TEXAS INSTRUMENTS

TMS320C5x Evaluation Module

Getting Started Guide

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Installing the EVM and the Debugger

This book helps you install the TMS320C5x evaluation module (EVM) C source debugger on a PC running MS-DOS™, PC-DOS™, or Windows™ When you complete the installation, turn to the *TMS320C5x C Source Debugger User's Guide.*

Topic **Page**

1 System Requirements

To install and use the ’C5x EVM and C source debugger, you need the items listed in the following hardware and software checklists.

Hardware requirements

☐	**Host**	32-bit x 86-based or Pentium™ PC with a hard-disk system and a CD-ROM drive.
☐	**Memory**	Minimum of 640K bytes; in addition, if you are running under Windows 3.x, you will need at least 256K of extended memory.
☐	**Display**	Monochrome or color monitor (color recommended)
☐	**Slot**	One 16-bit slot
☐	**EVM board power requirements**	Approximately 1.5 amperes @ 5 volts (15 watts)
☐	**Optional hardware**	Microsoft™-compatible mouse
☐		EGA- or VGA-compatible graphics display card and a large (17” or 19”) monitor. The debugger has several options that allow you to change the overall size of the debugger display. To use a larger screen size, you must invoke the debugger with an appropriate option. For more information about options, see the invocation section in the *TMS320C5x C Source Debugger User’s Guide.*

Software requirements

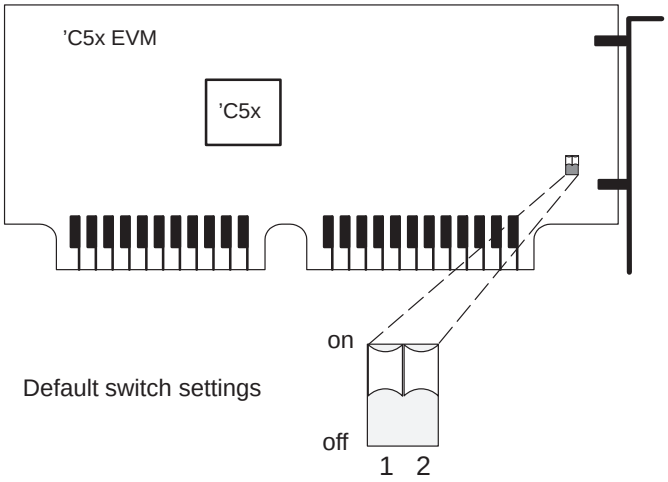
☐	**Operating system**	MS-DOS or PC-DOS (version 3.0 or later) Optional: Windows (version 3.0 or later)
☐	**Software tools**	TMS320 fixed-point family DSP (’C1x/’C2x/’C2xx/’C5x) assembler and linker Optional: TMS320C2x/’C2xx/’C5x C compiler
☐	**Required files included with the debugger package**	*evmrst.exe* resets the EVM
☐	**Optional files included with the debugger package**	*evminit.cmd* is a file that contains debugger commands that define a ’C5x memory map. When you first start using the EVM, this memory map should be sufficient for your needs. Later, you may want to define your own memory map. For information about setting up your own memory map, see the *TMS320C5x C Source Debugger User’s Guide.*
☐		*init.clr* is a general-purpose screen configuration file. If this file is not present when you invoke the debugger, the debugger uses the default screen configuration.
☐		The default configuration is for color monitors; an additional file, *mono.clr*, can be used for monochrome monitors. When you first start to use the debugger, the default screen configuration should be sufficient for your needs. Later, you may want to define your own custom configuration. For information about these files and about setting up your own screen configuration, see the *TMS320C5x C Source Debugger User’s Guide.*

2 Preparing the EVM Board for Installation

The EVM board has two switches that identify your system's I/O address space. Before you install the EVM board, you must be sure that the board's switches are set to correctly identify the I/O space that the board can use. You can change these switch settings to identify the I/O address space that the EVM uses in your system.

Figure 1 shows where these switches are on the EVM board and identifies the switch numbers.

Figure 1. EVM Board I/O Switches



The switches are shipped in the default settings shown here and described in Table 1. If you use an I/O space that differs from the default, change the switch settings. Table 1 shows you how to do this.

In most cases, you can leave the switch settings in the default position. However, you must ensure that the EVM I/O address space does not conflict with other bus settings. For example, if you have installed a sound card in your system, you may not be able to use the default switch settings for the I/O address space—the sound card might use this space.

See your PC technical reference manual and your other hardware-board manuals to determine if there are any I/O space conflicts. If you find a conflict, use one of the settings in Table 1.

Table 1. EVM Board Switch Settings

		Switch #	
	Address Range	**1**	**2**
default	0x0240–0x025F	on	on
	0x0280–0x029F	on	off
	0x0320–0x033F	off	on
	0x0340–0x035F	off	off

Some of the other installation steps require you to know which switch settings you used. If you reset the I/O switches, note the modified settings here for later reference.

Table 2. Your Switch Settings

	Switch #	
Address Range	**1**	**2**

3 Placing the EVM Board Into Your PC

After you have prepared the EVM board for installation, follow these steps to place it into your PC.

Minimizing Personal Injury

To minimize the risk of personal injury, *always* turn off the power to your PC and unplug the power cord before installing the EVM board.

Step 1: Turn off your PC's power and unplug the power cord.

Step 2: Remove the cover of your PC.

Step 3: Remove the mounting bracket from an unused 16-bit slot.

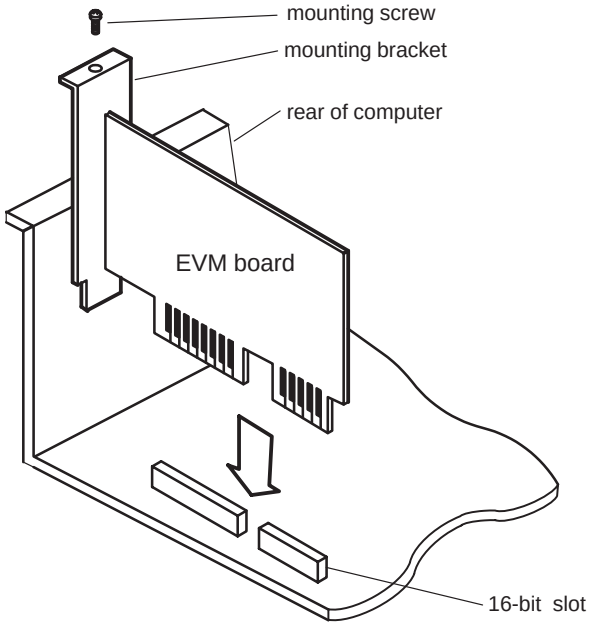
Step 4: Carefully but firmly push the EVM board into a 16-bit slot (see Figure 2).

Step 5: Return the mounting screw to the mounting bracket and tighten the screw (see Figure 2).

Step 6: Replace the PC cover.

Step 7: Plug in the power cord for your PC and turn on the PC's power.

Figure 2. Placing the EVM Board Into Your PC



4 Installing the Debugger Software

This section explains how to install the debugger software on a hard-disk system for two different operating systems:

- ❏ DOS
- ❏ Windows 3.1

Installing the debugger on DOS systems

To install the debugger on a DOS system, follow these steps:

1) Insert the debugger CD-ROM into your CD-ROM drive.
2) Change to the CD-ROM drive (replace *d* with the letter of your CD-ROM drive):

   `d:` ↵
3) Enter the following command:

   `install` ↵
4) Follow the on-screen instructions.

Installing the debugger on Windows 3.1 systems

To install the debugger on a Windows 3.1 system, follow these steps:

5) Insert the debugger CD-ROM into your CD-ROM drive.
6) Start Windows 3.1.
7) From the File menu, select Run.
8) In the dialog box, enter the following command (replace *d* with the letter of your CD-ROM drive):

   `d:\setup.exe`
9) Click on OK.
10) Follow the on-screen instructions.

5 Setting Up the Debugger Environment

You can define *environment variables* that set certain debugger parameters you normally use. An environment variable is a system symbol that you define and assign to a string. When you use environment variables, default values are set, making each individual invocation of the debugger simpler because these parameters are automatically specified.

The debugger uses environment variables for finding or obtaining certain types of information. The installation program either sets up the following environment variables or you can do it manually:

```
SET PATH=C:\c5xhll;%PATH%
SET D_DIR=C:\c5xhll
SET D_SRC=C:\c5xhll
```

If you choose not to have the environment variables set up for you, you can modify your autoexec.bat file to include the SET commands above.

The remainder of this section describes these environment variables and other variables that you can define.

Identifying the directory that contains the executable files (PATH statement)

You must include the debugger directory in your PATH statement. This allows you to specify the debugger executable without specifying the name of the directory that contains the executable file.

- If you modify your autoexec.bat file to change the path information, add the following to the end of the PATH statement:

  ;C:\c5xhll

- If you create your own batch file, use this format:

  SET PATH=C:\c5xhll;%PATH%

  Do not precede the equal sign with a space. The addition of **;%PATH%** ensures that this PATH statement does not undo the PATH statements in any other batch files (including the autoexec.bat file).

Identifying alternate directories for the debugger (D_DIR variable)

The debugger uses the D_DIR environment variable to name alternative directories that contain auxiliary files (evmrst, evminit.cmd, etc.) that the debugger needs. The command for assigning the environment variable is as follows:

SET D_DIR=C:\c5xhll

Do not precede the equal sign with a space.

Identifying directories that contain source files (D_SRC variable)

The debugger uses the D_SRC environment variable to name directories that contain program source files The command for assigning the environment variable is as follows:

SET D_SRC=*pathname1; pathname 2 . . .*

Do not precede the equal sign with a space. The *pathnames* are directories that contain program source files. You can separate pathnames with a semicolon or with blanks.

Setting default debugger options (D_OPTIONS variable)

You might find it useful to set default debugger options using the D_OPTIONS environment variable. When you use D_OPTIONS, the debugger uses the options or input filenames that you specify every time you run the debugger. The command for assigning the environment variable is as follows:

SET D_OPTIONS=[*object filename*] [*debugger options*]

Do not precede the equal sign with a space. This tells the debugger to load the specified object file and use the specified options each time you invoke the debugger. These are the options that you can identify with D_OPTIONS:

Option	Brief Description
–b[b]	Select the screen size
–i *pathname*	Identify additional directories for source files
–min	Select the minimal debugging mode
–p *port address*	Identify the port address (see *Identifying the correct I/O switches* on page 10)
–profile	Enter profiling environment
–s	Load the symbol table only
–t *filename*	Identify a new initialization file
–v	Load without the symbol table

Note that you can override D_OPTIONS by invoking the debugger with the –x option.

For more information about options, see the invocation instructions in the *TMS320C5x C Source Debugger User's Guide*.

Identifying the correct I/O switches

See your entries in Table 2 on page 5. If you did not modify the I/O switches, skip this subsection.

If you modified the I/O switch settings, you must use the debugger's –p option to identify the I/O space that the EVM is using. You can do this each time you invoke the debugger, or you can specify this information by using the D_OPTIONS environment variable. Table 3 lists the I/O switch settings and the appropriate line that you can add to the autoexec.bat file.

Table 3. Identifying I/O Address Space

	Switch #		
Address Range	**1**	**2**	**Add This Line**
0x0240–0x025F	on	on	None needed. This is the default value.
0x0280–0x029F	on	off	`SET D_OPTIONS=–p 280`
0x0320–0x033F	off	on	`SET D_OPTIONS=–p 320`
0x0340–0x035F	off	off	`SET D_OPTIONS=–p 340`

Note: I/O Address Space

1) The 'C5x EVM uses 96 bytes of the PC I/O space.

2) If you did not note the I/O switch settings, you may use a trial-and-error approach to find the correct –p setting. If you use the wrong setting, you will see this error message when you try to invoke the debugger:

```
CANNOT INITIALIZE THE EVM ! !
– Check I/O configuration
```

Running other host applications

If you plan to use the EVM for running other host applications (for example, a modem), you must first load a valid object file into the EVM. To do this, invoke the debugger and load the object file:

evm5x *filename*

Once you have entered the debugging environment and the object file has been loaded, exit the debugger:

```
quit ↵
```

At the DOS prompt, reset the EVM by entering the evmrst command:

```
evmrst ↵
```

If you modified the I/O switch settings, you must use the debugger's –p option to identify the I/O space that the EVM is using. You can do this each time you reset the EVM, or you can specify this information by using the D_OPTIONS environment variable (the evmrst command reads your autoexec.bat or initdb.bat file). You can override D_OPTIONS by entering evmrst followed by the –x option.

Notes:

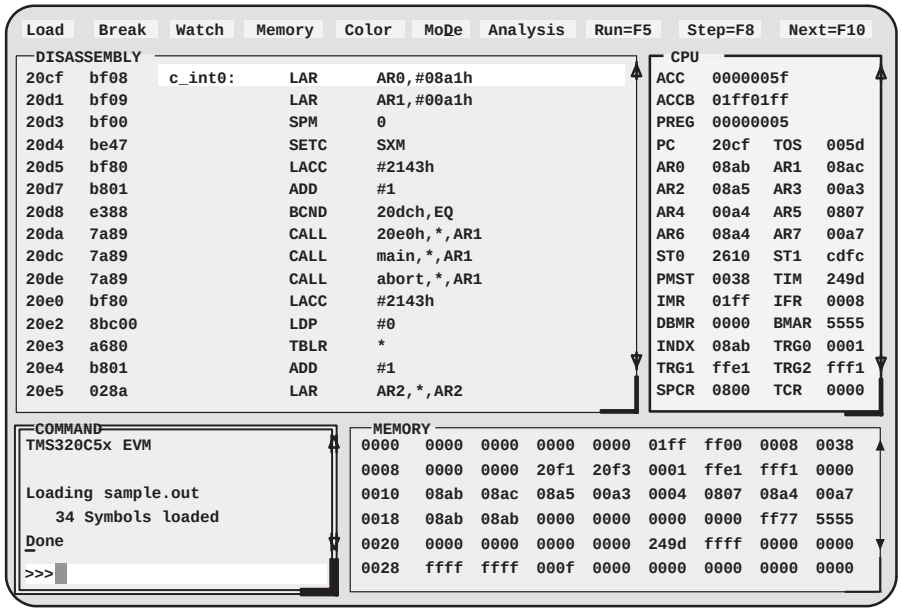
- Never reset the 'C5x EVM with evmrst unless you have first loaded a valid object file to the EVM.
- If you plan to use the debugger with the EVM, you do not need to reset the EVM with evmrst before invoking the debugger.

6 Verifying the Installation

To ensure that you have correctly installed the EVM and debugger software, enter this command at the system prompt:

evm5x c:\c5xhll\sample ↵

You should see a display similar to this one:



- ❑ If you see a display similar to this one, you have correctly installed your EVM and debugger.
- ❑ If you see a display and the lines of code show ADD instructions, your EVM board may not be installed snugly. Check your board to determine if it is correctly installed, and reenter the command above.
- ❑ If you see a display and the lines of code say *Invalid address* or the fields in the MEMORY window are shown in red, the debugger may not be able to find the evminit.cmd file. Check for the file in the directories specified by the D_SRC environment variable or ensure that the file is in the current directory. Reenter the command above.
- ❑ If you do not see a display, then your debugger or board may not be installed properly. Go back through the installation instructions and be sure that you have followed each step correctly; then reenter the command above.

Installation error messages

While invoking the debugger, you may see the following message:

```
CANNOT INITIALIZE THE EVM ! !
– Check I/O configuration
```

One or several of the following conditions may be the cause:

- ❏ Is the EVM board installed snugly?
- ❏ Did you use the –p option? Is your port address set correctly?
  - ■ Ensure the –p option used with the D_OPTIONS environment variable matches the I/O address defined by your switch settings. For information about the switch settings, see Section 2, *Preparing the EVM Board for Installation*, on page 4.
  - ■ Determine if you have a conflict in address space with another bus setting. If you have a conflict, change the switches on your board to one of the alternate settings. Modify the –p option of the D_OPTIONS environment variable to reflect the change in your switch settings.

After you have checked the above, repeat the verification instructions (see Section 6, *Verifying the Installation*, on page 12).

7 Using the Debugger With Windows 3.1

If you are using Windows 3.1, you can freely move or resize the debugger display on the screen. If the resized display is bigger than the debugger requires, the extra space is not used. If the resized display is smaller than required, the display is clipped. Note that when the display is clipped, it cannot be scrolled.

You should run Windows 3.1 in either the standard mode or the 386 enhanced mode to get the best results.