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TMS470R1x Emulator Software

Getting Started Guide

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Preface

Read This First

About This Manual

The book tells you how to install release 1.xx of the TMS470R1x emulator debugging tools on your system. It also does the following:

❑ Tells you how to set environment variables for parameters that you use often

❑ Gives helpful information for troubleshooting

❑ Gives information on new or changed features for this release of the emulator

How to Use This Manual

The goal of this book is to get you started using the emulator specifically designed for the TMS470R1x. Following are the topics covered in this getting started guide:

For information about …	**See** …
Installing the emulator, setting environment variables, and verifying the installation on Windows™ 3.1 systems	Chapter 1
Installing the emulator, setting environment variables, and verifying the installation on Windows NT™ systems	Chapter 2
Installing the emulator, setting environment variables, and verifying the installation on Windows™ 95 systems	Chapter 3
Installing the emulator, setting environment variables, and verifying the installation on a SPARCstation™	Chapter 4
Installing the emulator, setting environment variables, and verifying the installation on HP systems	Chapter 5
Workstation Troubleshooting	Appendix A
Installing the Emulator Device Driver Manually	Appendix B

Notational Conventions

This document uses the following conventions.

- The TMS470R1x family of processors is referred to as ’470.
- Program listings, program examples, and interactive displays are shown in a `special typeface` similar to a typewriter’s. Examples use a **`bold version`** of the special typeface for emphasis; interactive displays use a **`bold version`** of the special typeface to distinguish commands that you enter from items that the system displays (such as prompts, command output, error messages, etc.).

  Here is an example of a command that you might enter:

  ```
  cd /cdrom/hp
  ```

- In syntax descriptions, the instruction, command, or directive is in a **bold typeface** font and parameters are in an *italic typeface*. Portions of a syntax that are in **bold** should be entered as shown; portions of a syntax that are in *italics* describe the type of information that should be entered. Here is an example of a command syntax:

  PATH=C:\*pathname*$_1$**;***pathname*$_2$

  PATH is the command. This command has one parameter, indicated by *pathname*.

- Square brackets (**[** and **]**) identify an optional parameter. If you use an optional parameter, you specify the information within the brackets; you don’t enter the brackets themselves. Here’s an example of a command that has an optional parameter:

  emurst [*options*]

  This command allows you to specify one or more options.

Related Documentation From Texas Instruments

The following books describe the TMS470R1x and related support tools. To obtain a copy of any of these TI documents, call the Texas Instruments Literature Response Center at (800) 477–8924. When ordering, please identify the book by its title and literature number.

TMS470R1x Assembly Language Tools User's Guide (literature number SPNU118) describes the assembly language tools (assembler, linker, and other tools used to develop assembly language code), assembler directives, macros, common object file format, and symbolic debugging directives for the TMS470R1x devices.

TMS470R1x C Source Debugger User's Guide (literature number SPNU124) describes the TMS470R1x emulator and simulator versions of the C source debugger interface. This book discusses various aspects of the debugger interface, including window management, command entry, code execution, data management, and breakpoints. It also includes a tutorial that introduces basic debugger functionality.

TMS470R1x Optimizing C Compiler User's Guide (literature number SPNU119) describes the TMS470R1x C compiler. This C compiler accepts ANSI standard C source code and produces assembly language source code for the TMS470R1x devices.

TMS470R1x User's Guide (literature number SPNU134) gives a detailed description of the TMS470R1x RISC microcontroller: its architecture including registers, ICEBreaker module, and interfaces (memory, coprocessor, and debug), its instruction sets (both 16- and 32-bit), and electrical specifications.

XDS51x Emulator Installation Guide (literature number SPNU070) describes the installation of the XDS510™, XDS510PP™, and XDS510WS™ emulator controllers. The installation of the XDS511™ emulator is also described.

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This equipment is intended for use in a laboratory test environment only. It generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

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❑ Documentation

When making suggestions or reporting errors in documentation, please include the following information that is on the title page: the full title of the book, the publication date, and the literature number.

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Contents

Chapter 1

Installing the Debugger With Windows 3.1x

This chapter provides instructions for installing the C source debugger on a PC™ running Windows 3.1x. When you complete the installation, turn to the *TMS470R1x C Source Debugger User's Guide*.

To install the emulator controller, see the *XDS51x Emulator Installation Guide*, which is included in your kit.

Topic **Page**

1.1 System Requirements

To install the ’470 C source debugger and TMS470R1x emulator, you need the items in the following hardware and software checklists.

Hardware checklist

□	**System**	80386-, 80486, or Pentium™-based PC
□	**Memory**	4–16 Mbytes of free memory
□	**Disk space**	10 Mbytes available disk space for executables and libraries
□	**Display**	Color monitor
□	**Required hardware**	CD-ROM drive
□	**Optional hardware**	Microsoft™-compatible mouse
□	**XDS510 emulator controller**	XDS510™ or XDS510PP™ emulator controller

Note:

The speed at which your system operates depends on the amount of RAM available on your PC and the number of debuggers running simultaneously.

Software checklist

□ **Operating system**

Windows 3.1x

□ **Software tools**

TMS470R1x assembler and linker
Optional: TMS470R1x C compiler

Required files included with the debugger package

□ *emu470.exe* is the debugger executable file

□ *emurst.exe* resets the XDS510 emulator

□ *emurstpp.exe* resets the XDS510PP emulator

□ *board.dat* describes your target system to the debugger in terms of what devices are on the emulation scan path. The board.dat file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ *board.cfg* is a text file used to describe your target system to the debugger in terms of what devices are on the emulation scan path. The board.cfg file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ The *composer* utility allows you to convert your text board configuration file (board.cfg) into a format the debugger can read (board.dat). For the emulator to initialize properly, you must create a new board.dat file with this release of the composer or use the samples that are provided for you.

Optional files included with the debugger package

□ *emuinit.cmd* is a general-purpose batch file that contains debugger commands. The version of this file that is shipped with the debugger defines a ’470 memory map. When you first start using the debugger, 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 *TMS470R1x C Source Debugger User’s Guide*.

1.2 Step 1: Installing the XDS510 or XDS510PP Emulator Controller

Before installing the ’470 debugger software, you must install an XDS510 emulator controller: the XDS510 or XDS510PP.

Follow the instructions in the *XDS51x Emulator Installation Guide* to install the XDS510 emulator controller.

1.3 Step 2: Installing the Debugger Software

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

1) Insert the debugger CD-ROM into your CD-ROM drive.

2) Start Windows 3.1x.

3) From the File menu, select Run.

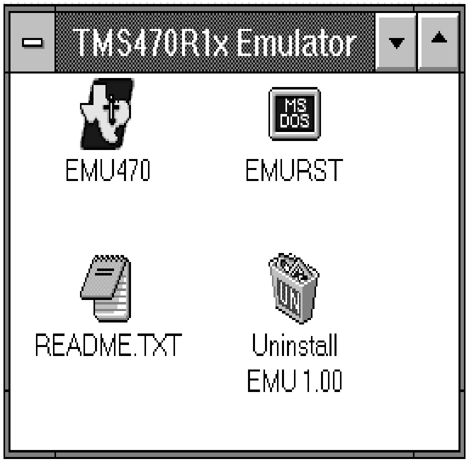
4) In the dialog box, enter the following command (replace d with the letter of your CD-ROM drive):

```
d:\setup.exe
```

5) Click on OK.

6) Follow the on-screen instructions.

The setup.exe program creates a program group for the TMS470R1x Emulator that looks similar to the following example:



1.4 Step 3: Setting Up a DLL File for Your XDS510 or XDS510PP

After you run the installation program (setup.exe), you must set up a DLL (dynamic link library) file for your XDS510 or XDS510PP. You can set up the smg510w.dll file for your XDS510 or XDS510PP by running a batch file, or you can do it manually.

- For the XDS510:
  - Run set510.bat. This file sets up the smg510w.dll file.

    or
  - Copy the smg510.xds file to the smg510w.dll file.
- For the XDS510PP:
  - Run set510pp.bat. This file sets up the smg510w.dll file.

    or
  - Copy the smg510.pp file to the smg510w.dll file.

1.5 Additional XDS510PP Setup

If you are using the XDS510PP, you need to complete the following:

❑ Check your BIOS (basic input/output system) to ensure that your printer is in one of the following modes:

EPP:	Enhanced printer port
SPP4:	4-bit unidirectional mode
SPP8:	8-bit bidirectional mode

EPP mode provides the best performance. If your BIOS offers the options *EPP+ECP* and *EPP+SPP*, select *EPP+SPP*. The *EPP+ECP* option is not supported. Note the port address of your printer.

❑ Edit the parameters in the xds510pp.ini file to match your system. The xds510pp.ini file contains parameters for the printer address, printer mode, and printer speed. Make sure the xds510pp.ini file is in the same directory as your debugger software. The following is a sample xds510pp.ini file:

```
port = 378
mode = EPP
speed = 10
```

Where:

- Port is the I/O address of your printer port.
- Mode is the printer port mode (EPP, SPP4, or SPP8).
- Speed is a delay parameter that may be required on some systems. Set this parameter to 10 initially. You can reduce this number once your XDS510PP is up and running.

Diagnostic files

The XDS510PP software includes diagnostic files that help you determine system information (see Table 1–1). Use these files if you have problems setting up your parallel printer port.

Table 1–1. Diagnostic Files

File	Purpose
smcmode.exe	Determines if your parallel printer port uses a port controller device manufactured by SMC.
–h	gives you more information about the options.
–r	resets the status register.
–m x	sets your printer port to mode *x* where: Mode 0: Standard bidirectional mode. Mode 1: EPP and SPP mode. Mode 2: ECP mode. Mode 3: ECP and EPP mode. Mode 4: Non bidirectional mode.
nscmode.exe	Determines if your parallel printer port uses a port controller device manufactured by National Semiconductor.
portchk.exe	Determines if your parallel printer port is bidirectional.

For more information about the smcmode.exe program, see Section 1.7, *Special Considerations When Resetting the XDS510PP*.

1.6 Step 4: 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 three environment variables: D_DIR, D_SRC, and D_OPTIONS.

By default, the installation program sets up these environment variables in your autoexec.bat file:

```
SET PATH=C:\EMU470;%PATH%
SET D_DIR=C:\EMU470;
```

If you choose not to have the environment variables set up automatically, you can modify your autoexec.bat file to exclude 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 emulator 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:\EMU470

❑ If you set the PATH statement from the command line, use this format:

  SET PATH=C:\EMU470;%PATH%

  (Be careful not to 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)

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

SET D_DIR=C:\EMU470

(Be careful not to precede the equal sign with a space.)

Identifying directories that contain source files (D_SRC)

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

SET D_SRC=*pathname1; pathname2 . . .*

(Be careful not to 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)

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

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

(Be careful not to 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. The options that you can identify with D_OPTIONS are listed on page 1-10.

These are the options you can identify with D_OPTIONS:

Option	Brief Description
–b[b]	Select the screen size.
–bl	Select screen length.
–bw	Select screen width.
–c	Clear the .bss section.
–f *filename*	Identify a new board configuration file.
–font *size*	Select font point size.
–i *pathname*	Identify additional directories.
–me	Select little-endian format.
–min	Select the minimal debugging mode.
–n *processor name*	Identify the processor for debugging (this processor name must match the processor name as stated in the configuration file).
–p *port address*	Identify the port address.
–profile	Enter the profiling environment.
–s	Load the symbol table only.
–t *filename*	Identify a new initialization file.
–v	Load without the symbol table.

Note: Overriding D_OPTIONS

You can override D_OPTIONS by invoking the debugger or emurst with the –x option.

For more information about options, see the invocation instructions in the *TMS470R1x C Source Debugger User's Guide*.

1.7 Step 5: Resetting the Emulator

You must reset your XDS510 or XDS510PP *before* invoking the debugger. A successful reset can occur only after you have powered up the target board. You can reset the emulator by adding one of the following commands to the autoexec.bat file:

XDS510: **emurst** [**–x**] [**–p** *port address*]

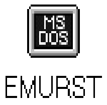
XDS510PP: **emurstpp** [**–x**]

The –x option tells the emurst/emurstpp utility to ignore any options specified with the D_OPTIONS environment variable.

The –p option identifies the port address.

When you want to reset your XDS510 or XDS510PP without rebooting your system, use the icons provided in the program group.

❑ To reset the XDS510 from Windows, click on the EMURST icon in the TMS470R1x Emulator program group.



❑ To reset the XDS510PP from Windows, click on the EMURSTPP icon in the TMS470R1x Emulator program group.

Note:

If the debugger is running, emurst/emurstpp will not reset the emulator. The debugger displays the following message:

```
RESET DISALLOWED : DEBUGGER RUNNING
```

If an error message appears after the emulator is reset, see Section 1.10, *Installation Error Messages*.

Special Considerations When Resetting the XDS510PP

You must reset your XDS510PP with the emurstpp command *before* invoking the debugger. After resetting the XDS510PP with the emurstpp command, you will see one of two messages.

- If you see the following message, the reset was successful:

  ```
  EMURST FOR THE XDS510PP VERSION 1.0
  XDS510PP IS RESET, HARDWARE VERSION 1
  ```

- If you see the following message, the reset was unsuccessful:

  ```
  EMURST FOR THE XDS510PP VERSION 1.0
  COMMUNICATIONS ERROR, OR POD HAS NO POWER
  ```

The smcmode command

If emurstpp does not reset your XDS510PP, it is possible that the printer port device in your computer and the SMC chip in the XDS510PP are confused during power cycles. Enter the following command:

smcmode –r ↵

If your computer has an SMC device, this command resets and initializes the device for proper operation.

The smcmode command works only if your computer uses an SMC printer port controller chip. To determine if your computer uses an SMC printer port controller chip, enter the following command with no parameters:

smcmode ↵

This command tells you if an SMC device is installed and lists the device's configuration.

1.8 Step 6: Describing Your Target System to the Debugger

In order for the debugger to understand how you have configured your target system, you must supply a file for the debugger to read. You can either use the default configuration file, *board.dat*, or create your own file.

❑ If you are using an emulation scan path that contains only one ’470 and no other devices, you can use the board.dat file that comes with the ’470 emulator kit. This file describes the single ’470 in the scan path and gives the ’470 the name tms470. Since the debugger automatically looks for a file called board.dat in the current directory and in the directories specified with the D_DIR environment variable, you don’t need to create your own board configuration file.

❑ If you want to use a different name for the target device or you want the debugger to recognize a different target configuration, you must follow these steps:

1) Create the board configuration file.
2) Use *composer* to translate the board configuration file to binary so that the debugger can read it.
3) Specify the target processor name as stated in the configuration file. This name is used with the *–n* option when invoking the debugger.

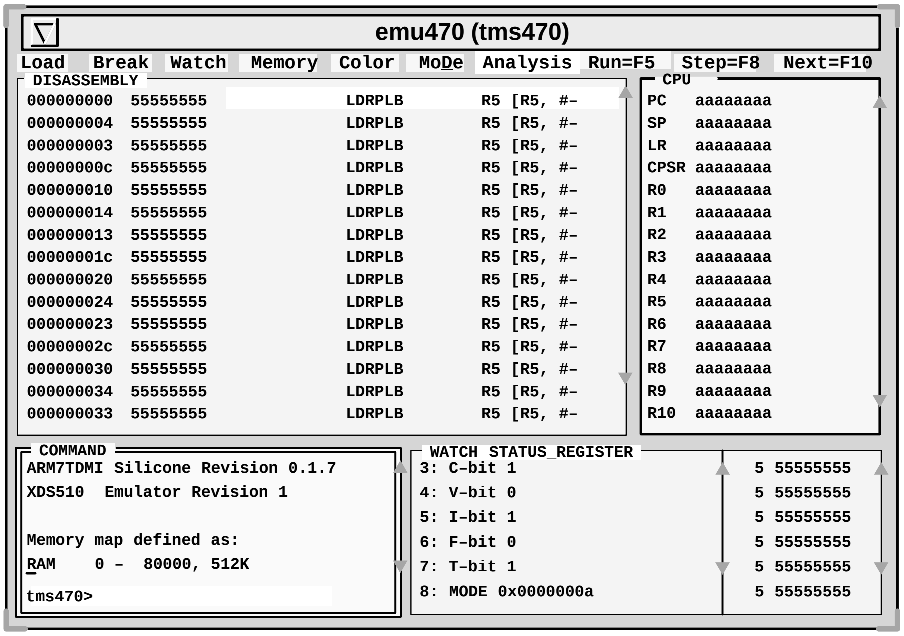
These steps are described in the *TMS470R1x C Source Debugger User’s Guide*.

1.9 Step 7: Verifying the Installation

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

emu470 –p *port address* –n tms470 ↵

You should see a display similar to this one:



```
000000000  55555555          LDRPLB        R5 [R5, #–
000000004  55555555          LDRPLB        R5 [R5, #–
000000003  55555555          LDRPLB        R5 [R5, #–
00000000c  55555555          LDRPLB        R5 [R5, #–
000000010  55555555          LDRPLB        R5 [R5, #–
000000014  55555555          LDRPLB        R5 [R5, #–
000000013  55555555          LDRPLB        R5 [R5, #–
00000001c  55555555          LDRPLB        R5 [R5, #–
000000020  55555555          LDRPLB        R5 [R5, #–
000000024  55555555          LDRPLB        R5 [R5, #–
000000023  55555555          LDRPLB        R5 [R5, #–
00000002c  55555555          LDRPLB        R5 [R5, #–
000000030  55555555          LDRPLB        R5 [R5, #–
000000034  55555555          LDRPLB        R5 [R5, #–
000000033  55555555          LDRPLB        R5 [R5, #–
```

```
PC   aaaaaaaa
SP   aaaaaaaa
LR   aaaaaaaa
CPSR aaaaaaaa
R0   aaaaaaaa
R1   aaaaaaaa
R2   aaaaaaaa
R3   aaaaaaaa
R4   aaaaaaaa
R5   aaaaaaaa
R6   aaaaaaaa
R7   aaaaaaaa
R8   aaaaaaaa
R9   aaaaaaaa
R10  aaaaaaaa
```

```
ARM7TDMI Silicone Revision 0.1.7
XDS510  Emulator Revision 1

Memory map defined as:
RAM    0 –  80000, 512K

tms470>
```

```
3: C–bit 1               5 55555555
4: V–bit 0               5 55555555
5: I–bit 1               5 55555555
6: F–bit 0               5 55555555
7: T–bit 1               5 55555555
8: MODE 0x0000000a       5 55555555
```

- ❏ If you see a display similar to this one, you have correctly installed your emulator and debugger.

- ❏ 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 emuinit.cmd file. Check for the file in the directories specified by the D_DIR environment variable or ensure that the file is in the current directory. Reenter the command above.

- ❏ If you don't see a display, 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.

1.10 Installation Error Messages

While invoking the debugger, you may see one of the following messages:

```
CANNOT INITIALIZE THE TARGET SYSTEM ! !
– Check I/O configuration
– Check cabling and target power
```

```
CANNOT DETECT TARGET POWER ! !
– Check I/O configuration
– Check cabling and target power
```

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

- Is the target power on?
- Is the XDS510/XDS510PP installed snugly?
- Is the device installed snugly?
- Is the cable connecting your emulator and target system loose?
- Is your target board getting the correct voltage?
- Is your emulator scan path interrupted? One or more devices on the emulator scan path may have been removed. Check the connections; either they are not connected, or they are connected improperly.
- Did you use the –n option? Was it used with an incorrect device name? You must supply a valid device name with the –n option.
- After you powered up the target board, did you execute the emurst/ emurstpp command? This command must be executed *after* you powered up the target board.

❑ Did you use the –p option? Is your port address correct (XDS510 only)?

  ■ Check to be sure 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 the XDS510 installation instructions in the *XDS51x Emulator Installation Guide.*

  ■ Check to see 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 alternative settings. Modify the –p option of the D_OPTIONS environment variable to reflect the change in your switch settings.

❑ Is the board.dat file in the current directory or in a directory specified by D_DIR?

After you have checked all of the above, repeat the verification instructions on page 1-14.

Chapter 2

Installing the Debugger With Windows NT

This chapter provides instructions for installing the C source debugger on a PC running Windows NT™. When you complete the installation, turn to the *TMS470R1x C Source Debugger User's Guide*.

To install the emulator controller, see the *XDS51x Emulator Installation Guide,* which is included in your kit.

Topic **Page**

2.1 System Requirements

To install the ’470 C source debugger and TMS470R1x emulator, you need the items in the following hardware and software checklists.

Hardware checklist

□	**System**	32-bit x86- or Pentium-based PC with an ISA/EYES, VESA local, or PCI bus.
□	**Memory**	4–16 Mbytes of free memory
□	**Disk space**	10 Mbytes available disk space for executables and libraries
□	**Display**	Color monitor
□	**Required hardware**	CD-ROM drive
□	**Optional hardware**	Microsoft-compatible mouse
□	**XDS510 emulator controller**	XDS510 emulator controller

Software checklist

□ **Operating system** Windows NT version 3.5 or higher

□ **Software tools** TMS470R1x assembler and linker
Optional: TMS470R1x C compiler

Required files included with the debugger package

□ *emu470.exe* is the debugger executable file

□ *emurst.exe* resets the XDS510 emulator

□ *board.dat* describes your target system to the debugger in terms of what devices are on the emulation scan path. The board.dat file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ *board.cfg* is a text file used to describe your target system to the debugger in terms of what devices are on the emulation scan path. The board.cfg file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ The *composer* utility allows you to convert your text board configuration file (board.cfg) into a format the debugger can read (board.dat). For the emulator to initialize properly, you must create a new board.dat file with this release of the composer or use the samples provided for you.

Optional files included with the debugger package

□ *emuinit.cmd* is a general-purpose batch file that contains debugger commands. The version of this file that is shipped with the debugger defines a ’470 memory map. When you first start using the debugger, 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 *TMS470R1x C Source Debugger User’s Guide*.

2.2 Step 1: Installing the XDS510 Emulator Controller

Before installing the ’470 debugger software, you must install the XDS510 emulator controller.

Follow the instructions in the *XDS51x Emulator Installation Guide* to install the XDS510 emulator controller.

2.3 Step 2: Installing the Debugger Software

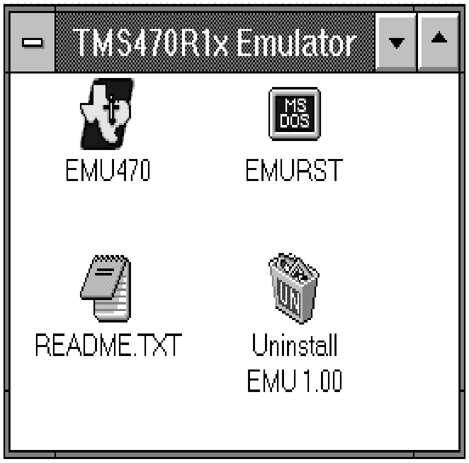
To install the debugger on a Windows NT system, follow these steps:

1) Insert the debugger CD-ROM into your CD-ROM drive.
2) Start Windows NT.
3) From the File menu, select Run.
4) In the dialog box, enter the following command (replace d with the letter of your CD-ROM drive):

```
d:\setup.exe
```

5) Click on OK.
6) Follow the on-screen instructions.

The setup.exe program creates a program group for the TMS470R1x Emulator that looks similar to the following example:



2.4 Step 3: Installing the Emulator Device Driver

You must install the emulator device driver, genport.sys, in the Windows NT registry to enable the debugger to communicate with the emulator. To install the emulator device driver, you can use the regdrv.exe driver installation program. The regdrv.exe program is stored in the emu470\drivers subdirectory of the emulation software and performs the following tasks:

- ❑ Copies genport.sys to the Windows NT drivers directory. In most cases, this directory is C:\WINDOWS\SYSTEM32\DRIVERS or C:\WINNT35\SYSTEM32\DRIVERS. However, the directory name may be different on your system.
- ❑ Registers the genport.sys parameters in the Windows NT registry.

> **Note:**
>
> The Windows NT registry (also referred to as the configuration registry) serves as a repository for all information about the computer hardware that the Windows NT operating system is running on, the software installed on the system, and the users of the system. Device drivers, applications, and users can also place information in the registry and can later query the registry for the information they need.

To install the the emulator device driver, genport.sys, follow these steps:

1) Set your current directory to the *driver* subdirectory where the emulator software is installed.

   For example, enter a command like the following:

   ```
   CD:\EMU470\DRIVER
   ```

2) Execute the driver installation program.

   ```
   regdrv.exe ↵
   ```

   The regdrv.exe program prompts you to enter the path to the directory where the genport.sys device driver is located. If you don’t enter a path, the regdrv.sys program searches the current directory.

3) To accept the default parameters, press enter.

   The regdrv.exe program prompts you to register the emulator driver parameters.

   ```
   <Y/N>
   ```

   - If you enter Y, the regdrv.exe program checks to see if the emulator driver is already installed. If it is, the regdrv.exe program prompts you to replace/update the driver with the new emulator driver.

   - If you enter N, the regdrv.exe program exits without updating the emulator driver parameters in the Windows NT registry.

4) To complete the installation, enter the following:

   Y ↵

   When the registration is complete, the regdrv.exe program displays the status of the registration.

5) Reboot your PC.

If you get error messages during the installation process, see the *Driver Installation Error Messages* subsection on page 2-7.

For information about installing the emulator device driver, see Appendix B, *Installing the Emulator Device Driver Manually*.

2.5 Step 4: Verifying the Emulator Device Driver Installation

To ensure that you have correctly installed the emulator device driver, follow these steps:

1) Turn off the power to the TMS470 target board.

2) Connect the JTAG cable to the TMS470 target board.

3) Turn on the power to the TMS470 target board.

   If a hard reset is not generated automatically after power up, apply a hard reset to the TMS470 device.

4) From the command prompt in an MS-DOS™ window, enter:

   `emurst` ↵

   If the port address has a value other than 240, you must use the –p option with the emurst command to specify the appropriate port address.

❑ If you see a message similar to the following, you have correctly installed the emulator device driver.

```
XDS510 IS RESET, HARDWARE VERSION 3
```

❑ If you see this message:

```
CANNOT DETECT TARGET POWER
```

follow the troubleshooting tips below.

Driver installation error messages

Invalid Source Path

Description The directory path that you entered does not exist.

Action Be sure that the path to the emulator software is correct. Discontinue the driver installation program by entering **N** at the next prompt. Reinvoke the regdrv program and reenter the emulator software directory.

Can’t find the emulator driver

Description The directory path that you entered does not contain the emulator driver genport.sys.

Action Check the directory path and make sure it corresponds to the emulator software directory.

Can’t find Windows NT SYSTEM32\DRIVERS\ directory

Description The Windows NT drivers directory should be c:\pathname\system32\drivers. Typically, the *pathname* is c:\windows\ or c:\winnt35.

Action Reinvoke the regdrv program and enter the correct pathname to the system32\drivers directory. If you continue to see this message, you may need to install the emulator driver manually. Refer to Appendix B, *Installing the Emulator Device Driver Manually*, for more information.

Can’t overwrite emulator driver – access denied

Description The permissions for the emulator driver are not correct.

Action Check the permissions on the emulator driver that is already installed. If the driver is loaded in memory, from the command line, type **NET STOP GENPORT** to stop the driver. Reinstall the driver by following the directions in Section 2.4, *Installing the Emulator Device Driver*.

2.6 Step 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 three environment variables–D_DIR, D_SRC, and D_OPTIONS.

The debugger uses environment variables for finding or obtaining certain types of information. By default, the installation program sets up these environment variables:

```
SET PATH=C:\EMU470;%PATH%
SET D_DIR=C:\EMU470
```

These variables are set up in the registry under:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\SessionManager\Environment
```

If you choose not to have the environment variables set up automatically, you can set up the environment variables in the System applet of the Control Panel.

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 emulator 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 System applet to change the path information, add the following to the end of the PATH statement:

  ;C:\EMU470

❑ If you set the PATH statement from the command line, use this format:

  SET PATH=C:\EMU470;%PATH%

  (Be careful not to 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)

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

SET D_DIR=C:\EMU470

(Be careful not to precede the equal sign with a space.)

Identifying directories that contain source files (D_SRC)

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; pathname2 . . .*

(Be careful not to 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)

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

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

(Be careful not to 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. The options that you can identify with D_OPTIONS are listed on page 2-11.

These are the options you can identify with D_OPTIONS:

Option	Brief Description
–b[b]	Select the screen size.
–bl	Select screen length.
–bw	Select screen width.
–c	Clear the .bss section.
–f *filename*	Identify a new board configuration file.
–font *size*	Select font point size.
–i *pathname*	Identify additional directories.
–me	Select little-endian format.
–min	Select the minimal debugging mode.
–n *processor name*	Identify the processor for debugging (this processor name must match the processor name as stated in the configuration file).
–p *port address*	Identify the port address.
–profile	Enter the profiling environment.
–s	Load the symbol table only.
–t *filename*	Identify a new initialization file.
–v	Load without the symbol table.

Note: Overriding D_OPTIONS

You can override D_OPTIONS by invoking the debugger or emurst with the –x option.

For more information about options, see the invocation instructions in the *TMS470R1x C Source Debugger User's Guide*.

2.7 Step 6: Resetting the Emulator

You must reset the emulator *before* invoking the debugger. Reset can occur only *after* you have powered up the target board. You can reset the emulator by adding the following command to the autoexec.bat file:

- **emurst** [**–x**] [**–p** *port address*]

The –x option tells the emurst utility to ignore any options specified with the D_OPTIONS environment variable.

The –p option identifies the port address.

When you want to reset your XDS510 or XDS510PP without rebooting your system, use the icons provided in the program group.

- To reset the XDS510 from Windows, click on the EMURST icon in the TMS470R1x Emulator program group.

Note:

If the debugger is running, emurst will not reset the emulator. The debugger displays the following message:

```
RESET DISALLOWED : DEBUGGER RUNNING
```

If an error message appears after the emulator is reset, see Section 2.10, *Installation Error Messages*.

2.8 Step 7: Describing Your Target System to the Debugger

In order for the debugger to understand how you have configured your target system, you must supply a file for the debugger to read. You can either use the default configuration file, *board.dat*, or create your own file.

❑ If you are using an emulation scan path that contains only one ’470 and no other devices, you can use the board.dat file that comes with the ’470 emulator kit. This file describes the single ’470 in the scan path and gives the ’470 the name tms470. Since the debugger automatically looks for a file called board.dat in the current directory and in the directories specified with the D_DIR environment variable, you don’t need to create your own board configuration file.

❑ If you want to use a different name for the target device or you want the debugger to recognize a different target configuration, you must follow these steps:

1) Create the board configuration file.
2) Use *composer* to translate the board configuration file to binary so that the debugger can read it.
3) Specify the target processor name as stated in the configuration file. This name is used with the *–n* option when invoking the debugger.

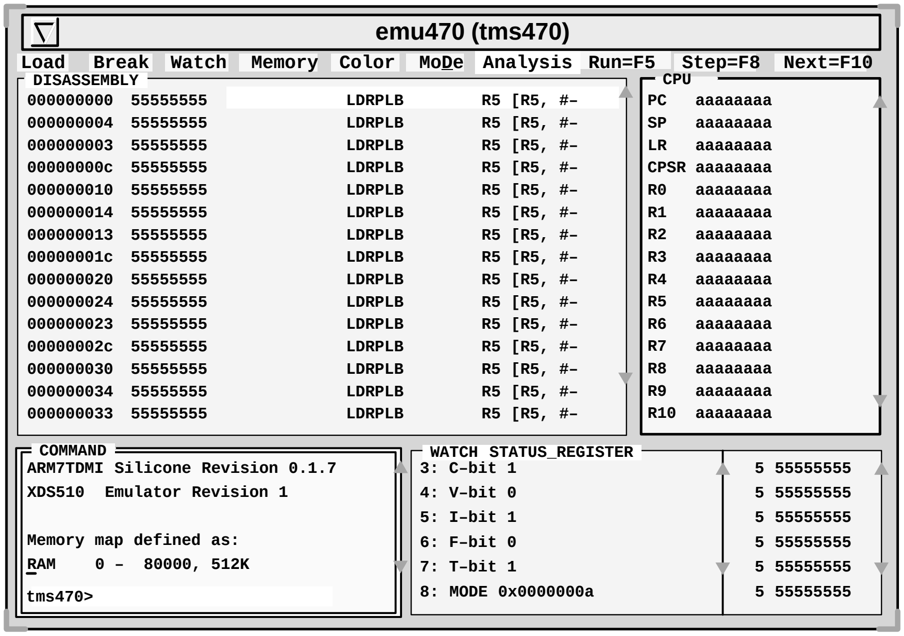
These steps are described in the *TMS470R1x C Source Debugger User’s Guide*.

2.9 Step 8: Verifying the Installation

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

`emu470 –p` ***`port address`*** **`–n tms470`** ↵

You should see a display similar to this one:



```
000000000  55555555              LDRPLB        R5 [R5, #–
000000004  55555555              LDRPLB        R5 [R5, #–
000000003  55555555              LDRPLB        R5 [R5, #–
00000000c  55555555              LDRPLB        R5 [R5, #–
000000010  55555555              LDRPLB        R5 [R5, #–
000000014  55555555              LDRPLB        R5 [R5, #–
000000013  55555555              LDRPLB        R5 [R5, #–
00000001c  55555555              LDRPLB        R5 [R5, #–
000000020  55555555              LDRPLB        R5 [R5, #–
000000024  55555555              LDRPLB        R5 [R5, #–
000000023  55555555              LDRPLB        R5 [R5, #–
00000002c  55555555              LDRPLB        R5 [R5, #–
000000030  55555555              LDRPLB        R5 [R5, #–
000000034  55555555              LDRPLB        R5 [R5, #–
000000033  55555555              LDRPLB        R5 [R5, #–
```

```
PC   aaaaaaaa
SP   aaaaaaaa
LR   aaaaaaaa
CPSR aaaaaaaa
R0   aaaaaaaa
R1   aaaaaaaa
R2   aaaaaaaa
R3   aaaaaaaa
R4   aaaaaaaa
R5   aaaaaaaa
R6   aaaaaaaa
R7   aaaaaaaa
R8   aaaaaaaa
R9   aaaaaaaa
R10  aaaaaaaa
```

```
ARM7TDMI Silicone Revision 0.1.7
XDS510  Emulator Revision 1

Memory map defined as:
RAM    0 –  80000, 512K

tms470>
```

```
3: C–bit 1                      5 55555555
4: V–bit 0                      5 55555555
5: I–bit 1                      5 55555555
6: F–bit 0                      5 55555555
7: T–bit 1                      5 55555555
8: MODE 0x0000000a              5 55555555
```

- ❑ If you see a display similar to this one, you have correctly installed your emulator and debugger.
- ❑ 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 emuinit.cmd file. Check for the file in the directories specified by the D_DIR environment variable or ensure that the file is in the current directory. Reenter the command above.
- ❑ If you don’t see a display, 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.

2.10 Installation Error Messages

While invoking the debugger, you may see one of the following messages:

```
CANNOT INITIALIZE THE TARGET SYSTEM ! !
– Check I/O configuration
– Check cabling and target power
```

```
CANNOT DETECT TARGET POWER ! !
– Check I/O configuration
– Check cabling and target power
```

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

- ❑ Is the target power on?
- ❑ Is the XDS510 board installed snugly?
- ❑ Is the device installed snugly?
- ❑ Is the cable connecting your emulator and target system loose?
- ❑ Is your target board getting the correct voltage?
- ❑ Is your emulator scan path interrupted? One or more devices on the emulator scan path may have been removed. Check the connections; either they are not connected, or they are connected improperly.
- ❑ Did you use the –n option? Was it used with an incorrect device name? You must supply a valid device name with the –n option.
- ❑ After you powered up the target board, did you execute the emurst command? This command must be executed *after* you powered up the target board.
- ❑ Is the board.dat file in the current directory or in a directory specified by D_DIR?
- ❑ Is the emulator driver installed properly?

❑ Did you use the –p option? Is your port address correct?

  ■ Check to be sure 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 the XDS510 installation instructions in the *XDS51x Emulator Installation Guide.*

  ■ Check to see 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 alternative settings. Modify the –p option of the D_OPTIONS environment variable to reflect the change in your switch settings.

After you have checked all of the above, repeat the verification instructions on page 2-14.

Chapter 3

Installing the Debugger With Windows 95

This chapter provides instructions for installing the C source debugger on a PC running Windows 95. When you complete the installation, turn to the *TMS470R1x C Source Debugger User's Guide*.

To install the emulator controller, see the *XDS51x Emulator Installation Guide,* which is included in your kit.

Topic **Page**

3.1 System Requirements

To install the ’470 C source debugger and TMS470R1x emulator, you need the items in the following hardware and software checklists.

Hardware checklist

□	**System**	32-bit x86- or Pentium-based PC with an ISA/EISA, VESA local, or PCI bus
□	**Memory**	4–16 Mbytes of free memory
□	**Disk space**	10 Mbytes available disk space for executables and libraries
□	**Display**	Color monitor
□	**Required hardware**	CD-ROM drive
□	**Optional hardware**	Microsoft-compatible mouse
□	**XDS510 emulator controller**	XDS510 or XDS510PP emulator controller

Note:

The speed at which your system operates depends on the amount of RAM available on your PC and the number of debuggers running simultaneously.

Software checklist

□ **Operating system** — Windows 95

□ **Software tools** — TMS470R1x assembler and linker
Optional: TMS470R1x C compiler

Required files included with the debugger package

□ *emu470.exe* is the debugger executable file

□ *emurst.exe* resets the XDS510 emulator

□ *emurstpp.exe* resets the XDS510PP emulator

□ *board.dat* describes your target system to the debugger in terms of what devices are on the emulation scan path. The board.dat file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ *board.cfg* is a text file used to describe your target system to the debugger in terms of what devices are on the emulation scan path. The board.cfg file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ The *composer* utility allows you to convert your text board configuration file (board.cfg) into a format the debugger can read (board.dat). For the emulator to initialize properly, you must create a new board.dat file with this release of the composer or use the samples that are provided for you.

Optional files included with the debugger package

□ *emuinit.cmd* is a general-purpose batch file that contains debugger commands. The version of this file that is shipped with the debugger defines a ’470 memory map. When you first start using the debugger, 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 *TMS470R1x C Source Debugger User’s Guide*.

3.2 Step 1: Installing the XDS510 or XDS510PP Emulator Controller

Before installing the ’470 debugger software, you must install an XDS510 emulator controller: the XDS510 or XDS510PP.

Follow the instructions in the *XDS51x Emulator Installation Guide* to install the XDS510 emulator controller.

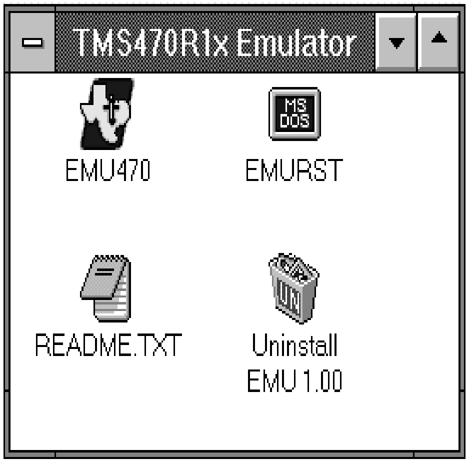
3.3 Step 2: Installing the Debugger Software

To install the debugger on a Windows 95 system, follow these steps:

1) Insert the debugger CD-ROM into your CD-ROM drive.
2) Start Windows 95.
3) From the Start menu, select Run.
4) In the dialog box, enter the following command (where d: is the name of your CD-ROM drive):

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

The setup.exe program creates a program group for the TMS470R1x Emulator that looks similar to the following example:



3.4 Step 3: Setting Up a DLL File for Your XDS510 or XDS510PP

After you run the installation program (setup.exe), you must setup a DLL (dynamic link library) file for your XDS510 or XDS510PP. You can set up the smg510w.dll file for your XDS510 or XDS510PP by running a batch file, or you can do it manually.

- ❑ For the XDS510:
  - ■ Run set510.bat. This file sets up smg510w.dll file.

    or
  - ■ Copy the smg1095.xds file to the smg510w.dll file.
- ❑ For the XDS510PP:
  - ■ Run set510pp.bat. This file sets up the smg510w.dll file.

    or
  - ■ Copy the smg1095.pp file to the smg510w.dll file.

3.5 Additional XDS510PP Setup

If you are using the XDS510PP, you need to complete the following:

❑ Check your BIOS (basic input/output system) to ensure that your printer is in one of the following modes:

EPP:	Enhanced printer port
SPP4:	4-bit unidirectional mode
SPP8:	8-bit bidirectional mode

EPP mode provides the best performance. If your BIOS offers the options *EPP+ECP* and *EPP+SPP*, select *EPP+SPP*. The *EPP+ECP* option is not supported. Note the port address of your printer.

❑ Edit the parameters in the xds510pp.ini file to match your system. The xds510pp.ini file contains parameters for the printer address, printer mode, and printer speed. Make sure the xds510pp.ini file is in the same directory as your debugger software. The following is a sample xds510pp.ini file:

```
port = 378
mode = EPP
speed = 10
```

Where:

- Port is the I/O address of your printer port.
- Mode is the printer port mode (EPP, SPP4, or SPP8).
- Speed is a delay parameter that may be required on some systems. Set this parameter to 10 initially. You can reduce this number once your XDS510PP is up and running.

Diagnostic files

The XDS510PP software includes diagnostic files that help you determine system information (see Table 3–1). Use these files if you have problems setting up your parallel printer port.

Table 3–1. Diagnostic Files

File	Purpose
smcmode.exe	Determines if your parallel printer port uses a port controller device manufactured by SMC.
–h	gives you more information about the options.
–r	resets the status register.
–m x	sets your printer port to mode *x* where: Mode 0: Standard bidirectional mode. Mode 1: EPP and SPP mode. Mode 2: ECP mode. Mode 3: ECP and EPP mode. Mode 4: Non bidirectional mode.
nscmode.exe	Determines if your parallel printer port uses a port controller device manufactured by National Semiconductor.
portchk.exe	Determines if your parallel printer port is bidirectional.

For more information about the smcmode.exe program, see Section 3.7, *Special Considerations When Resetting the XDS510PP*.

3.6 Step 4: 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 three environment variables: D_DIR, D_SRC, and D_OPTIONS.

By default, the installation program sets up these environment variables in your autoexec.bat file:

```
SET PATH=C:\EMU470;%PATH%
SET D_DIR=C:\EMU470
```

If you choose not to have the environment variables set up automatically, you can modify your autoexec.bat file to exclude 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 emulator 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:\EMU470

❑ If you set the PATH statement from the command line, use this format:

   SET PATH=C:\EMU470;%PATH%

   (Be careful not to 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)

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

SET D_DIR=C:\EMU470

(Be careful not to precede the equal sign with a space.)

Identifying directories that contain source files (D_SRC)

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; pathname2 . . .*

(Be careful not to 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)

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

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

(Be careful not to 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. The options that you can identify with D_OPTIONS are listed on page 3-10.

These are the options that you can identify with D_OPTIONS:

Option	Brief Description
–b[b]	Select the screen size.
–bl	Select screen length.
–bw	Select screen width.
–c	Clear the .bss section.
–f *filename*	Identify a new board configuration file.
–font *size*	Select font point size.
–i *pathname*	Identify additional directories.
–me	Select little-endian format.
–min	Select the minimal debugging mode.
–n *processor name*	Identify the processor for debugging (this processor name must match the processor name as stated in the configuration file).
–p *port address*	Identify the port address.
–profile	Enter the profiling environment.
–s	Load the symbol table only.
–t *filename*	Identify a new initialization file.
–v	Load without the symbol table.

Note:

You can override D_OPTIONS by invoking the debugger or emurst with the –x option.

For more information about options, see the invocation instructions in the *TMS470R1x C Source Debugger User's Guide*.

3.7 Step 5: Resetting the Emulator

You must reset the XDS510 or XDS510PP *before* invoking the debugger. A successful reset can occur only after you have powered up the target board. You can reset the emulator by adding one of the following commands to the autoexec.bat file:

XDS510: **emurst** [**–x**] [**–p** *port address*]

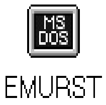
XDS510PP: **emurstpp** [**–x**]

The –x option tells the emurst/emurstpp utility to ignore any options specified with the D_OPTIONS environment variable.

The –p option *port address* identifies the port address.

When you want to reset your XDS510 or XDS510PP without rebooting your system, use the icons provided in the program group.

- To reset the XDS510 from Windows, click on the EMURST icon in the TMS470R1x Emulator program group.



- To reset the XDS510PP from Windows, click on the EMURSTPP icon in the TMS470R1x Emulator program group.

Note:

If a debugger is running, emurst/emurstpp will not reset the emulator. The debugger displays the following message:

```
RESET DISALLOWED : DEBUGGER RUNNING
```

If an error message appears after the emulator is reset, see Section 3.10, *Installation Error Messages.*

Special Considerations When Resetting the XDS510PP

You must reset your XDS510PP with the emurstpp command *before* invoking the debugger. After resetting the XDS510PP with the emurstpp command, you will see one of two messages.

❑ If you see the following message, the reset was successful:

```
EMURST FOR THE XDS510PP VERSION 1.0
XDS510PP IS RESET, HARDWARE VERSION 1
```

❑ If you see the following message, the reset was unsuccessful:

```
EMURST FOR THE XDS510PP VERSION 1.0
COMMUNICATIONS ERROR, OR POD HAS NO POWER
```

The smcmode command

If emurstpp does not reset your XDS510PP, it is possible that the printer port device in your computer and the SMC chip in the XDS510PP are confused during power cycles. Enter the following command:

```
smcmode –r ↵
```

If your computer has an SMC device, this command resets and initializes the device for proper operation.

The smcmode command works only if your computer uses an SMC printer port controller chip. To determine if your computer uses an SMC printer port controller chip, enter the following command with no parameters:

```
smcmode ↵
```

This command tells you if an SMC device is installed and lists the device’s configuration.

3.8 Step 6: Describing Your Target System to the Debugger

In order for the debugger to understand how you have configured your target system, you must supply a file for the debugger to read. You can either use the default configuration file, *board.dat*, or create your own file.

❑ If you are using an emulation scan path that contains only one ’470 and no other devices, you can use the board.dat file that comes with the ’470 emulator kit. This file describes the single ’470 in the scan path and gives the ’470 the name tms470. Since the debugger automatically looks for a file called board.dat in the current directory and in the directories specified with the D_DIR environment variable, you don’t need to create your own board configuration file.

❑ If you want to use a different name for the target device or you want the debugger to recognize a different target configuration, you must follow these steps:

1) Create the board configuration file.

2) Use *composer* to translate the board configuration file to binary so that the debugger can read it.

3) Specify the target processor name as stated in the configuration file. This name is used with the –*n* option when invoking the debugger.

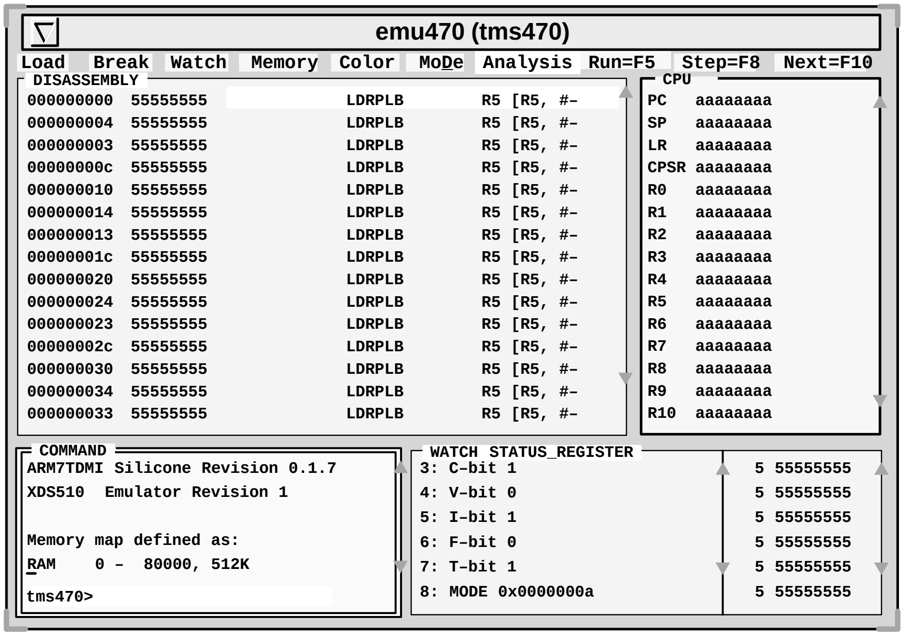
These steps are described in the *TMS470R1x C Source Debugger User’s Guide*.

3.9 Step 7: Verifying the Installation

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

emu470 –p *port address* –n tms470 ↵

You should see a display similar to this one:



```
DISASSEMBLY
000000000  55555555              LDRPLB        R5 [R5, #–
000000004  55555555              LDRPLB        R5 [R5, #–
000000003  55555555              LDRPLB        R5 [R5, #–
00000000c  55555555              LDRPLB        R5 [R5, #–
000000010  55555555              LDRPLB        R5 [R5, #–
000000014  55555555              LDRPLB        R5 [R5, #–
000000013  55555555              LDRPLB        R5 [R5, #–
00000001c  55555555              LDRPLB        R5 [R5, #–
000000020  55555555              LDRPLB        R5 [R5, #–
000000024  55555555              LDRPLB        R5 [R5, #–
000000023  55555555              LDRPLB        R5 [R5, #–
00000002c  55555555              LDRPLB        R5 [R5, #–
000000030  55555555              LDRPLB        R5 [R5, #–
000000034  55555555              LDRPLB        R5 [R5, #–
000000033  55555555              LDRPLB        R5 [R5, #–
```

```
CPU
PC   aaaaaaaa
SP   aaaaaaaa
LR   aaaaaaaa
CPSR aaaaaaaa
R0   aaaaaaaa
R1   aaaaaaaa
R2   aaaaaaaa
R3   aaaaaaaa
R4   aaaaaaaa
R5   aaaaaaaa
R6   aaaaaaaa
R7   aaaaaaaa
R8   aaaaaaaa
R9   aaaaaaaa
R10  aaaaaaaa
```

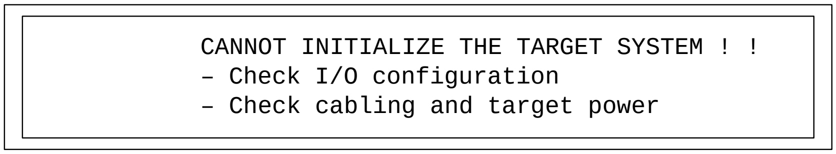
```
COMMAND
ARM7TDMI Silicone Revision 0.1.7
XDS510  Emulator Revision 1

Memory map defined as:
RAM    0 –  80000, 512K

tms470>
```

```
WATCH STATUS_REGISTER
3: C–bit 1                      5 55555555
4: V–bit 0                      5 55555555
5: I–bit 1                      5 55555555
6: F–bit 0                      5 55555555
7: T–bit 1                      5 55555555
8: MODE 0x0000000a              5 55555555
```

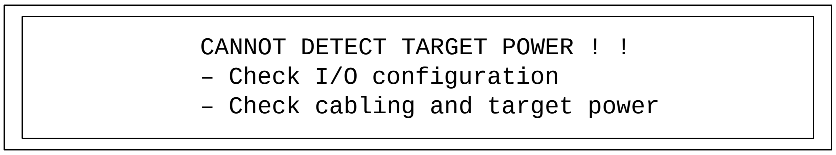
- ❑ If you see a display similar to this one, you have correctly installed your emulator and debugger.
- ❑ If you see a display and the lines of code say *Invalid address* or the fields in the MEMORY window are shown in red, the debugger may not be able to find the emuinit.cmd file. Check for the file in the directories specified by the D_DIR environment variable or ensure that the file is in the current directory. Reenter the command above.
- ❑ If you don’t see a display, 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.

3.10 Installation Error Messages

While invoking the debugger, you may see one of the following messages:



```
CANNOT INITIALIZE THE TARGET SYSTEM ! !
– Check I/O configuration
– Check cabling and target power
```



```
CANNOT DETECT TARGET POWER ! !
– Check I/O configuration
– Check cabling and target power
```

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

- Is the target power on?
- Is the XDS510/XDS510PP board installed snugly?
- Is the device installed snugly?
- Is the cable connecting your emulator and target system loose?
- Is your target board getting the correct voltage?
- Is your emulator scan path interrupted? One or more devices on the emulator scan path may have been removed. Check the connections; either they are not connected, or they are connected improperly.
- Did you use the –n option? Was it used with an incorrect device name? You must supply a valid device name with the –n option.
- After you powered up the target board, did you execute the emurst/ emurstpp command? This command must be executed *after* you powered up the target board.

❑ Did you use the –p option? Is your port address correct (XDS510 only)?

  ■ Check to be sure 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 the XDS510 installation instructions in the *XDS51x Emulator Installation Guide.*

  ■ Check to see 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 alternative settings. Modify the –p option of the D_OPTIONS environment variable to reflect the change in your switch settings.

❑ Is the board.dat file in the current directory or in a directory specified by D_DIR?

After you have checked all of the above, repeat the verification instructions on page 3-14.

Chapter 4

Installing the Debugger on a SPARCstation

This chapter provides instructions for installing the TMS470R1x C source debugger on a SPARCstation running OpenWindows™ under SunOS™ version 4.1.x. After completing the installation, see the *TMS470R1x C Source Debugger User's Guide*.

To install the emulator controller, see the *XDS51x Emulator Installation Guide.*

Topic **Page**

4.1 System Requirements

To install the ’470 C source debugger and TMS470R1x emulator, you need the items in the following hardware and software checklists.

Hardware checklist

□	**System**	SPARCstation or 100%-compatible system
□	**Display**	Color monitor
□	**CD-ROM drive**	CD-ROM drive
□	**XDS510 emulator controller**	XDS510WS™ emulator controller

Software checklist

□	**Operating system**	SunOS version 4.1.x or SunOS version 5.x (also known as Solaris™ 2.x) using an X Window System™-based window manager, such as OpenWindows version 3.x.
□	**Root privileges**	If you are running SunOS 4.1.x, 5.0, or 5.1, you *must* have root privileges to mount and unmount the CD-ROM. If you don’t, get help from your system administrator.
□	**Software tools**	TMS470R1x assembler and linker Optional: TMS470R1x C compiler
□	**Required files included with the debugger package**	*emu470* is the debugger executable file.
□		*r470510ws.out* is the executable portion of the debugger that runs on the emulator.
□		*emurst* resets the emulator and downloads r470510ws.out to the emulator.
□		*board.dat* describes your target board to your debugger in terms of what devices are in the emulation scan path. The board.dat file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ *board.cfg* is a text file used to describe your target system to the debugger in terms of what devices are on the emulation scan path. The board.cfg file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ The *composer* utility allows you to convert your text board configuration file (board.cfg) into a format the debugger can read (board.dat). For the emulator to initialize properly, you must create a new board.dat file with this release of the composer or use the samples that are provided for you.

Optional files included with the debugger package

□ *emuinit.cmd* is a general-purpose batch file that contains debugger commands. The version of this file that is shipped with the debugger defines a ’470 memory map. When you first start using the debugger, 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 *TMS470R1x C Source Debugger User’s Guide*.

4.2 Step 1: Installing the XDS510WS Emulator Controller

Before installing the ’470 debugger software, you must install an XDS510WS emulator controller.

Follow the instructions in the *XDS51x Emulator Installation Guide* to install the XDS510WS emulator controller.

4.3 Step 2: Installing the Debugger Software

This section explains how to install the debugger software on your hard disk system. The software package is shipped on CD-ROM. To install the emulator software, you must mount the CD-ROM, copy the files, and unmount the CD-ROM.

Note:

If you are running SunOS 4.1.x, 5.0, or 5.1, you *must* have root privileges to mount or unmount the CD-ROM. If you don’t, get help from your system administrator.

Mounting the CD-ROM

The steps to mount the CD-ROM vary according to your operating system version:

- If you have a SunOS 4.1.x, load the CD-ROM into the drive. As root, enter the following from a command shell:

```
mount –rt hsfs /dev/sr0 /cdrom ⏎
exit ⏎
cd /cdrom/sparc ⏎
```

- If you have SunOS 5.0 or 5.1, load the CD-ROM into the drive. As root, enter the following from a command shell:

```
mount –rF hsfs /dev/sr0 /cdrom ⏎
exit ⏎
cd /cdrom/cdrom0/sparc ⏎
```

❑ If you have SunOS 5.2 or higher:

  ■ If your CD-ROM drive is already attached, load the CD-ROM into the drive and enter the following from a command shell:

```
cd /cdrom/cdrom0/sparc ⏎
```

  ■ If you do not have a CD-ROM drive attached, you must shut down your system to the PROM level, attach the CD-ROM drive, and enter the following:

```
boot –r ⏎
```

  After you log into your system, load the CD-ROM into the drive and enter the following from a command shell:

```
cd /cdrom/cdrom0/sparc ⏎
```

Copying the files

After you mount the CD_ROM, you must create the directory that will contain the debugger software and copy the software to that directory.

1) Create a directory named emu470 on your hard disk. To create this directory, enter:

```
mkdir /your_pathname/emu470
```

2) Copy the files from the CD-ROM to your hard-disk system:

```
cp –r * /your_pathname/emu470
```

Unmounting the CD-ROM

You must unmount the CD-ROM after copying the files.

❑ If you have a SunOS 4.1.x, 5.0, or 5.1, as root, enter the following from a command shell:

```
cd ⏎
umount /cdrom ⏎
eject /dev/sr0 ⏎
exit ⏎
```

❑ If you have SunOS 5.2 or higher, enter the following from a command shell:

```
cd ⏎
eject ⏎
```

4.4 Step 3: Ensuring That the Emulator Supports the Debugger

The ROM code for the XDS510WS does not contain the information necessary to communicate with the target; that code must be downloaded from the host. The *emurst* program downloads the necessary code for proper emulation.

To run this program, enter the emurst command in the following format:

emurst [**–x**] [**–p** *port address*] **r470510ws.out**

The –x option tells the emurst utility to ignore any options specified with the D_OPTIONS environment variable.

The –p option identifies the SCSI port address.

r470510ws.out contains the information neccessary to communicate with the target.

You can be sure that emurst succeeded when only the first and second LEDs from the left are on. For more information about XDS510WS LEDs, see the *XDS51x Emulator Installation Guide*.

4.5 Step 4: Describing Your Target System to the Debugger

In order for the debugger to understand how you have configured your target system, you must supply a file for the debugger to read. You can either use the default configuration file, *board.dat*, or create your own file.

- ❑ If you are using an emulation scan path that contains only one ’470 and no other devices, you can use the board.dat file that comes with the ’470 emulator kit. This file describes the single ’470 in the scan path and gives the ’470 the name tms470. Since the debugger automatically looks for a file called board.dat in the current directory and in the directories specified with the D_DIR environment variable, you don’t need to create your own board configuration file.

- ❑ If you want to use a different name for the target device or you want the debugger to recognize a different target configuration, you must follow these steps:

  1) Create the board configuration file.
  2) Use *composer* to translate the board configuration file to binary so that the debugger can read it.
  3) Specify the target processor name as stated in the configuration file. This name is used with the *–n* option when invoking the debugger.

  These steps are described in the *TMS470R1x C Source Debugger User’s Guide*.

4.6 Step 5: Setting Up the Debugger Environment

To ensure that your debugger works correctly, you must:

- ❑ Modify the path shell variable to identify the emu470 directory.
- ❑ Set up the environment variables that you want to use.
- ❑ Invoke the new or modified .cshrc file.

Modifying the path shell variable

You must include the debugger directory in your shell path. To do this, you need to modify your shell configuration file in your home directory (for example, the .cshrc file for a C shell). Include the pathname to your emu470 directory in your path. The following statement is an example of what a typical path-variable definition looks like:

```
set path = (. /bin /usr/ucb /usr/contrib/bin /usr/bin \
/usr/openwin/bin)
```

The following is an example of a modified path variable. The part of the path that is boldface is an example of a pathname that identifies the emu470 directory:

```
set path = (. /bin /usr/ucb /usr/contrib/bin /usr/bin \
/usr/openwin/bin /user/fred/emu470)
```

Setting up the environment variables

An environment variable is a special system symbol that the debugger uses for finding or obtaining certain types of information. You can set up the environment variables in your shell configuration file. The debugger uses four environment variables, named D_DIR, D_SRC, D_OPTIONS, and DISPLAY:

- ❑ Set up the D_DIR environment variable to identify the emu470 directory by defining the D_DIR environment variable:

  setenv D_DIR ″/user/fred/emu470″

  (Be sure to enclose the directory name within quotes.)

  This directory contains auxiliary files (such as emuinit.cmd) that the debugger needs.

- ❑ Set up the D_SRC environment variable to identify any directories that contain program source files that you'll want to access from the debugger. The general format for doing this is:

  setenv D_SRC ″*pathname1;pathname2...***″**

  (Be sure to enclose the path names within one set of quotes.)

  For example, if your programs were in a directory named */user/fred/emu470/samples*, the D_SRC setup would be:

  setenv D_SRC ″/user/fred/emu470/samples″

❑ You can use several options when you invoke the debugger. If you use the same options repeatedly, it’s convenient to specify them with D_OPTIONS. The general format for doing this is:

setenv D_OPTIONS ”[*object filename*] [*debugger options*]**”**

(Be sure to enclose the options and filenames within one set of quotes.)

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.
–bl	Select screen length.
–bw	Select screen width.
–c	Clear the .bss section.
–f *filename*	Identify a new board configuration file.
–font *size*	Select font point size.
–i *pathname*	Identify additional directories.
–me	Select little-endian format.
–min	Select the minimal debugging mode.
–n *processor name*	Identify the processor for debugging (this processor name must match the processor name as stated in the configuration file).
–p *port address*	Identify the port address.
–profile	Enter the profiling environment.
–s	Load the symbol table only.
–t *filename*	Identify a new initialization file.
–v	Load without the symbol table.

Note: Overriding D_OPTIONS

You can override D_OPTIONS by invoking the debugger or emurst with the –x option.

For more information about options, see the invocation section in the *TMS470R1x C Source Debugger User’s Guide*.

- If you are using the X Window System, you can use the DISPLAY environment variable to display the debugger on a different machine from the one the debugger is running on. The general format for doing this is:

  setenv DISPLAY *machine name*

  For example, if you are running the debugger on a machine called opie and you want the debugger display to appear on a machine called barney, the DISPLAY setup would be:

  ```
  setenv DISPLAY barney:0 ↵
  ```

  You can also display the debugger on a different machine by using the -d option when invoking the debugger.

  ```
  emu470 –d barney:0 ↵
  ```

  For more information about using the debugger under the X Window system, see Section 4.8, *Using the Debugger With the X Window System*.

Invoking the new or modified .cshrc file

When you modify your shell configuration file, you must ensure that the changes are made to your current session. For example, if you are using a C shell, use this command to reread the .cshrc file:

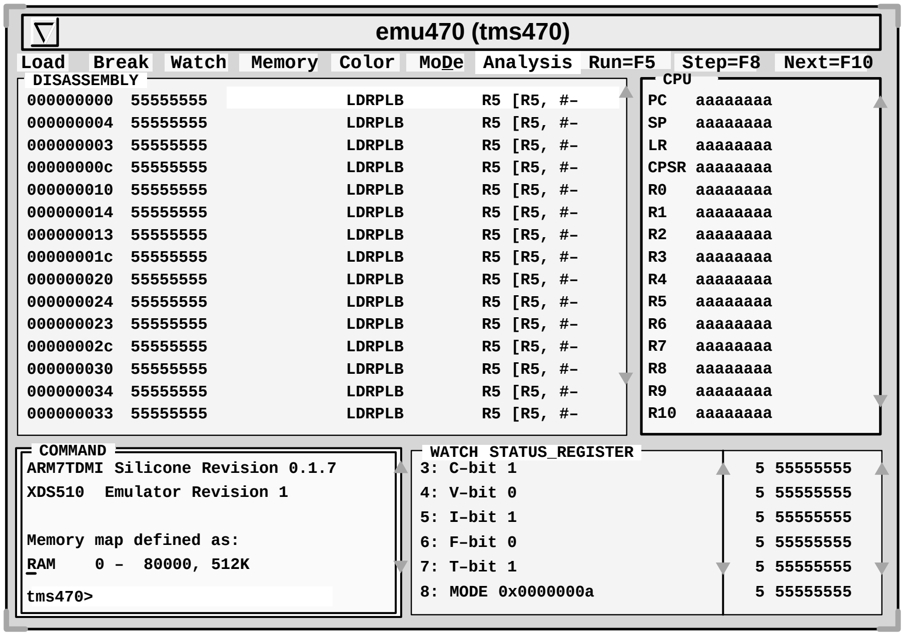
```
source ~/.cshrc ↵
```

4.7 Step 6: Verifying the Installation

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

emu470 –p *port address* –n tms470 ↵

You should see a display similar to this one:



```
DISASSEMBLY                                                        CPU
000000000  55555555            LDRPLB        R5 [R5, #–          PC   aaaaaaaa
000000004  55555555            LDRPLB        R5 [R5, #–          SP   aaaaaaaa
000000003  55555555            LDRPLB        R5 [R5, #–          LR   aaaaaaaa
00000000c  55555555            LDRPLB        R5 [R5, #–          CPSR aaaaaaaa
000000010  55555555            LDRPLB        R5 [R5, #–          R0   aaaaaaaa
000000014  55555555            LDRPLB        R5 [R5, #–          R1   aaaaaaaa
000000013  55555555            LDRPLB        R5 [R5, #–          R2   aaaaaaaa
00000001c  55555555            LDRPLB        R5 [R5, #–          R3   aaaaaaaa
000000020  55555555            LDRPLB        R5 [R5, #–          R4   aaaaaaaa
000000024  55555555            LDRPLB        R5 [R5, #–          R5   aaaaaaaa
000000023  55555555            LDRPLB        R5 [R5, #–          R6   aaaaaaaa
00000002c  55555555            LDRPLB        R5 [R5, #–          R7   aaaaaaaa
000000030  55555555            LDRPLB        R5 [R5, #–          R8   aaaaaaaa
000000034  55555555            LDRPLB        R5 [R5, #–          R9   aaaaaaaa
000000033  55555555            LDRPLB        R5 [R5, #–          R10  aaaaaaaa

COMMAND                                   WATCH STATUS_REGISTER
ARM7TDMI Silicone Revision 0.1.7          3: C–bit 1                  5 55555555
XDS510  Emulator Revision 1               4: V–bit 0                  5 55555555
                                          5: I–bit 1                  5 55555555
Memory map defined as:                    6: F–bit 0                  5 55555555
RAM    0 –  80000, 512K                   7: T–bit 1                  5 55555555
                                          8: MODE 0x0000000a          5 55555555
tms470>
```

- ❑ If you see a display similar to this one, you have correctly installed your emulator and debugger.
- ❑ If you do not see a display, then your debugger, board, or XDS510WS 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.
- ❑ If you continue to experience problems, see Appendix A, *Workstation Troubleshooting*.

4.8 Using the Debugger With the X Window System

If you’re using the X Window System to run the ’470 debugger, you need to know about the keyboard’s special keys, the debugger fonts, and using the debugger on a monochrome monitor.

Using the keyboard’s special keys

The debugger uses some special keys that you can map differently from your particular keyboard. Some keyboards, such as the Sun Type 5 keyboard, have these special symbols on separate keys. Other keyboards, such as the Sun Type 4 keyboard, do not have the special keys, but the functions are available.

The special keys that the debugger uses are shown in the following table with their corresponding keysym. A *keysym* is a label that interprets a keystroke; it allows you to modify the action of a key on the keyboard.

Debugger Key Needed	Keysym for That Function
F1 to F10	F1 to F10
PAGE UP	Prior
PAGE DOWN	Next
HOME	Home
END	End
INSERT	Insert
→	Right
←	Left
↑	Up
↓	Down

Use the X utility xev to check the keysyms associated with your keyboard. If you need to change the keysym definitions, use the xmodmap utility. For example, you could create a file that contains the following commands and use that file with xmodmap to map a Sun Type 4 keyboard to the keys listed above:

key code
keysym

```
keysym R13    = End
keysym Down   = Down
keysym F35    = Next
keysym Left   = Left
keysym Right  = Right
keysym F27    = Home
keysym Up     = Up
keysym F29    = Prior
keysym Insert = Insert
```

Refer to your X Window System documentation for more information about using xev and xmodmap.

Changing the debugger font

You can change the font of the debugger screen by using the xrdb utility and modifying the .Xdefaults file in your root directory. For example, to change the '470 debugger fonts to Courier, add the following line to the .Xdefaults file:

```
emu470*font:courier
```

For more information about using xrdb to change the font, refer to your X Window System documentation.

Color mappings on monochrome screens

Although a color monitor is recommended, you can use a monochrome monitor. The following table shows the color mappings for monochrome screens:

Color	Appearance on Monochrome Screen
black	black
blue	black
green	white
cyan	white
red	black
magenta	black
yellow	white
white	white

Chapter 5

Installing the Debugger on an HP Workstation

This chapter provides instructions for installing the TMS470R1x C source debugger on an HP 9000 Series 700™ PA-RISC™ computer with HP-UX™ 9.0x. After completing the installation, turn to the *TMS470R1x C Source Debugger User's Guide*.

To install the emulator controller, see the *XDS51x Emulator Installation Guide.*

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5.1 System Requirements

To install the ’470 C source debugger and TMS470R1x emulator, you need the items in the following hardware and software checklists.

Hardware checklist

□	**System**	HP 9000 Series 700 PA-RISC computer
□	**Display**	Color monitor
□	**CD-ROM drive**	CD-ROM drive
□	**XDS510 emulator controller**	XDS510WS emulator controller

Software checklist

□ **Operating system** HP-UX version 9.0x or higher

□ **Root privileges** You *must* have root privileges to mount and unmount the CD-ROM. If you don’t, get help from your system administrator.

□ **Software tools** TMS470R1x assembler and linker
Optional: TMS470R1x C compiler

Required files included with the debugger package

□ *emu470* is the debugger executable file.

□ *r470510ws.out* is the executable portion of the debugger that runs on the emulator.

□ *emurst* resets the emulator and downloads r470510ws.out to the emulator.

□ *board.dat* describes your target board to your debugger in terms of what devices are on the emulation scan path. The board.dat file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ *board.cfg* is a text file used to describe your target system to the debugger in terms of what devices are on the emulation scan path. The board.cfg file included in the debugger package is for a target board with one TMS470R1x named *tms470*.

□ The *composer* utility allows you to convert your text board configuration file (*board.cfg*) into a format the debugger can read (*board.dat*). For the emulator to initialize properly, you must create a new board.dat file with this release of the composer or use the samples that are provided for you.

Optional files included with the debugger package

□ *emuinit.cmd* is a general-purpose batch file that contains debugger commands. The version of this file that’s shipped with the debugger defines a ’470 memory map. When you first start using the debugger, 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 *TMS470R1x C Source Debugger User’s Guide*.

5.2 Step 1: Installing the XDS510WS Emulator Controller

Before installing the ’470 debugger software, you must install an XDS510WS emulator controller.

Follow the instructions in the *XDS51x Emulator Installation Guide* to install the XDS510WS emulator controller.

5.3 Step 2: Installing the Debugger Software

This section explains how to install the debugger software on your hard-disk system. The software package is shipped on a CD-ROM. To install the software, you must mount the CD-ROM, copy the files, and unmount the CD-ROM.

Note:

You *must* have root privileges to mount or unmount the CD-ROM. If you don’t, get help from your system administrator.

Mounting the CD-ROM

As root, mount the CD-ROM using the UNIX mount command or the SAM (system administration manager):

- To use the UNIX mount command, enter:

  ```
  mount –rt cdfs /dev/dsk/your_cdrom_device /cdrom ⏎
  exit ⏎
  ```

  Make the hp directory on the CD-ROM the current directory. For example, if the CD-ROM is mounted at /cdrom, enter:

  ```
  cd /cdrom/hp ⏎
  ```

- To use SAM to mount the CD-ROM, see *System Administration Tasks*, the HP documentation about SAM, for instructions.

Copying the files

After you have mounted the CD-ROM, you must create the directory that will contain the debugger software and copy the software to that directory.

1) Create a directory named emu470 on your hard disk. To create this directory, enter:

```
mkdir /your_pathname/emu470 ↵
```

2) Copy the files from the CD-ROM to your hard-disk system:

```
cp –r * /your_pathname/emu470 ↵
```

Unmounting the CD-ROM

You must unmount the CD-ROM after copying the files. As root, enter:

```
cd ↵
umount /cdrom ↵
exit ↵
```

5.4 Step 3: Ensuring That the Emulator Supports the Debugger

The ROM code for the XDS510WS does not contain the information necessary to communicate with the target; that code must be downloaded from the host. The *emurst* program downloads the necessary code for proper emulation.

To run this program, enter the emurst command in the following format:

emurst [**–x**] [**–p** *port address*] *pathname–filename*

The –x option tells the emurst utility to ignore any options specified with the D_OPTIONS environment variable.

The –p option identifies the SCSI port address.

r470510ws.out contains the information necessary to communicate with the target.

You can be sure that emurst succeeded when only the first and second LEDs from the left are on. For more information about XDS510WS LEDs, see the *XDS51x Emulator Installation Guide*.

5.5 Step 4: Describing Your Target System to the Debugger

In order for the debugger to understand how you have configured your target system, you must supply a file for the debugger to read. You can either use the default configuration file, *board.dat*, or create your own file.

❑ If you are using an emulation scan path that contains only one ’470 and no other devices, you can use the board.dat file that comes with the ’470 emulator kit. This file describes the single ’470 in the scan path and gives the ’470 the name tms470. Since the debugger automatically looks for a file called board.dat in the current directory and in the directories specified with the D_DIR environment variable, you don’t need to create your own board configuration file.

❑ If you want to use a different name for the target device or you want the debugger to recognize a different target configuration, you must follow these steps:

1) Create the board configuration file.

2) Use *composer* to translate the board configuration file to binary so that the debugger can read it.

3) Specify the target processor name as stated in the configuration file. This name is used with the *–n* option when invoking the debugger.

These steps are described in the *TMS470R1x C Source Debugger User’s Guide*.

5.6 Step 5: Setting Up the Debugger Environment

To ensure that your debugger works correctly, you must:

- ❑ Modify the path shell variable to identify the emu470 directory.
- ❑ Set up the environment variables that you want to use.
- ❑ Invoke the new or modified .cshrc file.

Modifying the path shell variable

You must include the debugger directory in your shell path. To do this, you need to modify your shell configuration file in your home directory (for example, the .cshrc file for a C shell). Include the pathname to your emu470 directory in your path. The following statement is an example of what a typical path-variable definition looks like:

```
set path = (. /bin /usr/ucb /usr/contrib/bin /usr/bin \
/usr/openwin/bin)
```

The following is an example of a modified path variable. The part of the path that is boldface is an example of a pathname that identifies the emu470 directory:

```
set path (. /bin /usr/ucb /usr/contrib/bin /usr/bin \
/usr/openwin/bin /user/fred/emu470)
```

Setting up the environment variables

An environment variable is a special system symbol that the debugger uses for finding or obtaining certain types of information. You can set up the environment variables in your shell configuration file. The debugger uses four environment variables, named D_DIR, D_SRC, D_OPTIONS, and DISPLAY:

- ❑ Set up the D_DIR environment variable to identify the emu470 directory by defining the D_DIR environment variable:

  `setenv D_DIR ”/user/fred/emu470”`

  (Be sure to enclose the directory name within quotes.)

  This directory contains auxiliary files (such as emuinit.cmd) that the debugger needs.

- ❑ Set up the D_SRC environment variable to identify any directories that contain program source files that you'll want to look at while you're debugging source code. The general format for doing this is:

  setenv D_SRC ”*pathname1;pathname2;...***”**

  (Be sure to enclose the path names within one set of quotes.)

  For example, if your programs were in a directory named */user/fred/emu470/samples*, the D_SRC setup would be:

  `setenv D_SRC ”/user/fred/emu470/samples”`

❑ You can use several options when you invoke the debugger. If you use the same options repeatedly, it's convenient to specify them with D_OPTIONS. The general format for doing this is:

setenv D_OPTIONS "[*object filename*] [*debugger options*]**"**

(Be sure to enclose the options and filenames within one set of quotes.)

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.
–bl	Select screen length.
–bw	Select screen width.
–c	Clear the .bss section.
–f *filename*	Identify a new board configuration file.
–font *size*	Select font point size.
–i *pathname*	Identify additional directories.
–me	Select little-endian format.
–min	Select the minimal debugging mode.
–n *processor name*	Identify the processor for debugging (this processor name must match the processor name as stated in the configuration file).
–p *port address*	Identify the port address.
–profile	Enter the profiling environment.
–s	Load the symbol table only.
–t *filename*	Identify a new initialization file.
–v	Load without the symbol table.

Note: Overriding D_OPTIONS

You can override D_OPTIONS by invoking the debugger or emurst with the –x option.

For more information about options, see the invocation instructions in the *TMS470R1x C Source Debugger User's Guide*.

- If you are using the X Window System, you can use the DISPLAY environment variable to display the debugger on a different machine from the one the debugger is running on. The general format for doing this is:

  setenv DISPLAY *machine name*

  For example, if you are running the debugger on a machine called opie and you want the debugger display to appear on a machine called barney, the DISPLAY setup would be:

  ```
  setenv DISPLAY barney:0 ↵
  ```

  You can also display the debugger on a different machine by using the -d option when invoking the debugger.

  ```
  emu470 –d barney:0 ↵
  ```

  For more information about using the debugger under the X Window system, see Section 5.8, *Using the Debugger With the X Window System*.

Invoking the new or modified .cshrc file

When you modify your shell configuration file, you must ensure that the changes are made to your current session. For example, if you are using a C shell, use this command to reread the .cshrc file:

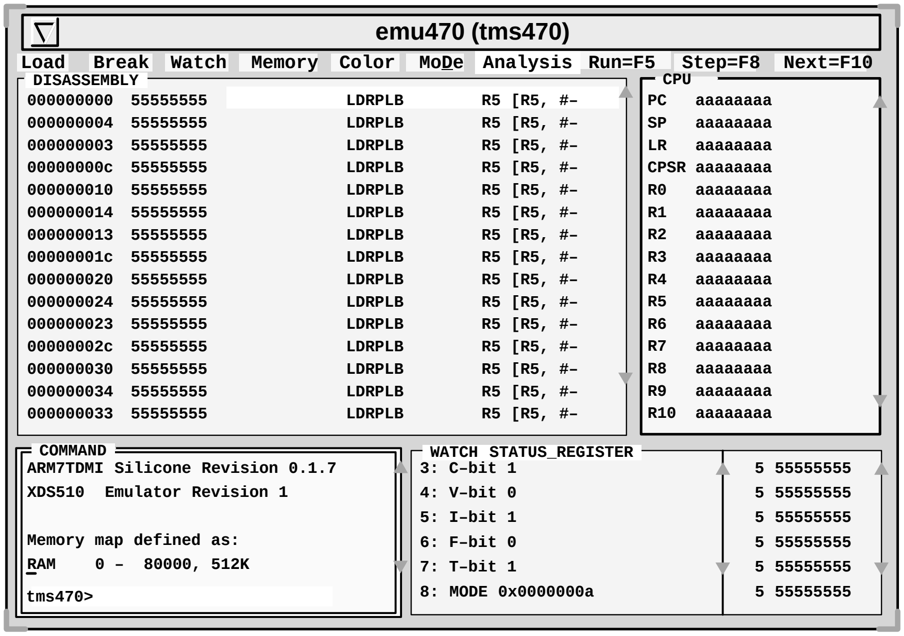
```
source ~/.cshrc ↵
```

5.7 Step 6: Verifying the Installation

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

emu470 –p *port address* –n tms470 ↵

You should see a display similar to this one:



```
000000000  55555555            LDRPLB        R5 [R5, #–
000000004  55555555            LDRPLB        R5 [R5, #–
000000003  55555555            LDRPLB        R5 [R5, #–
00000000c  55555555            LDRPLB        R5 [R5, #–
000000010  55555555            LDRPLB        R5 [R5, #–
000000014  55555555            LDRPLB        R5 [R5, #–
000000013  55555555            LDRPLB        R5 [R5, #–
00000001c  55555555            LDRPLB        R5 [R5, #–
000000020  55555555            LDRPLB        R5 [R5, #–
000000024  55555555            LDRPLB        R5 [R5, #–
000000023  55555555            LDRPLB        R5 [R5, #–
00000002c  55555555            LDRPLB        R5 [R5, #–
000000030  55555555            LDRPLB        R5 [R5, #–
000000034  55555555            LDRPLB        R5 [R5, #–
000000033  55555555            LDRPLB        R5 [R5, #–
```

```
PC   aaaaaaaa
SP   aaaaaaaa
LR   aaaaaaaa
CPSR aaaaaaaa
R0   aaaaaaaa
R1   aaaaaaaa
R2   aaaaaaaa
R3   aaaaaaaa
R4   aaaaaaaa
R5   aaaaaaaa
R6   aaaaaaaa
R7   aaaaaaaa
R8   aaaaaaaa
R9   aaaaaaaa
R10  aaaaaaaa
```

```
ARM7TDMI Silicone Revision 0.1.7
XDS510  Emulator Revision 1

Memory map defined as:
RAM    0 –  80000, 512K

tms470>
```

```
3: C–bit 1               5 55555555
4: V–bit 0               5 55555555
5: I–bit 1               5 55555555
6: F–bit 0               5 55555555
7: T–bit 1               5 55555555
8: MODE 0x0000000a       5 55555555
```

- If you see a display similar to this one, you have correctly installed your emulator and debugger.
- If you do not see a display, then your debugger, board, or XDS510WS 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.
- If you continue to experience problems, see Appendix A, *Workstation Troubleshooting*.

5.8 Using the Debugger With the X Window System

If you're using the X Window System to run the '470 debugger, you need to know about the keyboard's special keys, the debugger fonts, and using the debugger on a monochrome monitor.

Using the keyboard's special keys

The debugger uses some special keys that you can map differently from your particular keyboard. Some keyboards, such as the Sun Type 5 keyboard, have these special symbols on separate keys. Other keyboards, such as the Sun Type 4 keyboard, do not have the special keys, but the functions are available.

The special keys that the debugger uses are shown in the following table with their corresponding keysym. A *keysym* is a label that interprets a keystroke; it allows you to modify the action of a key on the keyboard.

Debugger Key Needed	Keysym for That Function
F1 to F10	F1 to F10
PAGE UP	Prior
PAGE DOWN	Next
HOME	Home
END	End
INSERT	Insert
→	Right
←	Left
↑	Up
↓	Down

Use the X utility xev to check the keysyms associated with your keyboard. If you need to change the keysym definitions, use the xmodmap utility. For example, you could create a file that contains the following commands and use that file with xmodmap to map a Sun Type 4 keyboard to the keys listed above:

key code keysym

```
keysym R13    = End
keysym Down   = Down
keysym F35    = Next
keysym Left   = Left
keysym Right  = Right
keysym F27    = Home
keysym Up     = Up
keysym F29    = Prior
keysym Insert = Insert
```

Refer to your X Window System documentation for more information about using xev and xmodmap.

Changing the debugger font

You can change the font of the debugger screen by using the xrdb utility and modifying the .Xdefaults file in your root directory. For example, to change the ’470 debugger fonts to Courier, add the following line to the .Xdefaults file:

```
emu470*font:courier
```

For more information about using xrdb to change the font, refer to your X Window System documentation.

Color mappings on monochrome screens

Although a color monitor is recommended, you can use a monochrome monitor. The following table shows the color mappings for monochrome screens:

Color	Appearance on Monochrome Screen
black	black
blue	black
green	white
cyan	white
red	black
magenta	black
yellow	white
white	white

Appendix A

Workstation Troubleshooting

This chapter describes some common problems you may encounter while using your emulator or debugger on your SPARCstation or HP workstation.

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A.1 Problems When Booting Your Workstation

After installing your emulator, problems may occur when you attempt to boot your workstation. The following are typical problems and suggestions to help resolve these problems:

❑ Your workstation will not boot when connected to your emulator, even if your emulator is not turned on.

1) Be sure that all of your SCSI cables are connected securely and that the SCSI bus is terminated properly.
2) Remove any unnecessary SCSI devices from the bus.
3) Make sure that the total length of the SCSI bus is less than six meters, including the section of the bus within the SPARCstation chassis.

❑ Your workstation will boot when the emulator is turned off but will not boot when the emulator is turned on.

Your emulator’s SCSI ID conflicts with the SCSI ID of another device on the SCSI bus.

For more information, see the *XDS51x Emulator Installation Guide.*

A.2 Problems With Multiple Emulators on SunOS

When you have multiple emulators running constantly, they may consume most of the CPU time. To overcome this situation, run the emulators at a lower priority using the UNIX nice command. See the man page entry on nice for more information.

A.3 Problems When Resetting the Emulator

After you power up the emulator and the workstation, and if you have the following problems while attempting to reset the emulator, implement the applicable solutions:

- When you execute the emurst command, you receive this message:

  ```
  emurst file [.out]:
  ```

  You forgot to specify the *pathname–filename* of the r470510ws.out file. You can specify it at this prompt or you can reeducate emurst with *pathname–filename* specified on the command line.

- When executing the emurst command, you receive this message:

  ```
  >> can’t initialize the target system
  ```

  1) You haven’t set the IPCSEMAPHORE option to allow the debugger to access the emulator. Be sure that the configuration file, EMULATOR, has the options line set correctly, without comments. Then, use the corrected configuration file to build the currently executing kernel (see the XDS510WS installation instructions in the *XDS51x Emulator Installation Guide* for more information).

  2) There are too many current semaphores on the system. Clean up the unused semaphores by using the **ipcs –st** and **ipcrm** utilities, and try to execute emurst again.

  3) You may not have permission to access the driver file you specified with the –p debugger option. Normally, you specify the –p debugger option on the command line or in the D_OPTIONS environment variable. Remember, if you haven’t specifically reset the driver file number to another number, the default is 4. Have the root user execute the following command, and try to execute emurst again.

     `chmod a+rw /dev/rsd#a` ⏎

  4) The driver file you specified with the –p debugger option is not correctly associated to your emulator in your configuration file. Make sure your configuration file contains a line similar to this:

     ```
     disk sd# at scsibus<m> target <s> lun 0
     ```

     where # is the device driver number. The <m> is zero (0) unless the XDS510WS is connected to a second SCSI bus that you added to your SPARCstation, which causes <m> to change. The <s> is the SCSI ID of the XDS510WS you set with the switch at the front of the XDS510WS. Use the corrected configuration file to build the currently executing kernel (see the XDS510WS installation instructions in the *XDS51x Emulator Installation Guide* for more information).

5) You have not turned on the XDS510WS, or it has not completed its self test. Turn on the XDS510WS and wait for the self test to complete successfully before executing emurst. The self test has completed once the sixth LED from the left is off and the first, second, and fifth LEDs from the left are on.

❑ When executing the emurst command, you receive this message:

```
>> error loading file
```

1) The emurst utility can’t find the r470510ws.out file as specified. If you didn’t specify the *pathname–filename* with an extension as part of the name, the emurst utility appends the default extension *.out* to the name.

2) If you didn’t provide path information (just the filename), emurst searches first in the current directory and then in all of the directories specified in the D_DIR environment variable before returning this error. Make sure the correct file is located where emurst can find it.

3) The file that you specified to emurst is not appropriate for this use. Use the r470510ws.out file that is included with the debugger software.

A.4 Problems When Invoking the Debugger

If you encounter these problems when you invoke the debugger, the suggested solutions may resolve the problems:

❑ You receive the following message when executing the emu470 command:

```
CANNOT INITIALIZE THE TARGET !!
– Check I/O configuration
– Check cabling and target power
```

1) The emurst command didn't successfully execute before you tried to invoke the debugger. Execute emurst (see Section 4.4, *Step 3: Ensuring That the Emulator Supports the Debugger,* on page 4-6 for SPARCstations and Section 5.4, *Step 3: Ensuring That the Emulator Supports the Debugger,* on page 5-5, for HP workstations). The emurst has completed successfully if you see your command prompt after this message:

   ```
   EMURST for XDS510WS loading <pathname-filename> at #
   ```

   where <pathname-filename> is the location of the r470510ws.out file, and # refers to the file /dev/rsd#a, which is associated with the emulator in the configuration file, EMULATOR. Also, you can be sure that emurst succeeded when only the first and second LEDs from the left are on.

2) The –p debugger option that you entered on the command line or in the D_OPTIONS environment variable specifies a different driver file from the one used by emurst. Remember, if you haven't specifically reset the driver file number to another number, the default is 4. Use the same –p option that you used when you executed emurst. (For more information on the –p option, see Section 4.4, *Step 3: Ensuring That the Emulator Supports the Debugger,* on page 4-6, for SPARCstations and Section 5.4, *Step 3: Ensuring That the Emulator Supports the Debugger,* on page 5-5, for HP workstations.)

3) The –f debugger option you specified on the command line or in the D_OPTIONS environment variable (where the default file specified by the –f option is board.dat) specifies a file that the debugger can't find.

   - If you didn't provide *any* path information with the filename, the debugger could not find the file in the current directory or in any of the directories listed in the D_DIR environment variable.

   - If you didn't provide the *correct* path information, reexecute the debugger, specifying the correct pathname and filename for the board configuration file.

4) One of these two problems could exist:

   - You didn't specify **–n tms470** debugger option.
   - The debugger couldn't find the **tms470** that you specified with the **–n** option in your board configuration file.

   Re-execute the debugger with the –n debugger option, specifying the name of a '470 device from the board configuration file.

5) You may not have described your target system correctly in the board configuration file that you specified with the –f debugger option on the command line or in the D_OPTIONS environment variable. Review your board configuration file and correctly describe the target system.

6) Make sure that your emulation cable is firmly attached both to the XDS510WS and to your target system.

7) Make sure that your target system is receiving sufficient power at the required voltage to allow all devices on the board to work properly.

❑ You receive the following message at the operating-system command line when trying to execute the emu470 command:

```
emu470: display :0.0 doesn't know font 7x14
```

The default font file that the debugger uses (7x14.ff) couldn't be found by OpenWindows. OpenWindows searches for these font files in the directories specified in the FONTPATH environment variable. To correct the problem, do one of the following:

- Add the font file 7x14.ff to a directory defined in the FONTPATH environment variable.
- Add to the .Xdefaults file in your home directory the line "emu470*font: *GoodFontName*", where *GoodFontName* is the name of a font that OpenWindows can find.
- Copy a valid font file onto 7x14.ff.

A.5 Additional Emulator and Debugger Problems

The operating-system window displays operating-system messages. These messages differ from the error messages that you may see in the COMMAND window of the debugger. If you receive one of these operating-system messages while executing emu470 or emurst under SunOS 4.1.x, refer to the following explanations.

These messages are status messages, not error messages.

- ❑ `<date> <time> <hostname> vmunix: sd<n>: disk not responding to selection`

  or under SunOS 5.x:

  ```
  WARNING: /sbus@1,f8000000/esp@0,800000/sd@<n>,0(sd<n>):
        disk not responding to selection
  ```

  The XDS510WS didn't respond to the SPARCstation in a certain amount of time. This can be caused by one of these conditions:

  - ■ The XDS510WS isn't powered.
  - ■ The XDS510WS is executing its self test.
  - ■ The XDS510WS is executing a lengthy debugger command such as a large memory fill.

- ❑ `<date> <time> <hostname> vmunix: sd<n>: offline`

  or under SunOS 5.x.

  ```
  WARNING /sbus@1,f8000000/esp@0,800000/sd@<n>,0(sd<n>):
        offline
  ```

  The SPARCstation is unable to select the XDS510WS after several attempts and therefore considers the emulator to be offline. This message can be generated during large memory-fill instructions and should *not* be considered an error by itself or in combination with the preceding message. The debugger automatically corrects for this situation unless a major error has taken place, in which case the debugger eventually returns an error message in the COMMAND window of the debugger.

❑
```
<date> <time> <hostname> vmunix: sd<n>: disk okay
```

or under SunOS 5.x:

```
WARNING: /sbus@1,f8000000/esp@0,800000/sd@<n>,0(sd<n>):
      disk okay
```

The SPARCstation has reconnected with the XDS510WS after the XDS510WS didn't respond to the selection. When the debugger recovers from the *offline* condition (described in the previous bulleted item), one of the two messages shown above is written to the operating-system window.

❑
```
sd<n> at esp0 target <p> lun 0
sd<n>: Vendor 'TI–ASP', product 'XDS510–WS_Rev.*', 130
512 byte blocks
<date> <time> <hostname> vmunix: sd<n>: corrupt label –
wrong magic number
```

If the emulator has been inactive on the bus since the SPARCstation's last attempt to access it, the XDS510WS returns to an active status on the bus. The above message informs you of this *new* SCSI device.

Note:

Since the SPARCstation interprets the emulator as a SCSI disk, the SPARCstation expects it to be formatted. When the SPARCstation first finds that the new device isn't formatted, it produces the corrupt label message.

Appendix B

Installing the Emulator Device Driver Manually

You must install the emulator device driver (genport.sys) in the Windows NT registry to enable the debugger to communicate with the emulator. If you can't get regdrv installation program (described in Section 2.4, *Installing the Emulator Device Driver*, on page 2-5) to install and register the emulator device driver, you can install the driver manually by performing the following steps:

1) Copy the device driver file and invoke the registry editor.
2) Set up the genport directory.
3) Set up the values for the genport directory.
4) Set up the Parameters directory and values.

This appendix describes these steps.

Topic **Page**

B.1 Copying the Device Driver File and Invoking the Registry Editor

The TMS470R1x Emulator CD-ROM includes a genport.sys file that contains information about the emulator device driver. You must copy this file to the Windows NT drivers directory. Once you do so, you can use the registry editor to register the genport.sys parameters, allowing the emulator and debugger to communicate.

1) Copy genport.sys to the Windows NT drivers directory. For example:

   ```
   copy c:\emu470\genport.sys c:\winnt35\system32\drivers ↵
   ```

   or

   ```
   copy c:\emu470\genport.sys c:\windows\system32\drivers ↵
   ```

2) Invoke the registry editor:

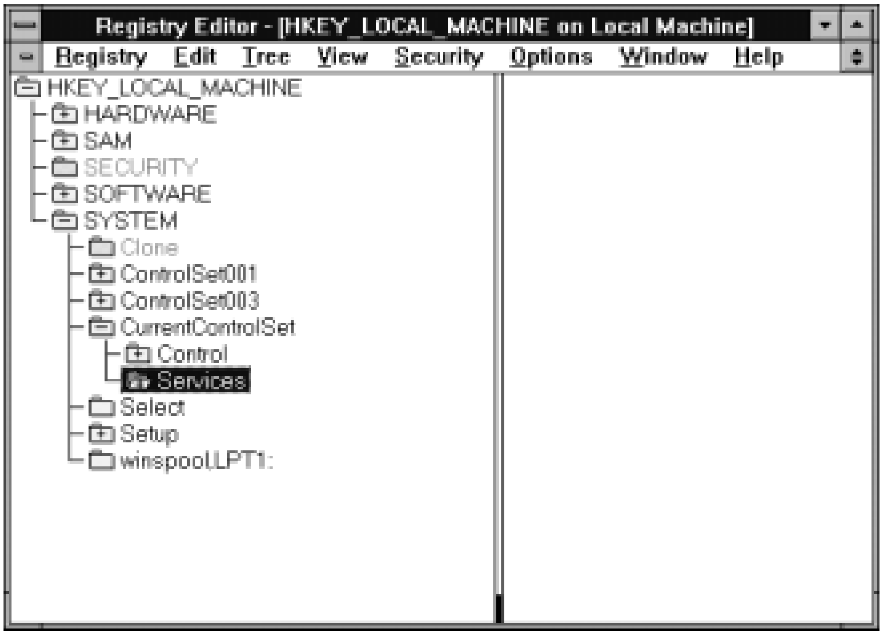
   ```
   regedt32 ↵
   ```

   The registry editor brings up several windows.

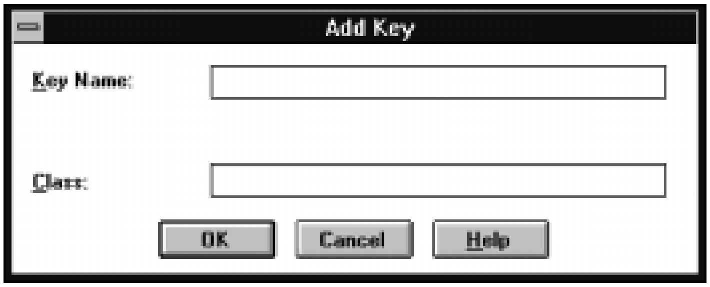
The remaining sections in this appendix tell you how to register the genport.sys parameters.

B.2 Setting Up the Genport Directory

1) After you invoke the registry editor, locate the window called *HKEY_LOCAL_MACHINE on Local Machine* and select the SYSTEM\CurrentControlSet\Services directory icon.



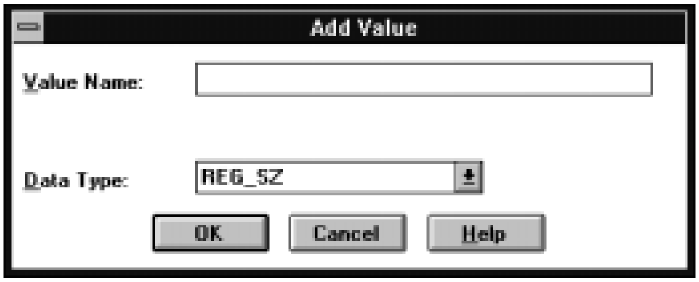
2) While the Services directory icon is highlighted, select Edit → Add Key from the menu bar. This displays the Add Key dialog box:



3) Enter *Genport* as the Key Name, then click on the OK button. This causes the Genport directory icon to appear under the Services directory (you may need to scroll the window to see the Genport directory).

B.3 Setting Up the Values for the Genport Directory

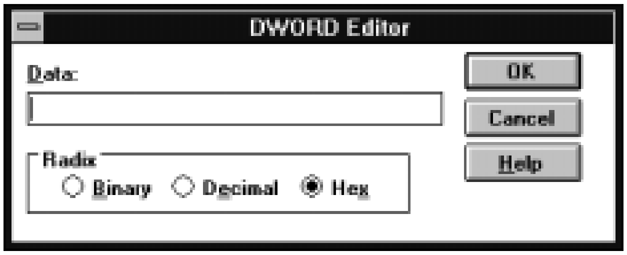
1) Click on the Genport directory icon to make it active (highlighted), then select Edit → Add Value from the menu bar. This displays the Add Value dialog box:



Value Name:

Data Type: REG_SZ

2) Enter *ErrorControl* as the Value Name, select *REG_DWORD* as the Data Type, then click on the OK button. This displays the DWORD editor dialog box:



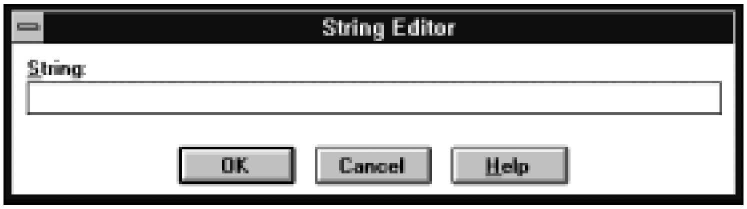
Data:

Radix: ○ Binary ○ Decimal ● Hex

3) Enter *1* as the Data, select *Hex* as the Radix, then click on the OK button.

4) Click on the Genport directory icon to make it active (highlighted), then select Edit → Add Value from the menu bar. This displays the Add Value dialog box.

5) Enter *Group* as the Value Name, select *REG_SZ* as the Data Type, then click on the OK button. This displays the String Editor dialog box:



String:

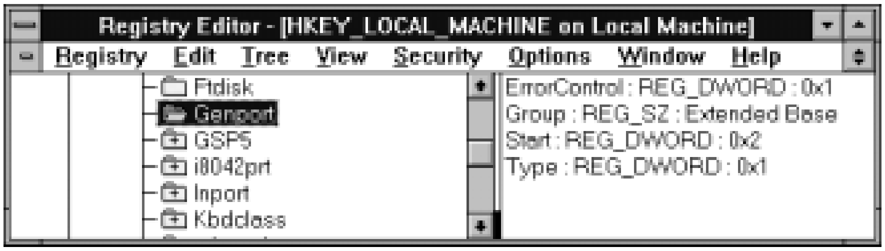
6) Enter *Extended Base* as the String, then click on the OK button.

7) Repeat steps 1–3 with the following information:

Value Name:	Start
Data Type:	REG_DWORD
Data:	2
Radix:	Hex

Value Name:	Type
Data Type:	REG_DWORD
Data:	1
Radix:	Hex

The following values should appear in the registry editor when the Genport directory icon is highlighted:



ErrorControl : REG_DWORD : 0x1
Group : REG_SZ : Extended Base
Start : REG_DWORD : 0x2
Type : REG_DWORD : 0x1

B.4 Setting Up the Parameters Directory and Values

1) Click on the Genport directory icon to make it active, then select Edit → Add Key from the menu bar. This displays the Add Key dialog box.

2) Enter *Parameters* as the Key Name, then click on the OK button. This causes the Parameters directory icon to appear under the Genport directory.

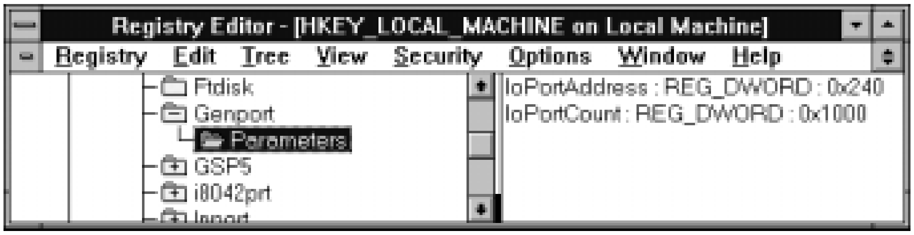
3) Click on the Parameters directory to make it active, select Edit → Add Value from the menu bar, then enter the following information:

Value Name:	IoPortAddress
Data Type:	REG_DWORD
Data:	240
Radix:	Hex

4) Repeat step 3 with the following information:

Value Name:	IoPortCount
Data Type:	REG_DWORD
Data:	1000
Radix:	Hex

The following values should appear in the registry editor when the Parameters directory icon is highlighted:



```
IoPortAddress : REG_DWORD : 0x240
IoPortCount : REG_DWORD : 0x1000
```

5) Exit the registry editor, then reboot your PC. This completes the manual driver installation process.

*This template is for the “*See*” and “*See also*” references in your index. Since these entries do not have a page number associated with them, it’s extremely difficult to locate one if you need to modify or delete it and you don’t remember which chapter it’s in. By using this template, you can alphabetize your entries according to the first letter of the first level entry.*

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

Index

Literature Number Request Form

Requester:	Sheryl Moore	274–3456	SAMZ
	Patrick Rockecharlie	*274–2863*	*PRR1*
	name2	*phone2*	*MSG2*
	name3	*phone3*	*MSG3*
	name4	*phone4*	*MSG4*
	name5	*phone5*	*MSG5*

Please fill in the following information completely. Attach a copy of the first page or cover of the document needing a literature number (when available). If you have any questions interpreting the instructions, contact the Literature Number Assigner.

New ___ | Revision____ Correction_X__ | Version Chnge:____
* Product Family: | * Literature Number: | *Liter. No _______
* Type Code: | * Revision Letter: * | Gram. Chnge: Yes No
| | Language:_________
| Alphabet:_________

Distribution Region: x World Wide Asia Pacific Europe Japan United States
____

Concise Description of Document (up to 45 characters):
concise desc
* Title 1: Book Title
* Title 2: Subtitle
* Title 3: Getting Started Guide

* Origination Date: orig date * Revision Date: October 1996

* Number of Pages:

* Source Custodian: (Circle One)
ASL ASPD ASPH LIN MOSM PSP MARK Non–US: ____
____

* Document Status: (Circle One) PP AI PD MS * Document Source: RDM

Note: Attach a separate sheet if the space below is not enough. Special arrangements for importing file listings for extremely large books are available.

* Device Name Listing: (List all device names associated with the technical document described above.)
TMS

Included in Literature Number: (List all parent literature numbers.)
N/A________________ ____________________ ____________________ ____________________

Child Literature Numbers (For books list all children.)
N/A________________ ____________________ ____________________ ____________________
____________________ ____________________ ____________________ ____________________
____________________ ____________________ ____________________ ____________________
____________________ ____________________ ____________________ ____________________

27 Device Name: List all of the devices found on this document. This is not necessary for user guides or books that are a compilation of other documents. Please list all of these even when they are in the title; a substitute Literature Number Assignor may not be familiar with your device names.

28 Old LiteratureNumber: Next to each Device Name write in the corresponding literature number on which this technical information is superseding. This note will be made in the database so the most current information for a device can be found.

ECN/Manufacturing Part Number Request

Date of Request ______

Complete Title TMS470R1x Emulator Software Getting Started Guide

Responsible Writer	Phone	MSGID
Sheryl Moore	274–3456	SAMZ
Patrick Rockecharlie	*274–2863*	*PRR1*
name2	*phone2*	*MSG2*
name3	*phone3*	*MSG3*
name4	*phone4*	*MSG4*
name5	*phone5*	*MSG5*

New or revised book? Revised

If revised,
original part number:: ______

Primary Contact ______ MSGID ______ Approx. Page Count 100

Device type: □ DSP □ Microcontroller

Page Trim Size

□ 6.375 × 8.5
☑ 7.5 × 9.25
□ 8.5 × 11
□ other (specify) ______

Binding/Cover Style

☑ black-and-white/self-cover/saddle-stitch
□ yellow-and-blue/soft cover/auto-bound
□ other (specify) ______
□ 3-hole punch required?

Reference Cards	Number
☑ none	
□ reader response	______
□ pocket-sized reference (include # of panels)	______
□ other-sized reference (include # of panels)	______

Restricted Access? ______

TDS-Written Document? (if not, explain) yes

Illustrator Artwork Boards? (list) ______

Literature Number (including rev. letter) SPNU123B

Database (Publishing Software)

☑ Interleaf
□ Word Perfect
□ other (specify) ______

Will this document be included in a kit that TI ships? In most cases, the answer will be "yes"; an example of an exceptional document is a product brief—it usually doesn't ship with kits. ______

If the book is a revision, give a brief description of the changes that are occurring in the book and why these changes are occurring. If the book is an addendum or manual update sheet (MUS), give the name of the book that the document is modifying, a brief description of the contents of the addendum or MUS, and why the changes are occurring.

If you have any additional comments or you want to further describe something above, use this space:

ECN/Manufacturing Part Number Request

Complete Title TMS320C5x C Source Debugger User’s Guide

Responsible Writer Sheryl Moore MSGID SAMZ New or revised book? revised

Primary Contact Eric Stotzer MSGID EJS1 Approx. Page Count 370

Page Trim Size

□ 6.375 × 8.5

☑ 7.5 × 9.25

□ 8.5 × 11

□ other (specify)

Binding/Cover Style

□ black-and-white/self-cover/saddle-stitch

☑ yellow-and-blue/soft cover/auto-bound

□ other (specify)

□ 3-hole punch required?

Reference Cards	Number
□ none	
☑ reader response	1
☑ pocket-sized reference (include # of panels)	1 (8 panels)
☑ other-sized reference (include # of panels)	1 (4 panels)

Restricted Access? no

TDS-Written Document? (if not, explain) yes

Illustrator Artwork Boards? (list) covers

Literature Number (including rev. letter) SPRU055A

Database (Publishing Software)

☑ Interleaf

□ Word Perfect

□ other (specify)

Will this document be included in a kit that TI ships? In most cases, the answer will be “yes”; an example of an exceptional document is a product brief—it usually doesn’t ship with kits. yes

If the book is a revision, give a brief description of the changes that are occurring in the book and why these changes are occurring. If the book is an addendum or manual update sheet (MUS), give the name of the book that the document is modifying, a brief description of the contents of the addendum or MUS, and why the changes are occurring.

Numerous features have been added to the debugger since the last revision of the book. This revision adds support for patch assembly, profiler, analysis, and multiple MEMORY windows. Also added is support for the EVM. This revision deletes support for the SWDS.

If you have any additional comments or you want to further describe something above, use this space:

The “other-sized” reference card is twice the width of the pocket reference card.

TECHNICAL DOCUMENTATION SERVICES

REQUEST FOR ILLUSTRATION: TMS470R1x Emulator Software `Subtitle` Getting Started Guide

DATE IN	REQUESTER Sheryl Moore *Patrick Rockecharlie* *name2* *name3* *name4* *name5*		PHONE 274–3456 *274–2863* *phone2* *phone3* *phone4* *phone5*	MSG SAMZ *PRR1* *MSG2* *MSG3* *MSG4* *MSG5*
DATE REQUESTED	FINAL REVIEW DATE 9/26/96	TO PRINT **10/4/96**	DIV/COST CENTER 499	JOB NO. 66261
FINAL FORMAT			MFG PART #: M414009–9741A	LIT #: SPNU123B
PATH NAME FOR FILES				

INSTRUCTIONS: Include purpose and description of each illustration.

Document Type (Please check one)	**Font**	**Line Spacing**	**Caps**
□ Data Sheets (Product Preview, Adv. Info., Production Data)	8–bold	10	Initial
□ Application Report/Application Book/Application Guide	8–bold	10	Initial
□ User’s Guide/Reference Guide	9–medium	10	Initial
□ Technical Reference/Installation Guide	9–medium	10	Initial
□ Data Manual	8–bold	10	Initial
□ Product Brief	9–medium	10	Initial

Line Weights

Object line weight: 0.022 in. or 0.75 mm. or 1.5 points. Connecting line weight: 0.01 in. or 0.35 mm. or 0.5 points.
Reference line weight: 0.01 in. or 0.35 mm. or 0.5 points.
Single-line representations of multiple lines should be 2–points line weight with the number of lines indicated.

Text

The positioning of text is generally flush toward the object or entity being labeled. Labels often are (or contain) acronyms; acronyms are always shown in the same manner throughout the document, once the acronym is established
Text style varies according to the document type:

Illustrator: ______________________ Illustrations completed/proofed ______________ Date ______________

TECHNICAL DOCUMENTATION SERVICES

First Review: TMS470R1x Emulator Software Getting Started Guide *Subtitle*

Literature Number: SPNU123B **Mfg Part** #:M414009–9741A **TDS Job #**: 66261
Device Number(s): TMS

Concise Description: concise desc
Scheduled printing date: 10/4/96 **Print Quantity:**

Distributed:	9/13/96	**Return by:**	***return date***
From:	Sheryl Moore	*274–3456*	SAMZ
	Patrick Rockecharlie	*274–2863*	*PRR1*
	name2	*phone2*	*MSG2*
	name3	*phone3*	*MSG3*
	name4	*phone4*	*MSG4*
	name5	*phone5*	*MSG5*

		Responsible for these topics:	**Initials**
Program manager:	Jon Humphreys	All	___________
Source engineer:	Krishna Allam	All	___________
Additional engineer(s):	Caryn Arouty	All	___________
	Ray Pereda	All	___________
	Mark Rix	All	___________
	Mark Sanderson	All	___________
Application engineer:	source 6	All	___________
		All	___________
	source 8	All	___________
	source 9	All	___________
	source 10	All	___________
DSP hotline:	Roland Larch	All	___________
Marketing:	Armin Lichtblau	Marketing data	___________
Marcom Manager:	Bradley Pesson	Marketing data	___________
Senior Writer:	Sheryl Moore	All	___________
Mentor:	Mary Early	Organization, style	___________
Documentation editor:	Maureen Riordan	Spelling, grammar, format, consistency, etc.	___________
Illustrator:	**Bob Herke**	Illustrations	___________

This is the first review of the TMS470R1x Emulator Software `Subtitle` ***one–line titletwo–line title***. Please send your corrections, additions, and suggestions to me before 4:00 on *return date*.

The purpose of this review is to identify technical inaccuracies, missing information, and organizational problems. As you review this book, please do the following:

- To ensure technical accuracy, carefully scrutinize the portions of the book that you sourced, and please review the rest of the book to locate potential inconsistencies created by different sources.
- Make every effort to meet the review deadline. If you do not have time in your schedule, please find someone else who can provide input equal to your level of expertise.
- Provide specific comments about what needs to be fixed. Please include detailed information that needs to be added, and give specific examples that can make the documentation more useable by our end customers.
- Do not be overly concerned about such things as headers and footers and cosmetic appearance; a documentation editor and illustrator reviews the document to ensure consistency with TDS standards.

First Review: TMS470R1x Emulator Software Getting Started Guide *Subtitle*

Thank you for serving as a valuable resource in our documentation process.

Patrick Rockecharlie*, name2, name3, name4, name5*

TECHNICAL DOCUMENTATION SERVICES

Second Review: TMS470R1x Emulator Software Getting Started Guide *Subtitle*

Literature Number: SPNU123B **Mfg Part** #:M414009–9741A **TDS Job #**: 66261
Device Number(s): TMS

Concise Description: concise desc

Scheduled printing date: 10/4/96 **Print Quantity:**

Distributed: 9/26/96 **Return by:** ***return date***

From:	Sheryl Moore	274–3456	SAMZ
	Patrick Rockecharlie	*274–2863*	*PRR1*
	name2	*phone2*	*MSG2*
	name3	*phone3*	*MSG3*
	name4	*phone4*	*MSG4*
	name5	*phone5*	*MSG5*

		Responsible for these topics:	**Initials**
Program manager:	Jon Humphreys	All	___________
Source engineer:	Krishna Allam	All	___________
Additional engineer(s):	Caryn Arouty	All	___________
	Ray Pereda	All	___________
	Mark Rix	All	___________
	Mark Sanderson	All	___________
Application engineer:	source 6	All	___________
		All	___________
	source 8	All	___________
	source 9	All	___________
	source 10	All	___________
DSP hotline:	Roland Larch	All	___________
Marketing:	Armin Lichtblau	Marketing data	___________
Marcom Manager:	Bradley Pesson	Marketing data	___________
Senior Writer:	Sheryl Moore	All	___________
Mentor:	Mary Early	Organization, style	___________
Documentation editor:	Maureen Riordan	Spelling, grammar, format, consistency, etc.	_
Illustrator:	Bob Herke	Illustrations	___________

This is the second review of the TMS470R1x Emulator Software `Subtitle` ***one–line titletwo–line title***. The content of this book has been updated with comments from the last review. Please send corrections, additions, and suggestions to me before 4:00 on *return date*.

Please remember that you need to make all organizational and informational suggestions and corrections at this time. The next review is usually the final review;

If you cannot review this book, please find someone else who can provide input equal to your level of expertise.

Thank you for your cooperation.

Patrick Rockecharlie*, name2, name3, name4, name5*

TECHNICAL DOCUMENTATION SERVICES

FINAL SIGNOFF: TMS470R1x Emulator Software Getting Started Guide

Literature Number: SPNU123B **Mfg Part** #:M414009–9741A **TDS Job #**: 66261

Distributed: 9/26/96 **Return by:** **9/30/96**
From: Patrick Rockecharlie *274–2863* *PRR1*

The enclosed document is ready for final approval and printing.

Please review it carefully to ensure that it is technically accurate, and then sign and date this form so we can send the book to print.

Major changes at this time can almost guarantee a slip in the printing schedule, which requires 3 to 5 weeks.

		Sign Off for Print	Date
Program manager:	Jon Humphreys	____________	________
Source engineer:	Krishna Allam	____________	________
Additional engineer(s):	Caryn Arouty	____________	________
	Ray Pereda	____________	________
	Mark Rix	____________	________
	Mark Sanderson	____________	________
Senior Writer:	Sheryl Moore	____________	________
Documentation editor:	Maureen Riordan	____________	________
Illustrator	Bob Herke	____________	________
Writer(s):	Patrick Rockecharlie	____________	________

MarCom: Please verify the print quantity and scheduled print date, and sign below.

Print Quantity: **Scheduled printing date: 10/4/96**

Marcom Manager: Bradley Pesson ____________ ________

Marketing/Team Leader: Please verify the devices; indicate the appropriate fullfillment channels; sign below.

Device Number(s): TMS

Channel	**Yes**	**No**
Internet		
Fax Servers		

Channel	**Yes**	**No**
Field Sales Office CD ROM		
Product Specific CD ROM		

Channel	**Yes**	**No**
Hibbert		
Print on Demand		

Marketing: Armin Lichtblau ____________ ________

TECHNICAL DOCUMENTATION SERVICES

Collation List for Electronic Transfer: TMS470R1x Emulator Software Getting Started Guide

Literature Number: SPNU123B **Mfg Part** #:M414009–9741A **TDS Job #**: 66261

Collation List file name 66261a.ps

Item	**# of Pages**	**File Name**	**Page Numbers**
Cover (see note 1)	4	**66261b.ps**	–
Title Page	1	**66261c.ps**	i (Implied)
Important Notice	1	**66261d.ps** **(Note: This MUST be a separate file!)**	ii (implied)
Preface	6	**66261e.ps**	iii to viii
TOC	4	**66261f.ps**	ix to xii
Chapter 1 (sse note 2)	16	**66261g.ps**	1 –1 to 1 –16
Chapter 2	16	**66261h.ps**	2 –1 to 2 – 16
Chapter 3	16	**66261i.ps**	3 –1 to 3 – 16
Chapter 4	14	**66261j.ps**	4 –1 to 4 – 14
Chapter 5	12	**66261k.ps**	5 –1 to 5 – 12
Appendix A	8	**66261l.ps**	A –1 to A–8
Appendix B	6	**66261m.ps**	B –1 to B–6
Index	10	**66261n.ps**	Index–1 to Index–10
Notes (see note 3) FSO	1 or pad to total 1	**UG_NOTES_LEFT.ps** **UG_NOTES_RIGHT.ps** **sszza01j.ps**	NEW FSO file date code:A040896
Business Reply Card (see note 1)	–		–
Reference Card (see note 1)	–		? pages
Total Pages (see note 4)	116 (multiple of 4)		

Notes

1) Cover:

- If your book has a blue and yellow cover, enter 0 (do not count the covers, reference cards, etc.)
- If your book has a self-cover, enter 4 (front and back cover as 4 pages).

2) Add as many rows as necessary for chapters, filenames, etc.

3) The Notes and Field Sales Office (FSO) listing count as 2 pages and the print vendor pads the last signature with the correct number of notes pages as needed.

4) The **Total Pages** should be a multiple of 4. The FSO is included on all documents; add notes page to create even signatures (which must be a mutlple of 4).

5) If you have more than 26 files, use “66261**za – 66261zz; then 66261zza – 66261zzz;**

Additional Information for Printer

☞ Note that *all possible fonts* are listed below. Before sending this book to print, delete fonts from the list that aren't used in this book.

Fonts Used: Helvetica
Helvetica Narrow
Courier
Symbol A
Symbol B
Symbols
Math A

Operating System: SunOS 4.1.3

Authoring/Word Processing Software: Interleaf 5.4.1

Media: 1/4" tape cartridge (DC6150)

PostScript Information: All fonts should be self-contained in the PostScript files. PostScript files are FTPs or written to tape in UNIX TAR format by default; other formats can be arranged with prior conditions

TECHNICAL DOCUMENTATION SERVICES

Print Check: TMS470R1x Emulator Software Getting Started Guide *Subtitle*

Writer: Patrick Rockecharlie, name2, name3, name4, name5

Literature Number: SPNU123B **Mfg Part** #:M414009–9741A **TDS Job #**: 66261

Scheduled printing date: 10/4/96

Print check completed: ______________________ ______________________ ____________

Name Signature Date completed

Verify and check the following items against the Postscript printout before a book goes to print. If there are any errors, return this checklist with the hard copy of the book to the writer or formatter.

Cover

Front and Spine

Do the following match and appear in the correct font and size on the front cover and spine?

- ❑ Correct title
- ❑ Correct subtitle (if any)
- ❑ Correct year

❑ Is the correct product group on the bottom right-hand side of the front cover (see Doc Plan to verify).

Back

❑ Does the lower left-hand corner read “Printed in U.S.A.” followed by the correct month and year for the printing date?
❑ Is there a correct part number below the printing date (only for books that are shipped in kits)?
❑ Is there a correct literature number and revision letter in the lower right-hand corner?

Title Page

❑ Does the title match the one on the front cover?
❑ Does the subtitle match the one on the front cover (if any)?
❑ Is the TI logo at the bottom of the page with the soy ink and recycle paper logos?

Important Notice

❑ Has the Important Notice page been included?
❑ Is the copyright year correct?

Preface

❑ Do the running headers match each heading in the Preface?
❑ Do the footers on odd-numbered pages say *Read This First* (except on page iii).
❑ Are the sections that appear in the Preface in the following order?

- ❑ About This Manual
- ❑ How To Use This Manual (optional)
  - ❑ Are chapter references in this section correct?
- ❑ Notational Conventions
- ❑ Information About Cautions and Warnings (optional)
- ❑ Related Documentation From Texas Instruments
- ❑ Related Documentation — not from TI (optional)
- ❑ FCC Warning (for books that document boards or other hardware)
- ❑ Trademarks
- ❑ If You Need Assistance....
  - ❑ Are only relevant phone numbers included?

TECHNICAL DOCUMENTATION SERVICES

Print Check: TMS470R1x Emulator Software Getting Started Guide *Subtitle*

Table of Contents, Lists of Figure, Tables, etc.

- □ Does each title in the TOC match the section title? (Watch for overbars (ex. $\overline{\text{CSTRB}}$), capitalization, etc.)
- □ Does each chapter have a meaningful chapter description?
- □ Has the dot leader and page number been removed from each chapter description?
- □ Are all level 1 and 2 headings in the book included in the TOC?
- □ Do headings in the main TOC that should contain *Example*, *Figure*, *Table*, or *Equation* still include those words? (Sometimes these words are accidentally deleted from the TOC when it is formatted.)
- □ Do TOC page numbers match the actual page number?
- □ Do TOC section numbers match the actual sections?
- □ Are all page numbers correctly tabbed to the right-hand side of the page?
- □ Do all headings have at least five dots before the page number? (. . . .)
- □ Are appendixes listed with the correct letter?
- □ Are all unnecessary spaces removed from the titles?
- □ Do page breaks keep logical sections together?

Chapters, Appendixes

Verify the Mini Table of Contents (first page of each chapter):

  - □ Do the titles inside the box match the level 1 headings in the chapter?
  - □ Do the heading numbers match?
  - □ Do the page numbers match the location of the heading?
  - □ Are all page numbers correctly tabbed to the right-hand side of the page?
  - □ Are all level 1 headings in the chapter in the mini TOC?
  - □ Does the shading allow all text to be readable?

- □ Is the book free of NO TAGs? (Scan each chapter for the phrase NO TAG. If you find ONE, return to the writer or a formatter immediately and ask for a NO TAG electronic check of all chapters.)
- □ Are all running headers and footers positioned correctly?
- □ Does the running title in the header match the corresponding level one heading?
- □ Do the footers on the odd-numbered pages show the page number and the correct chapter title?
- □ Do the footers on even pages show the page number (and module title for a multivolume manual)?
- □ Are all pages in numerical order with no blank pages in the middle of a chapter?
- □ Do all page breaks avoid split paragraphs or widowed components?
- □ Are all graphics placed appropriately? (Verify that no graphics "hang out" in the margins.)
- □ Is all text in graphics readable?
- □ Does the chapter end on an even-numbered page?
- □ If the last page in the chapter is blank, is the header empty?

Index

- □ Does the index end on an even-numbered page?
- □ Have *Nu* and *Sy* been removed as the first heading(s)?
- □ Are all letter headings followed by index entries?
- □ Have you spot-checked at least 6 index entries?
- □ Are the column breaks logical?
- □ Does each column begin with one of the following: level 1 entry, index letter, or *entry*, continued?
- □ Have all "continued" headings been removed from within the column?
- □ Are all page ranges specified with "to" instead of and en dash (–)?
- □ Are there em spaces (   ) between the entry and the first page number?