Mentor® Embedded Sourcery Probe Professional Hardware Manual

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Table of Contents

Chapter 1
Introduction to Mentor Embedded Sourcery Probe Professional

Mentor Embedded Sourcery Probe Professional (Sourcery Probe Professional) is a tool that helps you develop and debug embedded software.

Tip: If you have a probe that is labeled Mentor Embedded GIGA-JTAG Probe, this works exactly the same as Sourcery Probe Professional. The only difference is the label on the hardware. Follow the instructions in the manual for Sourcery Probe Professional.

Related Documentation

This manual describes the procedures for unpacking the probe, connecting the external power supply, setting up Ethernet communication, and connecting the probe to your target system.

- See the *Sourcery CodeBench Getting Started Guide* for details on installing and configuring your debugger.
- To update the firmware version of the Sourcery Probe Professional, refer to the *Appendix A - Probe Settings and Updates* section of the *Mentor Embedded Sourcery Probe User's Manual*. **NOTE**: This information is only relevant if you are using an ARM or MIPS target. If you have a powerPC target, ignore these procedures.

About Sourcery Probe Professional

The probe uses advanced emulation technology to provide control of and visibility into your target system. Combined with a host debugger, the probe speeds the debugging process by letting you interactively control and examine the state of your target system.

Sourcery Probe Professional is composed of two parts:

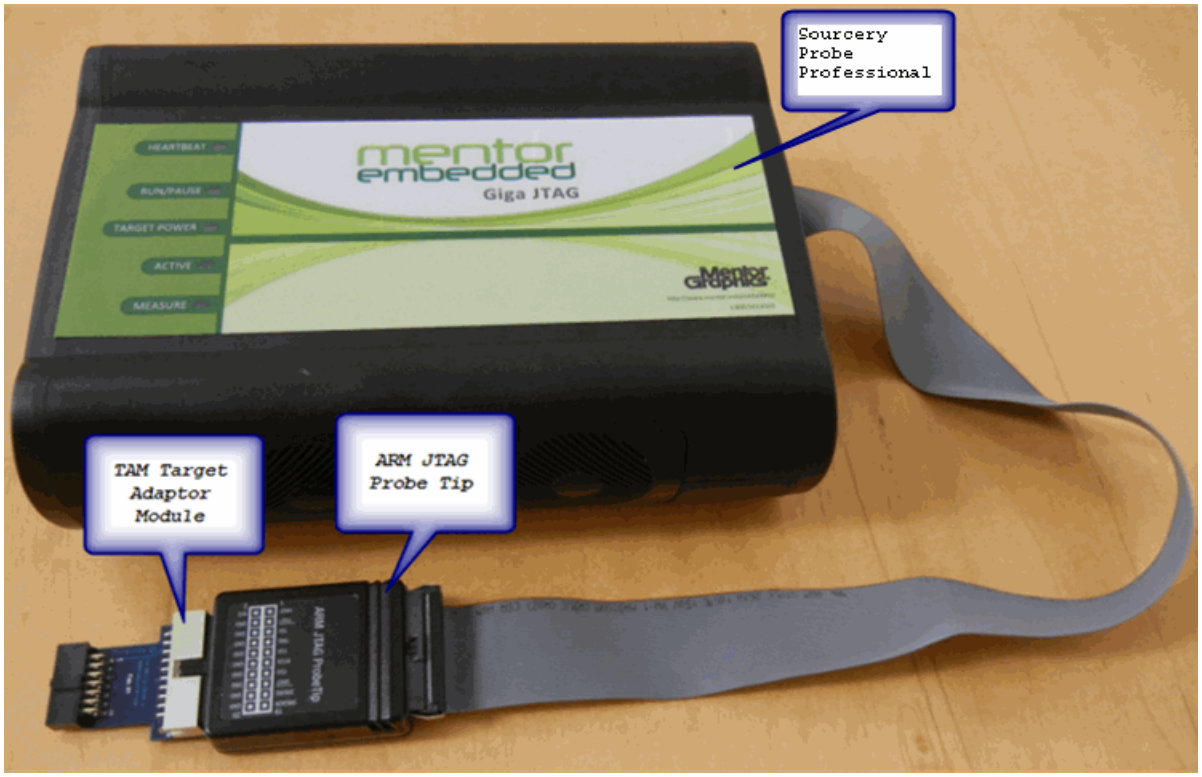
- The Ethernet probe

  The probe is shown in Figure 1-1. It provides visibility into and control of your target system using a JTAG interface. It connects to your host computer through a 10BaseT, 100BaseT, or 1000BaseT Ethernet link.

- A target system JTAG probe tip

  A probe tip, shown in Figure 1-1, is designed to provide a physical and electrical interface to the target system processor that you want to gain visibility into.

Figure 1-1. Sourcery Probe Professional with ARM JTAG Probe Tip



Supplied Components

Before you use the Sourcery Probe Professional, verify that these components are present:

- The external power supply with US cord and adapters (3) EUR, UK, AUST.

- One ADAP, MOD JCK/RS232, Female (9pin D).
- One ADAP, MODJCK/RS232, Male (9pin D).
- One Debug Probe Tip.
- One cable Ethernet, straight, 6ft.
- One cable, USB 2.0 A-M to B-M, 1.2 m.
- One RJ11 cable, 7ft.
- One flexible probe tip extension cable.
- One cable, assy, 50 pin, flat ribbon 18 in. (Standard debug port probe tip cable assembly).

Product Highlights

The Sourcery Probe Professional probe has these features:

- Supports ARM®, MIPS®, and PowerPC™ processors (via different probe tips).
- Supports all CPU core speeds.
- Lets you control and debug software running in-target, with minimal intrusion into target system operation.
- Lets you debug code in cache, ROM, RAM, and flash memory.
- Provides high performance:
  - Split-second single-step execution.
  - The probe is capable of JTAG download speeds greater than 1 MB per second from the host to the target system.

Note

The actual download speed depends on the target system processor, the clock frequency of the debug port, the network speed, and the debugger.

- Supports 10/100/1000BaseT Ethernet network connection.
- Supports telnet access to your target system's serial port, enabling you to interact with your target system's serial port over the network.
- Supports both big and little endian byte-order.
- Automatically supports target system signal levels from 1.2V to 3.3V.
- Includes the following software debug capabilities:

- Control instruction execution.
- Display and modify target system memory.
- Examine and modify any processor registers.
- Run to breakpoints in ROM, RAM, or flash memory.
- Single-step through source and assembly language code views.
- Step into, over, or out of functions.

The Debugging Environment

The Sourcery CodeBench debugger is integrated with Sourcery Probe Professional to give you control over the emulation functions and your target. They communicate via an Ethernet connection.

The probe contains the hardware and software needed to control the processor's Debug Support Unit (DSU) via the interface. It performs debug services like memory test, single stepping, and breakpoint management.

The debugger implements high-level debug functions by sending debug service requests to the probe over the communication link. It then formats and displays the data or status information that is returned from the probe.

Sourcery Probe Professional Benefits

Sourcery Probe Professional provides these key benefits:

- Visibility

  The probe enables you to observe registers and the current state of target system memory. You can halt program execution at predefined points and examine the data for a particular program state.

- Control

  You can control the state of the target system by downloading code, manually modifying processor registers and memory, single-stepping through the code, or setting breakpoints.

Environmental Information

All components used in the probe are RoHS compliant. The China RoHS HST table describes the hazardous materials that may be contained in the different components of the probe device. Figure 1-2 shows the table.

Figure 1-2. China RoHS HST Table

As of May 18, 2010	中国<<电子信息产品污染控制管理办法>> China RoHS						China RoHS			
	O: 表示该有毒有害物质在该部件所有均质材料中的确含量均在SJ/T 11363-2006规定的限量要求之下.						O: Indicates that the toxic substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T1136302006			
	X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006规定的限量要求. (企业可在此处,根据实际情况对上表中打"X"的技术原因进行进一步的说明.)						X: Indicates that the toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T1136302006			
	若发现管理办法中限制的物质，将暂缓接受供应商出具的全部产品成分数据. **1:供应商虽然被认定符合欧盟RoHS指令,但是没有提供确定产品成分所必需的数据. **2:供应商既没有被认定符合欧盟RoHS指令,又没有提供确定产品成分所必需的数据.						Presence of restricted substances is presumed pending receipt of all supplier content data. **1: Suppliers certified EU RoHS compliance, but did not provide data needed to confirm content. **2: Suppliers have neither certified EU RoHS compliance nor provided data needed to confirm content.			
	(有毒或有害物质和元素) Toxic or hazardous Substances and Elements						Mentor Graphics products marked as EU RoHS compliant must contain less than the EU RoHS specified PPM of restricted substances within each homogeneous material, or any restricted substances must be exempt.			
产品名称中	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚		中国<<电子信息产品污染控制管理办法>>注		是否符合欧盟RoHS指令
Part Number and Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr-VI)	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)	China EFUP	China RoHS Comment	Outermost Packing Material	EU RoHS Compliant
246271-USB JTAG for PPC COP	O	O	O	O	O	O	10	**1	CFB	Yes
246272-USB JTAG for PPC DPI	O	O	O	O	O	O	10	**1	CFB	Yes
246273-USB JTAG for ARM	O	O	O	O	O	O	10	**1	CFB	Yes
246274-USB JTAG for MIPS	O	O	O	O	O	O	10	**1	CFB	Yes
246279-Giga JTAG for ARM	O	O	O	O	O	O	10	**1	CFB	Yes
246280-Giga JTAG for PPC	O	O	O	O	O	O	10	**1	CFB	Yes
246281-Giga JTAG for MIPS	O	O	O	O	O	O	10	**1	CFB	Yes

Product Disposal

To ensure the correct disposal of the Sourcery Probe Professional development hardware, Mentor Graphics provides you with the means for disposal. When you determine that the product requires disposal, contact embedded_support@mentor.com for instructions. Include the following information:

- Part number
- Quantity
- Contact details
- Collection address

Operating Requirements

Before setting up the system, prepare the operating environment.

Operating Conditions

The following operating conditions must exist in order to operate this equipment safely:

- Indoor use only.
- No exposure to liquids and moisture.
- Dry environment.
- Environmental Rating: IPX0.
- Altitude up to 2000 m.
- Operational temperature range: 0 to 40 °C (32° to 104 °F).
- Maximum relative humidity: 5% to 95% relative humidity, noncondensing.

Standard Electrostatic Precautions

This instrument contains static-sensitive components that are subject to damage from electrostatic discharge (ESD). Use standard ESD precautions when transporting, handling, or using the probe and the target system, when connecting/disconnecting the probe and the target system, and when removing the cover of the instrument.

We recommend using the following precautions:

- Use wrist straps or heel bands with a $1 M\Omega$ resistor connected to ground.

- On the work surface and floor, use static conductive mats with a $1M\Omega$ resistor connected to ground.
- Keep high static-producing items, like non-ESD-approved plastics, tape and packaging foam away from the probe and the target system.

Note

Consider the above precautions as the minimum requirements for a static controlled environment.

Electrical Requirements

The probe is powered from the external power supply provided with your unit. It can use line voltages of 100-240 VAC (50/60 Hz). The probe tip draws less than $50\mu A$ from the target system.

We recommend that you use a surge protector between the power supply and AC power.

Target Power Requirements

Several configurations are possible for providing power to the target system. The preferred configuration is for all target DC power supplies to use a 3-wire AC input with an earth (safety) ground and with the earth ground isolated from the DC return. Table 1-1 shows various AC/DC configurations and the results of using each.

Table 1-1. Target System Device Power Supply Configuration

	AC Input	Isolation	Result
Preferred configuration	3-wire system with earth (safety) wire	AC earth is isolated from DC return. Target system DC is fully isolated and is floating.	Normal operation
Acceptable configuration	2-wire system with no earth (safety) wire	AC return is isolated from DC return. Target system DC is fully isolated and is floating.	Normal operation
Acceptable configuration	3-wire system with earth (safety) wire	AC return is tied to DC return. Target system DC is not isolated and is floating.	Configuration may result in unstable operation of DC signals.

Table 1-1. Target System Device Power Supply Configuration

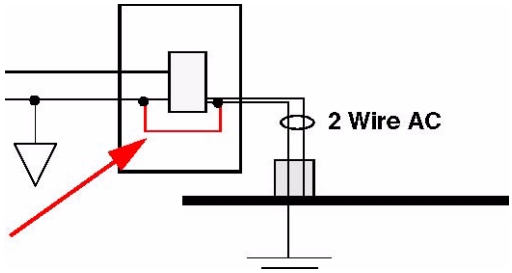
	AC Input	Isolation	Result
Prohibited configuration 	2-wire system with no earth (safety) wire	AC return is tied to DC return. Target system DC is not isolated and is not floating	Configuration may result in unstable operation of DC signals and AC hum. A safety hazard may result from power supply or target system failure where DC voltage is connected to AC return.

Caution

Do not use 2-wire AC input with the AC neutral tied to the DC return (Figure 1.3) on any power supply in the system. A failure in a power supply or target system where DC voltage becomes connected to AC neutral can result in personal injury and damage to the equipment.

The arrow in Figure 1-3shows the prohibited target power supply connection.

Figure 1-3. Prohibited Target Power Supply Connection



Caution

Good grounding practices must be observed when connecting digital grounds to earth ground because ground loops can induce sufficient currents to cause irregular operation of the combined system. Under no circumstances should the third wire prong on any power cord be removed or disconnected.

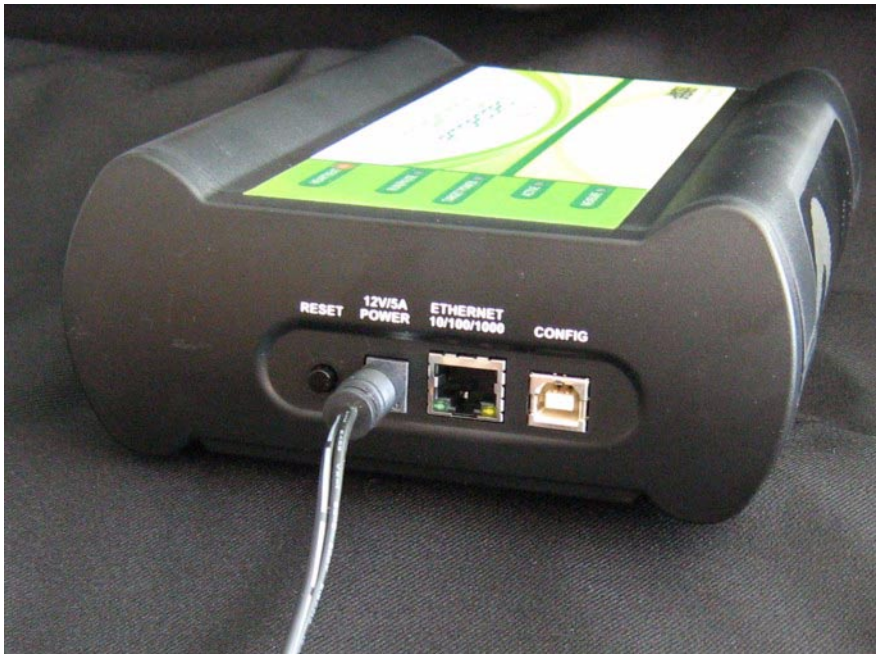
Connecting the Power Supply Cable

Connect the power supply DC cable connector to the POWER connector on the probe, shown in Figure 1-4.

Caution

Use only the power supply that is provided with the probe. Although other power supplies might look similar, they can damage the probe if the supply specifications differ from the required specifications.

Figure 1-4. Sourcery Probe Professional with Power Cable Attached



Target System Requirements

The probe automatically supports target system signal levels from 1.2V to 3.3V.

Note

In the case of PowerPC targets with a $\overline{\text{QACK}}$ signal, the $\overline{\text{QACK}}$ signal must be pulled low for the probe to properly stop and restart the target. The probe pulls this signal low through the probe tip.

Cycling Power to the System

When you need to apply or cycle power to the probe, connect or disconnect the power cable from the power source or from the probe. After you connect the probe to your target system, use the following sequence for applying or removing the power:

To turn the power on:

1. Apply power to the probe.

2. Apply power to the target system.

To turn the power off:

1. Remove power from the target system.
2. Remove power from the probe.

Chapter 2
Connecting to a Network

This chapter explains how to connect the probe to an existing Ethernet network. The probe is an Ethernet host device that can be configured for TCP/IP using either DHCP to acquire its IP configuration (the default method), or using a static IP configuration.

Caution

Sourcery Probe Professional contains components that are subject to damage from electrostatic discharge. Always use proper anti-static protection measures when you use, handle, or transport the probe, or connect to or disconnect from a target system as specified in Standard Electrostatic Precautions.

Connecting the Probe to the Network

The probe's default operation is to acquire its network configuration automatically using DHCP, and optionally, attempt to register its hostname with a name server. The factory assigned host name is FSL*xxyyzz* where *xxyyzz* is the last three octets of the Ethernet MAC address provided on a label on the bottom side of the probe. For example, if the probe's Ethernet MAC address is 00:04:9f:00:77:31, the host name is FSL007731.

As shipped, the probe acquires its network configuration automatically using DHCP. If the network has a DHCP server, then it is best to leave the probe configured to use it. If you cannot use DHCP, then you must configure the probe for your network using static IP address resolution. See Using netparam to Configure the Sourcery Probe Professional for details on configuring the probe to use a static IP address.

The Sourcery CodeBench debugger can automatically find probes on the local subnet. However, if the probe is on a different subnet than your computer, for example if it is in the downstairs lab, then you may have to know the probe's IP address. You can find this using the Sourcery Probe console. See Sourcery Probe Console.

Connecting to a Twisted Pair Interface

You can connect the probe directly to a network using twisted pair (10/100/1000BaseT) cables.

Procedure

1. Plug one end of the supplied RJ-45 cable (p/n 600-75499) into the RJ-45 connector of the probe, shown in Figure 2-1.

Figure 2-1. Sourcery Probe Professional with RJ-45 Cable Attached

2. Connect the other end of the RJ-45 cable into the RJ-45 connector of your twisted pair network or host computer.

Notes

- When you configure the debugger for the hardware connection, you must provide the IP address or hostname of the probe. The Sourcery CodeBench debugger can automatically find probes that are on a local subnet, but you must specify the address or hostname if the debugger and probe are on different subnets.
- Depending on the type and complexity of your network, your network administrator might need to update network server tables so the network accesses the probe correctly. Updating network server tables requires both a detailed knowledge of Ethernet address resolution and network routing with write access permission to the server tables. See Network Administration for more information on managing your network.

Related Topics

Accessing the Sourcery Probe Console Using Telnet

Using netparam to Configure the Sourcery Probe Professional

Configuring the Probe Network Settings

To manually configure the network settings of the probe for your network, use the Sourcery Probe Console to access the built-in setup utility, `netparam`. The `netparam` utility lets you select and modify network parameters that are saved in probe memory. Use `netparam` to

configure the probe to match your network address resolution and routing protocols, as described in Using netparam to Configure the Sourcery Probe Professional.

If the probe is able to communicate with hosts on other subnets, you will need to configure the probe for one of the following routing options:

- Default gateways
- Static routing tables

Testing Network Communication

You can use the **ping** command to ensure the probe can communicate with the host.

Note
You can find the IP address of your probe using the Sourcery Probe Console.

Verifying Communication

At a host command prompt, type:

```
ping hostname | ip_address
```

where *hostname* is the name and *ip_address* is the IP address assigned to the Ethernet probe.

If no output is displayed on the screen, verify:

- The physical connections are tight.
- The probe address and netmask in the `hosts` file match those in probe flash.
- The netmask used for the probe and for the Ethernet Network Interface Card (NIC) are appropriate to the class of the IP address.

Accessing Sourcery Probe Professional Remotely

You can remotely access the internal setup utility and the Target Serial port of the probe after you connect the probe to your network.

If the host computer is not physically located near Sourcery Probe Professional, remote access is useful when you need to do the following:

- Reconfigure communications (See Using netparam to Configure the Sourcery Probe Professional)

- Use the serial port of your target system (See Connecting to the Target System Serial Port)
- Reset the probe through your Ethernet connection

Chapter 3
Connecting to the Target System

This section explains how to connect a probe to the target system.

Caution

The probe contains components subject to damage from electrostatic discharge. Always use appropriate anti-static protection measures when you use, handle, or transport the probe, or connect to or disconnect from a target system. These protective measures include static-free bench pads and grounded wrist straps.

Debug Port Connector Information

Sourcery Probe Professional offers debugging capabilities without modifying any target system code or any special I/O port in the target system for communication with a monitor. Target system connections for PowerPC/COP, MIPS/EJTAG, ARM® EmbeddedICE, and CoreSight can be made using the JTAG port.

You can connect the probe to the target system in any of the following ways:

- Connect to the JTAG header on the target system directly with the probe tip. See “Connecting the Probe Tip Directly to a Debug Port Connector” on page 20.
- Connect to the JTAG header on the target system using a flexible extension cable that is provided with the probe. Use it when more clearance is required. See “Connecting the Probe Tip to a JTAG Header Using the Extension Cable” on page 22.
- Connect to the target system JTAG signals using a Target Adapter Module (TAM). Use it when the target system debug connector differs from the probe tip connector. See “Connecting the Probe to a JTAG Header Using a Target Adapter Module” on page 23.

Caution

Failure to connect the probe tip connector to the target system might damage the probe or target system. Verify all connections before applying power.

Table 3-1. Probe Tips

	Product Model		
	ARM	PA or PPC	MIPS
Probe Tip Debug Connector	ARM-20	COP-16	MIPS-14
TAM Accessories[1]	TAM-ARM20-ARM14 TAM-ARM20-TI14 TAM-ARM20-TI20 TAM-ARM20-CTX10J TAM-ARM20-CTX20J	-	TAM-MIPS14-MIPSJ12

1. TAM accessories are sold separately. Consult the *Mentor Embedded Sourcery Probe Target Connections* application note to determine TAM part numbers.

"Debug Connector Information" on page 41 describes the debug port connector specifications.

Connecting the Probe Tip Directly to a Debug Port Connector

If your target system has a standard debug port connector, you can directly connect the probe tip of the probe directly to the target system debug port connector.

Procedure

1. Turn off the power to the target system and the probe.
2. Verify all the pins of the probe tip are properly aligned with the debug port connector on the target system. Use mechanical keying and the label on the probe tip as a guide. The PowerPC probe tip is shown in Figure 3-1 (ARM and MIPS probe tips are similar).

Figure 3-1. Sourcery Probe Professional PPC JTAG/COP Probe Tip

3. Connect the probe tip 50-pin ribbon cable to the RUN CONTROL connector on the probe as shown in Figure 3-2.

Tip: If you have a PowerPC probe tip that is labeled “PA JTAG Probe Tip”, this works exactly the same as the “PPC JTAG Probe Tip” shown above. The only difference is the label on the hardware.

Figure 3-2. Sourcery Probe Professional with PPC-JTAG Probe Tip

4. Gently (but firmly) press the probe tip onto the target system debug port header. Make sure that you properly align the multi-pin socket connector with the multi-pin header on your target system.

Note

Ensure that pin 1 of the probe tip is connected to the pin 1 of the header. Do not force -- If the connectors are aligned correctly, they will engage smoothly. Use counter pressure behind the debug connector to avoid bending and potentially damaging the board.

Connecting the Probe Tip to a JTAG Header Using the Extension Cable

Use the supplied flexible probe tip extension cable to connect the Sourcery Probe Professional to your target system if there is not enough clearance for the standard probe tip to fit onto the target system JTAG header.

Procedure

1. Turn off the power to the target system and the probe.
2. Attach the multi-pin header end of the flexible probe tip extension cable to the JTAG socket of the probe tip as shown in Figure 3-3.

Figure 3-3. Flexible Probe Tip Extension Cable Attached to JTAG/COP Header

The red stripe on the cable identifies pin 1. The pin assignment of the cable is identical to that of the probe tip socket.

3. Connect the other end of the flexible probe tip extension cable to the debug port header on your target system.

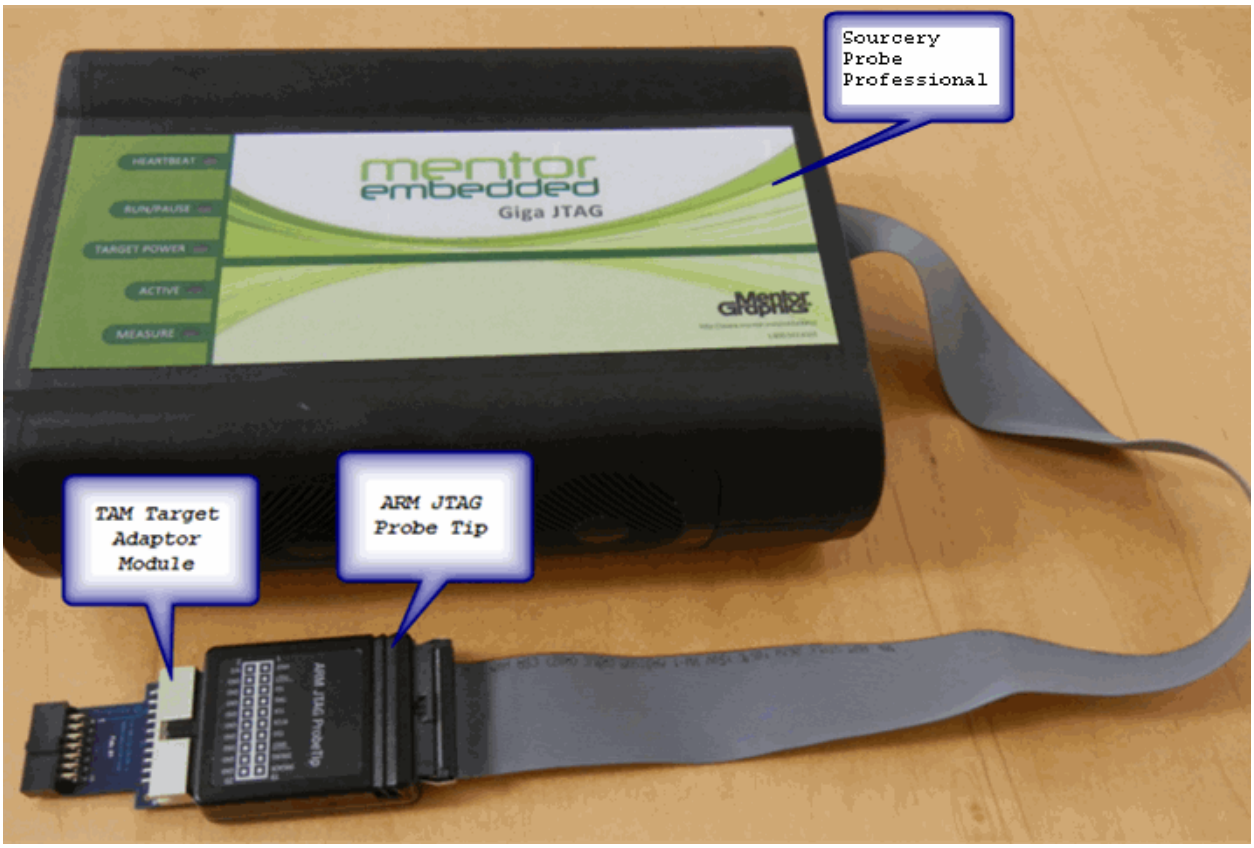
Connecting the Probe to a JTAG Header Using a Target Adapter Module

Use a Target Adapter Module (sold separately) if your target provides a different type of debug connector than the probe tip.

Procedure

1. Turn off power to the target system and the probe.
2. Attach the TAM to the probe tip.

3. Plug the TAM into your target board's debug connector.



Connecting to the Target System Serial Port

Many target system boards have a built-in serial port. A console interface connection to the serial port of the target system lets you query and configure the state of your target system.

The probe provides a serial port that can be configured to access the serial port of the target system. This is useful if you need to access the serial port of a remotely located target system over Ethernet from the host system. An RJ-25 cable (P/N 600-76822) is also provided with the probe to connect to the serial port of your target system.

To connect the probe to the target system serial port, perform the following steps.

Procedure

1. Connect one end of the RJ-25 cable, and the appropriate adapter, to the serial port on your target system board.
2. Connect the other end of the RJ-25 cable to the probe RJ-25 serial connector, labeled TARGET SERIAL.

Configuring the Target Serial Port

Table 3-2 shows the default settings of the Sourcery Probe Professional target serial port.

Table 3-2. Sourcery Probe Professional Target Serial Port Default Settings

For this option	Select
Baud rate	9600
Data bits	data8
Stop bits	stop1
Parity	no parity
Hardware flow control	nortscts
XON/XOFF flow control	noxon
Target echo feature	echo

If the probe target serial port settings do not match the serial port settings of your target system, perform the following steps.

Procedure

1. Make sure network communications have already been configured correctly. For more information, see Connecting the Probe to the Network.
2. Connect to the probe internal setup utility. For example, from a command shell, type `telnet` *`probe_ip_address`* `1082`. For more information, see Accessing the Sourcery Probe Console Using Telnet.
3. When the `core>` prompt appears on the terminal, use the **`tgtty`** command to configure the probe target serial port. To get a listing of options, type **`help tgtty`**:

   ```
   core> tgtty baud_rate data_bits stop_bits parity
   hardware_flow_control xon_off_flow_control echo_state
   ```

   For example:

   ```
   core> tgtty 19200 data8 stop2 noparity nortscts noxon echo
   ```

4. Verify the target serial port configuration:

   ```
   core> tgtty
   ```

Related Topics

Accessing the Sourcery Probe Console Using Telnet

Connecting the Probe to the Network

Restoring the Target Serial Port to the Default Settings

To restore the default settings for the target serial port, perform the steps provided in this section.

Procedure

1. Make sure network communications have already been configured correctly. For more information, see Connecting the Probe to the Network.
2. Connect to the Ethernet TAP probe internal setup utility. For example, from a command shell, type `telnet` *`probe_ip_address 1082`*. For more information, see Accessing the Sourcery Probe Console Using Telnet.
3. When the `core>` prompt appears on the terminal, use the **`tgtty`** command to reset the target serial port to the default settings:

   ```
   tgtty default
   ```

Related Topics

Accessing the Sourcery Probe Console Using Telnet

Chapter 4
Using Sourcery Probe Professional

This section provides instructions for accessing the Sourcery Probe console and provides system startup procedures.

Sourcery Probe Console

There are two ways you can access the Sourcery Probe console: USB and telnet. The following sections describe how to use both access methods.

Accessing the Sourcery Probe Console via USB

This section provides the steps required to establish serial communication with the probe, which is required for some configuration procedures.

Procedure

1. Connect one end of the USB cable (P/N 600-76787) to a USB port on your host computer.
2. Connect the other end of the USB cable to the USB connector of the probe, labeled *CONFIG*, shown in Figure 4-1.

Figure 4-1. Sourcery Probe Professional with USB Cable Attached

3. In Windows, you might need a driver before you can access the CONFIG port. The driver is installed automatically. If you find that drivers are not automatically installed:

   a. Click the Windows **Start** button and type **device** into the search box.

   b. Click **Device Manager** in the search results to launch it.

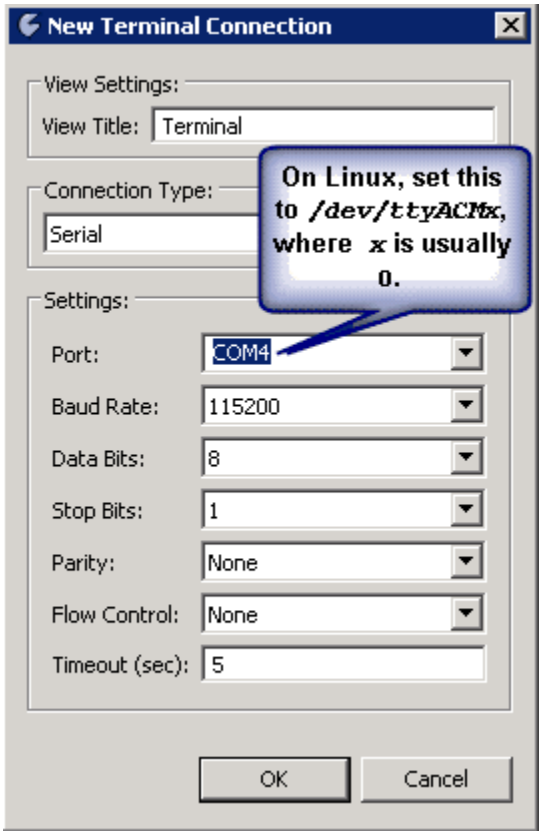
   If the probe registered, but failed to find drivers, there will be two USB devices listed in the Device Manager screen with problems ( ). Right-click the USB device and select the option to install or update the drivers. Select the option to search Microsoft Update for a driver.

4. Identify the serial port device assigned to the probe.

   - In Windows® XP, select **Start > Settings > Control Panel >Administrative Tools > Computer Management > Device Manager > Ports** and then select **USB serial port** from the ports list.
   - On Windows 7, select **Start > Control Panel >Hardware and Sound > Device Manager > Ports (COM & LPT)**.
   - On Linux, the device file is located at: */dev/ttyUSB0*.

5. Set up your terminal or terminal communication software (for example, Sourcery CodeBench Terminal View) as shown in Figure 4-2.

Figure 4-2. Terminal View



6. Turn on power to the probe. If the power is already on, push the reset button.
7. When prompted, press **Enter**. A boot screen will appear. Follow the instructions in the boot screen,
8. Once you are connected to the probe, the login banner is displayed and the `core>` command-line prompt appears. Type **help** for a list of the core commands.

Accessing the Sourcery Probe Console Using Telnet

You can use telnet to connect to the Sourcery Probe Professional Target configuration console remotely over Ethernet.

Procedure

1. Start a telnet session and connect to the Configuration console for the probe. You can use the Terminal view in Sourcery CodeBench to do this. To open the Terminal view,

from Sourcery CodeBench select **Window > Show Views > Other**. From the Show View dialog box, Select **Terminal > Terminal** and click **OK**.

```
telnet {hostname | ip_address}
```

Use the host name or IP address of the probe. For static IP, the *host* name must be the same one you entered into the hosts database file. The Configuration port number of the probe is *23*.

The login banner is displayed, followed by the `core>` command-line prompt.

Results

You should now have access to the configuration console for your target system.

Related Topics

Using netparam to Configure the Sourcery Probe Professional

Sourcery Probe Professional Network Ports

Debugging using Sourcery Probe Professional

This section explains how to start debugging with the probe.

Before you begin to debug with the probe, ensure the following:

- The probe is connected to your network.
- The probe is connected to the target system.
- The debugger software is installed.
- The software is configured to communicate with the probe.

Starting Sourcery Probe Professional

This section provides the steps required to prepare for debugging with the probe.

Prerequisites

The debugger software is installed.

Procedure

1. Apply power to the probe.
2. Apply power to the target system.

Note

The probes can require some time to establish the network connection, especially when using DHCP. The heartbeat LED blinks green when the probe is ready for use. For information on the LED indicators, see LEDs on Sourcery Probe Professional.

3. Start the debugger.
4. Configure the debugger for the probe connection. Refer to the Sourcery CodeBench debugger documentation for information on how to perform the configuration.

   You are now ready to begin your debug session. Refer to the debugger documentation for information on using the debugger.

Chapter 5
Hardware Specifications

This section provides hardware specifications for the Sourcery Probe Professional.

LEDs on Sourcery Probe Professional

Figure 5-1 shows the various LEDs of the probe.

Figure 5-1. Sourcery Probe Professional — Top View

Heartbeat Indicator

The Heartbeat LED (labeled HEARTBEAT) indicates the status of communication between the probe and the network:

- The LED is red until the probe boot code starts running.
- The LED flashes orange (1Hz) during configuration of the network interface.
- The LED flashes green (1Hz) after the network interface is successfully configured and the probe is ready for use. During firmware updates, the LED flashes green at a higher frequency (5Hz).

Note

Do not remove power, unplug the network, or press the reset button during firmware updates.

- The LED is unlit if the probe is not powered on.
- The LED flashes red if the probe is overheating.

Run/Pause Indicator

The status LED (labeled RUN/PAUSE) indicates the state of the target:

- The LED is initially unlit and remains so until the debugger connects to the probe.
- The LED is green when the target is in run mode.
- The LED is red when the target is in pause mode.
- The LED is orange when the target is in mixed mode.

Target Power Indicator

The target power LED (labeled TARGET POWER) indicates whether the probe detects target power.

- The LED is green when target power is detected.
- The LED is unlit when no target power is detected.

Active Indicator

The active LED (labeled ACTIVE) is unused at this time.

Measure Indicator

The measure LED (labeled MEASURE) is unused at this time.

RJ-45 Ethernet Connector with Link and Activity Indicators

The Sourcery Probe Professional interface consists of an RJ-45 connector and a built-in twisted pair MAU that connects directly to 10/100/1000BaseT twisted pair networks. See Connecting the Probe to the Network for more information on connecting to a network.

The probe link and activity indicators are integrated into the RJ-45 probe connector:

- The yellow indicator is turned on when the probe is connected to any network, and flickers when data is being transferred across the network.
- The green indicator is turned on when the probe is connected to a 1000BaseT network and flickers when data is being transferred across the network.

Sourcery Probe Professional Status Indicators

The probe uses LEDs to indicate its status. If you encounter problems related to Ethernet communication, consult the status indicator information in Table 5-1.

Table 5-1. Sourcery Probe Professional Status Indicators

LED	Location	Activity	Description
HEARTBEAT	Top	Off	Probe is not powered on.
		Solid Red	Probe is executing the BootLoader or has failed to boot.
		Orange heartbeat	Probe Operating System running and network interface is initializing.
		Green heartbeat	Probe Operating System running and network interface successfully configured.
		Red heartbeat	Probe is overheating. Remove airflow obstructions, and contact Customer Support if the problem persists.
RUN/PAUSE	Top	Off	Debugger is not connected to probe.
		Solid red	Probe is in pause mode.
		Solid green	Probe is in run mode.
		Solid orange	Probe is in mixed mode.
TARGET POWER	Top	Off	Target system power is not detected.
		Solid green	Target system power is detected.
ACTIVE	Top	Off	
MEASURE	Top	Off	
ACTIVITY	Ethernet Connector	Off	Ethernet is not transmitting or receiving data.
		Green heartbeat	Ethernet is transmitting or receiving.

Table 5-1. Sourcery Probe Professional Status Indicators (cont.)

LED	Location	Activity	Description
LINK	Ethernet Connector	Off	Ethernet is not linked.
		Solid Orange	Ethernet is linked.

Host Connectors on Sourcery Probe Professional

Figure 5-2 shows the host connectors of the probe.

Figure 5-2. Sourcery Probe Professional — Host End View

Reset Button

The reset button is used to reboot the probe.

Power Connector

The Power connector on the probe is used to connect the DC power supply cable.

RJ-45 Ethernet Connector

Use the Ethernet connector on the probe to connect to an 10/100/1000BaseT Ethernet.

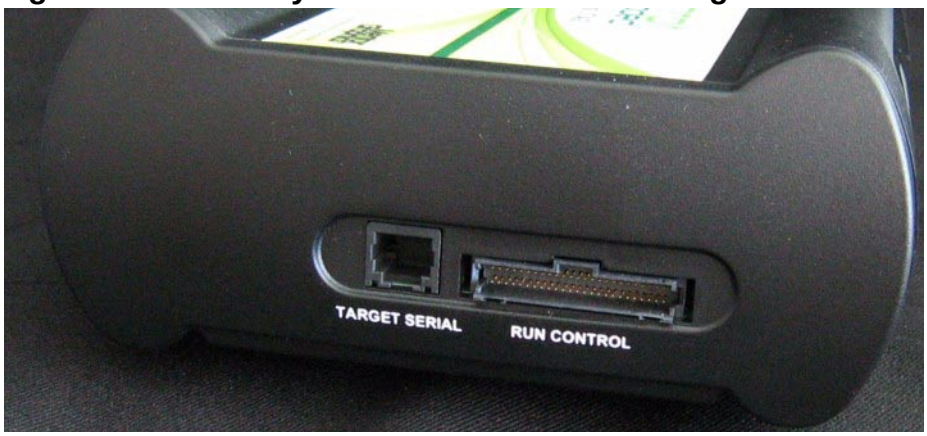
Config USB Connector

The Config USB port on the probe acts as a virtual serial device that supports RS-232 communication protocol at 115200 baud. The Config USB port is used for configuring network communication, entering routing tables, and diagnostics.

Target Connectors on the Sourcery Probe Professional

Figure 5-3 shows the target connectors of the probe.

Figure 5-3. Sourcery Probe Professional — Target End View



RJ-25 Target Serial Connector

The probe provides a target serial port that can be configured to access your target's serial port. This is useful if your host computer is not near the target and you need to access your target's serial port remotely over your network.

Table 5-2 shows the pinout definition of the target serial port.

Table 5-2. Pinout Definitions for Target Serial Port

Pin	Signal
1	Ready to Send (RTS)
2	Ground
3	Receive Data (RxD)
4	Transmit Data (TxD)
5	Ground
6	Clear to Send (CTS)

Note

Pin 1 is located on the right side when you view the RJ-11 socket with the locking tab on the bottom.

Run Control Probe Tip Cable Connector

The probe tip ribbon cable is connected to the 50-pin connector on the probe.

Debug Port Connector

The debug port socket is on the end of the probe tip and is used to connect the probe to a debug port header on your target system.

Note

Ensure that Pin 1 of the probe tip is connected to the Pin 1 of the header.

Sourcery Probe Professional Specifications

The dimensions of the probe are shown in Figure 5-4.

Figure 5-4. Sourcery Probe Professional Dimensions

Electrical Characteristics

The probe affects the load on only those signals that are connected to the debug port connector. Loading depends on the method used to connect the probe to the target system.

The probe affects the target processor and target electrical characteristics. Caution should be taken in designing the target to accommodate the small signal delays associated with an in-circuit emulator or other test equipment.

The probe automatically supports target signal levels from 1.2V to 3.3V.

Note
A probe tip draws less than 50 µA from the target to detect target power.

Physical Considerations

Table 5-3 shows the physical characteristics of the probe.

Table 5-3. Sourcery Probe Professional - Physical Characteristics

Physical Characteristic	Description	Value
Power Consumption		
	Probe power consumption from external power supply	5A @ 12V maximum
	Probe power consumption from target	Less than 50 µA to detect target power
Environmental Requirements		
	Operating temperature	0 to 40 °C (32 to 104 °F)
	Storage temperature	-40 to 70 °C (-40 to 158 °F)
	Humidity	5% to 95% relative humidity, non-condensing
Physical Size		
	Probe dimensions	8.473” x 6.2” x 2.661” (21.52 cm x 15.74 cm x 6.75 cm)
	Run Control probe tip enclosure dimensions (excluding connector) approx. 2.25" x 1.75" x 0.625" (5.72 cm x 4.44 cm x 1.59 cm)	
Run Control Target Socket Dimensions[1]		

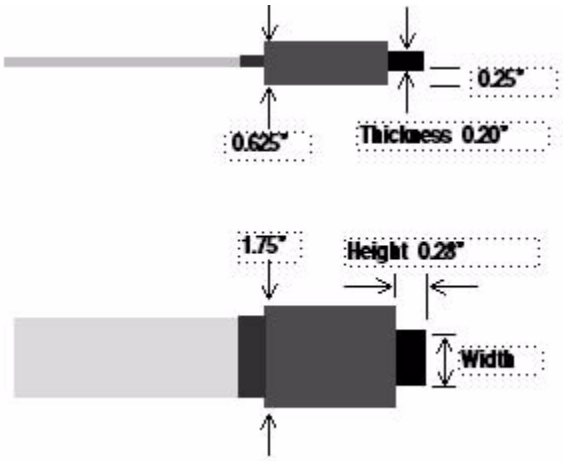
Table 5-3. Sourcery Probe Professional - Physical Characteristics (cont.)

Physical Characteristic	Description	Value
	Height (out of probe tip enclosure; above board)	0.28” (0.71 cm)
	Thickness	0.20” (0.51 cm)
	Pin-to-pin spacing	0.1” (0.25 cm)
	JTAG/COP width	0.8” (2.0 cm)
	Black and gray cable	approximately 16.0" x 1.25" x 0.126" (40.64 cm x 3.18 cm x 0.32 cm)

1. Figure 5-5 shows the target connector dimensions.

Figure 5-5 shows the target connector dimensions.

Figure 5-5. Target Connector Dimensions



Appendix A
Debug Connector Information

The debug connector depends on the probe tip that is installed. There are three different kinds: ARM, MIPS, and PPC/COP.

Tip: If you have a PowerPC probe tip that is labeled “PA JTAG Probe Tip”, this works exactly the same as the “PPC JTAG Probe Tip”. The only difference is the label on the hardware.

Refer to the *Mentor Embedded Sourcery Probe Target Connection* application note for information about pin assignments for the various debug connectors:

If you have a SupportNet account, you can access the application note here: http://supportnet.mentor.com/reference/appnotes/library/10891.pdf.

If you have a CodeSourcery Portal account, you can find the application note here: https://sourcery.mentor.com/GNUToolchain/kbentry247.

Table A-1 lists the signal names, direction, pin numbers, descriptions, drive capabilities, and operational requirements.

Note

To ensure proper and stable operation between the probe and the target system, the JTAG and debug I/O signals must meet the requirements listed in Table A-1.

Table A-1. Sourcery Probe Professional for JTAG/COP Signal Descriptions

ARM	MIPS	PowerPC	Signal Direction	Electrical Specification	Requirement
TCK	TCK	TCK	From probe connector	50mA driver	Must be wired to the target processor. The probe drives the TCK output with up to 50mA. Keep the TCK trace run as short as possible and maintain a "two signal width" spacing from any other parallel dynamic signal trace.
RTCK	-	-	From Target	17PF	Wired to the target processor. RTCK is an output from the target processor and an input to the probe. The RTCK trace run should be kept short and maintain a "two signal width" spacing from any other parallel dynamic signal trace. If not used, it should be grounded or pulled up with a 10K resistor. This is not connected on MIPS or PowerPC probe tips.
TMS	TMS	TMS	From probe connector	50mA driver	Must be wired to the target processor. The probe drives the TMS output with up to 50mA. Keep the TMS as short as possible and maintain a "two signal width" spacing from any other parallel dynamic signal trace. TMS should have a parallel termination option at the processor.

Table A-1. Sourcery Probe Professional for JTAG/COP Signal Descriptions

ARM	MIPS	PowerPC	Signal Direction	Electrical Specification	Requirement
TDI	TDI	TDI	From probe connector	50mA driver	Must be wired to the target processor. The probe drives the TDI output with up to 50mA. The TDI trace should be kept short and maintain a "two signal width" spacing from any other parallel dynamic signal trace. TDI should have a parallel termination option at the processor.
TDO	TDO	TDO	From target	17pF load	Must be wired to the target processor. TDO is an output from the target processor and an input to the probe. The TDO trace run should be kept short and maintain a "two signal width" spacing from any other parallel dynamic signal trace. TDO should have a series termination resistor located near the target processor.

Table A-1. Sourcery Probe Professional for JTAG/COP Signal Descriptions

ARM	MIPS	PowerPC	Signal Direction	Electrical Specification	Requirement
nTRST	TRST*	$\overline{\text{TRST}}$	From probe connector	50mA driver[1]	Must be wired to the target processor. The probe drives the TRST output with up to 50mA. To gain control of the processor, the probe negates $\overline{\text{TRST}}$ approximately 250 milliseconds before negation of $\overline{\text{HRST}}$. This allows the probe to issue COP commands through the JTAG/COP interface and gain control of the processor upon negation of $\overline{\text{HRST}}$. The $\overline{\text{TRST}}$ trace run should be kept short and maintain a "two signal width" spacing from any other parallel dynamic signal trace.
nSRST	RST*	$\overline{\text{SRST}}$	Bi-directional	Open-drain. 100Ohm to ground when asserted by probe, 22pF load when not asserted. [1]	Can be wired to the target processor. During reset, the probe drives SRST to ground through a 100Ohm resistor.
-	-	$\overline{\text{HRST}}$	Bi-directional	Open-drain. 100Ohm to ground when asserted by probe, 22pF load when not asserted. [1]	Must be wired to the target processor. During reset, the probe drives $\overline{\text{HRST}}$ to ground through a 100Ohm resistor.
DBGRQ	DINT	$\overline{\text{CKSI}}$	From probe connector	50mA driver	Need not be wired to the target. ARM and PowerPC probes do not currently use this signal. The DINT signal may be asserted on some MIPS targets to force entry to debug mode, but is not normally used.

Table A-1. Sourcery Probe Professional for JTAG/COP Signal Descriptions

ARM	MIPS	PowerPC	Signal Direction	Electrical Specification	Requirement
DBGACK	-	$\overline{\text{CKSO}}$	From target	17pF Load[2]	Wired to the target processor. The probe senses CKSO to determine if the processor halted execution in a checkstop state.
-	-	HALTED	From target	17pF load	Should be wired to the PowerPC HALTED signal on those processors which support it. This is not connected on ARM or MIPS probe tips.
-	-	$\overline{\text{QACK}}$	From probe connector	100Ohm pull-down	Can be wired to the target processor. $\overline{\text{QACK}}$ is an input to most PowerPC processors and must remain low while the probe is connected to the target. The probe connects this signal internally to the JTAG/COP GND pin (16) through a 100Ohm resistor.
VREF	VREF	TGT PWR	From target	2MOhm pull-down, plus 0.01uF load.	Must be wired to the target. The probe uses this signal to determine if power is applied to the target. This signal is also used as a voltage reference for the signals driven by the probe ($\overline{\text{CKSI}}$, $\overline{\text{TRST}}$, TCK, TMS, TDI). TGT PWR (pin 6) should be connected to target Vcc through a 1KOhm pull-up resister.

1. 4.7KOhm pull-up to buffered TGT PWR.

Appendix B
Network Administration

This appendix describes how to set up the Sourcery Probe Professional communication parameters.

Sourcery Probe Professional is an Ethernet host device that can be configured for TCP/IP either using DHCP to acquire its IP configuration (the default method) or using a static IP configuration.

Sourcery Probe Professional Network Ports

Software communicates with the probe through various network ports. In the case where the probe and host software are on the same network, it is not necessary to be aware of these ports. However, in the case of a probe located on a protected network, an administrator must provide access to these ports if you want to connect to the probe from another network. Table B-1 shows the ports used by the probe and provides a brief description of each port.

Table B-1. Sourcery Probe Professional Network Ports

Port Number	Description
23	Telnet access to configuration console
1082	Telnet access to target serial port
1087	Used for system firmware updates and by the PowerPC debugger to initialize the probe
19119	Used by ARM and MIPS debuggers for probe configuration
41474	Used by the PowerPC debugger to control the probe
51410	Used by ARM and MIPS debuggers to control the probe
53099	Used by the PowerPC debugger to check probe status

Using netparam to Configure the Sourcery Probe Professional

Use the `netparam` command to select the network parameters:

- Address resolution protocol
- Static address resolution data
- Static routing tables

Caution

`netparam` writes its settings into non-volatile flash memory on the probe. Each time you enter a netparam command, wait for the `core>` prompt to re-appear before entering the next command.

Configuring a Dynamic IP Address

To configure a dynamic IP address, perform these steps.

Procedure

1. Connect to the probe internal setup utility. For example, from a command shell, type `telnet` *`probe_ip_address`*. For more information, see Using netparam to Configure the Sourcery Probe Professional.
2. At the `core>` prompt, use `netparam` to specify the protocol appropriate to your network:

   ```
   netparam bootconfig dhcp[:hostname]
   ```

   DHCP is the default setting. If you specify a hostname for the probe, the probe will attempt to register the host name with the DHCP server, that will then update any name servers on the network.

Configuring a Static IP Address

This section covers the set up of a static IP address for the Sourcery Probe Professional. If you are unfamiliar with IP address concepts, refer to the section Step-by-Step Guide to Configuring a Static IP.

Note

Because this is a proven method to add a probe to a TCP/IP network, we recommend using it if you have any network communication problems.

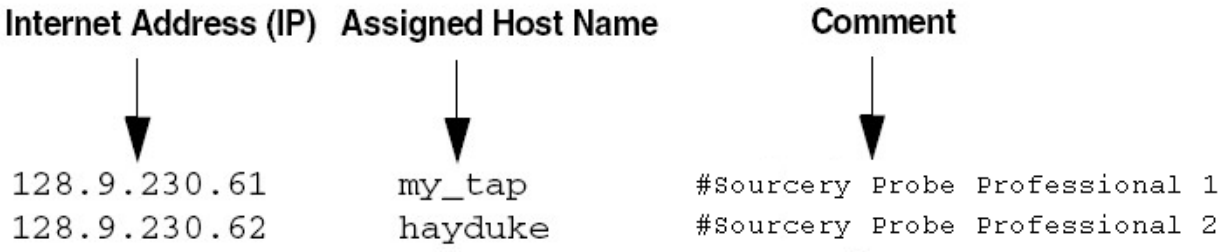
To enter the IP and optional netmask in flash, perform the following steps.

Procedure

1. Ask your network administrator to assign an unused IP (Internet Protocol) address and host name to the probe.

2. Enter the name/address pair into the `hosts` database file. Windows hosts files are typically located in the *%system_root%\system32\drivers\etc* directory.

Example B-1. Probe Entries in a *hosts* File for a Windows Host Environment



Note

You should create or update the `hosts` file on the network server or on each local workstation that requires access to the probe.

3. At the `core>` prompt, use `netparam` to set and store the IP address and netmask (subnetting only) in the probe flash EPROM.

```
netparam static_ip_address nnn.nnn.nnn.nnn
[:mmm.mmm.mmm.mmm]
```

Where *nnn.nnn.nnn.nnn* represents the IP address and *mmm.mmm.mmm.mmm* represents the subnet mask.

Static Routing

The simplest networks consist of one or more subnets. Routers forward network traffic from one point on the network to another across these subnets.

If the probe uses DHCP to automatically acquire its network settings, it is most likely that a default gateway setting was acquired and the probe will be accessible on other subnets.

However, when using a static IP configuration or where the DHCP configuration is incomplete, you might need to provide additional routing information, including:

- Store a default gateway in flash memory
- Load static routing tables into flash memory

Specify a Default Gateway or Static Route Table (Optional)

If you are using a static IP configuration, or your DHCP configuration does not specify a default gateway, you can manually enter the IP address of the default gateway to use. This gateway must be accessible on your local subnet.

To Specify a Default Gateway

A default gateway entry must specify the IP address of the first gateway that network traffic from the probe crosses. Failing to specify gateway information can cause problems with the probe's discovery feature. This gateway must be aware of the network's complete route table. Use the following netparam syntax:

```
netparam add_route 0.0.0.0 gateway_ip 1
```

For *gateway_ip*, provide the IP address of the router or gateway in dot notation. The default value is *0.0.0.0*.

Changing an Existing Route Entry

Note

If you enter static routes in the probe, they are not updated automatically. You must update these routes if changes in the network topology affect the static routes.

Before entering static routes, make a map of all gateway paths between the probe, as a starting point, and each workstation that must have access to it.

To change an existing routing entry. perform the following steps.

Procedure

1. At the `core>` prompt, delete the existing routing entry:

   ```
   netparam delete_route host_ip
   ```

2. Enter the new route:

   ```
   netparam add_route host_ip gateway_ip hop_#
   ```

Note

host_ip can identify an individual workstation or a network serving multiple hosts. The gateway_ip is the first gateway the probe traffic crosses when communicating with the destination workstation. The hop_# is the decimal number of gateways between the probe and the destination workstation.

Entering Static Routes

Note

When you enter static routes into the probe, static routes are not updated automatically. You must update these routes if changes in network topology affect the static routes.

Before entering static routes, make a map of all gateway paths between the probe, as a starting point, and each workstation must have access to it.

To enter a static route or default gateway, perform the following steps.

Procedure

1. At the `core>` prompt, use the netparam command to enter the first host/gateway pair:

   ```
   netparam add_route host_ip gateway_ip hop_#
   ```

   NOTE: Wait for the *`core>`* prompt between each netparam entry.

Note

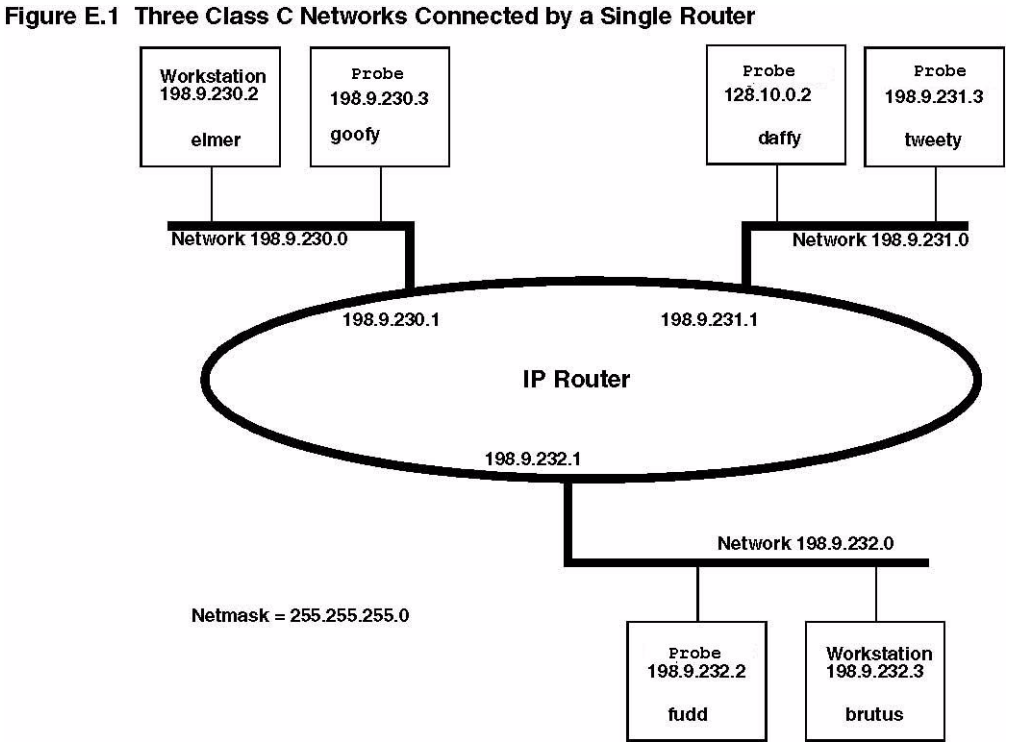
host_ip can identify an individual host or a network serving multiple hosts. The *gateway_ip* is the first gateway the probe crosses when communicating with the destination host. The *hop_#* is the decimal number of gateways between the probe and the destination host.

2. Add routes until all destination hosts or networks are defined.
3. When the `core>` prompt returns, reset the probe by cycling power, or by entering the `reset` command.

Example B-2. Static Route Example

Figure B-1 shows three class “C” networks joined together by a single IP router, making each probe accessible from three workstations (elmer, tweety, and brutus).

Figure B-1. Example Network with 1 Router



No static routing information is required to make a probe accessible from a workstation local to it on a network. For example, the probe `goofy` on network *198.9.230.0* communicates directly with workstation `elmer`.

When static routing is used, a routing entry is required on a probe for each workstation on a non-local network that accesses it. The probe `goofy` requires two entries, one for workstation `tweety` on network *198.9.231.0* and one for workstation `brutus` on network *198.9.232.0*.

Each static route entry is made using a `netparam` command and consists of a *network address* and a *host address*. The `netparam` commands for the static route entries for probe `goofy` are:

```
netparam add_route 198.9.231.0 198.9.230.1 1
netparam add_route 198.9.232.0 198.9.230.1 1
```

Each of the three probe hosts must have a static route entry for each remote workstation that accesses it.

To delete a static route, use the `netparam` command:

```
core> netparam delete_route 1
SIOCADDRT: Network is unreachable
core> netparam
ethernet_address        = 00:04:9F:00:FF:80
bootconfig              = static:MEGJ
static_ip_address       = 192.168.0.201:255.255.255.0
static_dns_server       = 0.0.0.0
```

```
static_hosts            = <none>
static_routes           = destination     gateway         metric
                          --------------- --------------- ------
                          default         134.86.179.254  1
core> netparam delete_route default
core> netparam
ethernet_address        = 00:04:9F:00:FF:80
bootconfig              = static:MEGJ
static_ip_address       = 192.168.0.201:255.255.255.0
static_dns_server       = 0.0.0.0
static_hosts            = <none>
static_routes           = <none>
core>
```

Step-by-Step Guide to Configuring a Static IP

This section provides the steps required to assign a static IP address and host name to the probe.

Prerequisites

- You must have write permissions to the network database or the assistance of your network system administrator.

Procedure

1. Use a terminal emulator to log into the USB serial port of your probe. After login, you'll be presented with a core> prompt.

   From this prompt, use the netparam command to review the current network settings. The following example shows a DHCP (default) output:

   ```
   core> netparam
    ethernet_address        = 00:04:9F:00:FF:65
    bootconfig              = dhcp:FSL00FF65 (134.86.178.206)
    static_ip_address       = <none>
    static_dns_server       = <none>
    static_hosts            = <none>
    static_routes           = <none>
   ```

2. Use the ping command to verify that the static IP address assigned to you by your network administrator is not currently in use by someone else as shown in the following example:

   ```
   H:\>ping 134.86.178.63
   Pinging 134.86.178.63 with 32 bytes of data:
   Reply from 134.86.178.187: Destination host unreachable.
   ```

3. Gather the other network settings you require.

   Use the ipconfig command to display the information on a Windows machine that is on the same physical subnet as the probe you are configuring. The ipconfig command enumerates the network adapters on your system. You must determine which adapter information is for the physical network to which your probe is connected.

```
H:\>ipconfig /all

Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix .: sje.mentorg.com
Description . . . . . . . . . . . : Intel(R) 82567LM Gigabit Network
Connection
Physical Address. . . . . . . . . : 00-24-E8-91-37-2E
DHCP Enabled. . . . . . . . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . :
fe80::e589:cc9d:86f9:1835%12(Preferred)
IPv4 Address. . . . . . . . . . . : 134.86.178.186(Preferred)
Subnet Mask . . . . . . . . . . . : 255.255.254.0
Lease Obtained. . . . . . . . . . : Thursday, September 30, 2010 11:33:29
AM
Lease Expires . . . . . . . . . . : Tuesday, October 05, 2010 5:27:44 PM
Default Gateway . . . . . . . . . : 134.86.179.254
DHCP Server . . . . . . . . . . . : 134.86.188.34
DHCPv6 IAID . . . . . . . . . . . : 251667688
DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-13-CE-A5-3A-00-24-E8-91-
37-2E
DNS Servers . . . . . . . . . . . : 134.86.188.38
                                   134.86.188.11
                                   134.86.188.57
Primary WINS Server . . . . . . . : 147.34.97.74
Secondary WINS Server . . . . . . : 134.86.188.34
NetBIOS over Tcpip. . . . . . . . : Enabled
```

4. Use the netparam command to make the settings in the probe as shown here:

```
core> netparam static_ip_address <static ip>:<subnet  mask>
core> netparam add_route default <gateway> 1
core> netparam static_dns_server <dns server ip>
core> netparam  bootconfig static
```

Caution

The netparam utility copies its settings into non-volatile memory on the probe. Follow these rules while using netparam utility:

- Each time you enter a netparam command, wait for the core> prompt to reappear before entering the next command. The prompt indicates that the parameter change has been logged.

Note

The add_route entry is required if you want to access your probe from outside the subnet the probe is connected to. The static_dns_server entry is required if you wish to access the probe via a symbolic hostname. The hostname is constructed from the bottom three fields of the MAC address (no colons) preceded by FSL. Your network name server must support DDNS protocols for this to work. If you find that the auto discovery feature in CodeBench or the command line tool does not list your probe, please make sure these two settings are set correctly for your network.

- When you have finished entering all settings, type **reset** at the core> prompt. When the probe restarts, it uses the new netparam parameters.

```
core> reset
```

Results

- The reset command reboots the probe and once it returns you to the core> prompt, you can review the settings:

```
core> netparam
ethernet_address        = 00:04:9F:00:FF:65
bootconfig              = static:FSL00FF65
static_ip_address       = 134.86.178.63:255.255.254.0
static_dns_server       = 134.86.188.11
static_hosts            = <none>
static_routes           = destination     gateway         metric
                          --------------- --------------- ------
                          default         134.86.179.254  1
```

Appendix C
Troubleshooting

This appendix provides Sourcery Probe Professional troubleshooting information.

Troubleshooting Communications Problems

This section explains how to troubleshoot communication problems between the debugger and the probe.

If the debugger is unable to communicate with Sourcery Probe Professional:

- Check the cable and connections between the network cable and the probe.

  The probe connects directly to networks that use twisted pair (10/100/ 1000BaseT) cables.

- Ensure communication is configured correctly for your network.
- Ensure the probe is receiving power.

  See Sourcery Probe Professional Status Indicators for a description of the status LEDs.

- Ensure the probe is running the operating system software by checking the Heartbeat LED.

  See Sourcery Probe Professional Status Indicators for a description of the status LEDs.

- Use the communication troubleshooting utilities of the probe to verify that it is recognized on your network, or to help diagnose problems connecting to your network.

  To troubleshoot communication, see Verify Network Communication.

- Ensure the debugger is set up correctly for Ethernet communication with the probe.

If all the settings are correct and the debugger cannot communicate with the probe, visit SupportNet (http://supportnet.mentor.com/) for assistance.

Verify Network Communication

If you want to verify the probe is up and running on your network, enter the `ping` command at the `core>` prompt of the probe to determine if it can communicate with your computer.

To verify network communication, perform the following steps.

Procedure

1. Connect to the probe internal setup utility (See Using netparam to Configure the Sourcery Probe Professional).
2. Verify communication by entering this command at the `core>` prompt:

   ```
   ping ipaddress | hostname
   ```

   For example, to ping a hostname named *my_pc* at IP address *128.9.230.61*, enter the command:

   ```
   ping 128.9.230.61
   ```

   or —

   ```
   ping my_pc
   ```

Note

When you establish communication, you must ping the IP address used during the setup process, because the Sourcery Probe Professional might not automatically recognize the hostname. To ping a hostname, the probe internal host table must first be updated.

View Network Connections

If you want to check your network configuration and activity, use the `netstat` command. This command displays all the network statistics on active connections, including their current status, connected hosts, and running programs. You can also see information about the routing table and get statistics on your network interfaces.

To run the `netstat` command, perform these steps.

Procedure

1. Connect to the internal setup utility of the probe.
2. At the `core>` prompt, enter the `netstat` command using this syntax:

   ```
   netstat -s
   ```

   The output of this command shows whether data is being sent or received over the network.

Troubleshooting Power Problems

If the probe behaves erratically, check the connections to the external power supply.

The LED labeled HEARTBEAT indicates whether the probe is receiving power. If this LED is not lit, check the connections to the external power supply.

Troubleshooting Overheating Problems

The following problems indicate the cause of overheating of the Sourcery Probe Professional:

- Excessive fan noise:

  The probes have cooling fans that keep critical components from overheating. These fans generally run quietly, but will run faster and louder if the probe is getting too hot.

- Red heartbeat LED:

  The probe monitors the temperature of several key components, and will change the color of the heartbeat LED to red if these components get close to overheating.

- Unexpected shutdown or reset:

  If the probe detects that components are reaching their maximum rated operating temperature, it will automatically go into an overtemperature shutdown. When this occurs, the probe will power off all components (including LEDs, USB, Serial, and network), and run the fans at maximum speed until the system cools off.

If you encounter any of these problems, follow these steps to resolve it:

Procedure

1. Check for air flow obstructions. The probe has air vents on both sides that must be kept clear of obstructions and dust. If any of these air vents are blocked, the probe cannot adequately cool itself.
2. Check the ambient temperature. The probe is designed to operate at ambient temperatures up to 40 degrees Celsius. If the ambient temperature exceeds 40 degrees Celsius, the probe can overheat.

Note

Do not position the probe near the heat exhausts of other hardware or equipment. Doing so will cause the probe to use air that is warmer than ambient room temperature.

3. Check that the fans are clean and spinning smoothly. Checking the fans will require opening the probe case, and this should only be done after contacting technical support.

Embedded Software and Hardware License Agreement

The latest version of the Embedded Software and Hardware License Agreement is available on-line at:
www.mentor.com/eshla

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1. **Definitions.** As used in this Agreement and any applicable quotation, supplement, attachment and/or addendum ("Addenda"), these terms shall have the following meanings:

   1.1. "Customer's Product" means Customer's end-user product identified by a unique SKU (including any Related SKUs) in an applicable Addenda that is developed, manufactured, branded and shipped solely by Customer or an authorized manufacturer or subcontractor on behalf of Customer to end-users or consumers;

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   1.6. "End-User" means Customer's customer;

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   1.8. "Hardware" means a physically tangible electro-mechanical system or sub-system and associated documentation;

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   1.10. "Mentor Embedded Linux" or "MEL" means Mentor Graphics' tools, source code, and recipes for building Linux systems;

   1.11. "Open Source Software" or "OSS" means software subject to an open source license which requires as a condition for redistribution of such software, including modifications thereto, that the: (i) redistribution be in source code form or be made available in source code form; (ii) redistributed software be licensed to allow the making of derivative works; or (iii) redistribution be at no charge;

   1.12. "Processor" means the specific microprocessor to be used with Software and implemented in Customer's Product;

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1.16. "Related SKU" means two or more Customer Products identified by logically-related SKUs, where there is no difference or change in the electrical hardware or software content between such Customer Products;

1.17. "Software" means software programs, Embedded Software and/or Development Tools, including any updates, modifications, revisions, copies, documentation and design data that are licensed under this Agreement;

1.18. "Source Code" means software in a form in which the program logic is readily understandable by a human being;

1.19. "Sourcery CodeBench Software" means Mentor Graphics' Development Tool for C/C++ embedded application development;

1.20. "Sourcery VSIPL++" is Software providing C++ classes and functions for writing embedded signal processing applications designed to run on one or more processors;

1.21. "Stock Keeping Unit" or "SKU" is a unique number or code used to identify each distinct product, item or service available for purchase;

1.22. "Subsidiary" means any corporation more than 50% owned by Customer, excluding Mentor Graphics competitors. Customer agrees to fulfill the obligations of such Subsidiary in the event of default. To the extent Mentor Graphics authorizes any Subsidiary's use of Products under this Agreement, Customer agrees to ensure such Subsidiary's compliance with the terms of this Agreement and will be liable for any breach by a Subsidiary; and

1.23. "Term-Licensed Products" means Products licensed to Customer for a limited time period ("Term").

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2.1. To the extent Customer (or if agreed by Mentor Graphics, Customer's appointed third party buying agent) places and Mentor Graphics accepts purchase orders pursuant to this Agreement ("Order(s)"), each Order will constitute a contract between Customer and Mentor Graphics, which shall be governed solely and exclusively by the terms and conditions of this Agreement and any applicable Addenda, whether or not these documents are referenced on the Order. Any additional or conflicting terms and conditions appearing on an Order will not be effective unless agreed in writing by an authorized representative of Customer and Mentor Graphics.

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3.2.1. Development License: During the Term, if any, Customer may modify, compile, assemble and convert the applicable Embedded Software Source Code into Linkable Object Code and/or Executable Code form by the number of Developers specified, for the Processor(s), Customer's Product(s) and at the Development Location(s) identified in the applicable Addenda.

3.2.2. End-User Product License: During the Term, if any, and unless otherwise specified in the applicable Addenda, Customer may incorporate or embed an Executable Code version of the Embedded Software into the specified number of copies of Customer's Product(s), using the Processor Unit(s), and at the Development Location(s) identified in the applicable Addenda. Customer may manufacture, brand and distribute such Customer's Product(s) worldwide to its End-Users.

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4.2. If Mentor Graphics authorizes Customer to use the Beta Code, Customer agrees to evaluate and test the Beta Code under normal conditions as directed by Mentor Graphics. Customer will contact Mentor Graphics periodically during Customer's use of the Beta Code to discuss any malfunctions or suggested improvements. Upon completion of Customer's evaluation and testing, Customer will send to Mentor Graphics a written evaluation of the Beta Code, including its strengths, weaknesses and recommended improvements.

4.3. Customer agrees to maintain Beta Code in confidence and shall restrict access to the Beta Code, including the methods and concepts utilized therein, solely to those employees and Customer location(s) authorized by Mentor Graphics to perform beta testing. Customer agrees that any written evaluations and all inventions, product improvements, modifications or developments that Mentor Graphics conceived or made during or subsequent to this Agreement, including those based partly or wholly on Customer's feedback, will be the exclusive property of Mentor Graphics. Mentor Graphics will have exclusive rights, title and interest in all such property. The provisions of this Subsection 4.3 shall survive termination of this Agreement.

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6.1. Except as described in Sections 6.2, 6.3 and 6.4 below, and unless otherwise specified in any applicable Addenda to this Agreement, to the extent Customer purchases support services, Mentor Graphics will provide Customer updates and technical support for the number of Developers at the Development Location(s) for which support is purchased in accordance with Mentor Graphics' then-current End-User Software Support Terms located at http://supportnet.mentor.com/about/legal/.

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12. **Termination and Effect of Termination.** If a Software license was provided for limited term use, such license will automatically terminate at the end of the authorized Term.

12.1. Termination for Breach. This Agreement shall remain in effect until terminated in accordance with its terms. Mentor Graphics may terminate this Agreement and/or any licenses granted under this Agreement, and Customer will immediately discontinue use and distribution of Products, if Customer (a) commits any material breach of any provision of this Agreement and fails to cure such breach upon 30-days prior written notice; or (b) becomes insolvent, files a bankruptcy petition, institutes proceedings for liquidation or winding up or enters into an agreement to assign its assets for the benefit of creditors. Termination of this Agreement or any license granted hereunder will not affect Customer's obligation to pay for Products shipped or licenses granted prior to the termination, which amounts shall be payable immediately upon the date of termination. For the avoidance of doubt, nothing in this Section 12 shall be construed to prevent Mentor Graphics from seeking immediate injunctive relief in the event of any threatened or actual breach of Customer's obligations hereunder.

12.2. Effect of Termination. Upon termination of this Agreement, the rights and obligations of the parties shall cease except as expressly set forth in this Agreement. Upon termination or expiration of the Term, Customer will discontinue use and/or distribution of Products, and shall return Hardware and either return to Mentor Graphics or destroy Software in Customer's possession, including all copies and documentation, and certify in writing to Mentor Graphics within ten business days of the termination date that Customer no longer possesses any of the affected Products or copies of Software in any form, except to the extent an Open Source Software license conflicts with this Section 12.2 and permits Customer's continued use of any Open Source Software portion or component of a Product. Upon termination for Customer's breach, an End-User may continue its use and/or distribution of Customer's Product so long as: (a) the End-User was licensed according to the terms of this Agreement, if applicable to such End-User, and (b) such End-User is not in breach of its agreement, if applicable, nor a party to Customer's breach.

13. **Export.** The Products provided hereunder are subject to regulation by local laws and United States government agencies, which prohibit export or diversion of certain products, information about the products, and direct or indirect products thereof, to certain countries and certain persons. Customer agrees that it will not export Products in any manner without first obtaining all necessary approval from appropriate local and United States government agencies. Customer acknowledges that the regulation of product export is in continuous modification by local governments and/or the United States Congress and administrative agencies. Customer agrees to complete all documents and to meet all requirements arising out of such modifications.

14. **U.S. Government License Rights.** Software was developed entirely at private expense. All Software is commercial computer software within the meaning of the applicable acquisition regulations. Accordingly, pursuant to US FAR 48 CFR 12.212 and DFAR 48 CFR 227.7202, use, duplication and disclosure of the Software by or for the U.S. Government or a U.S. Government subcontractor is subject solely to the terms and conditions set forth in this Agreement, except for provisions which are contrary to applicable mandatory federal laws.

15. **Third Party Beneficiary.** For any Products licensed under this Agreement and provided by Customer to End-Users, Mentor Graphics or the applicable licensor is a third party beneficiary of the agreement between Customer and End-User. Mentor Graphics Corporation, Mentor Graphics (Ireland) Limited, and other licensors may be third party beneficiaries of this Agreement with the right to enforce the obligations set forth herein.

16. **Review of License Usage.** Customer will monitor the access to and use of Software. With prior written notice, during Customer's normal business hours, and no more frequently than once per calendar year, Mentor Graphics may engage an internationally recognized accounting firm to review Customer's software monitoring system, records, accounts and sublicensing documents deemed relevant by the internationally recognized accounting firm to confirm Customer's compliance with the terms of this Agreement or U.S. or other local export laws. Such review may include FlexNet (or successor product) report log files that Customer shall capture and provide at Mentor Graphics' request. Customer shall make records available in electronic format and shall fully cooperate with data gathering to support the license review. Mentor Graphics shall bear the expense of any such review unless a material non-compliance is revealed. Mentor Graphics shall treat as confidential information all Customer information gained as a result of any request or review and shall only use or disclose such information as required by law or to enforce its rights under this Agreement. Such license review shall be at Mentor Graphics' expense unless it reveals a material underpayment of fees of five percent or more, in which case Customer shall reimburse Mentor Graphics for the costs of such license review. Customer shall promptly pay any such fees. If the license review reveals that Customer has made an overpayment, Mentor Graphics has the option to either provide the Customer with a refund or credit the amount overpaid to Customer's next payment. The provisions of this Section 16 shall survive the termination of this Agreement.

17. **Controlling Law, Jurisdiction and Dispute Resolution.** This Agreement shall be governed by and construed under the laws of the State of California, USA, excluding choice of law rules. All disputes arising out of or in relation to this Agreement shall be submitted to the exclusive jurisdiction of the state and federal courts of California, USA. Nothing in this section shall restrict Mentor Graphics' right to bring an action (including for example a motion for injunctive relief) against Customer or its Subsidiary in the jurisdiction where Customer's or its Subsidiary's place of business is located. The United Nations Convention on Contracts for the International Sale of Goods does not apply to this Agreement.

18. **Severability.** If any provision of this Agreement is held by a court of competent jurisdiction to be void, invalid, unenforceable or illegal, such provision shall be severed from this Agreement and the remaining provisions will remain in full force and effect.

19. **Miscellaneous.** This Agreement contains the parties' entire understanding relating to its subject matter and supersedes all prior or contemporaneous agreements, including but not limited to any purchase order terms and conditions. This Agreement may only be modified in writing, signed by an authorized representative of each party. Waiver of terms or excuse of breach must be in writing and shall not constitute subsequent consent, waiver or excuse.

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