

IBM

RISCWatch Debugger

Installation Guide

Ninth edition (June 1997)

This edition of *IBM RISCWatch Debugger Installation Guide* applies to IBM RISCWatch Debugger Version 4.0 and to all subsequent versions of the debugger until otherwise indicated in new versions or technical newsletters.

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Chapter 1. Introduction

This book describes how to install and configure the IBM RISCWatch Debugger hardware and software.

If you are a first time RISCWatch user, you must first determine the target type you will be using with RISCWatch. The following sections describe the four possible target types RISCWatch supports. Once you determine the target type, you may proceed to the chapter which details the installation procedures for the specific workstation (host) RISCWatch will be installed on.

BEFORE BEGINNING THE HARDWARE INSTALLATION, YOU MUST REFER TO THE ENCLOSED IBM SAFETY BOOKLET (SD21-0030-02).

JTAG Ethernet Target

The JTAG Ethernet target type requires hardware which is labeled "RISCWatch Processor Probe". One end of the RISCWatch processor probe connects to your host workstation via a standard ethernet setup. The other end of the processor probe connects to the JTAG connector resident on the target PowerPC board.

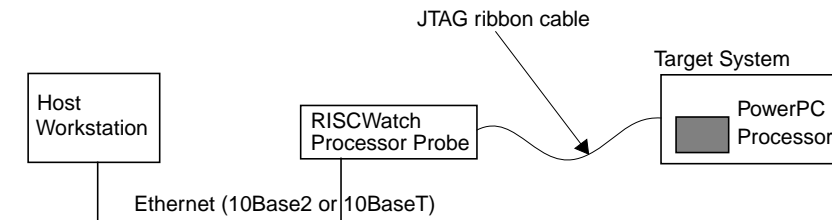


Figure 1-1. RISCWatch JTAG Ethernet Target

By setting the RISCWatch TARGET_TYPE environment variable to "jtag_eth", RISCWatch will be configured to communicate with the processor probe. See the RISCWatch User's Guide for additional information about environment variables.

When using this target type, you can direct RISCWatch to freeze or stop the processor via execution of specific commands or debug events. When the processor is stopped, you can access and alter all architected resources of the processor (registers, etc) and peripherals connected to the PowerPC processor or processor core. Use of this target type relies on internal processor resources provided in IBM 400, 600, and 700 Series PowerPC processors. Debug of system hardware and software is accomplished without the need of any target control program software, so no additional code constraints are put on your PowerPC

application. In addition, by using a standard ethernet connection, RISCWatch is capable of running on any PowerPC board (connected to a processor probe) defined on the network.

There are two types of RISCWatch processor probes which can be ordered. One probe provides an added feature called RISCTrace. RISCTrace allows you to take advantage of the real-time trace debug logic available on some IBM 400 Series PowerPC processors. See the RISCWatch User's Guide for more information on RISCTrace.

JTAG Parallel Port Target

The JTAG Parallel Port target type requires hardware which is labeled "RISCWatch Parallel Port Adapter". One end of the parallel port adapter is connected to your host workstation via the parallel port adapter cable provided. The other end of the parallel port adapter connects to the JTAG connector resident on the target PowerPC board.

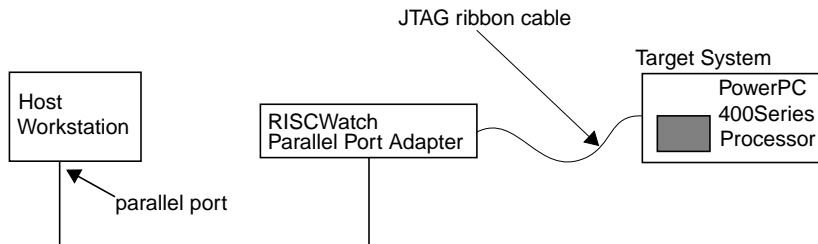


Figure 1-2. RISCWatch JTAG Parallel Port Target

By setting the RISCWatch TARGET_TYPE environment variable to "jtag_par", RISCWatch will be configured to communicate to the parallel port adapter. See the RISCWatch User's Guide for additional information about environment variables.

When using this target type, you can direct RISCWatch to freeze or stop the processor via execution of specific commands or debug events. When the processor is stopped, you can access and alter all architected resources of the processor (registers, etc) and peripherals connected to the PowerPC processor or processor core.

Use of this target type relies on internal processor resources provided in IBM 400 Series PowerPC processors. Debug of system hardware and software is accomplished without the need of any target control program software, so no additional code constraints are put on your PowerPC application. Unlike JTAG Ethernet target use, JTAG parallel port targets require a direct local connection from your host workstation to the target board under test. There is no network link to other workstations.

ROM Monitor Target

The ROM Monitor target type makes use of the standard ethernet or serial port cards available on most host workstations. For PC host users, an ethernet card is provided with RISCWatch, since some PC workstations are not shipped with ethernet hardware. The RISCWatch product provided with the IBM PowerPC Evaluation Kits will only work on a ROM Monitor or OS Open target.

RISCWatch can communicate with the target PowerPC over a standard TCP/IP Ethernet or a Serial Line IP (SLIP) network. Cables are provided to make the required connections. By setting the RISCWatch TARGET_TYPE environment variable to “rom_mon”, RISCWatch will be configured to communicate with IBM OpenBIOS code (ROM monitor code) which is running on the target PowerPC board.

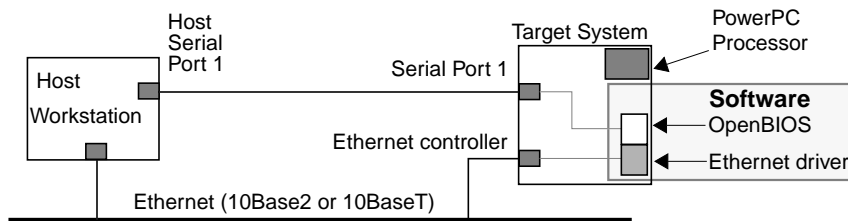


Figure 1-3. ROM Monitor Target

Please refer to the appropriate IBM PowerPC Evaluation Kit documentation for details about setting up your target board to run OpenBIOS code. Note that the OpenBIOS code provided in the evaluation kit can be ported to custom board designs. Contact your local IBM representative for more information on customizing OpenBIOS ROM Monitor code.

When using this target type, you can direct the ROM monitor code to load and control the execution of your application. Note that RISCWatch is constantly communicating with the ROM monitor code on the target. This means the target PowerPC processor is always running. After loading your program with RISCWatch, debug events are set up to control the execution of your application. These debug events generate debug exceptions, which interrupt normal application program flow so the ROM code running on the target system can collect processor status and alter processor resources.

Use of this target type relies on the dedicated exception handler and command set API available in OpenBIOS. The ROM Monitor is ideal for debugging application software on a working target system. Hardware debug is limited since RISCWatch is dependent upon successful execution of the ROM Monitor code on the target PowerPC system.

OS Open Target

The OS Open target type makes use of the standard ethernet or serial port cards available on most host workstations. For PC host users, an ethernet card is provided with RISCWatch, since some PC workstations are not shipped with ethernet hardware. The RISCWatch product provided with the IBM PowerPC Evaluation Kits will only work on a ROM Monitor or OS Open target.

RISCWatch can communicate with the target PowerPC over a standard TCP/IP Ethernet or a Serial Line IP (SLIP) network. Cables are provided to make the required connections. By setting the RISCWatch TARGET_TYPE environment variable to “osopen”, RISCWatch will be configured to communicate with IBM OS Open Real Time Operating System which is running on the target PowerPC board.

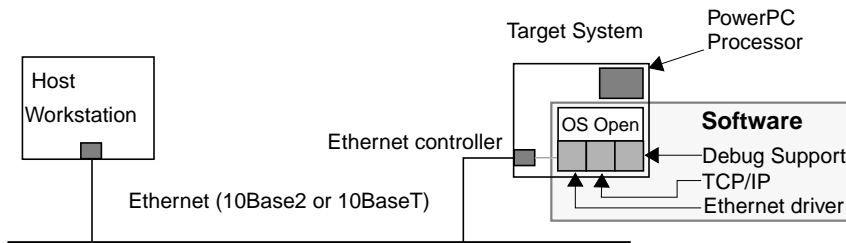


Figure 1-4. OS Open Target

Please refer to the appropriate OS Open documentation for details about setting up your target board to run and debug with RISCWatch.

Note that RISCWatch is constantly communicating with OS Open on the target. This means the target PowerPC processor is always running. After loading your program with RISCWatch, debug events are set up to control the execution of your application. These debug events generate debug exceptions, which interrupt normal application program flow so OS Open running on the target system can collect processor status and alter processor resources.

Use of this target type is ideal for debugging OS Open applications in which thread debug is required. Hardware debug is limited since RISCWatch is dependent upon successful execution of OS Open code on the target PowerPC system.

Chapter 2. Installing RISCWatch on Windows 3.1

Windows 3.1 Hardware Installation

Please follow the hardware installation instructions for the RISCWatch target you plan to use. For example, evaluation kit users may skip directly to “ROM Monitor and OS Open Target Hardware Install” on page 2-9.

JTAG Parallel Port Target Hardware Install

For JTAG parallel port targets, the following installation steps need to be performed:

1. Verify the following hardware is available:
 - One RISCWatch parallel port adapter
 - One RISCWatch parallel port adapter cable
 - One RISCWatch Parallel Port Adapter power supply for U.S.A and Canada use only
 - One RISCWatch Parallel Port Adapter power supply plug/cable assembly for countries other than the U.S.A or Canada
YOU MUST PROVIDE A 240VA (OR LESS) POWER SUPPLY THAT IS AGENCY-APPROVED IN THE COUNTRY YOU ARE IN.

Note: The power requirements for the adapter are 5V, 300mA, regulated, 5V on the inner conductor, GND on the outer conductor.
2. Plug one end of the adapter cable into the adapter and plug the other end into the parallel port of the host platform.
3. Attach the 16-pin cable of the RISCWatch parallel port adapter to the JTAG header on your PowerPC target board.

Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
4. If you are in the U.S.A. or Canada, plug the connector of the enclosed power supply into the parallel port adapter box and plug the power supply into the wall outlet.
5. If you are not in the U.S.A or Canada, attach the enclosed power supply plug/cable assembly to your own agency-approved, 240VA (or less), 5V, 300ma, regulated power supply. The inner conductor of the plug/cable assembly has to be connected to 5V and the outer conductor has to be connected to ground. Insert the plug/cable assembly into the parallel port adapter box and plug the power supply into the wall outlet.

6. Hardware installation for the JTAG parallel port target is complete. Please proceed to “Windows 3.1 Software Installation” on page 2-9.

JTAG Ethernet Target Hardware Install

For JTAG Ethernet targets, the following installation steps need to be performed:

1. Verify the following hardware is available:
 - One RISCWatch processor probe
 - One RISCWatch processor probe AC/DC power adapter and power cord
 - One RISCWatch processor probe JTAG adapter assembly (see descriptions in step 3 below)
 - One 9-pin serial cable
 - Two 10Base2 50-ohm terminators
 - Two 10Base2 T-connectors
 - One 10Base2 Ethernet cable
2. Remove the “wrap” adapter from the front of the processor probe, if one exists.
3. Determine which JTAG adapter assembly you have by examining the following three figures:

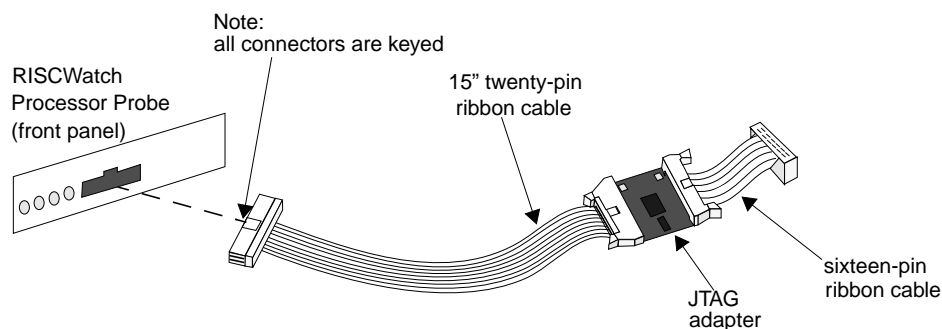


Figure 2-1. Typical JTAG Adapter Assembly

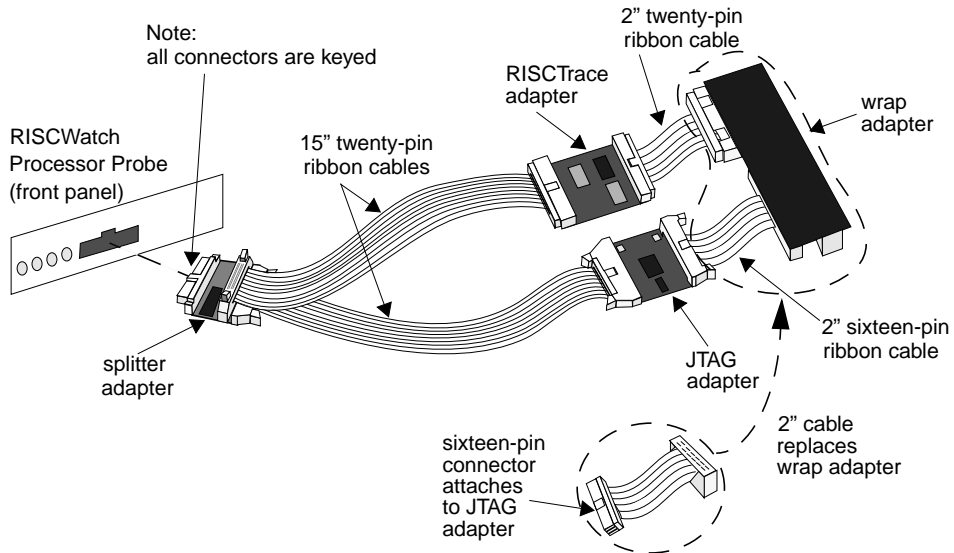


Figure 2-2. JTAG Adapter with RISCTrace Assembly

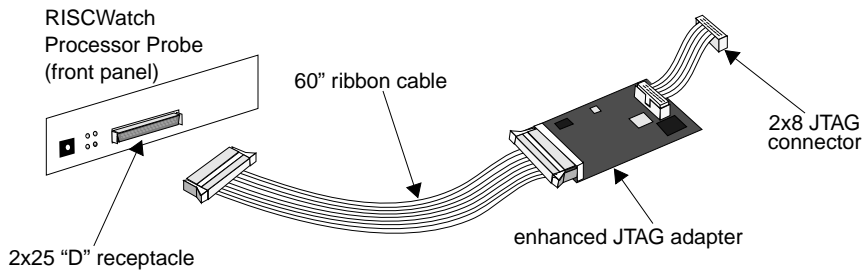


Figure 2-3. Enhanced JTAG Adapter Assembly

4. If your JTAG adapter assembly looks like the one shown in Figure 2-1, you have a typical JTAG adapter assembly. To assemble the adapter and cables, perform the following steps:
 - a. Attach the 15" cable to the 20 pin connector on the adapter.
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector on the adapter.

Note: Failure to use the non-keyed side may damage the small adapter.

- c. Attach the connector on the 15" ribbon cable to the front of the processor probe.
- d. Proceed to Step 7.
5. If your adapter assembly resembles Figure 2-2, you have a JTAG adapter with RISCTrace. To assemble the adapter and cables, perform the following steps:
 - a. Remove the "wrap" adapter, if attached to the cables (see Figure 2-2).
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector.

Note: Failure to use the non-keyed side may damage the small adapter.
 - c. Attach the splitter adapter to the front of the processor probe.
 - d. Proceed to Step 7.
6. If your adapter assembly resembles Figure 2-3, you have an enhanced JTAG adapter. To assemble the adapter and cables, perform the following steps:
 - a. Attach the 60" cable to the adapter.
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector .

Note: Failure to use the non-keyed side may damage the small adapter.
 - c. Attach the connector on the 60" ribbon cable to the front of the processor probe.
7. Attach the connector on the 2" cable to the JTAG header on your PowerPC target board.

Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
8. If you have the JTAG adapter with RISCTrace, attach the RISCTrace connector to the RISCTrace header on the target board.
9. Set the processor probe configuration switches located on the back of the processor probe (RISCWatch includes cable and connectors for a 10Base2 connection).

Note: Configuration switch functions are described on the underside of the processor probe frame.

 - a. If using a 10Base2 Ethernet connection, set the processor probe configuration switch 1 to the "open" position and the other switches to the "closed" position.
 - b. If using a 10BaseT Ethernet connection, set the processor probe configuration switches 1 and 5 to the "open" position, and have the other switches set to the "closed" position.
10. Connect the processor probe's AC/DC power adapter to both the back of the processor probe and to the power cord.

11. Connect the power cord to the power supply and to a wall outlet. **USE ONLY THE SUPPLIED POWER CORD.** The power light on the front of the RISCWatch processor probe will be illuminated. The processor probe does not have an on/off switch.
12. Proceed to the next section, "Establishing an Ethernet Connection with the RISCWatch Processor Probe" on page 2-5.

Establishing an Ethernet Connection with the RISCWatch Processor Probe

1. If you do not already have an existing Ethernet card in your PC, follow the directions supplied with the Kingston EtherX Plug and Play ISA Ethernet Adapter to install this card.
2. Hook up the Ethernet cables, T-connectors, and terminators according to your desired network topology.
 - a. For customers with no current Ethernet network, a point-to-point connection should be configured. A 10Base2 connection between a host machine and the RISCWatch processor probe requires a pair of BNC T-connectors and 50-ohm terminators, plus a short length of 10Base2 ThinLAN cable, as shown in Figure 2-5.

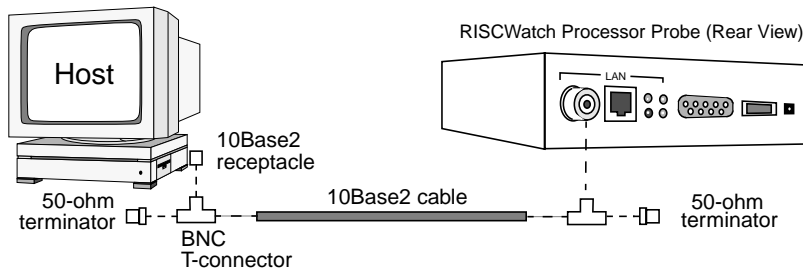


Figure 2-4. 10Base2 Ethernet Point-to-Point Connection

- b. For a 10Base2 connection to a site-wide LAN with multiple devices, the terminators would not be used, as shown in Figure 2-5.

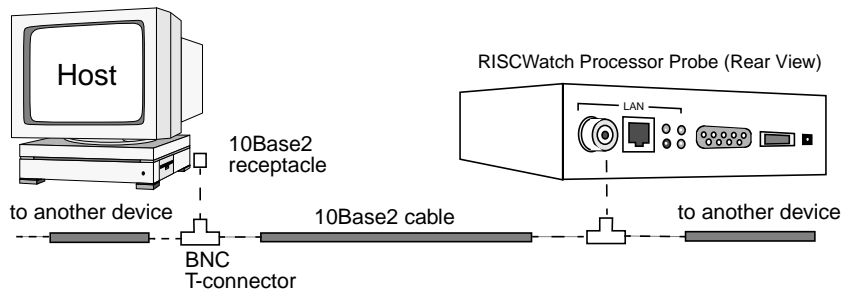


Figure 2-5. 10Base2 LAN Connection

- c. For 10BaseT Ethernet, the connection can be made in two ways. If the connection is to be used exclusively between the host and the evaluation board (a 10BaseT point-to-point connection), a crossover cable must be used to connect the two nodes (see Appendix A for a diagram of the wiring for a 10BaseT crossover cable). Figure 2-6 shows a point-to-point Ethernet connection using a 10BaseT crossover cable:

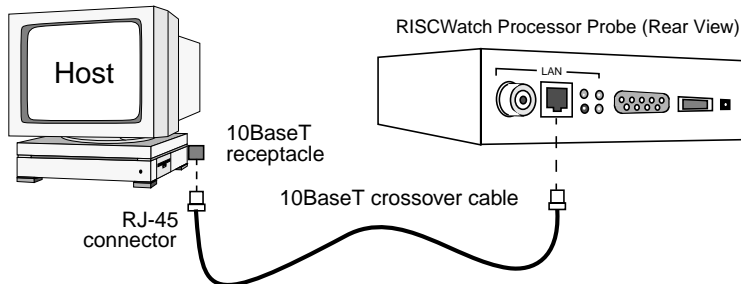


Figure 2-6. 10BaseT Crossover Connection

d. Figure 2-5 shows a 10BaseT Ethernet connection using a hub:

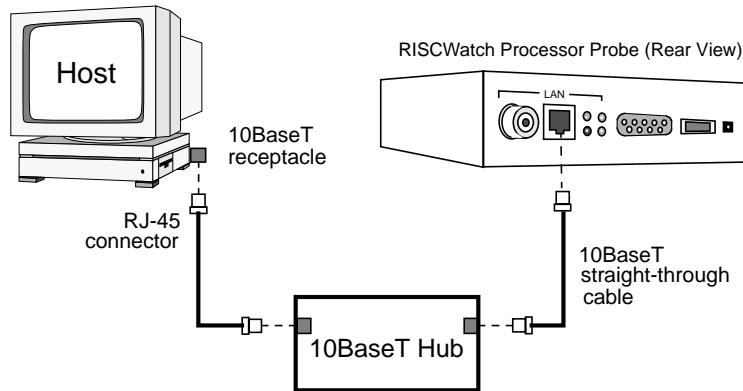


Figure 2-7. 10BaseT Hub Connection

3. Proceed to the next section, "Setting the TCP/IP Parameters of the RISCWatch Processor Probe".

Setting the TCP/IP Parameters of the RISCWatch Processor Probe

The RISCWatch processor probe ships with a TCP/IP address of 0.0.0.0 and a gateway address of 0.0.0.0. To change these addresses to valid addresses on your network, a serial port connection must be made from the host to the processor probe. Most PCs include two serial ports to support communications via asynchronous data transfer. These ports are sometimes referred to as communication or COM ports. These ports are usually accessed from the back of the system unit. This document refers to these serial ports as S1 and S2. Consult your PC literature to determine how many serial ports are available on your unit and where they are located.

1. Connect the 9-pin female connector of the supplied serial cable to S1 or S2 on the PC.
2. Connect the 9-pin male connector of the supplied cable to the connector labeled RS232 on the processor probe.
3. Start Microsoft Windows if it is not active.
4. Select Accessories from the Windows Program Manager.
5. Double-click on the Terminal icon to start the terminal emulator program.
6. Select Settings->Communications.
7. Select COM1 if using S1 or COM2 if using S2.
8. Select Baud Rate 9600, Data Bits 8, Stop Bits 1, Parity None and Flow Control Xon/Xoff

9. Select OK.
10. Press Enter. The processor probe will respond with a status prompt consisting of a letter followed by the ">" sign.
11. Enter "lan" to display the current lan settings.
12. Determine a valid TCP/IP address and gateway for the processor probe.
 - a. If connecting to an existing network, obtain the TCP/IP address and gateway address from your system administrator.
 - b. If connecting to the processor probe via a point-to-point connection with your PC, we suggest a TCP/IP address of "7.1.1.100". The processor probe's default gateway of "0.0.0.0" is sufficient.
13. Change the TCP/IP address by entering "lan -i 'TCP/IP address'". For example, enter "lan -i 7.1.1.100".
14. Change the TCP/IP gateway by entering "lan -g 'TCP/IP address'". For example, enter "lan -g 0.0.0.0".
15. If necessary, change the processor probe's port number. This step is only necessary if there is a conflict using the probe's default port number of 6470. Conflicts should only exist if a device **other** than an IBM RISCWatch Processor Probe is using port number 6470. To change the port number, enter "lan -p 'port number'". For example, enter "lan -p 6470".

Note: The port number must match the host port number entry in the host PC's TCP/IP **services** file. Refer to "TCP/IP Package Setup" on page 2-10 for where this is entered.
16. Select File->Exit to exit the terminal session.
17. If asked to save changes to terminal settings, select No.
18. Cycle power on the processor probe for the changes to take effect. Power can be cycled by disconnecting and then reconnecting the AC/DC power adapter attached to the processor probe.

Note: There is no command to set the subnet mask. As the probe boots, it sends ICMP address mask requests out on the network. If a response is received, the probe sets its subnet mask to that of the network. If multiple responses are received, the probe sets its subnet mask to the first value it receives and issues a warning message over the serial port. This is an error condition on the network and should be corrected. If no response is received, the probe sets the subnet mask to one of the following defaults based on its TCP/IP address:

 - a. 255.0.0.0 for Class A addresses (1.x.x.x - 127.x.x.x)
 - b. 255.255.0.0 for Class B addresses (128.x.x.x - 191.x.x.x)
 - c. 255.255.255.0 for Class C addresses (192.x.x.x - 223.x.x.x)

19. Once the addresses are made valid for your network, the "telnet" utility on your host and the "lan" command on the RISCWatch processor probe can be used to change the addresses from then on.
20. Hardware installation for the JTAG Ethernet target is complete. Please proceed to "Windows 3.1 Software Installation" on page 2-9.

ROM Monitor and OS Open Target Hardware Install

For ROM Monitor and OS Open targets, a communications link must be established between the host PC and the target board. For serial communications (SLIP), a NULL modem cable is the only hardware required. For Ethernet communications, please refer to "Establishing an Ethernet Connection with the RISCWatch Processor Probe" on page 2-5, substituting the ROM Monitor or OS Open target board where the processor probe is mentioned.

Consult the appropriate ROM Monitor and OS Open documentation for establishing TCP/IP parameters necessary for your network.

Windows 3.1 Software Installation

For all RISCWatch target types, the following installation steps need to be performed:

1. Verify the following items are available:
 - IBM or compatible PC
Minimum required: x486 DX2 50/66 MHz with 8 MB of RAM
 - VGA/SVGA Display
Minimum required: VGA 640x480
Recommended: SVGA 1024x768 or above
Supports: VGA 640x480, SVGA 800x600, SVGA 1024x768, SVGA 1280x1024, SVGA 1600x1200
 - Microsoft Windows 3.1
 - RISCWatch Installation Diskettes
 - One 3.5" diskette drive
 - Four megabytes of hard disk space
 - For JTAG Ethernet, ROM Monitor, and OS Open targets, a TCP/IP for Windows package compliant with the Microsoft Windows Socket API definition
2. Place the RISCWatch Installation diskette in the proper drive.
3. Start Microsoft Windows if it is not active.
4. Select Run... from the File pull-down of Program Manager.
5. Type "A:INSTALL"(or "B:INSTALL" if applicable) then press Enter.

6. When the Welcome window appears, select Continue.
7. When the Custom Installation window appears, use the Set Location button if you wish to change the directory where the program files will be installed (default location is C:\RWPPC).
8. Select Install.
9. Follow any instructions that may prompt you to insert additional installation diskettes.
Note: You will be prompted to insert one or more "Processor Probe Driver" diskettes. For targets other than JTAG Ethernet, these diskettes are not necessary, so simply "Cancel" this prompt.
10. Once the installation is completed, a RISCWatch group will be created along with some program items. The RISCWatch "README" file will then be displayed. Please view the entire file for the latest changes to the program and its operation.
11. JTAG parallel port target users should proceed to "RISCWatch Environment Setup" on page 2-14. JTAG Ethernet, ROM Monitor, and OS Open target users should continue to "TCP/IP Package Setup" on page 2-10.

TCP/IP Package Setup

For JTAG Ethernet, ROM Monitor, and OS Open targets, a TCP/IP package compliant with the Microsoft Windows Socket API is required. A TCP/IP package is not included with RISCWatch.

1. Determine if you will need to install a TCP/IP package on Windows 3.1 by performing the following steps:
 - a. Select the 'Main' icon from the Window's 'Program Manager'.
 - b. Select the 'File Manager' icon.
 - c. Select 'File' from the menu bar and choose 'Search'.
 - d. Perform a search on 'WINSOCK.DLL' for your entire hard drive. If this file exists, you probably have some TCP/IP compliant package already installed. For example, 'WorkGroup for Windows' is a product that provides a TCP/IP package.
 - e. If you determine that you need to install a TCP/IP package, complete section "TCP/IP Package Installation" on page 2-11 before continuing. If you have a valid TCP/IP package installed, proceed to step 2.

2. Edit the TCP/IP **services** file to establish a named communications port and port number for your TCP/IP socket communications. Most TCP/IP packages place the **services** file under one of the package's subdirectories (For example, C:\TRUMPET\SERVICES or C:\WINDOWS\SERVICES). Consult your TCP/IP documentation or contact your system administrator if this file cannot be found. The following lines must be added to the file:

osopen-dbg	20044/tcp	# For ROM Monitor targets
osopen-dbg	20044/udp	# For OS Open targets
jtag_eth	6470/tcp	# For JTAG Ethernet targets

Note: use underscore, not hyphen
3. For the update to take effect, TCP/IP may need to be restarted. This may require a reboot of the system and/or a restart of the TCP/IP package.
4. Verify your network connection. From your host, enter "ping 'TCP/IP address'". For example, enter "ping 7.1.1.100". If the ping does not complete successfully, verify that the installation steps have been followed correctly or contact a system administrator.
5. Proceed to "RISCWatch Environment Setup" on page 2-14.

TCP/IP Package Installation

This section applies to JTAG Ethernet, ROM Monitor, and OS Open target users that have determined that a TCP/IP package is not installed. A TCP/IP package compliant with the Microsoft Windows Socket API must be purchased. For those interested in getting started immediately, we have identified one possible package, called Trumpet Winsock, which can be down loaded from the following internet site:

<http://www.trumpet.com>

The following information is provided as a guide to installing the Trumpet Winsock (TCP/IP package) code. It is not meant to be a replacement to the installation instructions contained at the Trumpet internet site. It is provided to help clarify items which may be confusing.

1. For ethernet users - (ROM Monitor and OS Open SLIP users can go directly to step 2) Trumpet Software International provides software which works with 'packet drivers'. When you first install your Ethernet card, a set of different device drivers are provided. In order to use Trumpet Winsock, you will need to select a 'Packet Driver'. The Kingston card, provided with some RISCWatch packages, contains a packet driver that can be selected. If you buy an ethernet card that does not contain a packet driver, you can use the help option on

the Trumpet menu bar to find out how you may be able to obtain a packet driver from the internet. We will assume you have already followed the instructions for installing your ethernet card, and have chosen a packet driver for use with Trumpet.

2. Go to the Trumpet Software International's web site (<http://www.trumpet.com>) and find the installation information for Trumpet Winsock. You want to download the latest version which can be used for Windows 3.1 (must have 16 bit support). For example, version 3.0 (file twsk30c.exe) is a combined 16 bit/Windows 95 release. This version can be downloaded.
3. The downloaded version is usually a single file called a self extracting ZIP file (has an extension *.EXE). This file should be installed in a new directory (C:\TRUMPET, for example) and then executed. Execution is accomplished by going to the newly created directory and entering the name of the file. This will result in the creation of many more files in the new directory.
4. Look for any 'README' files (dir READ*) and read them carefully.
5. Ethernet users should follow directions concerning Packet Drivers because you will not be using a modem and you have already determined that a TCP/IP package does not exist on your system.
6. If the README file does not direct you to do otherwise, execute 'INSTALL.EXE' to start the installation process. You will be prompted for any required information. Note that you may be informed that a search will be done to rename any 'WINSOCK.DLL' files found. If you performed this check earlier, this file should not be found anywhere else on your hard drive.
7. If a 'Setup' screen appears, you can defer entering any fields until a later time.
8. When installation is complete, reboot the system, bring up Windows, and select the icon associated with the Trumpet installation.
9. Select the Help icon.
10. Ethernet users need to follow the directions for using Trumpet Winsock over a packet driver. SLIP users can go directly to 13).
11. Follow the instructions for installing a packet driver and WINPKT. At the time of this publication, the WINPKT program needed to be extracted from 'ftp://ftp.trumpet.com/winsock/winpkt.com'. The ndis3pkt package, referred in the help as a replacement for winpkt in the help, does not work unless you have WorkGroups for Windows, or some other windows package that runs 'NDIS'.
12. Using the Trumpet help as a guide, your 'AUTOEXEC.BAT' file will need to have two lines added to get the Ethernet communications working. The first line starts the packet driver you installed with your ethernet card. The proper name and syntax for this line should be identified in your ethernet card instal-

- lation guide or in one of the files that came with the packet driver (i.e. the Kingston Ethernet card has a '.DOC' file that is part of the packet driver that describes how to invoke the driver). The second line to add is 'winpkt 0x60' (vector 0x60 is usually the default vector to use).
13. Edit the 'HOSTS' file found in the installed Trumpet directory to include the 'IP' address you will be using. Add appropriate lines for any RISCWatch processor probe or ROM Monitor targets (SLIP or Ethernet) you plan to use. Examples would be:
 - 7.1.1.4 localhost
 - 8.1.1.4 localslip
 - 7.1.1.100 processor_probe
 - 7.1.1.5 rom_monitor_target
 14. After updating the 'AUTOEXEC.BAT' file, reboot the system to execute the changes. From Windows, select the Trumpet icon and double click on the icon used to start trumpet.
 15. If 'Setup' was bypassed during installation, your connection should fail. A Trumpet Winsock window comes up indicating your connection status. Choose the 'file' menu option and go to 'Setup'.
 16. Enter the IP address you will be using for your PC (ex 7.1.1.4).
 17. Ethernet users need to select 'Packet driver', and set the vector to '60', network mask to '255.255.240.0', and gateway to '0.0.0.0'. Select OK. If prompted to restart Trumpet, you will need to exit the window and restart Trumpet.
 18. SLIP users need to select 'SLIP' and then go to dialer settings.
 - Select the correct com port you will be using.
 - Set the baud rate to 38400.
 - Disable 'hardware handshaking' and make sure no autologin is performed.
 19. Use the default settings for the remaining options and/or check the help for more details.
 - After entering all the information, you may need to restart Trumpet.
 20. Use the Trumpet 'ping' icon to verify your connection is working. First try pinging your local host (ex 7.1.1.4), then try to ping the RISCWatch processor probe, ROM Monitor, or any other address on your connection.

Note: A ping to the ROM Monitor will require the ROM Monitor debugger to be running.

21. Prior to exiting Windows, we recommend terminating Trumpet Winsock (close the application). If you do not follow this recommendation, subsequent Trumpet starts may fail. If this occurs, you will need to reboot your system.
22. Proceed back to section “TCP/IP Package Setup” on page 2-10 to edit your TCP/IP **services** file.

RISCWatch Environment Setup

You **must** edit the RISCWatch environment file **rwppc.env** to make the appropriate changes to certain RISCWatch environment variables.

1. Start Microsoft Windows if it is not active.
2. Double click on the “RWPPC Environment File” icon in the RISCWatch program group. This will bring up the **rwppc.env** file in the Notepad editor.
3. Change the PROC variable to the processor you will be debugging. See the README for a list of valid processors for your release.
4. Change the TARGET_TYPE variable to the proper target type you will be using. Valid selections are “jtag_par”, “jtag_eth”, “rom_mon”, and “osopen”.
5. For JTAG Ethernet, ROM Monitor, and OS Open targets, change the TARGET_NAME variable to the TCP/IP name or address of either the RISCWatch processor probe, the ROM Monitor local address, or OS Open address, respectively.
6. Edit any other environment variables as desired. Environment variables are described in “Environment Resources” on page 3-6 in the *RISCWatch Debugger User's Guide*. Users that have a working directory other than the install directory have their own copy of the **rwppc.env** file. Such users should backup their copy, make a fresh one from the install directory, and then merge their changes from the old one to the new one.
7. Exit from Notepad by selecting File->Exit, and select “Yes” when asked if “Do you want to save the changes”.

This completes the Windows 3.1 installation of RISCWatch. Proceed to “Quick Start” on page 2-1 in the *RISCWatch Debugger User's Guide*.

Chapter 3. Installing RISCWatch on Windows 95

Windows 95 Hardware Installation

Please follow the hardware installation instructions for the RISCWatch target you plan to use. For example, evaluation kit users may skip directly to “ROM Monitor and OS Open Target Hardware Install” on page 3-9.

JTAG Parallel Port Target Hardware Install

For JTAG parallel port targets, the following installation steps need to be performed:

1. Verify the following hardware is available:
 - One RISCWatch parallel port adapter
 - One RISCWatch parallel port adapter cable
 - One RISCWatch Parallel Port Adapter power supply for U.S.A and Canada use only
 - One RISCWatch Parallel Port Adapter power supply plug/cable assembly for countries other than the U.S.A or Canada

YOU MUST PROVIDE A 240VA (OR LESS) POWER SUPPLY THAT IS AGENCY-APPROVED IN THE COUNTRY YOU ARE IN.

Note: The power requirements for the adapter are 5V, 300mA, regulated, 5V on the inner conductor, GND on the outer conductor.
2. Plug one end of the adapter cable into the adapter and plug the other end into the parallel port of the host platform.
3. Attach the 16-pin cable of the RISCWatch parallel port adapter to the JTAG header on your PowerPC target board.

Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
4. If you are in the U.S.A. or Canada, plug the connector of the enclosed power supply into the parallel port adapter box and plug the power supply into the wall outlet.
5. If you are not in the U.S.A or Canada, attach the enclosed power supply plug/cable assembly to your own agency-approved, 240VA (or less), 5V, 300ma, regulated power supply. The inner conductor of the plug/cable assembly has to be connected to 5V and the outer conductor has to be connected to ground. Insert the plug/cable assembly into the parallel port adapter box and plug the power supply into the wall outlet.

6. Hardware installation for the JTAG parallel port target is complete. Please proceed to “Windows 95 Software Installation” on page 3-9.

JTAG Ethernet Target Hardware Install

For JTAG Ethernet targets, the following installation steps need to be performed:

1. Verify the following hardware is available:
 - One RISCWatch processor probe
 - One RISCWatch processor probe AC/DC power adapter and power cord
 - One RISCWatch processor probe JTAG adapter assembly (see descriptions in step 3 below)
 - One 9-pin serial cable
 - Two 10Base2 50-ohm terminators
 - Two 10Base2 T-connectors
 - One 10Base2 Ethernet cable
2. Remove the “wrap” adapter from the front of the processor probe, if one exists.
3. Determine which JTAG adapter assembly you have by examining the following 3 figures:

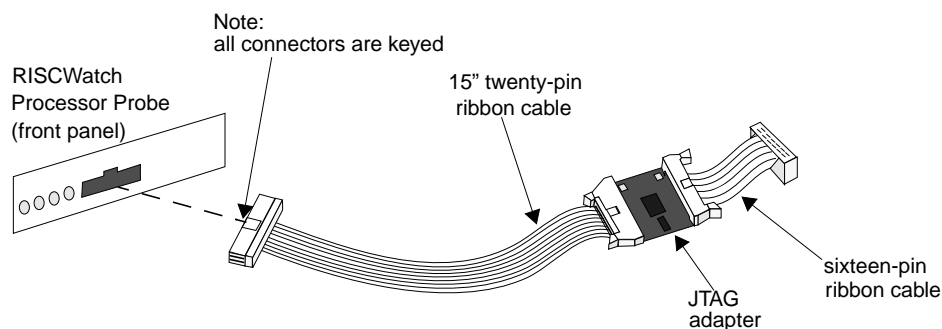


Figure 3-1. Typical JTAG Adapter Assembly

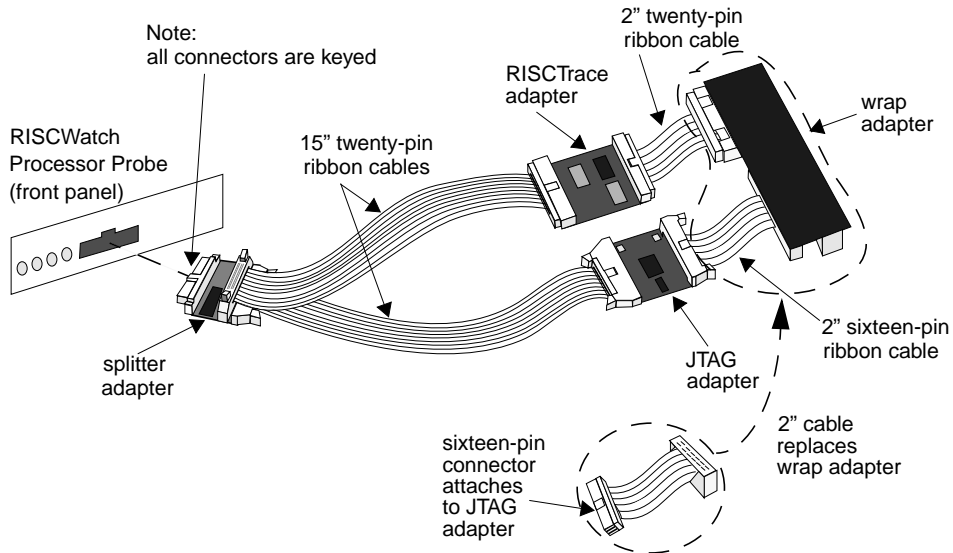


Figure 3-2. JTAG Adapter with RISCTrace Assembly

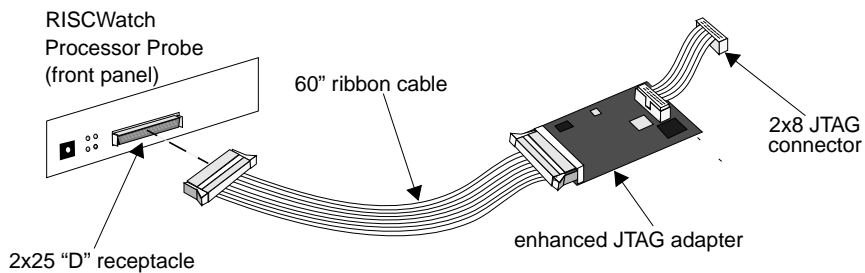


Figure 3-3. Enhanced RISCWatch Adapter Assembly

4. If your JTAG adapter assembly looks like the one shown in Figure 3-1, you have a typical JTAG adapter assembly. To assemble the adapter and cables, perform the following steps:
 - a. Attach the 15" ribbon cable to the 20 pin connector on the JTAG adapter.
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector on the adapter.

Note: Failure to use the non-keyed side may damage the JTAG adapter.

- c. Attach the connector on the 15" ribbon cable to the front of the processor probe.
 - d. Proceed to Step 7.
- 5. If your adapter assembly resembles Figure 3-2, you have a JTAG adapter with RISCTrace assembly. To assemble the adapter assembly and cables, perform the following steps:
 - a. Remove the "wrap" adapter, if attached to the cables (see Figure 3-2).
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector.
Note: Failure to use the non-keyed side may damage the JTAG adapter.
 - c. Attach the splitter adapter to the front of the processor probe.
 - d. Proceed to Step 7.
- 6. If your adapter assembly resembles Figure 3-3, you have an enhanced JTAG adapter assembly. To assemble the adapter assembly and cables, perform the following steps:
 - a. Attach the 60" cable to the adapter.
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector (see Figure 3-5).
Note: Failure to use the non-keyed side may damage the JTAG adapter.
 - c. Attach the connector on the 60" ribbon cable to the front of the processor probe.
- 7. Attach the connector on the 2" cable to the JTAG header on your PowerPC target board.
Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
- 8. If you have the JTAG adapter with RISCTrace, attach the RISCTrace connector to the RISCTrace header on the target board.
- 9. Set the processor probe configuration switches located on the back of the processor probe (RISCWatch includes cable and connectors for a 10Base2 connection).
Note: Configuration switch functions are described on the underside of the processor probe frame.
 - a. If using a 10Base2 Ethernet connection, set the processor probe configuration switch 1 to the "open" position and the other switches to the "closed" position.
 - b. If using a 10BaseT Ethernet connection, set the processor probe configuration switches 1 and 5 to the "open" position, and have the other switches set to the "closed" position.

10. Connect the processor probe's AC/DC power adapter to both the back of the processor probe and to the power cord.
11. Connect the power cord to the power supply and to a wall outlet. **USE ONLY THE SUPPLIED POWER CORD.** The power light on the front of the RISCWatch processor probe will be illuminated. The processor probe does not have an on/off switch.
12. Proceed to the next section, "Establishing an Ethernet Connection with the RISCWatch Processor Probe" on page 3-5.

Establishing an Ethernet Connection with the RISCWatch Processor Probe

1. If you do not already have an existing ethernet card in your PC, follow the directions supplied with the Kingston EtherX Plug and Play ISA Ethernet Adapter to install this card.
2. Hook up the Ethernet cables, T-connectors, and terminators according to your desired network topology.
 - a. For customers with no current Ethernet network, a point-to-point connection should be configured. A 10Base2 connection between a host machine and the RISCWatch processor probe requires a pair of BNC T-connectors and 50-ohm terminators, plus a short length of 10Base2 ThinLAN cable, as shown in Figure 3-5.

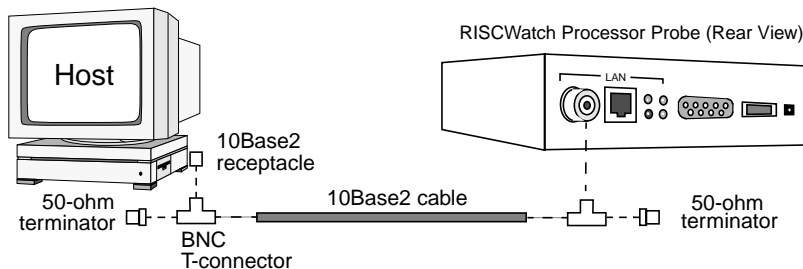


Figure 3-4. 10Base2 Ethernet Point-to-Point Connection

- b. For a 10Base2 connection to a site-wide LAN with multiple devices, the terminators would not be used, as shown in Figure 3-5.

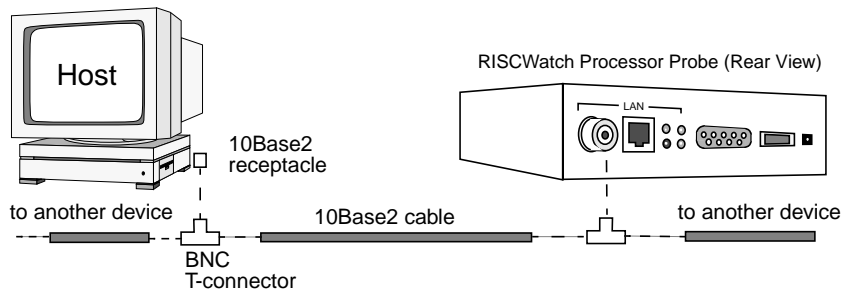


Figure 3-5. 10Base2 LAN Connection

- c. For 10BaseT Ethernet, the connection can be made in two ways. If the connection is to be used exclusively between the host and the evaluation board (a 10BaseT point-to-point connection), a crossover cable must be used to connect the two nodes (see Appendix A for a diagram of the wiring for a 10BaseT crossover cable). Figure 3-5 shows a point-to-point Ethernet connection using a 10BaseT crossover cable:

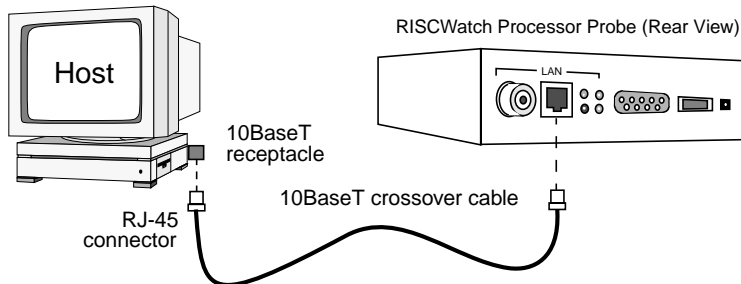


Figure 3-6. 10BaseT Crossover Connection

d. Figure 3-5 shows a 10BaseT Ethernet connection using a hub:

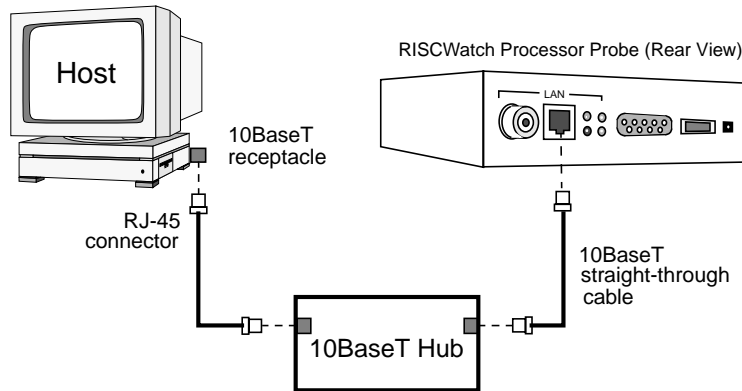


Figure 3-7. 10BaseT Hub Connection

3. Proceed to the next section, “Setting the TCP/IP Parameters of the RISCWatch Processor Probe”.

Setting the TCP/IP Parameters of the RISCWatch Processor Probe

The RISCWatch processor probe ships with a TCP/IP address of 0.0.0.0 and a gateway address of 0.0.0.0. To change these addresses to valid addresses on your network, a serial port connection must be made from the host to the processor probe. Most PCs include two serial ports to support communications via asynchronous data transfer. These ports are sometimes referred to as communication or COM ports. These ports are usually accessed from the back of the system unit. This document refers to these serial ports as S1 and S2. Consult your PC literature to determine how many serial ports are available on your unit and where they are located.

1. Connect the 9-pin female connector of the supplied serial cable to S1 or S2 on the PC.
2. Connect the 9-pin male connector of the supplied cable to the connector labeled RS232 on the processor probe.
3. Select 'Start' from the Windows 95 task bar.
4. Select 'Programs'.
5. Select 'Accessories'.
6. Select 'HyperTerminal'.
7. If you see a window that says “You need to install a modem before you can make a connection. Would you like to do this now?”, click on “No”, as you do not need a modem for a direct serial link.

8. Select the 'Hypertrm' icon.
9. Enter a name, for example, "RW probe", and select an icon.
10. Select the following communications characteristics:
 - a. Connect using Direct to Com1 if S1 or Com 2 if using S2
 - b. Bits per second - 9600
 - c. Data Bits 8 (default)
 - d. Stop Bits - 1 (default)
 - e. Parity - None (default)
 - f. Flow Control - Hardware (default)
11. Select OK.
12. Press Enter. The processor probe will respond with a status prompt consisting of a letter followed by the ">" sign.
13. Enter "lan" to display the current lan settings.
14. Determine a valid TCP/IP address and gateway for the processor probe.
 - a. If connecting to an existing network, obtain the TCP/IP address and gateway address from your system administrator.
 - b. If connecting to the processor probe via a point-to-point connection with your PC, we suggest a TCP/IP address of "7.1.1.100". The processor probe's default gateway of "0.0.0.0" is sufficient.
15. Change the TCP/IP address by entering "lan -i 'TCP/IP address'". For example, enter "lan -i 7.1.1.100".
16. Change the TCP/IP gateway by entering "lan -g 'TCP/IP address'". For example, enter "lan -g 0.0.0.0".
17. If necessary, change the processor probe's port number. This step is only necessary if there is a conflict using the probe's default port number of 6470. Conflicts should only exist if a device **other** than an IBM RISCWatch Processor Probe is using port number 6470. To change the port number, enter "lan -p 'port number'". For example, enter "lan -p 6470".

Note: The port number must match the host port number entry in the Windows 95's TCP/IP **services** file. Refer to "TCP/IP Package Setup" on page 3-11 for where this is entered.
18. Select File->Exit to exit the terminal session.
19. If asked to save changes to terminal settings, select No.
20. Cycle power on the processor probe for the changes to take effect. Power can be cycled by disconnecting and then reconnecting the AC/DC power adapter attached to the processor probe.

Note: There is no command to set the subnet mask. As the probe boots, it sends ICMP address mask requests out on the network. If a response is received, the probe sets its subnet mask to that of the network. If multiple responses are received, the probe sets its subnet mask to the first value it receives and issues a warning message over the serial port. This is an error condition on the network and should be corrected. If no response is received, the probe sets the subnet mask to one of the following defaults based on its TCP/IP address:

- a. 255.0.0.0 for Class A addresses (1.x.x.x - 127.x.x.x)
 - b. 255.255.0.0 for Class B addresses (128.x.x.x - 191.x.x.x)
 - c. 255.255.255.0 for Class C addresses (192.x.x.x - 223.x.x.x)
21. Once the addresses are made valid for your network, the "telnet" utility on your host and the "lan" command on the RISCWatch processor probe can be used to change the addresses from then on.
 22. Hardware installation for the JTAG Ethernet target is complete. Please proceed to "Windows 95 Software Installation" on page 3-9.

ROM Monitor and OS Open Target Hardware Install

For ROM Monitor and OS Open targets, a communications link must be established between the host PC and the target board. For serial communications (SLIP), a NULL modem cable is the only hardware required. For Ethernet communications, please refer to "Establishing an Ethernet Connection with the RISCWatch Processor Probe" on page 3-5, substituting the ROM Monitor or OS Open target board where the processor probe is mentioned.

Consult the appropriate ROM Monitor and OS Open documentation for establishing TCP/IP parameters necessary for your network.

Windows 95 Software Installation

For all RISCWatch target types, the following installation steps need to be performed:

1. Verify the following items are available:

- IBM or compatible PC
Minimum required: x486 DX2 50/66 MHz with 8 MB of RAM
 - VGA/SVGA Display
Minimum required: VGA 640x480
Recommended: SVGA 1024x768 or above
Supports: VGA 640x480, SVGA 800x600, SVGA 1024x768, SVGA 1280x1024, SVGA 1600x1200
 - Microsoft Windows 95
 - RISCWatch Installation Diskettes
 - One 3.5" diskette drive
 - Four megabytes of hard disk space
 - For JTAG Ethernet, ROM Monitor, and OS Open targets, Microsoft Windows 95 TCP/IP support
2. Place the RISCWatch Installation diskette in the proper drive.
 3. Select 'Start' from the Windows 95 task bar.
 4. Select Run.
 5. Type "A:INSTALL"(or "B:INSTALL" if applicable) then press Enter.
 6. When the Welcome window appears, select Continue.
 7. When the Custom Installation window appears, use the Set Location button if you wish to change the directory where the program files will be installed (default location is C:\RWPPC).
 8. Select Install.
 9. Follow any instructions that may prompt you to insert additional installation diskettes.
Note: You will be prompted to insert one or more "Processor Probe Driver" diskettes. For targets other than JTAG Ethernet, these diskettes are not necessary, so simply "Cancel" this prompt.
 10. Once the installation is completed, a RISCWatch group will be created along with some program items. The RISCWatch "README" file will then be displayed. Please view the entire file for the latest changes to the program and its operation.
Note: RISCWatch is currently a 16 bit executable developed for Windows 3.1. Though it can be run successfully on Windows 95, certain restrictions apply. For example, file IDs need to be restricted to an eight character file name, and a three character file extension, or RISCWatch will not be able to locate source files
 11. JTAG parallel port target users should proceed to "RISCWatch Environment Setup" on page 3-11. JTAG Ethernet, ROM Monitor, and OS Open target users should continue to "TCP/IP Package Setup" on page 3-11.

TCP/IP Package Setup

For JTAG Ethernet, ROM Monitor, and OS Open targets, the Windows 95 TCP/IP package should be configured. If using Ethernet, follow the installation instructions that came with your ethernet card.

To set the host TCP/IP address for the Ethernet connection:

1. Select the 'My Computer' icon from the desktop.
2. select 'Control Panel'.
3. select 'Network'.
4. Add the appropriate "Adapter" network component for the ethernet adapter being used (if not already added).
5. Add a "Protocol" network component of 'Microsoft - TCP/IP' (if not already added). Specify the IP address (7.1.1.4 is recommended to maintain consistency with this document) and netmask (255.255.240.0) to be used.
6. Edit the TCP/IP **services** file to establish a named communications port and port number for your TCP/IP socket communications. Windows 95 places the **services** file under C:\WINDOWS\SERVICES). Consult your TCP/IP documentation or contact your system administrator if this file cannot be found. The following lines must be added to the file:

```
osopen-dbg 20044/tcp      # For ROM Monitor targets
osopen-dbg 20044/udp      # For OS Open targets
jtag_eth    6470/tcp       # For JTAG Ethernet targets
Note: use underscore, not hyphen
```

7. For the update to take effect, TCP/IP may need to be restarted. This may require a reboot of the system and/or a restart of the TCP/IP package.
8. Verify your network connection. From your host, enter "ping 'TCP/IP address'". For example, enter "ping 7.1.1.100". If the ping does not complete successfully, verify that the installation steps have been followed correctly or contact a system administrator.
9. Proceed to "RISCWatch Environment Setup" on page 3-11.

RISCWatch Environment Setup

You **must** edit the RISCWatch environment file **rwppc.env** to make the appropriate changes to certain RISCWatch environment variables.

1. Start Microsoft Windows if it is not active.
2. Double click on the "RWPPC Environment File" icon in the RISCWatch program group. This will bring up the **rwppc.env** file in the Notepad editor.

3. Change the PROC variable to the processor you will be debugging. See the README for a list of valid processors for your release.
4. Change the TARGET_TYPE variable to the proper target type you will be using. Valid selections are "jtag_par", "jtag_eth", "rom_mon", and "osopen".
5. For JTAG Ethernet, ROM Monitor, and OS Open targets, change the TARGET_NAME variable to the TCP/IP name or address of either the RISC-Watch processor probe, the ROM Monitor local address, or OS Open address, respectively.
6. Edit any other environment variables as desired. Environment variables are described in "Environment Resources" on page 3-6 in the *RISCWatch Debugger User's Guide*. Users that have a working directory other than the install directory have their own copy of the **rwppc.env** file. Such users should backup their copy, make a fresh one from the install directory, and then merge their changes from the old one to the new one.
7. Exit from Notepad by selecting File->Exit, and select "Yes" when asked if "Do you want to save the changes".

This completes the Windows 95 installation of RISCWatch. Proceed to "Quick Start" on page 2-1 in the *RISCWatch Debugger User's Guide*.

Chapter 4. Installing RISCWatch on the RS/6000

RS/6000 Hardware Installation

Please follow the hardware installation instructions for the kind of RISCWatch target you are installing. For example, Evaluation Kit users may skip directly to “ROM Monitor and OS Open Target Hardware Install”

JTAG Parallel Port Target Hardware Install

For JTAG parallel port targets, the following installation steps need to be performed:

1. Verify the following hardware is available:
 - One RISCWatch parallel port adapter
 - One RISCWatch parallel port adapter cable
 - One RISCWatch Parallel Port Adapter power supply for U.S.A and Canada use only
 - One RISCWatch Parallel Port Adapter power supply plug/cable assembly for countries other than the U.S.A or Canada

YOU MUST PROVIDE A 240VA (OR LESS) POWER SUPPLY THAT IS AGENCY-APPROVED IN THE COUNTRY YOU ARE IN.

Note: The power requirements for the adapter are 5V, 300mA, regulated, 5V on the inner conductor, GND on the outer conductor.
2. Plug one end of the adapter cable into the adapter and plug the other end into the parallel port of the host platform.

Note: The RISCWatch parallel port adapter can only be attached to the parallel port on the motherboard of the RS/6000 system unit.
3. Attach the 16-pin cable of the RISCWatch parallel port adapter to the JTAG header on your PowerPC target board.

Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
4. If you are in the U.S.A. or Canada, plug the connector of the enclosed power supply into the parallel port adapter box and plug the power supply into the wall outlet.

5. If you are not in the U.S.A or Canada, attach the enclosed power supply plug/cable assembly to your own agency-approved, 240VA (or less), 5V, 300ma, regulated power supply. The inner conductor of the plug/cable assembly has to be connected to 5V and the outer conductor has to be connected to ground. Insert the plug/cable assembly into the parallel port adapter box and plug the power supply into the wall outlet.
6. Hardware installation for the JTAG parallel port target is complete. Please proceed to "RS/6000 Software Installation".

JTAG Ethernet Target Hardware Install

1. Verify the following hardware is available:
 - One RISCWatch processor probe
 - One RISCWatch processor probe AC/DC power adapter and power cord
 - One RISCWatch processor probe JTAG adapter assembly (see descriptions in step 3 below)
 - One 9-pin serial cable
 - One 25-pin-to-9-pin adapter
2. Remove the "wrap" adapter from the front of the processor probe, if one exists.
3. Determine which JTAG adapter assembly you have by examining the following 3 figures:

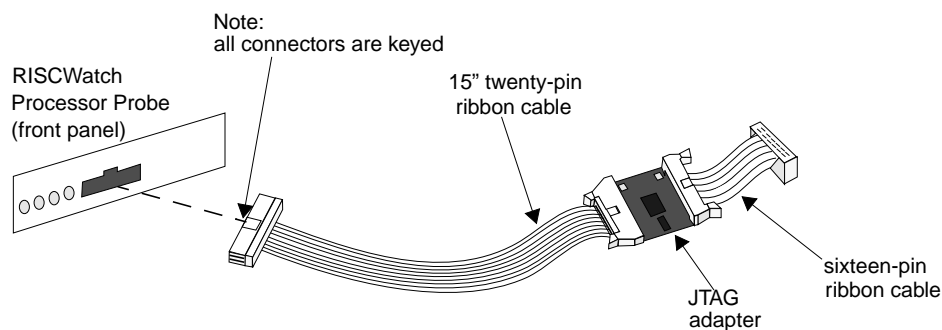


Figure 4-1. Typical JTAG Adapter Assembly

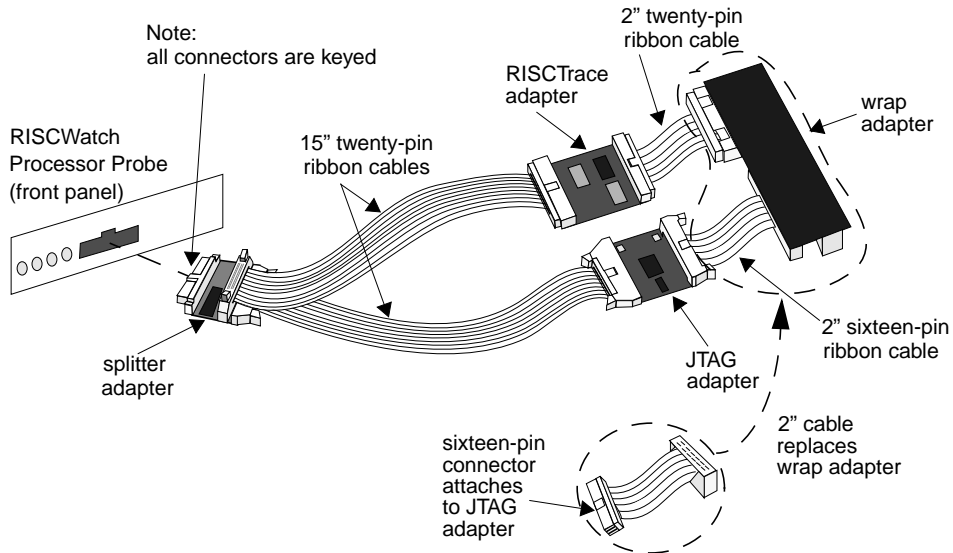


Figure 4-2. JTAG Adapter with RISCTrace Assembly

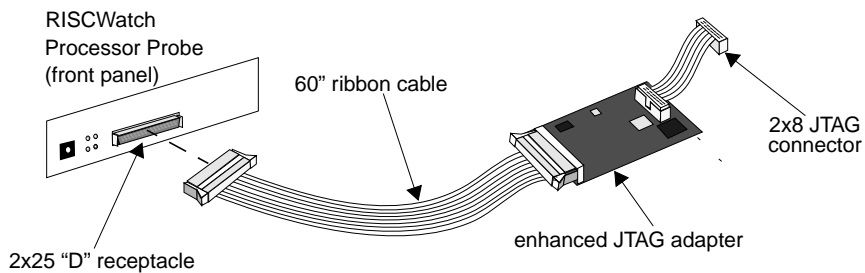


Figure 4-3. Enhanced JTAG Adapter Assembly

4. If your JTAG adapter assembly looks like the one shown in Figure 4-1, you have what we refer to as a "typical JTAG adapter assembly". To assemble the adapter and cables, perform the following steps:
 - a. Attach the 15" ribbon cable to the 20 pin connector on the JTAG adapter.
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector on the adapter.

Note: Failure to use the non-keyed side may damage the JTAG adapter.

- c. Attach the connector on the 15" ribbon cable to the front of the processor probe.
 - d. Proceed to Step 7.
5. If your adapter assembly resembles Figure 4-2, you have what we refer to as a "JTAG adapter with RISCTrace assembly". To assemble the adapter assembly and cables, perform the following steps:
 - a. Remove the "wrap" adapter, if attached to the cables. This requires disconnecting the 20 pin ribbon cable from the wrap adapter and the 16 pin ribbon cable from the JTAG adapter (See Figure 4-2).
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector (See Figure 4-2).

Note: Failure to use the non-keyed side may damage the JTAG adapter.

 - c. Attach the splitter adapter to the front of the processor probe.
 - d. Proceed to Step 7.
6. If your adapter assembly resembles Figure 4-3, you have what we refer to as an "Enhanced JTAG adapter assembly". To assemble the adapter assembly and cables, perform the following steps:
 - a. Attach the 60" cable to the enhanced JTAG adapter.
 - b. Attach the non-keyed side of the 2" cable to the 16 pin connector (See Figure 4-4).

Note: Failure to use the non-keyed side may damage the JTAG adapter.

 - c. Attach the connector on the 60" ribbon cable to the front of the processor probe.
7. Attach the connector on the 2" cable to the JTAG header on your PowerPC target board.

Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
8. If you have the JTAG adapter with RISCTrace, attach the RISCTrace connector to the RISCTrace header on the target board.
9. Set the processor probe configuration switches located on the back of the processor probe (RISCWatch includes cable and connectors for a 10Base2 connection).

Note: Configuration switch functions are described on the underside of the processor probe frame.

 - a. If using a 10Base2 ethernet connection, set the processor probe configuration switch 1 to the "open" position and the other switches to the "closed" position.

- b. If using a 10BaseT ethernet connection, set the processor probe configuration switches 1 and 5 to the "open" position, and have the other switches set to the "closed" position.
10. Connect the processor probe's AC/DC power adapter to both the back of the processor probe and to the power cord.
11. Connect the power cord to the power supply and to a wall outlet. USE ONLY THE SUPPLIED POWER CORD. The power light on the front of the RISCWatch processor probe will be illuminated. The processor probe does not have an on/off switch.
12. Proceed to the next section, "Establishing an Ethernet Connection with the RISCWatch Processor Probe".

Establishing an Ethernet Connection with the RISCWatch Processor Probe

1. The host must be equipped to participate in a 10Base2 or 10BaseT Ethernet network.

This may involve the installation of any or all of the following hardware: an ethernet adapter card for the specific RS/6000 model, a 10Base2 network transceiver, a BNC "T" type connector, and a terminating resistor. Consult the documentation included with the hardware for installation instructions. Most RS/6000 models come with ethernet adapters already installed. They are labeled ET in the back of the RS/6000 system unit.

Note: *AIX Communications Concepts and Procedures* (GC23-2203, two volumes) has additional information about the management and configuration of a TCP/IP network, including specifics as to how to configure an Ethernet network interface.

2. Assuming the host system is equipped with the appropriate ethernet adapter, the Ethernet interface must be configured properly. To do this:
 - a. Log in as **root** or superuser (**su**)
 - b. Enter **smit**
 - c. Select Communication Applications and Services
 - d. Select TCP/IP
 - e. Select Further Configuration
 - f. Select Network Interfaces
 - g. Select Network Interface Selection
 - h. Select Add a Network Interface
 - i. Select Add a Standard Ethernet Network Interface.
Choose "Standard Ethernet" as opposed to "IEEE 802.3 Ethernet".

Note: If you receive an error message stating that there is "No available adapter", go directly to step 3. Skip the remaining items in step 2.

- j. Select en0
- k. Set the INTERNET ADDRESS field to the host TCP/IP address. An acceptable value would be 7.1.1.4
- l. Set the Network MASK field to 255.255.240.0
- m. Insure that ACTIVATE is yes
- n. Insure that the Use Address Resolution Protocol is yes
- o. Leave the BROADCAST ADDRESS blank
- p. Select Do or press Enter

Upon successful completion, a properly configured Ethernet interface has been added. The Ethernet set-up is complete and step 3 need not be performed.

3. Perform this step only if you received the "No available adapter" error message when trying to Add a Standard Ethernet Network Interface in step 2.

This message indicates that either the ethernet adapter is missing (or possibly misplugged) or the Ethernet Network Interface already exists. To determine whether the interface already exists:

- a. Return to the Network Interface Selection screen in **smit**
- b. Select Change/Show Characteristics of a Network Interface
 - If en0 is not listed, insure that the RS/6000 host does have an ethernet adapter and, if possible, verify that it is plugged correctly. If the adapter was misplugged, repeat step 2 to add the Ethernet Network Interface.
 - If en0 is listed, then the Ethernet Network Interface already exists. Select en0 and note the TCP/IP address listed for the INTERNET ADDRESS field. This value is the host's Ethernet TCP/IP address and will be needed later. If no TCP/IP address is listed, choose one. The TCP/IP address 7.1.1.4 is recommended to maintain consistency with the menus and examples in this document. The Ethernet set-up is complete.
- 4. Hook up the ethernet cables, T-connectors, and terminators according to your desired network topology.

- a. For customers with no current ethernet network, a point-to-point connection should be configured. A 10Base2 connection between a host machine and the RISCWatch processor probe requires a pair of BNC T-connectors and 50-ohm terminators, plus a short length of 10Base2 ThinLAN cable, as shown in Figure 4-4.

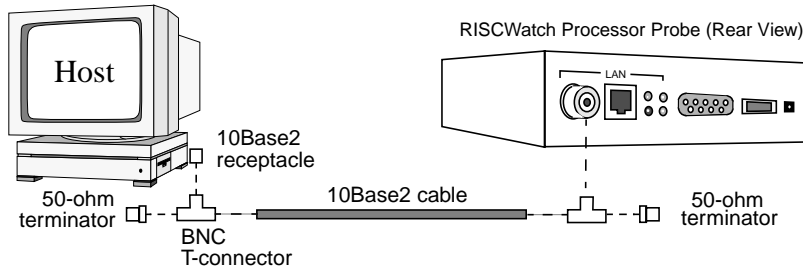


Figure 4-4. 10Base2 Ethernet Point-to-Point Connection

- b. For a 10Base2 connection to a site-wide LAN with multiple devices, the terminators would not be used, as shown in Figure 4-5.

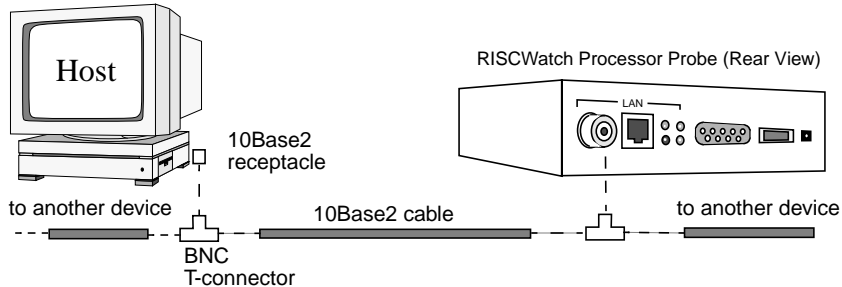


Figure 4-5. 10Base2 LAN Connection

- c. For 10BaseT Ethernet, the connection can be made in two ways. If the connection is to be used exclusively between the host and the Evaluation Board (a 10BaseT point-to-point connection), a crossover cable must be used to connect the two nodes (see Appendix A for a diagram of the wiring for a 10BaseT crossover cable). Figure 4-4 shows a point-to-point ethernet connection using a 10BaseT crossover cable:

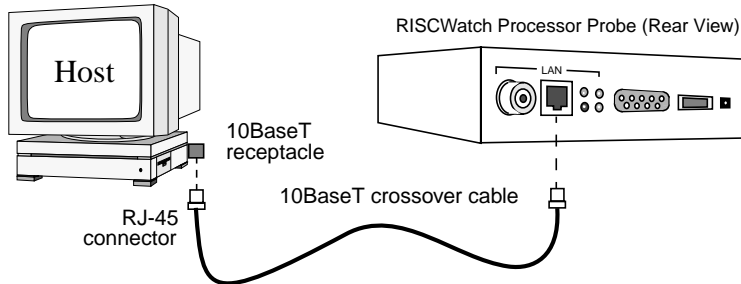


Figure 4-6. 10BaseT Crossover Connection

- d. Figure 4-4 shows a 10BaseT Ethernet connection using a hub:

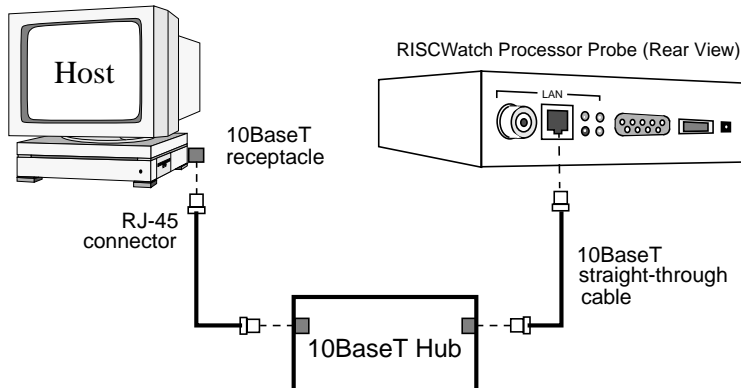


Figure 4-7. 10BaseT Hub Connection

5. Proceed to the next section, "Setting the TCP/IP Parameters of the RISCWatch Processor Probe".

Setting the TCP/IP Parameters of the RISCWatch Processor Probe

The RISCWatch processor probe ships with a TCP/IP address of 0.0.0.0 and a gateway address of 0.0.0.0. To change these addresses to valid addresses on your network, a serial port connection must be made from the host to the processor probe. The RS/6000 includes two serial ports to support communications via asynchronous data transfer. These ports are labeled S1 and S2 on the back of the RS/6000's system unit.

1. Connect the supplied 25-pin-to-9-pin adapter to the 9-pin female connector of the supplied serial cable.
2. Connect the 25-pin connector to port S1 or S2 on the RS/6000.
3. Connect the 9-pin male connector of the supplied serial cable to the connector labeled RS232 on the RISCWatch processor probe.
4. Log in as **root** or superuser (**su**)

Proper set-up involves the configuration of tty devices for either S1 or S2. The following steps should be taken to insure proper S1 or S2 configuration:

5. Determine whether the tty0 or tty1 devices already exist. tty0 must exist if using port S1 and tty1 must exist if using S2.
 - a. Enter **smit**
 - b. Select Devices
 - c. Select TTY
 - d. Select List All Defined TTYs
 - e. Perform step 6 if tty0 or tty1 is not listed. To properly configure a defined tty device, perform step 7 for systems running AIX 4 or higher.
6. To add a tty device:
 - a. Select Done or PF3 to exit the List All Defined TTYs screen
 - b. Return to the TTY screen
 - c. Select Add a TTY
 - d. Select tty RS232 Asynchronous Terminal
 - e. Select sa0 - Serial Port 1 when adding tty0
sa1 - Serial Port 2 when adding tty1
 - f. Select s1 for the port number when adding tty0
s2 for the port number when adding tty1
 - g. Insure that the BAUD rate is 9600
 - h. Insure that the PARITY is none
 - i. Insure that the BITS per character is 8
 - j. Insure that the Number of STOP BITS is 1
 - k. Insure that Enable LOGIN is disabled
 - l. The default settings for all the other fields are satisfactory.
 - m. Select Do or press Enter

Upon successful completion, a properly configured tty device is created and thus, step 7 can be skipped for the particular tty (tty0 or tty1) added. Go directly to step 8.

7. To properly configure a previously defined tty device:
 - For systems running AIX 4 or later :
 - a. Select Done or PF3 to exit the List All Defined TTYs screen
 - b. Return to the TTY screen
 - c. Select Change / Show Characteristics of a TTY
 - d. Select tty# (where # = 0 or 1)
 - e. Insure that the following fields are set to the indicated values:

TTY	tty# (#=0 for tty0, 1 for tty1)
TTY type	tty
TTY interface	RS232
Description	Asynchronous Terminal
Status	Available
Location	00-00-S*-00 (*=1 for tty0, 2 for tty1)
Parent Adapter	sa# (#=0 for tty0, 1 for tty1)
Port Number	s* (*=1 for tty0, 2 for tty1)
Terminal Type	dumb
Enable LOGIN	disable
 - f. Insure that the BAUD rate is 9600 for tty0
 - g. Insure that the PARITY is none
 - h. Insure that the BITS per character is 8
 - i. Insure that the Number of STOP BITS is 1
The other fields can remain at their default values.
 - j. Select Do or press Enter

Upon successful completion, the tty device is properly configured.

8. Edit the file /etc/uucp/Devices and add one of the following lines:
 - "Direct tty0 - 9600 direct" if using S1
 - "Direct tty1 - 9600 direct" if using S2
9. File the changes.
10. Exit from **root**.
11. From the AIX command line, enter:
 - "/usr/bin/cu -m -l tty0" if using S1
 - "/usr/bin/cu -m -l tty1" if using S2
12. Press Enter. The processor probe will respond with a status prompt consisting of a letter followed by the ">" sign.
13. Enter "lan" to display the current lan settings.

14. Determine a valid TCP/IP address and gateway for the processor probe.
 - a. If connecting to an existing network, obtain the TCP/IP address and gateway address from your system administrator.
 - b. If connecting to the processor probe via a point-to-point connection with your RS/6000, we suggest a TCP/IP address of "7.1.1.100". The processor probe's default gateway of "0.0.0.0" is sufficient.
15. Change the TCP/IP address by entering "lan -i 'TCP/IP address'". For example, enter "lan -i 7.1.1.100".
16. Change the TCP/IP gateway by entering "lan -g 'TCP/IP address'". For example, enter "lan -g 0.0.0.0".
17. If necessary, change the processor probe's port number. This step is only necessary if there is a conflict using the probe's default port number of 6470. Conflicts should only exist if a device **other** than an IBM RISCWatch Processor Probe is using port number 6470. To change the port number, enter "lan -p 'port number'". For example, enter "lan -p 6470".

Note: The port number must match the host port number entry in the TCP/IP /etc/**services** file.
18. Enter "~." to return to the host.
19. Press Enter to quit the session.
20. There is no command to set the processor probe's subnet mask. As the probe boots, it sends ICMP address mask requests out on the network. If a response is received, the probe sets its subnet mask to that of the network. For AIX to respond to ICMP requests, the following commands must be entered as superuser (root):
 - "no -o icmpaddressmask=1"
 - "no -o ipforwarding=1"

Note: If multiple responses are received, the probe sets its subnet mask to the first value it receives and issues a warning message over the serial port. This is an error condition on the network and should be corrected. If no response is received, the probe sets the subnet mask to one of the following defaults based on its TCP/IP address:

 - a. 255.0.0.0 for Class A addresses (1.x.x.x - 127.x.x.x)
 - b. 255.255.0.0 for Class B addresses (128.x.x.x - 191.x.x.x)
 - c. 255.255.255.0 for Class C addresses (192.x.x.x - 223.x.x.x)
21. Cycle power on the processor probe for the changes to take effect. Power can be cycled by disconnecting and then reconnecting the AC/DC power adapter attached to the processor probe.
22. Once the addresses are made valid for your network, the "telnet" utility on your host and the "lan" command on the RISCWatch processor probe can be used to change the addresses from then on.

23. Verify your network connection. From your host, enter "ping 'TCP/IP address'". For example, enter "ping 7.1.1.100". If the ping does not complete successfully, verify that the installation steps have been followed correctly or contact a system administrator.
24. Hardware installation for the JTAG ethernet target is complete. Please proceed to "RS/6000 Software Installation".

ROM Monitor and OS Open Target Hardware Install

For ROM Monitor and OS Open targets, a communications link must be established between the host PC and the target board. For serial communications (SLIP), a NULL modem cable is the only hardware required. For ethernet communications, please refer to "Establishing an Ethernet Connection with the RISCWatch Processor Probe", substituting the ROM Monitor or OS Open target board where the processor probe is mentioned.

Consult the appropriate ROM Monitor and OS Open documentation for establishing TCP/IP parameters necessary for your network.

RS/6000 Software Installation

For all RISCWatch target types, the following installation steps need to be performed:

1. Verify the following items are available:
 - AIX Version 4.1 or later
 - AIX/Windows with X11R5 and Motif 1.2
 - RISCWatch Installation Diskettes
 - One 3.5" diskette drive
 - Four megabytes of hard disk space

Note: During program installation, an additional four megabytes of hard disk space are needed temporarily to hold both the RISCWatch program files and the installation file.
2. Logon as **root** to the RISC System/6000 or use the **su** command to gain root user privileges.
3. Choose an already existing directory or create a new directory. For example:
`mkdir /usr/rwppc`
which will contain the RISCWatch program and its associated files.
4. Issue the `cd` command to make it the present working directory. For example:
`cd /usr/rwppc`
5. Insert the RISCWatch Installation Diskette into the diskette drive

6. Issue the following command to extract the files from the RISC System/6000 RISCWatch Installation Diskette(s) and place them in the chosen directory:

```
tar -xvf /dev/rfd0
```
7. Run the installation program, "rw_inst".
8. The install program will prompt you for one or more driver diskettes. Insert the Processor Probe Driver diskettes for JTAG Ethernet targets, or the Device Driver diskette for the parallel port target. No diskette is required for OS Open or ROM Monitor targets.
9. Add the following line to every user's .profile that will be running RISCWatch:

```
export UIDPATH=./%U:/usr/rwppc/%U (for Korn shell)
setenv UIDPATH ./%U:/usr/rwppc/%U (for C shell)
```

You must specify the %U at the end of each path in the UIDPATH line.

Note: Be sure to change the directory in the above lines if you did not install RISCWatch in the /usr/rwppc directory. If you wish to use RISCWatch without logging off and logging on your machine again, type in the above line at the AIX prompt to set this environment variable immediately.
10. For proper device configuration reporting, ensure that one of the following export lines exists in each user's **.profile** :

For AIX 4.1 :

```
export LANG=en_US (for Korn shell)
setenv LANG en_US (for C shell)
```
11. For JTAG ethernet, ROM Monitor, and OS Open targets, these additional steps are required to establish communications between the host and target:
 - a. To modify the **/etc/services** file, the user must be logged in as **root** or superuser (**su**). The following lines must be added to the file:

```
osopen-dbg  20044/tcp
osopen-dbg  20044/udp
jtag_eth    6470/tcp # Note: Underscore used, not hyphen
```
 - b. The AIX **refresh -s inetd** command must then be run to synchronize the object data manager (ODM) database and to update the **inetd** daemon.
12. Once the installation is completed, the RISCWatch "README" file will be displayed. Please view the entire file for the latest changes to the program and its operation.
13. It may be necessary to add the chosen directory to the PATH environment variable if it has not already been added. Furthermore, it may be necessary to change ownership of this directory as well as all of its files if many people will need access to the RISCWatch program

RISCWatch Environment Setup

You **must** edit the RISCWatch environment file **rwppc.env** to make the appropriate changes to certain RISCWatch environment variables.

14. Bring up the **rwppc.env** file in your favorite editor.
15. Change the PROC variable to the processor you will be debugging. See the README for a list of valid processors for your release.
16. Change the TARGET_TYPE variable to the proper target type you will be using. Valid selections are "jtag_par", "jtag_eth", "rom_mon", and "osopen".
17. For JTAG ethernet, ROM Monitor, and OS Open targets, change the TARGET_NAME variable to the TCP/IP name or address of either the RISCWatch processor probe, the ROM Monitor local address, or OS Open address, respectively.
18. Edit any other environment variables as desired. Environment variables are described in "Environment Resources" on page 3-6 in the *RISCWatch Debugger User's Guide*. Users that have a working directory other than the install directory have their own copy of the **rwppc.env** file. Such users should backup their copy, make a fresh one from the install directory, and then merge their changes from the old one to the new one.

This completes the RS/6000 installation of RISCWatch. Proceed to "Quick Start" on page 2-1 in the *RISCWatch Debugger User's Guide*.

Chapter 5. Installing RISCWatch on Sun

Sun Hardware Installation

Please follow the hardware installation instructions for the kind of RISCWatch target you are installing. For example, Evaluation Kit users may skip directly to “ROM Monitor and OS Open Target Hardware Install” on page 5-10.

JTAG Parallel Port Target Hardware Install

For JTAG parallel port targets, the following installation steps need to be performed:

1. Verify the following hardware is available:
 - One Sparcstation 5,10 or 20
 - One RISCWatch parallel port adapter
 - One RISCWatch parallel port adapter cable
 - One RISCWatch Parallel Port Adapter power supply for U.S.A and Canada use only
 - One RISCWatch Parallel Port Adapter power supply plug/cable assembly for countries other than the U.S.A or Canada
YOU MUST PROVIDE A 240VA (OR LESS) POWER SUPPLY THAT IS AGENCY-APPROVED IN THE COUNTRY YOU ARE IN.

Note: The power requirements for the adapter are 5V, 300mA, regulated, 5V on the inner conductor, GND on the outer conductor.
2. Plug one end of the adapter cable into the adapter and plug the other end into the parallel port of the host platform.

Note: The RISCWatch parallel port adapter can only be attached to the parallel port on the motherboard of the host system unit.
3. Attach the 16-pin cable of the RISCWatch parallel port adapter to the JTAG header on your PowerPC target board.

Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
4. If you are in the U.S.A. or Canada, plug the connector of the enclosed power supply into the parallel port adapter box and plug the power supply into the wall outlet.

5. If you are not in the U.S.A or Canada, attach the enclosed power supply plug/cable assembly to your own agency-approved, 240VA (or less), 5V, 300ma, regulated power supply. The inner conductor of the plug/cable assembly has to be connected to 5V and the outer conductor has to be connected to ground. Insert the plug/cable assembly into the parallel port adapter box and plug the power supply into the wall outlet.
6. For Solaris users, hardware installation for the JTAG parallel port target is complete. Please proceed to "Sun Software Installation" on page 5-10. SunOS users should proceed to "Configuring the SunOS Kernel for RISCWatch JTAG Parallel Port targets" on page 5-2.

Configuring the SunOS Kernel for RISCWatch JTAG Parallel Port targets

For SunOS, the operating system kernel must be recompiled without a device attached to the parallel port for the RISCWatch parallel port device driver to dynamically install correctly. The kernel must be recompiled BEFORE the RISCWatch installation program, "rw_inst" is run. The following explains how to reconfigure the SunOS kernel.

1. Log in as **root**.
2. Change directory to /usr/kvm/sys/sun4m/conf.
3. Copy your existing kernel configuration file, eg. GENERIC, to a new name, eg. SUN4RW.
`cp GENERIC SUN4RW; chmod +w SUN4RW`
4. Edit SUN4RW to comment out the bidirectional device driver that comes with your kernel. # in the first column is used to indicate a comment. Any devices that use this device driver, such as a printer, will not be useable.
`#device-driver bpp # bpp support commented out`
5. Verify that the following line exists in SUN4RW to dynamically load device drivers:
`options VDDRV # loadable modules`
6. Verify that enough space exists to recompile the kernel. Approximately 2.5MB of disk space is needed in /usr to recompile the GENERIC configuration kernel.
7. Run config:
`/etc/config SUN4RW`
 (The directory ../SUN4RW will be made if it doesn't exist and "make depend" will be done unless you specify a "-n" flag)
8. Make the new system:
`cd ../SUN4RW`
`make`

9. Typically the running kernel should be “vmunix” because programs like ‘ps’ and ‘w’ expect “vmunix” to be the running kernel. Save the original kernel, install the new one in /vmunix, and try it out:

```
mv /vmunix /vmunix.old
cp vmunix /vmunix
/etc/halt
boot vmunix
```

10. If the system does not appear to work, boot and restore the original kernel, then fix the new kernel:

```
/etc/halt
b vmunix.old -s
mv /vmunix.old /vmunix
boot vmunix
```

11. Hardware installation for the JTAG parallel port target is complete. Please proceed to “Sun Software Installation” on page 5-10.

JTAG Ethernet Target Hardware Install

1. Verify the following hardware is available:
 - One RISCWatch processor probe
 - One RISCWatch processor probe AC/DC power adapter and power cord
 - One RISCWatch processor probe JTAG adapter assembly (see descriptions in step 3 below)
 - One 9-pin serial cable
 - One 25-pin-to-9-pin adapter
 - Other hardware that may be required is an AUI (or thick Ethernet) adapter cable (or an AUI/Audio Adapter cable depending on your SPARCstation model and options - both are available from Sun) and an Ethernet/IEEE 802.3 10Base2 network transceiver. Consult the documentation included with the hardware for installation instructions.
2. Remove the “wrap” adapter from the front of the processor probe, if one exists.

3. Determine which JTAG adapter assembly you have by examining the following three figures:

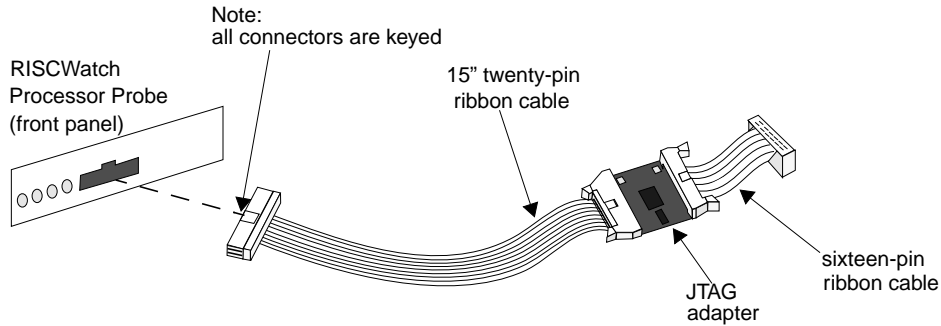


Figure 5-1. Typical JTAG Adapter Assembly

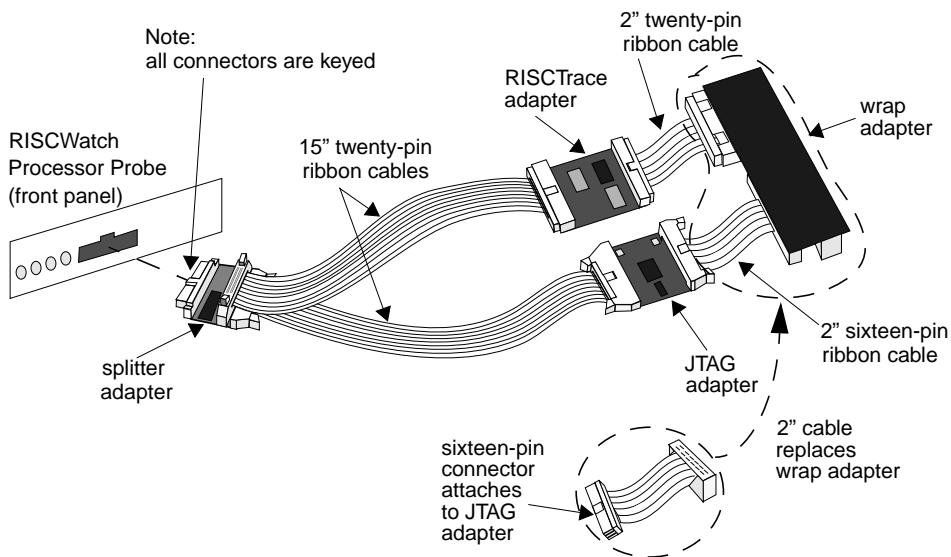


Figure 5-2. JTAG Adapter with RISCTrace Assembly

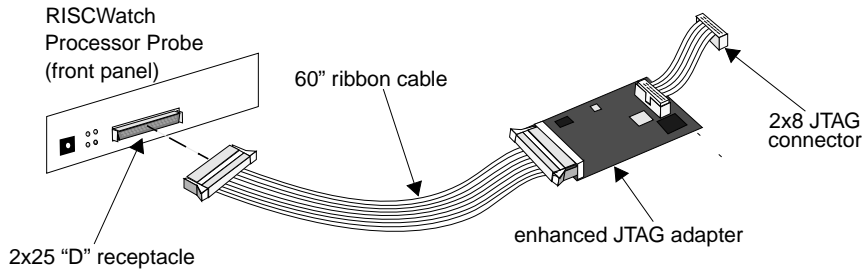


Figure 5-3. Enhanced JTAG Adapter Assembly

4. If your JTAG adapter assembly looks like the one shown in Figure 5-1, you have what we refer to as a “typical JTAG adapter assembly”. To assemble the adapter and cables, perform the following steps:
 - a. Attach the 15” ribbon cable to the 20 pin connector on the JTAG adapter.
 - b. Attach the non-keyed side of the 2” cable to the 16 pin connector on the adapter.

Note: Failure to use the non-keyed side may damage the JTAG adapter.

 - c. Attach the connector on the 15” ribbon cable to the front of the processor probe.
 - d. Proceed to Step 7.
5. If your adapter assembly resembles Figure 5-2, you have what we refer to as a “JTAG adapter with RISCTrace assembly”. To assemble the adapter assembly and cables, perform the following steps:
 - a. Remove the “wrap” adapter, if attached to the cables. This requires disconnecting the 20 pin ribbon cable from the wrap adapter and the 16 pin ribbon cable from the JTAG adapter (See Figure 5-2).
 - b. Attach the non-keyed side of the 2” cable to the 16 pin connector (See Figure 5-2).

Note: Failure to use the non-keyed side may damage the JTAG adapter.

 - c. Attach the splitter adapter to the front of the processor probe.
 - d. Proceed to Step 7.
6. If your adapter assembly resembles Figure 5-3, you have what we refer to as an “Enhanced JTAG adapter assembly”. To assemble the adapter assembly and cables, perform the following steps:
 - a. Attach the 60” cable to the enhanced JTAG adapter.
 - b. Attach the non-keyed side of the 2” cable to the 16 pin connector (See Figure 5-3).

Note: Failure to use the non-keyed side may damage the JTAG adapter.

- c. Attach the connector on the 60" ribbon cable to the front of the processor probe.
7. Attach the connector on the 2" cable to the JTAG header on your PowerPC target board.

Note: The JTAG header is keyed (pin 14). Failure to align the key properly may damage the target.
8. If you have the JTAG adapter with RISCTrace, attach the RISCTrace connector to the RISCTrace header on the target board.
9. Set the processor probe configuration switches located on the back of the processor probe (RISCWatch includes cable and connectors for a 10Base2 connection).

Note: Configuration switch functions are described on the underside of the processor probe frame.

 - a. If using a 10Base2 Ethernet connection, set the processor probe configuration switch 1 to the "open" position and the other switches to the "closed" position.
 - b. If using a 10BaseT Ethernet connection, set the processor probe configuration switches 1 and 5 to the "open" position, and have the other switches set to the "closed" position.
10. Connect the processor probe's AC/DC power adapter to both the back of the processor probe and to the power cord.
11. Connect the power cord to the power supply and to a wall outlet. **USE ONLY THE SUPPLIED POWER CORD.** The power light on the front of the RISCWatch processor probe will be illuminated. The processor probe does not have an on/off switch.
12. Proceed to the next section, "Establishing an Ethernet Connection with the RISCWatch Processor Probe" on page 5-6.

Establishing an Ethernet Connection with the RISCWatch Processor Probe

1. Assuming the host system is equipped with the appropriate Ethernet adapter, the Ethernet interface must be configured properly. To do this, the **ifconfig** command can be used. Users should consult their network administrator and Sun documentation for additional information. A host TCP/IP address of 7.1.1.4 is suggested to maintain consistency with this document.
2. Hook up the Ethernet cables, T-connectors, and terminators according to your desired network topology.

- a. For customers with no current Ethernet network, a point-to-point connection should be configured. A 10Base2 connection between a host machine and the RISCWatch processor probe requires a pair of BNC T-connectors and 50-ohm terminators, plus a short length of 10Base2 ThinLAN cable, as shown in Figure 5-4.

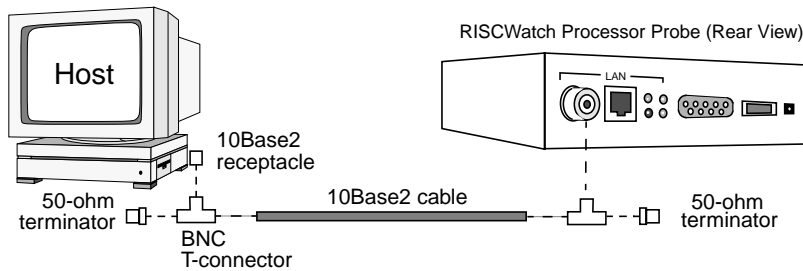


Figure 5-4. 10Base2 Ethernet Point-to-Point Connection

- b. For a 10Base2 connection to a site-wide LAN with multiple devices, the terminators would not be used, as shown in Figure 5-4.

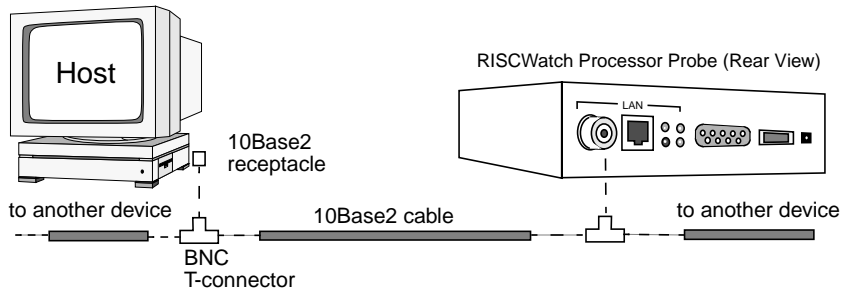


Figure 5-5. 10Base2 LAN Connection

- c. For 10BaseT Ethernet, the connection can be made in two ways. If the connection is to be used exclusively between the host and the Evaluation Board (a 10BaseT point-to-point connection), a crossover cable must be used to connect the two nodes (see Appendix A for a diagram of the wiring for a 10BaseT crossover cable). Figure 5-4 shows a point-to-point Ethernet connection using a 10BaseT crossover cable:

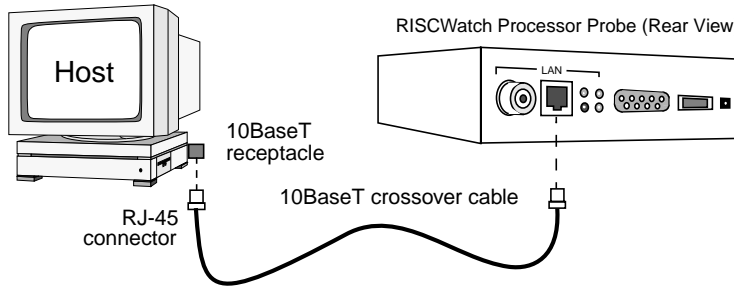


Figure 5-6. 10BaseT Crossover Connection

- d. Figure 5-4 shows a 10BaseT Ethernet connection using a hub:

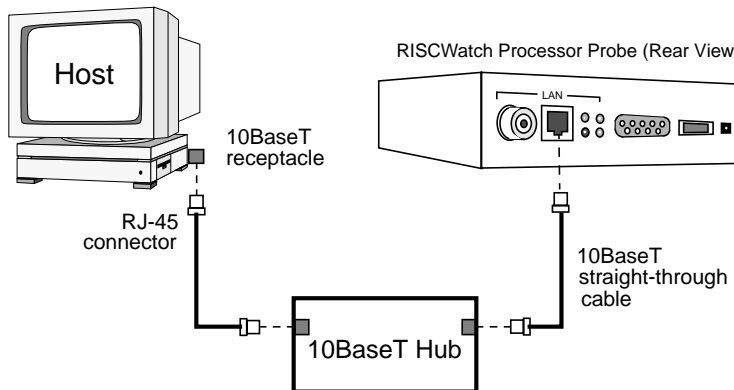


Figure 5-7. 10BaseT Hub Connection

3. Proceed to the next section, "Setting the TCP/IP Parameters of the RISC-Watch Processor Probe".

Setting the TCP/IP Parameters of the RISCWatch Processor Probe

The RISCWatch processor probe ships with a TCP/IP address of 0.0.0.0 and a gateway address of 0.0.0.0. To change these addresses to valid addresses on your network, a serial port connection must be made from the host to the processor probe. The Sun SPARCstation includes two serial ports to support communications via asynchronous data transfer. These ports are labeled Serial A

and Serial B on the back of the Sun's system unit. Some SPARCstation models multiplex these two ports into one physical port labeled A/B. Use A if it is available because use of the B port requires a special demultiplexing cable from Sun.

This section refers to these ports as S1 and S2, respectively.

1. Connect the supplied 25-pin-to-9-pin adapter to the 9-pin female connector of the supplied serial cable.
2. Connect the 25-pin connector to port S1 or S2 on the Sun.
3. Connect the 9-pin male connector of the supplied serial cable to the connector labeled RS232 on the RISCWatch processor probe.
4. From the command line, enter:

```
"/usr/bin/tip -9600 /dev/ttya" if using S1
```

```
"/usr/bin/tip -9600 /dev/ttyb" if using S2
```
5. Press Enter. The processor probe will respond with a status prompt consisting of a letter followed by the ">" sign.
6. Enter "lan" to display the current lan settings.
7. Determine a valid TCP/IP address and gateway for the processor probe.
 - a. If connecting to an existing network, obtain the TCP/IP address and gateway address from your system administrator.
 - b. If connecting to the processor probe via a point-to-point connection with your host, we suggest a TCP/IP address of "7.1.1.100". The processor probe's default gateway of "0.0.0.0" is sufficient.
8. Change the TCP/IP address by entering "lan -i 'TCP/IP address'". For example, enter "lan -i 7.1.1.100".
9. Change the TCP/IP gateway by entering "lan -g 'TCP/IP address'". For example, enter "lan -g 0.0.0.0".
10. If necessary, change the processor probe's port number. This step is only necessary if there is a conflict using the probe's default port number of 6470. Conflicts should only exist if a device **other** than an IBM RISCWatch Processor Probe is using port number 6470. To change the port number, enter "lan -p 'port number'". For example, enter "lan -p 6470".
Note: The port number must match the host port number entry in the TCP/IP /etc/**services** file.
11. Enter "~." to quit the session.
12. There is no command to set the processor probe's subnet mask. As the probe boots, it sends ICMP address mask requests out on the network. If a response is received, the probe sets its subnet mask to that of the network. For Solaris to respond to ICMP requests, the following command must be entered as superuser (root):

- “nidd -set /dev/ip ip_respond_address_mask_broadcast 1”

Note: If multiple responses are received, the probe sets its subnet mask to the first value it receives and issues a warning message over the serial port. This is an error condition on the network and should be corrected. If no response is received, the probe sets the subnet mask to one of the following defaults based on its TCP/IP address:

- 255.0.0.0 for Class A addresses (1.x.x.x - 127.x.x.x)
 - 255.255.0.0 for Class B addresses (128.x.x.x - 191.x.x.x)
 - 255.255.255.0 for Class C addresses (192.x.x.x - 223.x.x.x)
- Cycle power on the processor probe for the changes to take effect. Power can be cycled by disconnecting and then reconnecting the AC/DC power adapter attached to the processor probe.
 - Once the addresses are made valid for your network, the "telnet" utility on your host and the "lan" command on the RISCWatch processor probe can be used to change the addresses from then on.
 - Verify your network connection. From your host, enter "ping 'TCP/IP address'". For example, enter "ping 7.1.1.100". If the ping does not complete successfully, verify that the installation steps have been followed correctly or contact a system administrator.
 - Hardware installation for the JTAG Ethernet target is complete. Please proceed to “Sun Software Installation” below.

ROM Monitor and OS Open Target Hardware Install

For ROM Monitor and OS Open targets, a communications link must be established between the host PC and the target board. For serial communications (SLIP), a NULL modem cable is the only hardware required. For Ethernet communications, please refer to “Establishing an Ethernet Connection with the RISCWatch Processor Probe” on page 5-6, substituting the ROM Monitor or OS Open target board where the processor probe is mentioned.

Consult the appropriate ROM Monitor and OS Open documentation for establishing TCP/IP parameters necessary for your network.

Sun Software Installation

For all RISCWatch target types, the following installation steps need to be performed:

1. Verify the following items are available:

- A Sun workstation
- One 3.5" diskette drive
- SunOS 4.1.3 (or higher) or Solaris 2.4 (or higher)
- A window system such as Open Windows or CDE
- Motif 1.2 (Solaris))
- RISCWatch Installation Diskette(s)
- Three megabytes of hard disk space

Note: During program installation, an additional three megabytes of hard disk space are needed temporarily to hold both the RISCWatch program files and the installation file.

Software Installation Instructions for SunOS and Solaris

1. Logon as **root** or use the **su** command to gain root access.
2. Open at least two windows for this process.
3. Choose an already existing directory or create a new directory which will contain the RISCWatch program and its associated files. For example, to create a new directory `rwppc` within `/usr`:
`mkdir /usr/rwppc`
4. Issue the **cd** command in both windows to make `/usr/rwppc` the current working directory. For example:
`cd /usr/rwppc`
5. Insert RISCWatch Installation Diskette 1 into the diskette drive.

Instructions for SunOS

6. From the second window run the command:
`cpio -ivB rwppc.SunOS4.tar.Z rw_inst </dev/rfd0`
where `'/dev/rfd0'` is the name of your diskette device.
7. When the system prompts you for a new volume, move to the first window and type `eject` to eject the diskette. Insert the next diskette.
8. Move to the second window and type the name of the diskette device (`/dev/rfd0`) to continue the process.
9. If prompted for more diskettes, repeat steps 7 and 8 above.
10. Insert the driver diskette (Processor Probe Driver or Device Driver).
11. From the second window run the command:
`cpio -ivB < /dev/rfd0`
12. Skip to instruction 20 below:

Instructions for Solaris

13. From the first window run the command 'volcheck'. This creates a file called /vol/dev/rdiskette0/unlabeled (the diskette device name).
If the system pops up a message box saying the diskette format is unrecognized, ignore the message and cancel the message box. The name of the file created may be different on your system; use the command eject -q to see the actual name.
14. From the second window run the command:

```
cpio -ivB rwppc.SunOS5.tar.Z rw_inst </vol/dev/rdiskette0/unlabeled
```
15. When the system prompts you for a new volume, move to the first window and type eject to eject the diskette. Insert the next diskette and type volcheck.
16. Move to the second window and type the name of the diskette device (/vol/dev/rdiskette0/unlabeled) to continue the process.
17. If prompted for more diskettes, repeat steps 15 and 16 above.
18. Insert the driver diskette (Processor Probe Driver or Device Driver) and type "volcheck" from the first window.
19. From the second window run the command:

```
cpio -ivB < /vol/dev/rdiskette0/unlabeled
```

Instructions for both SunOS and Solaris

20. From the directory where RISCWatch was installed, type "./rw_inst" to untar the RISCWatch files and install the parallel port device driver, if required.
21. Once the installation is completed, the RISCWatch "README" file will be displayed. Please view the entire file for the latest changes to the program and its operation.
22. Add the following line to every user's .profile that will be running RISCWatch:

```
export UIDPATH=./%U:/usr/rwppc/%U (for Korn shell)
setenv UIDPATH ./%U:/usr/rwppc/%U (for C shell)
```

You must specify the %U at the end of each path in the UIDPATH line.

Note: Be sure to change the directory in the above lines if you did not install RISCWatch in the /usr/rwppc directory. If you wish to use RISCWatch without logging off and logging on your machine again, type in the above line at the shell prompt to set this environment variable immediately.
23. Add the LD_LIBRARY_PATH environment variable to include the Motif libraries (/usr/dt/lib:) and, if needed, include the Open Windows libraries (/usr/openwin/lib:). The environment variable should be added to any user's startup shell (.profile for Korn shell, .cshrc for C shell). For example:

For Korn shell:

```
export LD_LIBRARY_PATH=/usr/dt/lib:/usr/openwin/lib:$LD_LIBRARY_PATH
```

For C shell:

```
setenv LD_LIBRARY_PATH /usr/dt/lib:/usr/openwin/lib:$LD_LIBRARY_PATH
```

24. For JTAG Ethernet, ROM Monitor, and OS Open targets, an additional step is required to establish communications between the host and target. To modify the **/etc/services** file, the user must be logged in as **root** or superuser (**su**).

The following lines must be added to the file:

```
osopen-dbg  20044/tcp
osopen-dbg  20044/udp
jtag_eth     6470/tcp # Note: Underscore used, not hyphen
```

25. It may be necessary to add the chosen directory to the PATH environment variable if it has not already been added. Furthermore, it may be necessary to change ownership of this directory as well as all of its files if many people will need access to the RISCWatch program
26. Exit from **root** or **su**.
27. Proceed to “RISCWatch Environment Setup” below.

Notes for SunOS

1. `rw_inst` will update `/etc/rc.local`, if it exists, to automatically load the RISCWatch parallel device driver upon machine reboot. If `/etc/rc.local` does not exist or the modifications made by `rw_inst` are removed, type “`rw_inst -a`” to manually load the device driver into the kernel after machine reboot.
2. `libC.so.5.0` and `libC.sa.5.0`, two dynamic libraries which RISCWatch needs to run, will be installed in `/usr/lang/lib`.

RISCWatch Environment Setup

You **must** edit the RISCWatch environment file **rwppc.env** to make the appropriate changes to certain RISCWatch environment variables.

3. Bring up the **rwppc.env** file in your favorite editor.
4. Change the PROC variable to the processor you will be debugging. See the README for a list of valid processors for your release.
5. Change the TARGET_TYPE variable to the proper target type you will be using. Valid selections are “jtag_par”, “jtag_eth”, “rom_mon”, and “osopen”.
6. For JTAG Ethernet, ROM Monitor, and OS Open targets, change the TARGET_NAME variable to the TCP/IP name or address of either the RISCWatch processor probe, the ROM Monitor local address, or OS Open address, respectively.

7. Edit any other environment variables as desired. Environment variables are described in “Environment Resources” on page 3-6 in the *RISCWatch Debugger User's Guide*. Users that have a working directory other than the install directory have their own copy of the **rwppc.env** file. Such users should backup their copy, make a fresh one from the install directory, and then merge their changes from the old one to the new one.

This completes the Sun installation of RISCWatch. Proceed to “Quick Start” on page 2-1 in the *RISCWatch Debugger User's Guide*.

Appendix A. Ethernet Crossover Cable

Figure A-1 shows the connections and signal assignments in a crossover cable:

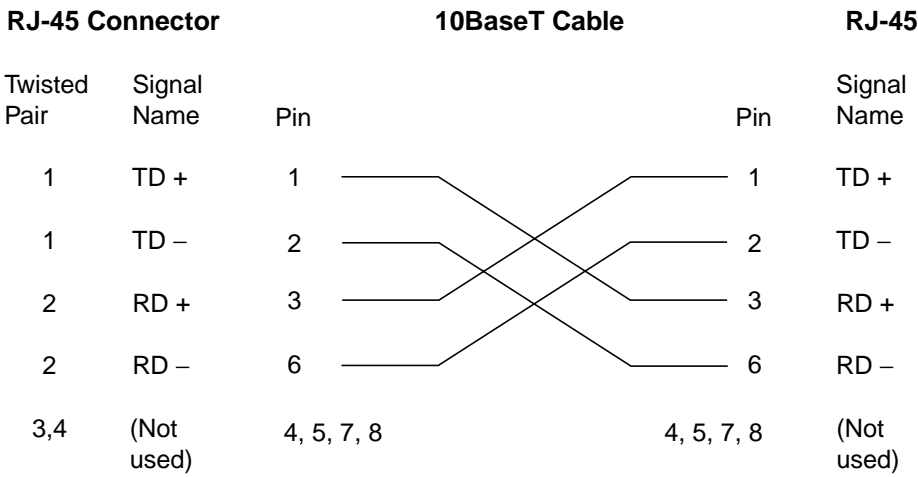


Figure A-1. Wiring in a 10BaseT Crossover Cable

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