct/union pointer	The expression left of '->' is not a structure or union pointer.
L-B-OBNM	E	module not found	The shown module name is not found in the internal list of loaded modules.
L-B-OJRD	E	object-format-error	The shown object file is corrupt and cannot be read in by the debugger correctly.
L-B-ONEP	E	procedure in epilogue	The end of the procedure is reached already.
L-B-OPBD	E	can't open	The mentioned boundfile cannot be opened. This file contains the symbol and debug information.
L-B-OPOJ	E	can't open object file	The shown object file cannot be opened.
L-B-OVFL	W	near pointer overflow	The given near pointer with its offset exceeds a 16 bit value.

CODE	CLASS	TEXT	DESCRIPTION
L-B-PDIR	E	illegal PAGE-direction	The direction word after the PAGE command is not allowed in HLL-mode.
L-B-PRFM	E	bad format specification	The shown format string is not valid.
L-B-PRMA	E	missing argument expression	The PRINT command is called with less argument expressions than required in the given format string.
L-B-PRTEX	W	protfile already exists	The protocol file exists already. Confirm overwriting.
L-B-PRTOP	E	can't open protfile	The mentioned file cannot be opened. Check its name and your access privileges.
L-B-PSUB	E	illegal pointer subtraction	The two pointers cannot be subtracted because they point to different types.
L-B-RGGP	E	no CPU register	This register is not a general purpose CPU register.
L-B-RGNV	E	register not valid	This register is not accessible now.
L-B-RGSE	E	can't set value of	This register cannot be modified by the debugger.
L-B-RGSH	E	can't show value of	This register cannot be shown by the debugger.
L-B-RGSZ	E	illegal register size	The mentioned register cannot be entered with this size parameter.

CODE	CLASS	TEXT	DESCRIPTION
L-B-RLSZ	E	size of expression exceeds buffer limit	The result of an expression is too big. It is probably a very big structure in an expression.
L-B-RLVO	E	value of VOID ?	A value of a void type expression is requested.
L-B-RMAP	E	register not accessible	The symbol is located in a register. The value of this register is currently saved at an unknown position at the stack.
L-B-RNOV	W	range-selection overflow	The selected range of index values exceeds the number of elements of this array.
L-B-RSNE	E	too deep nested stack	The runtime stack is nested too deeply. The internal buffer for tracking the stack-frame is filled completely.
L-B-SCCM	E	no current module	There is no module currently used.
L-B-SCCP	E	no current procedure	There is no procedure currently used.
L-B-SCID	E	no valid identifier	This expression is not a valid identifier for the command SET SCOPE.
L-B-SCLN	E	line number too high	The given line number is outside the module.
L-B-SCNE	E	scope stack deeply nested	The dynamic stack of local symbol tables overflows. There are currently too many active procedures.

CODE	CLASS	TEXT	DESCRIPTION
L-B-SCNL	E	no current line	The program is not at a correct source line.
L-B-SCNM	E	no such module	This module is not found in the debug tables.
L-B-SCNP	E	no procedure	The mentioned procedure name is not in the given module.
L-B-SCNR	E	no global scope	The debugger is not located at any debug information.
L-B-SGNF	E	segment not found	The given address is not included in the segment list.
L-B-SHAL	E	level too high	The requested scope level is higher than the current level of the program.
L-B-SHMA	E	expression not addressible	The result of the expression in not located in memory.
L-B-SHMO	E	no such module	The issued module name cannot be found in the debug tables.
L-B-SHMR	E	expression evaluated to register	The result of the expression is located in a register.
L-B-SMBO	W	already at bottom	The source window already displays the last lines of this module.
L-B-SMBT	W	can't go down	The source window cannot be moved down so many lines. The debugger goes to the last line.
L-B-SMLE	W	already at left border	The source window already displays the first column.

CODE	CLASS	TEXT	DESCRIPTION
L-B-SMLN	W	can't go to	The source window cannot be moved to that line. The debugger goes to the last line.
L-B-SMTO	W	already at top	The source window already displays the first lines of this module.
L-B-SMTP	W	can't go up	The source window cannot be moved up so many lines. The debugger goes to line 1.
L-B-SRNF	E	string not found	The shown pattern was not found in the current source file.
L-B-STFR	E	Corrupt stack-frame at	An illegal return-address is fetched during a walk through the dynamic procedure link on the stack.
L-B-STOP	E	unrecognized option	This option is no valid argument for the command SET OPTION.
L-B-STSB	E	on top of stack	The symbolic scope is already on top of stack.
L-B-STSC	E	not on active stack	The symbolic scope is not at any of the currently active procedures. Use the command SET SCOPE/CURRENT to get back on the active frame, and then you can use /UP and /DOWN.
L-B-STSE	E	move scope not implemented	This command is currently not usable.

CODE	CLASS	TEXT	DESCRIPTION
L-B-STSM	E	procedure not in current module	The given procedure is not in the current module.
L-B-STSR	E	relative scope changes not allowed in assembler	The relative changes of scope with /UP and /DOWN are not allowed in language assembler.
L-B-STST	W	on bottom of stack	The symbolic scope has reached the lower end of the stack frame.
L-B-STSZ	E	illegal size	The qualifier of the size option is illegal.
L-B-STTR	W	Unable to track call-frames, stop unwind	The current frame cannot be unwinded. The loop is stopped, thus not all procedures are currently visible on stack.
L-B-SVCO	E	set value of a constant expression only in assembler	Set value of a constant expression is possible in language assembler only.
L-B-SYBA	W	address not resolved	The address lies outside of any known memory region.
L-B-SYMB	E	symbol not found	The symbol is not found in the requested scope. Possibly the name is wrong or the path name specification is insufficient.
L-B-SYNA	E	symbol not addressible	The symbol is not reachable at this state of the debugger scope view.

CODE	CLASS	TEXT	DESCRIPTION
L-B-SYTY	W	no type information for, 'int' assumed	The issued symbol references to an unknown type. This is a problem of the debug information writer in the compiler. The debugger assumes an integer type for this symbol.
L-B-TID	E	invalid task-id#	The shown task-id# is invalid. Only numbers greater or equal to zero are allowed.
L-B-TKCP	E	capture task failed	An attempt to get the shown task under control of the debugger failed again.
L-B-TKEC	E	unmonitored exception	The shown exception is detected by the hardware interface but the debugger does not control it.
L-B-TKEN	E	invalid exception code	The shown exception code issued by the hardware interface is illegal. Check your monitor.
L-B-TKER	E	task	This task cannot be continued because it is in error state. Terminate this task and restart it.
L-B-TKID	E	no such task-id available	The requested task-id is not known by the debugger.
L-B-TKIF	E	INFO about task needed	Neither a task name nor arguments exists.
L-B-TKIN	E	invalid command	The requested command is not allowed for this task.

CODE	CLASS	TEXT	DESCRIPTION
L-B-TXNR	E	no running task	There is no monitored running task; thus no active stack frame can be shown.
L-B-TYFX	E	cannot fixup typename	The shown type name is referenced, but its definition is not found in any debug table.
L-B-TYMK	E	can't construct this type	This type cannot be generated internally by the debugger.
L-B-UDTY	E	undefined type	The shown type is referenced but not defined.
L-B-UPLNM	E	can't build upload-file name	The shown file name cannot be converted to an upload-file name.
L-B-UPLOP	E	can't open file	The mentioned file cannot be opened. Check its name and your access privileges.
L-B-VART	E	variable return offset	The return address offset is variable and there is no prologue information about this function available.
L-B-ZSTY	E	zero sized type	The shown type occupies 0 bytes of memory.
M-D-BAOP	E	can't open BATCH file	This file cannot be read. Check its name and your permissions.
M-D-FMIOE	E	Disk-i/o error no-#	The disk-i/o system interface detects an error.
M-D-FMIOW	E	Disk-i/o warning no-#	The disk-i/o system interface detects a warning.

CODE	CLASS	TEXT	DESCRIPTION
M-D-IONE	E	too deeply nested input	Your input sources (BATCH-file, MACROS) are nested too deeply.
M-H-HEAM	E	ambiguous topic name	The input string matches more than one help topic. Supply more characters.
M-H-HEFM	E	HELP-file format error	The help file is corrupt. Check your disk and restore it.
M-H-HEIN	E	can't setup HELP	The help feature cannot be started. Check the correctness of your help file.
M-H-HEOP	E	can't open HELP file	The help file cannot be opened. Check your installation or disk.
M-H-HEUN	E	unknown topic	This topic is not found in the help tables.
M-I-HICM	E	illegal history command	This command is not allowed in HISTORY mode. Consult your manual.
M-I-HIDL	E	delete history /ID=	The deletion of the history member with <id> failed.
M-I-HIID	E	no command word	The entered string is not a command word.
M-I-HIOP	E	can't open help file	The help-test database cannot be opened.
M-M-CLAC	E	read/write-access denied	The shown device cannot be used for read- and write-i/o.
M-M-CLOK	W	Target i/o redirected to	The target in-/output is redirected to the shown device.

CODE	**CLASS**	**TEXT**	**DESCRIPTION**
M-M-MABE	E	error in creating debug file name	The input file name cannot be modified to the name of the debug file. Check path name and length of file name.
M-M-MACV	E	preprocessing debug info failed	The preprocessor for the input file failed. Check your permissions and disk quota.
M-M-MAIT	W	target not initialized	The target initialization is not possible.
M-M-MALO	E	error in initialization	The internal set-up of the debugger fails.
M-M-MASU	E	error in setup	The basic set-up of the debugger with the configuration file failed.
M-M-MINF	E	too many input files	The debugger was started with too many input images.
M-M-MSDI	E	too many source directories	The limit of search directories for source directories is exceeded.
M-M-NCTK	E	no attached task	The debugger has no current attached task.
M-M-PWAP	E	absolute path needed in spite of	The call of **XDB** needs an absolute pathname.
M-M-PWCF	E	create password file	The password file cannot be opened for writing. Check the permissions.
M-M-PWDL	E	missing security key ...	The security mechanism is corrupted.

CODE	CLASS	TEXT	DESCRIPTION
M-M-PWHI	E	get host identification	The id of the host system **XDB** currently runs on cannot be read.
M-M-PWIL	E	too long input	The input line was too long.
M-M-PWKY	E	make key path	The path to the **XDB license** file cannot be made.
M-M-PWLF	E	create lock file	The lock file cannot be opened for writing. Check the permissions.
M-M-PWLK	E	make lock path	The path to the lock directory cannot be made.
M-M-PWNP	W	path not found	The path to **XDB** was not found.
M-M-PWOL	E	open lock directory	The lock directory was not found.
M-M-PWWF	E	write to password file	Write error on password file. Check disk quota.
M-M-SMVN	W	file-version not available, '0' assumed	The shown file is not accessible with the original version number.
M-M-TCLI	E	can't redirect XDB and CHILD output	Only one of them can be redirected to another in/out-device.
M-M-TLAC	E	read/write-access denied	The shown device cannot be used for read- and write-i/o.
M-M-TLOK	W	Debugger i/o redirected to	The in-/output of **XDB** is redirected to the shown device.

CODE	**CLASS**	**TEXT**	**DESCRIPTION**
U-E-AGREG	E	CPU register expected	The second parameter of an indirect addressing mode has to be a register.
U-E-AILL	E	illegal expression	The input string does not form a legal assembler expression.
U-E-AIREG	E	index-register required	A register is required which is suitable for an indexed addressing mode.
U-E-AMISS	E	missing	Supply it.
U-E-ARPAR	E	missing ')'	A ')' is missing. Supply it.
U-E-CID	E	identifier required	A C-Identifier is necessary at this point of the expression.
U-E-CMA	E	',' expected, not	The ',' is missing between two expressions in an argument list.
U-E-CNUN	E	no unary	The shown string does not form a unary expression.
U-E-CRBR	E	']' expected	The closing ']' is missing after an array index.
U-E-CRPAR	E	missing ')'	The closing ')' is missing after an expression.
U-E-EP	E	wrong identifier path name	An identifier can be prefixed by a path name which selects an other scope as the default. The path name consists of identifiers, level numbers and ' ' characters only.

CODE	CLASS	TEXT	DESCRIPTION
U-E-EXPR	E	missing expression, not	An expression was expected during reading of an argument list.
U-E-FCOM	E	COMMON block member expected	An identifier containing a common block member name is required.
U-E-FNUN	E	no unary	The shown string does not form a unary expression.
U-E-FOLWORD	E	invalid command	The entered word is not allowed.
U-E-FOPER	E	unknown F77 operator	This string does not match any F77 operator.
U-E-FRPAR	E	')' expected	The closing ')' after a FORTRAN expression is missing.
U-E-LNR	E	line number expected	A number constant for an @LINE expression is needed.
U-E-LNV	E	@LINE or @LEVEL expected	The expression allows a line number or level number only.
U-E-LV	E	level number expected	A number constant used as level is requested.
U-E-NCMA	E	missing argument separator	The ',' is missing between two expressions of an argument list.
U-E-OPTL	E	operator name too long	The name of the given operator exceeds 7 characters.
U-E-PID	E	identifier expected	This is not an identifier name.
U-E-PNUN	E	no unary	The shown string does not form a unary expression.

CODE	CLASS	TEXT	DESCRIPTION
U-E-PRBR	E	']' expected	The closing ']' is missing after an array index.
U-E-PRPAR	E	')' expected	The closing ')' after a PASCAL expression is missing.
U-E-REGI	E	invalid register	This name is no CPU general purpose register of the target processor.
U-E-TLP	E	too many path prefixes	The path specification of an identifier contains more than the allowed specifications of module, procedure and level.
U-E-XID	E	identifier required	A C-Identifier is necessary at this point of the expression.
U-E-XNUN	E	no unary	The shown string does not form a unary expression.
U-E-XRBR	E	')' expected	The closing ')' is missing after an array index.
U-E-XRPAR	E	missing ')'	The closing ')' is missing after an expression.
U-L-CHRDEL	E	char-const delimiter missing	A character constant has to be enclosed in single quotes.
U-L-EOI	E	unexpected End-of-Input on	The end-of-input condition was set by the mentioned input source. Check the source, e.g. a truncated BATCH-file or a corrupt MACRO-body definition.

CODE	CLASS	TEXT	DESCRIPTION
U-L-ICHAR	E	invalid number-prefix	The prefix of a numeric-constant is not the regular prefix for OCTAL (0) or HEXADECIMAL (0x,$) numbers.
U-L-IDTOL	E	identifier too long	An identifier name longer than 79 characters was entered.
U-L-NONASC	E	non-ASCII char	A value larger than 7 bits was read from the input. Only values between 0 and 127 are allowed (ASCII-character set). Possibly an unmonitored function/control key or a mouse button was pressed.
U-L-NTOL	E	number too long	A numberic-string longer than 79 characters was entered.
U-L-STRNT	E	unterminated string-constant	The delimiter character "" is missing. Supply one.
U-L-STRTL	E	string-constant too long	A string constant longer than 79 characters was entered.
U-L-UPBOF	F	input-overflow	An overflow of the internal input-buffer occurs during scanning the actual input line.
U-M-MAAI	E	Wrong parameter number	The shown number is not in the range of the called argument parameter list.
U-M-MADF	E	Macro already defined	The issued macro name is used already.
U-M-MANA	E	Too many arguments passed	The issued macro is called with an improper count of arguments.

CODE	CLASS	TEXT	DESCRIPTION
U-M-MANF	E	Macro not defined	The issued macro is not defined. There is no deletion possible.
U-M-MARD	W	Macro redefined	This macro is redefined. The old definition is lost.
U-M-NIMA	E	Not an immediate addressing mode	The shown expression does not form an immediate addressing mode.
U-M-SPC	E	illegal CPU-space qualifier	The shown name does not specify any legal addressing space of the processor.
U-M-SPTK	E	illegal SPAWN argument	The given string is not allowed as argument to SPAWN; enclose it in double quotes.
U-M-SPTL	E	too long argument list	The maximal size of an argument list for SPAWN is exceeded.
U-P-AMBK	E	Ambiguous keyword	The shown string is too short. This string matches to more than one keyword. Supply more characters.
U-P-CUGOTO	E	bad label name	This is not a correct label specifier. An alphanumeric name is needed.
U-P-EXIT	E	misplaced EXIT	The EXIT call is allowed on WINDOW-input level only.
U-P-FLAB	E	not in BATCH-File	Labels are allowed in BATCH-input mode only.
U-P-IFNEX	E	missing expression	The boolean expression is missing.

CODE	CLASS	TEXT	DESCRIPTION
U-P-IFRET	E	dangling END-if	End-of-input is reached inside the IF-body. Check the input.
U-P-IFTHE	E	THEN expected	The keyword THEN is necessary at this point of input.
U-P-IFTHP	E	END expected	The keyword END is necessary to terminate the action list of a true/false node in an IF construct.
U-P-ILLEX	E	illegal expression	The entered string does not form an expression in the current input language.
U-P-ILLRW	E	illegal keyword	The entered word is no keyword.
U-P-ILLTK	E	illegal keyword	This keyword is not allowed here. Look at your manual for the correct syntax.
U-P-INLAB	E	label already defined	A label can be defined only once.
U-P-MLAB	E	too many labels	Too many labels are defined. Reduce your input.
U-P-NHIST	E	no history	The command HISTORY is allowed on WINDOW-level only.
U-P-NOFILE	E	missing BATCH-file name	The name of the batchfile is missing.
U-P-NREG	E	not a register-name	This is not a name of any of the target CPU registers.
U-P-NSTR	E	no BATCH-file name	The entered string is not a string constant.

CODE	CLASS	TEXT	DESCRIPTION
U-P-SELIL	E	not a language name	This is not an identifier for an XDB language name.
U-P-TNRET	E	missing END	The END keyword is necessary to terminate the optional action list of the BREAKPOINT or WATCHPOINT command.
U-P-UEOC	E	unexpected EOF by	The last read word signals improper command completion. Review your input.
U-P-UFLAB	E	unbalanced labels	The BATCH-File contains undefined label references.
U-P-UNID	E	not a label	This is neither a LABEL nor a keyword.
U-P-WHNEX	E	missing WHEN-expression	The WHEN expression is missing.
U-P-WHRET	E	bad WHILE construct	A WHILE construct terminates incorrectly.
U-P-WHTHE	E	THEN missing	The THEN keyword must precede any action list in a WHILE loop.
U-X-STOL	E	string constant too long	The shown quoted string is too long for the internal buffer of the debugger.
U-X-XAML	E	missing '(' after keyword ADDR	The ADDR-modifier needs parantheses '(' and ')'.
U-X-XIMC	E	illegal mode conversion	A mode-conversion is not possible here.

CODE	CLASS	TEXT	DESCRIPTION
U-X-XIMO	E	illegal mode name	The shown name is not a mode name for type conversions.
U-X-XNDL	E	missing ''' after number constant	A numeric constant with prefix must be enclosed in single quotes.
U-X-XNLP	E	no '(' allowed	The left parenthesis is not allowed here.
W-I-EOF	E	unexpected EOF in	The source file does not contain as many lines as expected.
W-I-EXMX	E	reached maximum of monitored expressions 61	The limit of 61 expression for monitoring expression is reached
W-I-IEMR	W	end of module reached	The end of the module and all its includes are reached.
W-I-IGDS	E	get include file	The include file for the given line is not found.
W-I-INLF	E	line not found	The given line number is not found in the file.
W-I-ISDS	E	yet no source line read	Until now, the debugger has not read line information of the given file.
W-I-MOMD	W	source module	The shown source module has a modification time which is newer than the debugged image.
W-I-NOMAC	E	unknown macro	An unknown macro name was entered in the emulator window.

CODE	CLASS	TEXT	DESCRIPTION
W-I-WENASC	E	non-ASCII char	A value larger than 7 bits was read from the input to the emulator window. Only values between 0 and 127 are allowed (ASCII-character set). Possibly an unmonitored function/control key or a mouse-button was pressed.
W-I-WENESC	E	wrong escape sequence	The read string is no valid escape sequence in the emulator window.
W-I-WETOL	E	macro identifier too long	A macro identifier name longer than 79 characters was entered in the emulator window.
W-I-WILM	E	negative line number	Line numbers must be greater or equal to zero.
W-I-WINA	E	no ASSEMBLER window displayed	The assembler window is not displayed at the moment.
W-I-WINE	E	no EVALUATION window displayed	The evaluation window is not displayed at the moment.
W-I-WINH	E	no HISTORY window displayed	The history window is not displayed at the moment.
W-I-WINI	E	no terminal associated	There is no terminal associated with the job.
W-I-WINR	E	unresizable window	This window has fixed geometry. No resize is allowed.
W-I-WINT	E	no TRACE window displayed	The trace window is not displayed on the screen.

CODE	CLASS	TEXT	DESCRIPTION
W-I-WIRE	E	can't move	The requested positions would move the window border to invalid positions.
W-I-WIRS	E	not enough lines for REGISTERS	The register window cannot be displayed because the screen is occupied by other windows. Use the RESIZE command.
W-I-WISF	E	can't open source file	The source file which name is stored in the debug information, cannot be opened. Check your permission and the path name. Use the -D option to add alternative path names.
W-I-WISL	E	can't access line	The line cannot be read from the source file.
W-I-WISM	E	can't set scrollmode for	The scroll mode (continue/page) is not selectable for all windows. Look at the manual for a list of allowed windows.
W-I-WISU	E	window setup	The basic window setup failed. Look at your configuration files.
W-I-WRLR	E	resize left/right only	This window border can be moved left or right only.
W-I-WRUD	E	resize up/down only	This window border can be moved up or down only.
W-W-HIID	E	illegal history-id	The shown number is an illegal id-number.
W-W-WAED	E	editor:	The command line editor has encountered an error.