Mentor® Embedded Sourcery Probe Personal Hardware Manual

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Chapter 1
Introduction

Mentor Embedded Sourcery Probe Personal (Sourcery Probe Personal) is a cost-effective tool that helps you develop and debug a number of processors and microcontrollers.

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

Related Documentation

This manual describes the procedures for unpacking the probe, setting up USB communications, and connecting the probe to your target system.

- To learn how to set up the communication parameters and update the probe firmware image on ARM and MIPS models of the Sourcery Probe Personal, refer to the *Mentor Embedded Sourcery Probe User's Manual, Appendix A - Probe Settings and Updates*. **NOTE:** This information is only relevant if you are using an ARM or MIPS probe. If you have a powerPC probe, ignore these procedures.
- For details on installing and configuring your debugger, see the *Sourcery CodeBench Getting Started* manual.

About Sourcery Probe Personal

Sourcery Probe Personal uses advanced emulation technology to provide control of and visibility into your target system. Combined with the debugger software, the probe (Figure 1-1) speeds the debugging process by letting you interactively control and examine the state of your target system.

Figure 1-1. Sourcery Probe Personal with USB 2.0 Cable

Product Highlights

Sourcery Probe Personal has these features:

- Different product models are available for the following: PowerPC™ processors, ARM® processors, and MIPS® processors.
- Supports Windows® 7 and Windows® XP SP3.
- ARM and MIPS models support a Linux kernel version 2.6.24 or newer. Example Linux operating systems that meet this requirement are Ubuntu 8.04, Fedora 9, and RHEL 6. Newer versions of these operating systems should also work.
- The PowerPC model supports the following Linux builds: Red Hat® Linux® version 8.0 or 9.0, Fedora™ Core 3 or Core 4, and Mandrake® Linux® 10.0.
- Supports all CPU core speeds.
- Provides control and debug software running in-target, with minimal intrusion into target operation.
- Allows debug code in cache, ROM, RAM, and flash memory.
- Provides high performance:
  - Split-second single-step execution.
  - Capable of download speeds greater than 12 MB per minute from host to target.

Note

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

- Supports one USB 2.0 connection.
- Supports both big and little endian byte-order.

- Automatically supports target signal levels from 1.8V to 3.3V.
- Software debug capabilities including:
  - Controlling instruction execution.
  - Displaying and modifying target memory.
  - Examining and modifying any processor registers.
  - Running to breakpoints in ROM, RAM, or flash memory.
  - Single-stepping through source and assembly language code views.
  - Single-stepping into, over, or out of functions.

The Debugging Environment

The Sourcery CodeBench debugger has been integrated with Sourcery Probe Personal to give you control over the emulation functions and your target. They communicate via a high speed USB2 port.

The probe contains the hardware and software needed to control the processor's Debug Support Unit (DSU) via the JTAG 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 Personal Benefits

The probe provides these key benefits:

- Visibility:
  The probe enables you to observe registers and the current state of target 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.

Target Connections

The probe connects to your target through the standard debug port for the processor family, or via a Target Adapter Module if the target has a different connector type. Each probe supports a single target connection. The probes are available in the versions show in Table 2-1.

For additional details see Connecting to the Target and Host Computer.

Environmental Information

All components used in the probe are RoHS compliant. The China RoHS HST table describes the hazardous materials that can be contained in the different components of the probe device. To view this table, see Figure 1-2.

Figure 1-2. China RoHS HST Table

Mentor Graphics

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	Recyclable	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 Sourcery Probe Personal 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 your system, ensure the operating environment is prepared.

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 °C to 40 °C (32° to 104 °F).
- Maximum relative humidity is 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C.

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 instrument and the target, when connecting/disconnecting the instrument and the target, and when removing the cover of the instrument.

We recommend the following precautions:

- Use wrist straps or heel bands with a $1M\Omega$ 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 instrument and the target.

Note

Consider these precautions as *minimum* requirements for a static-controlled environment.

Electrical Requirements

The probe is powered through the USB cable and does not use an external power supply. The probe is designed to be plugged directly into a host computer, but also can work with self-powered hubs. Bus-powered hubs might not be able to provide sufficient power for the probe, which requires 200 mA. If insufficient power is available, your host operating system will indicate this failure and the probe will go into a low power suspend mode. If your hub is not able to provide sufficient power, connect the probe directly to your host PC, or purchase a self-powered USB hub.

Target Requirements

The probe automatically supports target signal levels from 1.8V to 3.3V.

Note

For additional requirements about your debug connector type, see the *Mentor Embedded Probe Target Connections* application note:

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 applications note here: https://sourcery.mentor.com/GNUToolchain/kbentry247.

Cycling Power to the System

When you need to apply or cycle power to the Sourcery Probe, connect or disconnect the power cable from the power source or from the probe. After you have connected the probe to your target system, perform the following steps to apply or remove the power.

Note

The first time you connect the probe to a PC, the PC will attempt to install and configure USB drivers. The requisite process is covered in the next chapter.

Procedure

To turn the power on, perform these steps:

1. Connect the USB cable from the PC to the Sourcery Probe.
2. Turn on the target system power.

To turn the power off, perform these steps:

1. Turn off the target system power.
2. Remove the USB cable from the Sourcery Probe.

Chapter 2
Connecting to the Target and Host Computer

Note

You should install the Sourcery CodeBench software before attempting to install or use the Sourcery Probe.

This section explains how to connect a Sourcery Probe Personal to both your host computer and to the target.

Caution

Sourcery Probe Personal contains components that are subject to damage from electrostatic discharge. Whenever you are using, handling, or transporting the probe, or connecting to or disconnecting from a target system, always use proper anti-static protection measures, as specified in Standard Electrostatic Precautions.

Connecting to a Windows 7 PC

To connect a Sourcery Probe Personal to your Windows 7 computer and configure it, perform the following steps.

Procedure

1. Connect one end of your USB 2.0 cable to a USB port on your host computer. Connect the other end of the cable to your probe.

   The first time you connect the USB cable to your host computer, you might get a New Hardware Detected dialog box. If you have already installed the debugger software, then Windows should be able to automatically install the right USB driver. This will happen

again the first time you connect a Sourcery Probe Personal to each different USB port on your computer.

2. Click the **New Hardware Detected** dialog box. The Driver Software Installation dialog box appears.

   It is important to note the warning in this dialog box stating that the process of installing the device drivers can require some time to complete.

3. When the installation is complete, click **Close**.

Note

New probes are configured for Local Link mode, which means the probe will assign itself an address in the range 169.254.xxx.yyy. You may want to check what value the probe picked using the Sourcery Probe Console, so you can ping it, but it is not usually necessary because CodeBench can automatically detect the presence of Sourcery Probes.

If the probe has been configured to use a static IP address, then you must configure the PC network adapter to use a unique address within the range set in the probe. See Configuring the Windows 7 Network Adapter to Use a Static IP Address for details.

If the probe's IP address is unknown, you can find it using the Sourcery Probe Personal Console Menu.

Configuring the Windows 7 Network Adapter to Use a Static IP Address

To configure the PC network adapter to use an unique static IP address, perform the following steps. Note that this is not normally necessary as the default configuration has the probe and PC assigning compatible addresses on their own. However, there are times when a static IP solution is desirable.

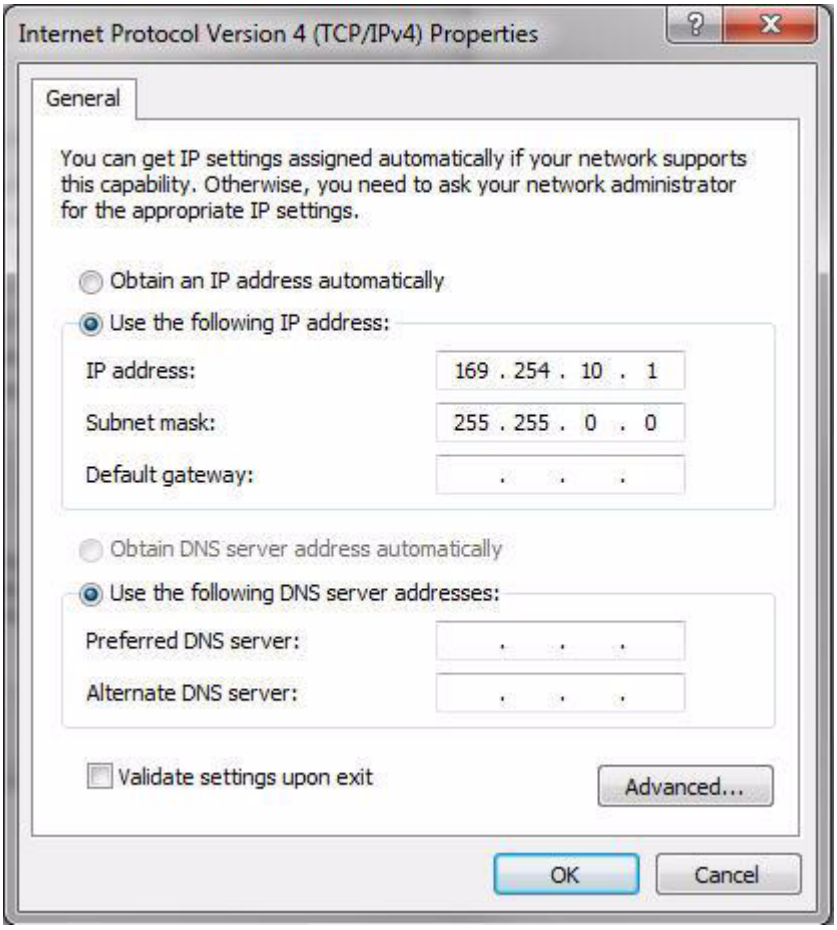
Procedure

1. From the Start menu, click **Computer.**
2. Right-click **Network** on the bottom of the left pane and choose **Properties**.
3. Select **Change adapter settings** from the left pane to see all the network adapters available on your computer.
4. Right-click the **Local Area Connection** associated with Mentor Embedded USB JTAG and choose **Properties**.
5. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**. The Internet Protocol Version 4 (TCP/IPv4) Properties dialog box appears.
6. Select **Use the following IP address**.

7. Enter the IP address. See the note above for information on choosing one.

   The Subnet mask should always be 255.255.0.0 when using IP addresses in the local link range. If you set the probe and PC to IP addresses in a different range, then the subnet mask would typically be 255.255.255.0 (on both probe and PC) and the Gateway field should remain blank.

Figure 2-1. IP Properties Dialog



8. Click **OK** to accept these changes.
9. Click **Close** to close the Properties dialog box for the connection.

Results

Windows 7 auto-configures after the drivers are installed and the connection is made.

Related Topics

Changing the IP Address of the Probe (Optional)

Connecting to a Windows XP/SP3 PC

There are two steps to set up the ARM and MIPS models on Windows XP.

Procedure

1. Install the USB drivers. See Installing the USB Driver Software.
2. Set the Windows network adapter to use a static IP address. See Configuring the Windows XP Network Adapter to Use a Static IP Address.

Sourcery Probe Personal for PowerPC installs a custom USB driver which does not use TCP/IP communication. This section does not apply to those models.

Note

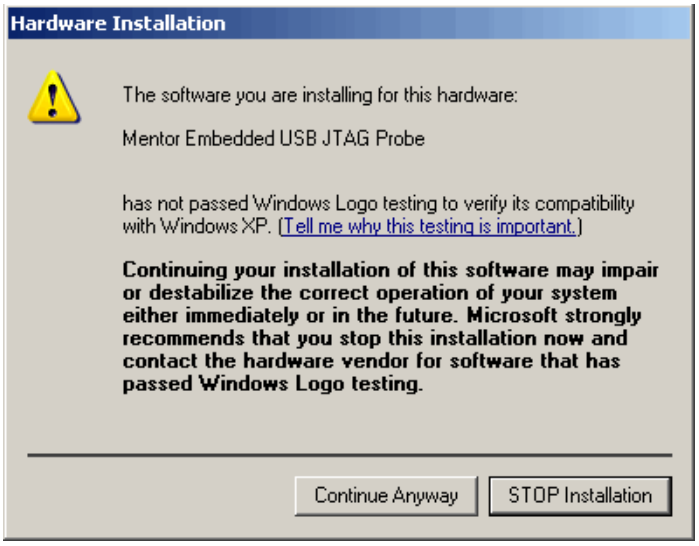
XP Service Pack 3 is required when using Sourcery Probe Personal with Windows XP.

Installing the USB Driver Software

This section provides the steps required to install the drivers for your probe.

Procedure

1. Connect the USB cable to your probe and to your PC. After a few seconds, the Found New Hardware Wizard appears. Install the USB drivers.
   - If a warning similar to the following appears, click **Continue Anyway**.



Note

The hardware name (Mentor Embedded USB JTAG Probe) shown in the warning message is the correct driver name for the Sourcery Probe Personal.

2. Set the XP network adaptor to use a static IP address. See Configuring the Windows XP Network Adapter to Use a Static IP Address.

Configuring the Windows XP Network Adapter to Use a Static IP Address

The Sourcery Probe Personal models for ARM and MIPS use remote RNDIS for TCP/IP communication to Windows over USB. If you are using Windows XP, the probe and PC automatically negotiate their IP addresses, so no manual setup is required. However, because this negotiation can take an extended time to complete, XP might report the network has limited or no connectivity. To avoid this, you can set the Windows Network Adapter to use static IP addresses. In general you can leave the probe configured for Local Link (automatic) mode, but we recommend that you set the PC to a compatible static IP address.

Note

There will be a 30 second delay for network connection if you are using Windows XP instead of Windows 7. You can avoid this delay by setting a static IP address on the XP network adapter properties. Additionally, Windows XP shows an exclamation mark (!) on the network icon in the tray area indicating limited or no connectivity. You can ignore this indication.

Prerequisites

Before setting the XP network adapter static IP address, you must pick a suitable address. The address must be unique, but within the same range as the probe's address. New probes are configured for Local Link mode, which means the probe will assign itself an address in the range 169.254.xxx.yyy. You may want to check what value the probe picked using the Sourcery Probe Console, but in practice you can probably just pick any number from 1-254 for each of xxx and yyy. If the PC reports that the address you chose is already in use, then just try another value for xxx or yyy.

However, if the probe was reconfigured to use a static IP address, then you must pick an address within the range set in the probe. If the probe's IP address is unknown, you can find it by using the Sourcery Probe Personal Console Menu.

Tip: If you do not know the probe's IP address, you can either use the Discovery dialog box in Sourcery CodeBench, or you can run the `mep_update` console application to find the probe and quit instead of proceeding with the update.

The `mep_update` utility is in the `...\mep\bin` directory within the Sourcery CodeBench installation.

Example 2-1. mep_update Console Output

```
MEP Update Ver 0.1.0 Copyright 2010 Mentor Graphics Inc.

Scanning for visible Probes...

    Model:                  Serial #:      IP Addr:        UnitName:
 0: MESP-Personal / ARM      07380004       169.254.156.36
 1: MESP-Pro / MIPS         FSL016F52      134.86.178.205  FSL016F52
                             Hostname: sj178dy205.my_network_name
```

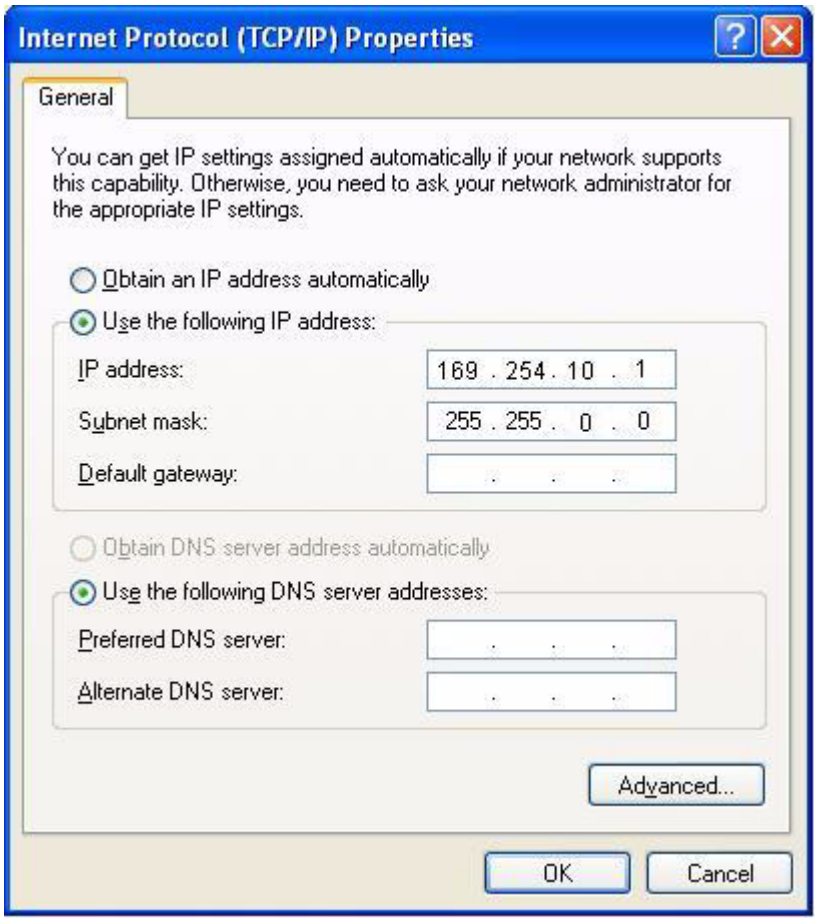
Select a Probe 0..6, q> q

Procedure

1. On your desktop, right-click **My Network Places** and click **Properties**.
2. Right-click the network connection associated with Sourcery Probe Personal. Note that the Local Area Connection number will differ from one computer to another and from one USB port to another.
3. Click **Properties** in the dropdown menu.
4. In the connection's properties dialog box, click **Internet Protocol (TCP/IP)**. Then, click the **Properties** button.
5. Choose **Use the following IP address**.
6. Select the static IP address option for the network adapter and enter the address chosen above, as shown in Figure 2-2.

   The Subnet mask should always be 255.255.0.0 when using IP addresses in the local link range. If you set the probe and PC to IP addresses in a different range, then the subnet mask would typically be 255.255.255.0 (on both probe and PC) and the Gateway field should remain blank.

Figure 2-2. IP Properties Dialog



7. Click **OK** to accept these changes.
8. Click **OK** to close the Properties dialog box for the connection.
9. Close **My Network Places**.
10. If you know the IP address of the probe, you should be able to ping the probe over USB using its IP address (for example, 169.254.85.218). The first time you ping, it can require some time to establish the connection.

```
ping 169.254.85.218
```

Related Topics

Sourcery Probe Console

Changing the IP Address of the Probe (Optional)

Connecting to a Linux PC

The ARM and MIPS models of the Sourcery Probe Personal support remote CDC Ethernet for TCP/IP communication over USB. This section describes how to configure the probe and Linux for use with USB.

Because the Sourcery Probe Personal models for PowerPC do not use TCP/IP communication, this section does not apply to those models.

Note

Although this setup description is valid for Ubuntu 10.04 LTS, the same steps are likely to work with many distributions. A quick Internet search on static IP setup for your Linux distribution should help resolve discrepancies.

Known Issues

The Linux kernel can assign different network interface names when you add or remove network interfaces.

Prerequisites

Before setting the PC's network adapter static IP address, you must pick a suitable address. The address must be unique, but within the same range as the probe's address. New probes are configured for Local Link mode, which means the probe will assign itself an address in the range 169.254.xxx.yyy. You may want to check what value the probe picked using the Sourcery Probe Console, but in practice you can probably just pick any number from 1-254 for each of xxx and yyy. If the PC reports that the address you chose is already in use, then just try another value for xxx or yyy.

However, if the probe was reconfigured to use a static IP address, then you must pick an address within the range set in the probe. If the probe's IP address is unknown, you can find it by using the Sourcery Probe Personal Console Menu.

Procedure

1. Determine your interface name.

Note

The Linux kernel can assign different network interface names when you add or remove network interfaces. If you discover your interface name has changed, revisit this document section and go through the setup instructions again to adjust your configuration. Be sure to remove any previous manual setup you configured for your probe.

a. Look at your current network device settings with your probe unplugged. You should see your normal wired or wireless network setup with its current IP address listed. Use the *ifconfig* command to show your current network interfaces and settings.

```
$ ifconfig
eth1      <snip>
lo        <snip>
```

b. Plug in the Sourcery Probe Personal and repeat the *ifconfig* command. Note the new Ethernet device listing and also that it does not have an IP address assigned. In this example the new device is **eth2**:

```
$ ifconfig
eth1      <snip>
eth2      Link encap:Ethernet  HWaddr 00:80:cf:88:88:88
          inet6 addr: fe80::280:cfff:fe88:8888/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:10 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:1836 (1.8 KB)
lo        <snip>
```

2. Permanently add a static IP setting for your probe:

a. Edit a Linux network configuration file:

```
$ sudo vi /etc/network/interfaces
```

NOTE: You can substitute your favorite editor in place of vi.

This file likely has these settings to start with:

```
auto lo
iface lo inet loopbacka
```

b. Below the current settings in your file, add the following settings using your probe's adapter name. In this example, the adapter name is *eth2*.

The complete file should look like the following:

```
auto lo
iface lo inet loopback
auto eth2
iface eth2 inet static
address 169.254.10.1
netmask 255.255.0.0
broadcast 169.254.255.255
```

c. Save the file.

Note

This example uses an address in the Local Link IP range. If your probe was configured to use a static IP address, the same procedure applies, but you must pick an IP address for the network adapter that is compatible with that of the probe.

d. Use the following command to cause Linux to load the changed network setup:

```
$ sudo ifup eth2
```

e. Verify the interface with the following command. It should show the IP address you associated with it:

```
$ ifconfig eth2
eth2      Link encap:Ethernet  HWaddr 00:80:cf:88:88:88
          inet addr:169.254.10.1  Bcast:169.254.255.255
Mask:255.255.0.0
          inet6 addr: fe80::280:cfff:fe88:8888/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:4 errors:0 dropped:0 overruns:0 frame:0
          TX packets:60 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:280 (280.0 B)  TX bytes:10556 (10.5 KB)
```

Alternatively, you can also set up a temporary static IP. If you want to use a temporary IP setting rather than editing system files, use the following command instead:

```
$sudo ifconfig eth2 169.254.10.1 netmask 255.255.0.0 up
```

3. Run `mep_update` to find the IP address of the probe, then quit and use ping to test communication with it.

Related Topics

Sourcery Probe Console

Connecting to the Sourcery Probe Console from Sourcery CodeBench

Changing the IP Address of the Probe (Optional)

Changing the IP Address of the Probe (Optional)

This section provides the steps required if you need to set the IP address of the probe.

Setting the probe to use a static IP address is not generally recommended. If you do need to, or want to, then it is a good idea to place a label on the probe showing its IP address.

Prerequisites

To configure the probe to use a static IP, use the probe's console to configure the probe's settings. The console is accessible via the Terminal view in Sourcery CodeBench, or a terminal program such as Hyperterm. See Sourcery Probe Console for the proper serial port settings.

Procedure

1. Connect to the virtual serial port console using the Terminal view in Sourcery CodeBench. See Connecting to the Sourcery Probe Console from Sourcery CodeBench for the steps required to make this connection.
2. When the terminal is connected to the virtual serial port, press **<ESC>** to enter the setup menu and choose **USB/Net settings** from the menu. See Sourcery Probe Console for details on the settings to use.
3. Disable Local Link mode, and enter a static IP address and subnet mask for the probe.
4. After you successfully update the probe:
   a. First, quit the terminal emulator program.
   b. Then, unplug the probe from your PC.

Tip: After setting a static IP address for the probe, remember that the network adapter on the PC must be changed to a unique address within the same range.

Related Topics

Sourcery Probe Console

Sourcery Probe Console

Access the Sourcery Probe console via a virtual serial port using the Terminal view in Sourcery CodeBench or another terminal emulator.

Note
PowerPC models of Sourcery Probe Personal do not support the Sourcery Probe console.

Configuring the USB Serial Interface

Perform the steps in this section to configure the USB serial interface to communicate with your probe.

Procedure

1. Plug in the probe's USB cable.
2. After plugging in the probe's USB cable, Windows automatically registers the port as COM*X*, where X is the next available number. Linux registers it as */dev/ttyACMX*, where X is the next available number.

Tip: `/dev/ttyACM0` is the typical device name created by the OS, but if other USB serial devices are active at connection time, the number portion (0) may increase.

3. Connect to the probe with a terminal emulator. You can use the emulator that comes with Sourcery CodeBench. See Connecting to the Sourcery Probe Console from Sourcery CodeBench.
4. After connecting, press the **<esc>** key in the terminal emulator. This brings up the Sourcery Probe Personal Console Menu.
5. In this menu, you can replay (option 5), the bootup log. This log shows you the currently assigned IP address.

Caution

Always close the terminal program or the Terminal view in Sourcery CodeBench before you unplug the probe.

The serial port settings for Sourcery Probe Personal are as follows. See Figure 2-4 for an example.

- Port: COM*X* (**NOTE:** for Linux it is */dev/ttyACMX)*
- Baud: 115200
- Data Bits: 8
- Parity: None
- Stop Bits: 1
- Flow control: none

Related Topics

Connecting to the Sourcery Probe Console from Sourcery CodeBench

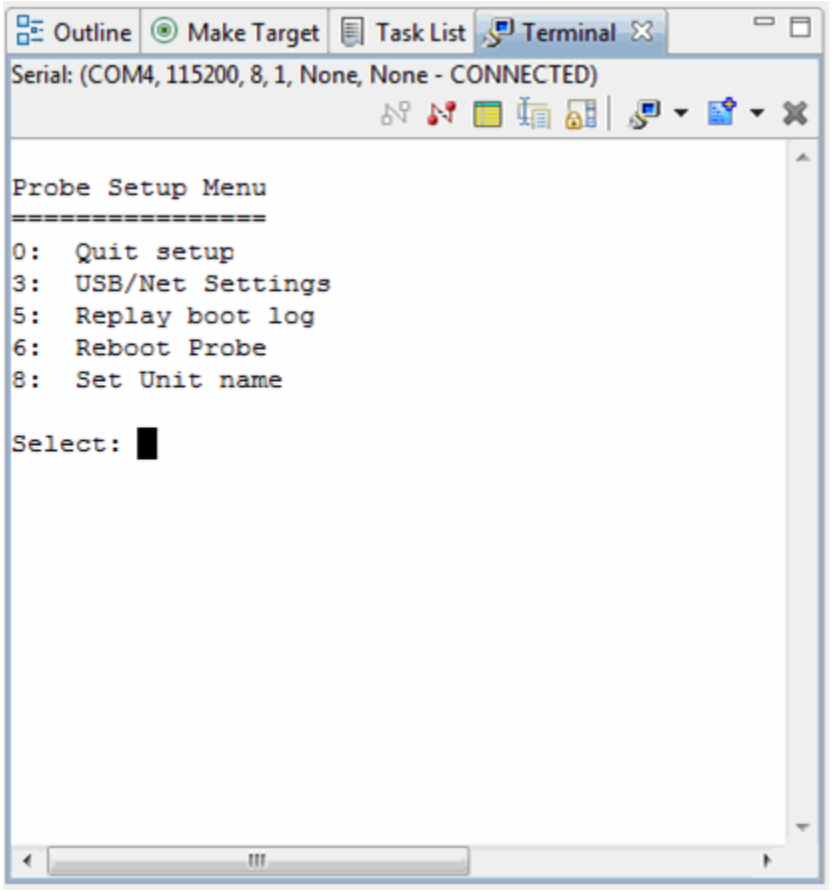
Sourcery Probe Personal Console Menu

The Sourcery Probe Personal Console Menu (Figure 2-3) provides you with several options including:

- Choose Replay boot log to view the probe configuration information.
- Choose USB/Net settings to set local link mode, or to enter a static IP address.
- Set a recognizable name for the unit, which will be displayed by the probe discovery feature of the CodeBench debugger.

You can access this menu once you have established a connection between your probe and a terminal emulator by pressing the <ESC> key.

Figure 2-3. Console Menu



Related Topics

Configuring the USB Serial Interface

Connecting to the Sourcery Probe Console from Sourcery CodeBench

Connecting to the Sourcery Probe Console from Sourcery CodeBench

You can use the Terminal view in Sourcery CodeBench to connect to the virtual serial port console for your probe.

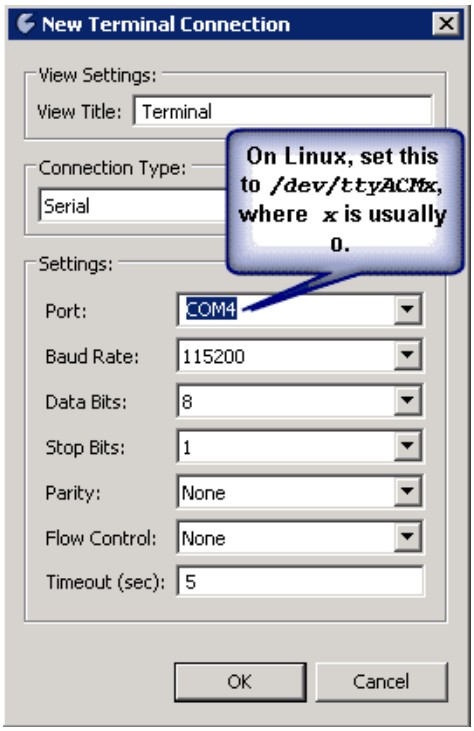
Prerequisites

- Your probe must be connected to your computer.
- Sourcery CodeBench must be installed and running.

Procedure

1. From Sourcery CodeBench, select **Window > Show Views > Other**. This opens the Show Views dialog box. Select **Terminal > Terminal** and click **OK**. This opens the Terminal view.
2. From the Terminal view, click **New Terminal Connection**  . This opens the New Terminal Connection dialog box.

Figure 2-4. New Terminal Connection Dialog Box



3. Set up the connection to use the settings defined in Sourcery Probe Console. Note that the specific COM port number may vary between computers and between USB ports.

Tip: On Linux, `/dev/ttyACM0` is the typical device name created by the OS, but if other USB serial devices are active at connection time, the number portion (0) may increase.

4. Click **OK** to connect to the console.
5. After connecting, press the **<ESC>** key in the Terminal window. This brings up the Sourcery Probe Personal Console Menu.

Related Topics

Sourcery Probe Console

Debug Port Connector Information

The Sourcery Probe Personal series supports a wide variety of processors that use either PowerPC/COP, PowerPC/DPI, MIPS/EJTAG, ARM® EmbeddedICE, or CoreSight JTAG debug interfaces.

See the *Mentor Embedded Sourcery Probe Target Connections* application note for details on the debug port connectors and adapter modules for supporting alternate debug connectors.

Caution

Failure to properly connect the probe to the target can damage the probe or target. Verify all connections before applying power.

If your target system has a debug port header that is compatible with the probe, you can directly connect the probe to the target debug port header. Ensure that pin 1 of the probe's gray ribbon cable connector lines up with pin 1 on the target's debug port header. Otherwise, you may need an adapter module to make the connection.

Table 2-1. Debug Connectors

	Product Model			
	ARM	COP	DPI	MIPS
Debug Connector Type	ARM20	COP16	DPI10	MIPS14
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.

Connecting the Probe to the Target

To connect the probe connector to the target debug port header, perform the steps provided in this section.

Prerequisites

- The debugger software must be installed before you attempt to connect the probe to the PC for the first time. This ensures the required USB drivers are available when the first connection is established. See Connecting to the Target and Host Computer.

Procedure

1. Remove power from your target.
2. Unplug the USB cable from the probe.
3. Ensure that pin 1 of the probe's gray ribbon cable connector lines up with pin 1 on the target's debug port header.

Note

Pin 1 is clearly marked on the probe's gray ribbon cable by a red line down one side of the cable and a small triangle in the plastic socket.

Figure 2-5. Sourcery Probe Personal

Note

There are many different standard debug connectors. Target Adapter Modules are available with certain probe models to support alternate debug connector types. (See Table 2-1.) It is very important to check the debug connector details of your target board when selecting the right adapter module. See the *Mentor Embedded Sourcery Probe Personal Target Connections* application note.

4. Gently (but firmly) press the probe connector onto the target debug port header.
5. Reconnect the USB cable to the probe.
6. Apply power to your target.

Probe Configuration Settings

Probe configuration settings like JTAG clock frequency must be adapted to meet the requirements of the target hardware. Refer to the *Mentor Embedded Sourcery Probe User's Manual* for information on how to configure the probe settings.

Note

Due to variations in the design of target systems, it is not possible to guarantee that all systems can be operated at the maximum debug port clock rates. These variations include circuit impedances, trace lengths, and signal terminations. You might need to select a lower clock rate to get reliable operation.

Chapter 3
Hardware Specifications

This section provides hardware specifications for the Sourcery Probe Personal.

Connectors and LEDs

Figure 3-1 and Figure 3-2 show the various LEDs and connectors of the probe device.

Figure 3-1. Sourcery Probe Personal - Top View

Figure 3-2. Sourcery Probe Personal - End View Showing USB Connector

These topics explain the various LEDs and connectors on the probe device:

- Run/Pause Indicator
- Transmit/Receive Indicator (TX/RX)
- USB Connector
- Debug Port Connector

Run/Pause Indicator

The probe hardware has a status LED labeled *Run/Pause*. It indicates the state of execution on the target device:

- The LED is initially unlit and remains so until the debugger connects to the probe.
- The LED is green when the target is running.
- The LED is red when the target is paused.
- The LED is orange when the target has some processor cores running while others are paused.

Transmit/Receive Indicator

The transmit/receive (labeled TX/RX) LED indicates the state of the USB interface:

- The LED flashes red when the probe is booting up.
- The LED flashes green when the probe is ready for use.
- The LED flashes orange when data is being transferred to or from the host.
- The LED is off if the probe is disabled or disconnected.

Note

When the probe is powered on, it can perform a brief self-test that displays a test pattern on both LEDs. When the self-test completes, it reverts to the behavior described in this section.

USB Connector

The USB interface consists of a mini-USB connector that connects directly to the provided USB cable.

Debug Port Connector

The debug connector consists of a 5.5 inch ribbon cable with the appropriate debug connector attached. The ribbon cable has a red stripe down one side to indicate the location of pin 1.

Note

There are many different standard debug connectors. Target Adapter Modules are available to support alternate debug connector types. It is very important to check the debug connector details of your target board when selecting the right adapter module. See the *Mentor Embedded Sourcery Probe Target Connection* application note and Table 2-1.

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 applications note here: https://sourcery.mentor.com/GNUToolchain/kbentry247.

Electrical Characteristics

The probe has a minimal effect on the target processor and target electrical characteristics. Use care to design the target to accommodate the small signal delays associated with in-circuit emulators or other test equipment.

The probe automatically supports target signal levels from 1.8V to 3.3V.

Physical Considerations

Although the probe was designed to be small, it might not physically fit in all target systems.

Contact SupportNet if you have special considerations that require review.

Table 3-1 shows the physical characteristics of the probe.

Table 3-1. Sourcery Probe Personal Physical Characteristics

Current Consumption	
Sourcery Probe Personal current consumption from USB cable	< 200 mA
Sourcery Probe Personal current consumption from target	< 50 µ A
Physical dimensions	
Sourcery Probe Personal dimensions	5.375" x 3.25" x 1.250" (13.63 cm x 8.26 cm x 3.175 cm)
Target connector ribbon length	5” +/- 0.5” (12.7 +/- 1.25 cm)

Table 3-1. Sourcery Probe Personal Physical Characteristics (cont.)

Current Consumption	
Target connector dimensions: Height Depth JTAG/COP width DPI width ARM® JTAG width MIPS	- 0.38" (0.97 cm) 0.20" (0.51 cm) 0.98" (2.49 cm) 0.68" (1.72 cm) 1.18" (3.00 cm) 0.88" (2.24 cm)
TAM MIPS14-J12 • MIPS-14: 14 pin header HTST-107-04-L-D- RA • J-12: 12 pin female socket SSW-106-02-S-D-RA	L x W x H: 1.0"x0.36" x 0.5"
TAM ARM20-ARM14 • ARM20: 20 pin header Part# HTST-110-04-L-D_RA • ARM14: 14pin female socket Part#ASP-141004-01	0.6'x0.20"x 0.5" 1.3x0.36"x0.5"
TAM ARM20-TX14 • ARM20: 20 pin header Part# HTST-110-04-L-D_RA • TX14: 14pin socket ASP-141004-01	 0.72" x0.26"x0.6"
TAM ARM20-TX20 • ARM20: 20 pin header Part# HTST-110-04-L-D_RA • TX20: ASP-145056-01	1.3"x0.36"x0.5" 0.72" x0.26"x0.6"
dpi-10 • 10 pin header	 1.3"x0.36"x0.5"
cop-16 • 16pin header	 0.5"x0.2"x0.45" 0.5" x 0.3" x0.45" 0.8"x0.3"x 0.45"

Chapter 4
Hardware Warranty and Servicing

This chapter provides you with the hardware warranty and service information on the Sourcery Probe Personal device.

Sourcery Probe Personal Hardware Warranty

Sourcery Probe Personal hardware is sold with Mentor Graphics' standard 90-day warranty against defects in materials or workmanship. The warranty period is 90 days starting on the 15th day after delivery or upon installation, whichever occurs first. The customer must notify Mentor Graphics in writing of any nonconformity within the warranty period. If the probe fails within the 90-day warranty period, Mentor Graphics will replace the unit at no charge.

Note

There are no user-serviceable parts on the probe. Contact Mentor Graphics technical support (supportnet.mentor.com) for assistance if damage or defects are suspected.

Cleaning the Probe

Keep the probe clean and free from dust. This section describes the steps required to clean this device.

Procedure

1. Remove the power supply connection.
2. Use a dry, non-abrasive cloth to wipe outer surfaces of the chassis and cables.

Appendix A
USB Network Details

This appendix describes the Sourcery Probe Personal network ports.

Note

This section does not apply to Sourcery Probe models for PowerPC because they do not use RNDIS and CDC/Ethernet.

Sourcery Probe Personal Network Ports

The Sourcery Probe Personal models for ARM and MIPS use remote RNDIS for TCP/IP communication to Windows over USB, and CDC/Ethernet for TCP/IP communication to Linux over USB. Specifically, the following network ports are used:

Table A-1. Sourcery Probe Personal Network Ports

Port Number	Description
19119	Used by ARM and MIPS debuggers for probe configuration
51410	Used by ARM and MIPS debuggers to control the probe

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www.mentor.com/eshla

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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;

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7. **Third Party and Open Source Software.** Products may contain Open Source Software or code distributed under a proprietary third party license agreement. Please see applicable Products documentation, including but not limited to license notice files, header files or source code for further details. Please see the applicable Open Source Software license(s) for additional rights and obligations governing your use and distribution of Open Source Software. Customer agrees that it shall not subject any Product provided by Mentor Graphics under this Agreement to any Open Source Software license that does not otherwise apply to such Product. In the event of conflict between the terms of this Agreement, any Addenda and an applicable OSS or proprietary third party agreement, the OSS or proprietary third party agreement will control solely with respect to the OSS or proprietary third party software component. The provisions of this Section 7 shall survive the termination of this Agreement.

8. **Limited Warranty.**

   8.1. Mentor Graphics warrants that during the warranty period its standard, generally supported Products, when properly installed, will substantially conform to the functional specifications set forth in the applicable user manual and/or specification. Mentor Graphics does not warrant that Products will meet Customer's requirements or that operation of Products will be uninterrupted or error free. The warranty period is 90 days starting on the 15th day after delivery or upon installation, whichever first occurs. Customer must notify Mentor Graphics in writing of any nonconformity within the warranty period. For the avoidance of doubt, this warranty applies only to the initial shipment of Products under an Order and does not renew or reset, for example, with the delivery of (a) Software updates or (b) authorization codes. This warranty shall not be valid if Products have been subject to misuse, unauthorized modification or improper installation. MENTOR GRAPHICS' ENTIRE LIABILITY AND CUSTOMER'S EXCLUSIVE REMEDY SHALL BE, AT MENTOR GRAPHICS' OPTION, EITHER (A) REFUND OF THE PRICE PAID UPON RETURN OF THE PRODUCTS TO MENTOR GRAPHICS OR (B) MODIFICATION OR REPLACEMENT OF THE PRODUCTS THAT DO NOT MEET THIS LIMITED WARRANTY, PROVIDED CUSTOMER HAS OTHERWISE COMPLIED WITH THIS AGREEMENT. MENTOR GRAPHICS MAKES NO WARRANTIES WITH RESPECT TO: (A) SERVICES; OR (B) PRODUCTS PROVIDED AT NO CHARGE, WHICH ARE PROVIDED "AS IS" UNLESS OTHERWISE AGREED IN WRITING.

   8.2. THE WARRANTIES SET FORTH IN THIS SECTION 8 ARE EXCLUSIVE TO CUSTOMER AND DO NOT APPLY TO ANY END-USER. NEITHER MENTOR GRAPHICS NOR ITS LICENSORS MAKE ANY OTHER WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, WITH RESPECT TO PRODUCTS OR OTHER MATERIAL PROVIDED UNDER THIS AGREEMENT. MENTOR GRAPHICS AND ITS LICENSORS SPECIFICALLY DISCLAIM ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF INTELLECTUAL PROPERTY.

9. **LIMITATION OF LIABILITY.** EXCEPT WHERE THIS EXCLUSION OR RESTRICTION OF LIABILITY WOULD BE VOID OR INEFFECTIVE UNDER APPLICABLE LAW, AND EXCEPT FOR EITHER PARTY'S BREACH OF ITS CONFIDENTIALITY OBLIGATIONS, CUSTOMER'S BREACH OF LICENSING TERMS OR CUSTOMER'S OBLIGATIONS UNDER SECTION 10, IN NO EVENT SHALL: (A) EITHER PARTY OR ITS RESPECTIVE LICENSORS BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS) WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY, EVEN IF SUCH PARTY OR ITS LICENSORS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES; AND (B) EITHER PARTY OR ITS RESPECTIVE LICENSORS' LIABILITY UNDER THIS AGREEMENT, INCLUDING, FOR THE AVOIDANCE OF DOUBT, LIABILITY FOR ATTORNEYS' FEES OR COSTS, EXCEED THE GREATER OF THE FEES PAID OR OWING TO MENTOR GRAPHICS FOR THE PRODUCT OR SERVICE GIVING RISE TO THE CLAIM OR $500,000 (FIVE HUNDRED THOUSAND U.S. DOLLARS). NOTWITHSTANDING THE FOREGOING, IN THE CASE WHERE NO AMOUNT WAS PAID, MENTOR GRAPHICS AND ITS LICENSORS SHALL HAVE NO LIABILITY FOR ANY DAMAGES WHATSOEVER. THE PROVISIONS OF THIS SECTION 9 SHALL SURVIVE THE TERMINATION OF THIS AGREEMENT.

10. **Hazardous Applications.**

   10.1. Customer agrees that Mentor Graphics has no control over Customer's testing or the specific applications and use that Customer will make of Products. Mentor Graphics Products are not specifically designed for use in the operation of nuclear facilities, aircraft navigation or communications systems, air traffic control, life support systems, medical devices or other applications in which the failure of Mentor Graphics Products could lead to death, personal injury, or severe physical or environmental damage ("Hazardous Applications").

   10.2. CUSTOMER ACKNOWLEDGES IT IS SOLELY RESPONSIBLE FOR TESTING PRODUCTS USED IN HAZARDOUS APPLICATIONS AND SHALL BE SOLELY LIABLE FOR ANY DAMAGES RESULTING FROM SUCH USE. NEITHER MENTOR GRAPHICS NOR ITS LICENSORS SHALL BE LIABLE FOR ANY DAMAGES RESULTING FROM OR IN CONNECTION WITH THE USE OF PRODUCTS IN ANY HAZARDOUS APPLICATIONS.

   10.3. CUSTOMER AGREES TO INDEMNIFY AND HOLD HARMLESS MENTOR GRAPHICS AND ITS LICENSORS FROM ANY CLAIMS, LOSS, COST, DAMAGE, EXPENSE OR LIABILITY, INCLUDING REASONABLE ATTORNEYS' FEES, ARISING OUT OF OR IN CONNECTION WITH THE USE OF PRODUCTS AS DESCRIBED IN SECTION 10.1.

   10.4. THE PROVISIONS OF THIS SECTION 10 SHALL SURVIVE THE TERMINATION OF THIS AGREEMENT.

11. **Infringement.**

11.1. Mentor Graphics will defend or settle, at its option and expense, any action brought against Customer in the United States, Canada, Japan, or member state of the European Union which alleges that any standard, generally supported Product acquired by Customer hereunder infringes a patent or copyright or misappropriates a trade secret in such jurisdiction. Mentor Graphics will pay any costs and damages finally awarded against Customer that are attributable to the action. Customer understands and agrees that as conditions to Mentor Graphics' obligations under this section Customer must: (a) notify Mentor Graphics promptly in writing of the action; (b) provide Mentor Graphics all reasonable information and assistance to settle or defend the action; and (c) grant Mentor Graphics sole authority and control of the defense or settlement of the action.

11.2. If a claim is made under Subsection 11.1 Mentor Graphics may, at its option and expense, and in addition to its obligations under Section 11.1, either (a) replace or modify the Product so that it becomes noninfringing; or (b) procure for Customer the right to continue using the Product. If Mentor Graphics determines that neither of those alternatives is financially practical or otherwise reasonably available, Mentor Graphics may require the return of the Product and refund to Customer any purchase price or license fee(s) paid.

11.3. Mentor Graphics has no liability to Customer if the claim is based upon: (a) the combination of the Product with any product not furnished by Mentor Graphics, where the Product itself is not infringing; (b) the modification of the Product other than by Mentor Graphics or as directed by Mentor Graphics, where the unmodified Product would not infringe; (c) the use of the infringing Product when Mentor Graphics has provided Customer with a current unaltered release of a non-infringing Product of substantially similar functionality in accordance with Subsection 11.2(a); (d) the use of the Product as part of an infringing process; (e) a product that Customer makes, uses, or sells, where the Product itself is not infringing; (f) any Product provided at no charge; (g) any software provided by Mentor Graphics' licensors who do not provide such indemnification to Mentor Graphics' customers; (h) Open Source Software, except to the extent that the infringement is directly caused by Mentor Graphics' modifications to such Open Source Software; or (i) infringement by Customer that is deemed willful. In the case of (i), Customer shall reimburse Mentor Graphics for its reasonable attorneys' fees and other costs related to the action.

11.4. THIS SECTION 11 IS SUBJECT TO SECTION 9 ABOVE AND STATES: (A) THE ENTIRE LIABILITY OF MENTOR GRAPHICS AND ITS LICENSORS AND (B) CUSTOMER'S SOLE AND EXCLUSIVE REMEDY, WITH RESPECT TO ANY ALLEGED PATENT OR COPYRIGHT INFRINGEMENT OR TRADE SECRET MISAPPROPRIATION BY ANY PRODUCT PROVIDED UNDER THIS AGREEMENT.

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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