Agilent E5900B/E5901B

For Safety information, Warranties, and Regulatory information, see
the pages behind the index.

Supplement to Emulation and Solution User's Guides

# Agilent Technologies E5900B Emulation Probe—At a Glance

> After the *User's Guide* for your emulator was written, new versions of the emulation probe, emulation module, emulation migration, and emulation solution have been released. Use this manual along with the processor-specific emulation or solution *User's Guide*.

This manual describes how to set up several emulation products: an emulation probe, an emulation module, an emulation migration, and an emulation solution.

The emulation probe can be controlled by a debugger on a host computer or by the Emulation Control Interface on an Agilent 16700-series logic analysis system.
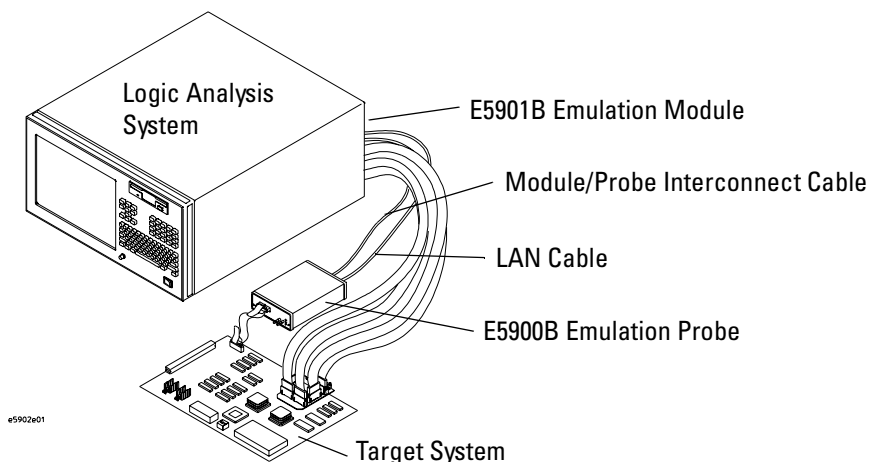
E5900B Emulation Probe

The emulation probe communicates with a host computer or logic analysis system via LAN.

Host
Computer

LAN Cable

E5900B
Emulation Probe

Target System
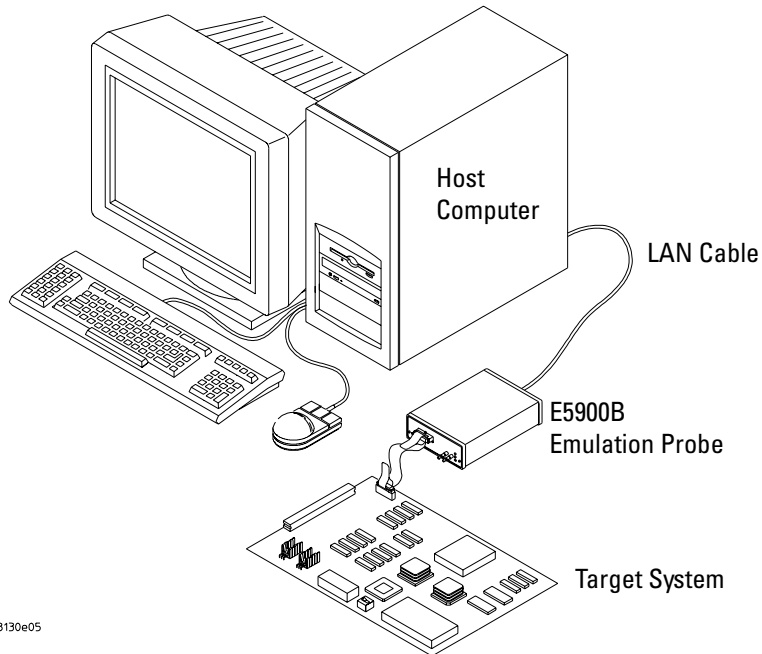
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E5901B Emulation Module

The Agilent E5901B emulation module plugs into your Agilent 16700-series logic analysis system frame. It provides power, cross triggering, and limited communication for the E5900B emulation probe through the module/probe interconnect cable. The logic analysis system communicates with the target system through the LAN connection to the E5900B emulation probe.

The E5901B emulation module must be used with an E5900B emulation probe.

This is a major change from the E5901A (16610A) emulation module, which could be connected directly to a target system through a target interface module (TIM).

E5902B Emulation Migration

The emulation migration includes the parts needed to use an emulation probe for a new processor family.

E9xxxB Emulation Solution

The emulation solution now includes an E5900B emulation probe and an E5901B emulation module. This manual supersedes the information about the emulation module in the *Solution User's Guide*. You may disregard the processor-specific *Emulation User's Guide*.

When To Use This Book

After the *User's Guide* for your emulator was written, new versions of the emulation probe, emulation module, emulation migration, and emulation solution have been released. Use this manual along with the processor-specific emulation or solution *User's Guide*.

Task	This book	Emulation or solution User's Guide	Setup Assistant
Designing your target system to be compatible with the emulator		✓	
Connecting and configuring an analysis probe		✓ if needed	✓ best
Connecting the emulation probe to your logic analysis sytem or PC	✓		
Installing an emulation module	✓		
Installing an emulation migration	✓		
Connecting the emulator to your target system	✓ over-view	✓ if needed	✓ best
Configuring the emulator		✓	
Setting up a debugger to work with your emulator	✓	✓	
Troubleshooting the emulator	✓	✓	

The Setup Assistant is an online tool for connecting and configuring your logic analysis system for microprocessor and bus analysis. The Setup Assistant is available on Agilent Technologies 16700-series logic analysis systems.

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1

Overview

Overview

This chapter describes:

- Setup flowchart
- Equipment used with the emulation probe
- Connection sequences for the emulation probe
- Equipment used with the emulation module
- Additional information sources

Setup Flowchart

```
┌─────────────────────┐   ┌─────────────────────┐   ┌─────────────────────┐
│  Emulation module   │   │ Emulation migration │   │   Emulation probe   │
│     HP E5901B       │   │     HP E5902B       │   │     HP E5900B       │
└─────────┬───────────┘   └──────────┬──────────┘   └──────────┬──────────┘
          │                          │                         │
          ▼                          ▼                         ▼
┌──────────────────┐      ┌──────────────────┐      ┌──────────────────┐
│ Install emulation│      │ Install new target│     │ Connect power    │
│     module       │      │ board adapter and │     │     supply       │
│ (if necessary)   │      │ front panel in   │     └────────┬─────────┘
└────────┬─────────┘      │ emulation probe  │              │
         │                └────────┬─────────┘              ▼
         ▼                         │               ┌──────────────────┐
┌──────────────────┐               ▼               │ Connect to LAN   │
│ Connect emulation│         ◇ Migrating ◇         └────────┬─────────┘
│ probe to emulation│  Module╱ a module or ╲Probe           │
│     module       │        ╲  a probe?   ╱                 │
└────────┬─────────┘          ◇─────────◇                   │
         │                                                   │
         ▼                                                   │
┌──────────────────┐                                         │
│ Connect emulation│                                         │
│ probe to LAN     │                                         │
└──────────────────┘                                         │
```

Install emulation module (if necessary)

Connect emulation probe to emulation module

Connect emulation probe to LAN

Install new target board adapter and front panel in emulation probe

Migrating a module or a probe? — Module / Probe

Connect power supply

Connect to LAN

Install software on logic analysis system

Update emulator firmware (if necessary)

Connect emulator to target system or analysis probe

Installation done. Begin making measurements.

E8130F01.VSD

Agilent E5900B Emulation Probe

Equipment supplied

- Emulation probe.
- 12V power supply for the emulation probe.
- Power cord.
- Ferrite (reduces electromagnetic interference on power cord).
- Serial cable.
- RJ12-to-DB9 adapter.
- Ribbon cable (connects the emulation probe to your target system).
- Firmware for the emulation probe on 3.5-inch disks. (Included only for E5900B options which need several firmware versions to support different target processors.)
- This *User's Guide Update*.
- An *Emulation User's Guide* for your processor.
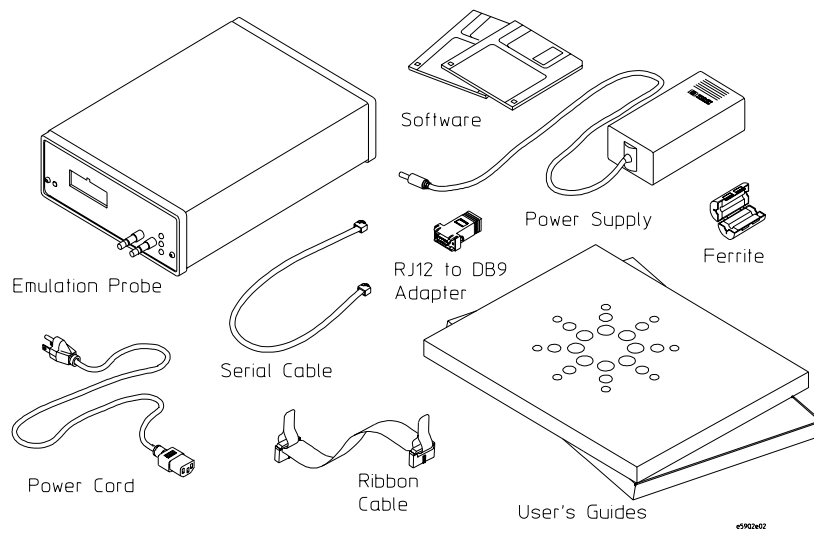
Minimum equipment required

The following equipment is required to use the emulation probe:

- A method for connecting the emulation probe to the target system. The target system must have an appropriate JTAG or BDM debug port connector. If your target system does not have a debug port connector, you may be able to use the debug port connector which is built into some analysis probes. The target system must meet the criteria on page 49.

- A host computer, such as a PC or workstation. You can also connect the emulation probe to an Agilent 16700-series logic analysis system.

- A LAN (local area network) to connect the emulation probe to the host computer or logic analysis system.

- A user interface on the host computer, such as a high-level source debugger or the logic analysis system's Emulation Control Interface.

To connect the emulation probe to a power source

The emulation probe is shipped from the factory with a power supply and cord appropriate for your country. If the cord you received is not appropriate for your electrical power outlet type, contact your Agilent Technologies sales and service office.

WARNING: ⚠️

Use only the supplied Agilent F1044B power supply and cord. Failure to use the proper power supply could result in electric shock.

CAUTION:

Use only the supplied Agilent power supply and cord. Failure to use the proper power supply could result in equipment damage.

1 Install the ferrite on the 12V power cord, near the end which plugs into the emulation probe.

2 Connect the power cord to the power supply and to a socket outlet.
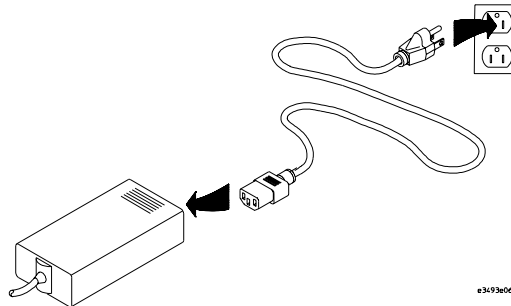
3 Connect the 12V power cord to the back of the emulation probe.

Ferrite
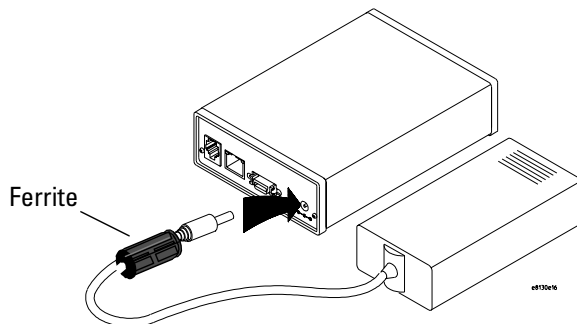
4 Turn on the emulation probe power switch.

Connection Sequence

Disconnect power from the target system, emulation probe, and logic analyzer before you make or break connections.

1 Connect the emulation probe to a LAN (page 25).

2 Connect the emulation probe to your target system (page 47).

3 Configure the emulation probe (See your processor-specific emulation or solution *User's Guide*).

To power on the system

With all components connected, power on your system as follows:

1 Logic analyzer, if you are using one.

2 Emulation probe.

3 Your target system.

To power off the system

Power off your system as follows:

1 Your target system.

2 Emulation probe.

3 Logic analyzer, if you are using one.

Agilent E5901B Emulation Module

Equipment supplied

The equipment supplied with your emulation module includes:

- All of the parts listed for the Agilent E5900B emulation probe (page 14).
- Agilent E5901B emulation module. If you ordered an emulation module as part of your Agilent 16700-series logic analysis system, it is already installed in the frame.
- Module/probe interconnect cable (connected to the emulation module).
- Serial cable.
- RJ12-to-DB9 adapter.
- Firmware for the emulation probe and software for the Emulation Control Interface on a CD-ROM.
- Torx T-10 and T-15 screwdrivers.
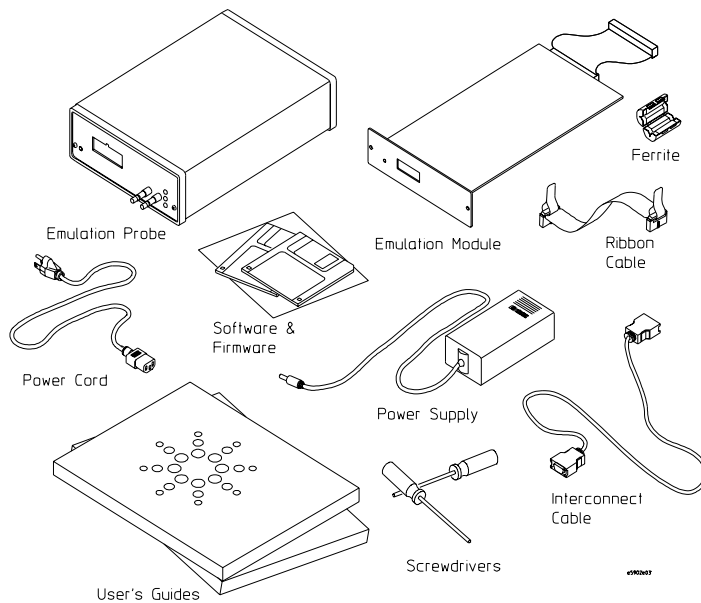
Minimum equipment required

The following equipment is required to use the emulation module:

- A method for connecting the emulation probe to the target system. The target system must have an appropriate JTAG or BDM debug port connector. If your target system does not have a debug port connector, you may be able to use the debug port connector which is built into some analysis probes. The target system must meet the criteria on page 49.
- An Agilent 16700-series logic analysis system.
- A user interface, such as a high-level source debugger or the logic analysis system's Emulation Control Interface.

Agilent E5902B Emulation Migration

Equipment supplied

The equipment supplied with your emulation migration includes:

- A target board adapter for the E5900B emulation probe.
- Firmware for the emulation probe and updated software for the Emulation Control Interface on a CD-ROM (use if you have a 16700-series logic analysis system).
- Firmware for the emulation probe on floppy disks (use if you do not have a logic analysis system).
- Ribbon cable (connects the emulation probe to your target system).
- Front panel for the emulation probe.
- Tool kit including a 1/4 inch wrench, a #1 Phillips screw driver, and a Torx T-10 screwdriver.
- This *User's Guide Update*.
- An *Emulation User's Guide* for your processor.

Target Board Adapter

Software & Firmware

Toolkit

Front Panel

Ribbon Cable

User's Guides

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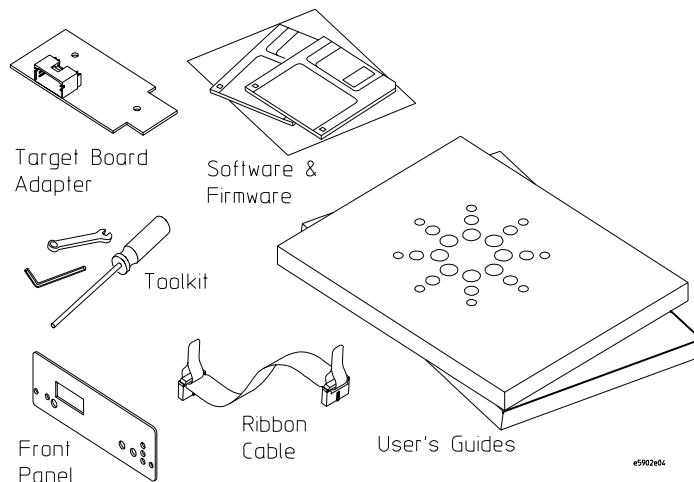
Minimum equipment required

The following equipment is required to use the emulation migration:

- An Agilent E5900B emulation probe.
- A method for connecting the emulation probe to the target system. The target system must have an appropriate JTAG or BDM debug port connector. If your target system does not have a debug port connector, you may be able to use the debug port connector which is built into some analysis probes. The target system must meet the criteria on page 49.
- A host computer such as a PC, a workstation, or an Agilent 16700-series logic analysis system.
- A user interface, such as a high-level source debugger or the logic analysis system's Emulation Control Interface.

E9xxxB Emulation Solution

Equipment supplied

The equipment supplied with your emulation solution includes:

- All of the parts listed for the Agilent E5901B emulation module (page 18), including an Agilent E5900B emulation probe.
- A CD-ROM which includes the inverse assembler software.
- An analysis probe and accessories. (Optional, depending on the product and option number you ordered. Analysis probes are not available for some processors.)
- Three manuals:
  - This manual, which contains the information you need to install the emulation module and emulation probe.
  - A *Solution User's Guide*, which contains the information you need to install and use the inverse assembler and analysis probe.
  - An *Emulation User's Guide*, which you will not need to use.

Installing Software on a Logic Analysis System

For instructions on how to install the software necessary to use the emulation probe with your 16700-series logic analysis system, see the "To install the software from CD-ROM" section in your emulation or solution *User's Guide*.

If you ordered an emulation module or emulation solution with your new Agilent 16700-series logic analysis system, all of the necessary software is pre-installed.

Additional Information Sources

Additional or updated information can be found in the following places:

Newer editions of this manual may be available. Contact your local Agilent Technologies representative.

If you have an analysis probe, the instructions for connecting the probe to your target microprocessor are in the analysis probe documentation. The ***Solutions User's Guide*** for your microprocessor provides information on using the analysis probe and emulation module together.

Application notes may be available from your local Agilent representative or on the World Wide Web at:

http://www.agilent.com/find/logicanalyzer

If you have an Agilent 16700-series logic analysis system, the **online help** for the Emulation Control Interface has additional information on using the emulation probe.

The **measurement examples** include valuable tips for making emulation and analysis measurements. You can find the measurement examples under the system help in your Agilent 16700-series logic analysis system.

2

Connecting the Emulation Probe to a LAN

> You need to set up a LAN connection for the E5900B emulation probe, even if you are using an E5901B emulation module.

The emulation probe has an IEEE 802.3 Type 10/100Base-TX LAN connector.

The emulation probe is compatible with both 10 Mbps (10BASE-T) and 100 Mbps (100BASE-TX) twisted-pair ethernet LANs. The probe automatically negotiates the data rate for the LAN it is connected to.

Before the Emulation Control Interface can connect to the emulation probe, the probe's LAN parameters (that is, its IP address, gateway address, and subnet mask) must be set up. The IP address and other network parameters are stored in nonvolatile memory within the emulation probe.

See Also   For information on connecting a debugger to the emulation probe, see Chapter 6, "Using the Emulator with a Debugger," beginning on page 59.

To choose a point-to-point or site LAN connection

You can connect the emulation probe to your site LAN, or you can create an isolated network between a 16700-series logic analysis system and the emulation probe using a point-to-point connection.

A point-to-point connection is especially useful when you have a 16700-series logic analysis system, and:

- You do not have a site LAN, or
- The measurement setup will be on a cart, or
- You do not want to connect the measurement setup to a LAN because of security reasons.

Advantages of a point-to-point connection:

- If you have an E5901B emulation module, all LAN parameters will be set automatically.
- No need for a system administrator to assign IP addresses. (You can use any IP address for the emulation probe, and it will not conflict with other

devices on the LAN.)
- The logic analysis system cannot be accessed across the network (required in some high-security environments).
- Can be used when a site LAN is not available.

Disadvantages of a point-to-point connection:

- Neither logic analysis system nor the emulation probe are connected to a site LAN.
- A special "crossover" LAN cable must be used.

  If you have an emulation module, use the LAN crossover cable supplied with the emulation module (Agilent part number 5061-7341). If you do not have an emulation module, use a Category 3 (for 10BASE-T) or Category 5 (for 100BASE-TX) crossover cable.

- The emulation probe must be near the logic analysis system. The length of the crossover cable supplied with emulation modules is 1.5m (5 feet).
- Remote file systems cannot be mounted for access to source code files, symbol files, or executable files.
- The emulation probe cannot be controlled by a debugger on a host computer.

Connection Method	Go to Page
Site LAN connection	page 28
Point-to-point	page 36

Connecting the Emulation Probe to a Site LAN

1 Connect the LAN cable to the connector on the emulation probe.

Be sure to use the appropriate Category 3 or Category 5 cable for your LAN. Do not use the LAN cable supplied with the emulation probe—it is a crossover cable used for point-to-point connections only.

2 Find out the IP address and other LAN parameters to use for the emulation probe. See "To obtain an IP address" on page 29.

3 Decide how you want to configure the LAN parameters:

If you have this equipment..	Use this procedure
Emulation probe only	"To configure LAN parameters using a serial connection" on page 30, or "To configure LAN parameters using DHCP" on page 33
Emulation probe and a logic analysis system without an E5901B emulation module	"To configure LAN parameters using a logic analysis system without an emulation module" on page 34
Emulation probe and a logic analysis system with an E5901B emulation module	"To configure LAN parameters using a logic analysis system with an emulation module" on page 35

4 Verify that your emulation probe is now active and on the network. See "To verify LAN communications" on page 38.

To obtain an IP address

1 Obtain the following information from your local network administrator
or system administrator:

- An IP address for the emulation probe.

    You can also use a "LAN name" for the emulation probe, but you must
    configure it using the integer dot notation (such as 127.0.0.1).

- The gateway address.

    The gateway address is an IP address and is entered in integer dot
    notation. The default gateway address is 0.0.0.0, which allows connections
    only on the local network or subnet. If connections are to be made to
    workstations on other networks or subnets, this address must be set to the
    address of the gateway machine.

- The subnet mask.

    A subnet mask blocks out part of an IP address so that the networking
    software can determine whether the destination host is on a local or
    remote network. It is usually represented as decimal numbers separated
    by periods; for example, 255.255.248.0.

2 Find out whether port numbers 6470 and 6471 are already in use on
your network and if that use constitutes a conflict.

The host computer interfaces communicate with the emulation probe through
two TCP service ports. The default base port number is 6470. The second port
has the next higher number (default 6471).

In almost all cases, the default numbers (6470, 6471) can be used without
change. If necessary the base port number can be changed if the port numbers
conflict with some other product on your network.

To change the port numbers, see page 32. If you have already set the IP
address, you can use a telnet connection instead of a serial connection to
connect to the emulation probe.

To configure LAN parameters using a serial connection

The E5900B emulation probe has a 9600 baud RS-232 serial interface with an RJ12 connector.

The emulation probe is shipped with a serial cable (with RJ-12 connectors on both ends, with 6-wire straight-through connections) and an adapter (female RJ-12 to female 9-pin D subminiature). The adapter plugs into the 9-pin serial port found on most PCs.

Serial connections on a workstation

If you are using a UNIX workstation as the host computer, you need to use a serial device file. If a serial device file does not already exist on your host, you need to create one. Once it exists, you need to ensure that it has the appropriate permissions so that you can access it. See the system documentation for your workstation for help with setting up a serial device.

Serial connections on a PC

Serial connections are supported on PCs.

If you are using a PC as the host computer, you do not need to set up any special files.

1 Connect the serial cable from the host computer to the emulation probe.

Use the DB9-to-RJ12 adapter and the serial cable supplied with the emulation probe.

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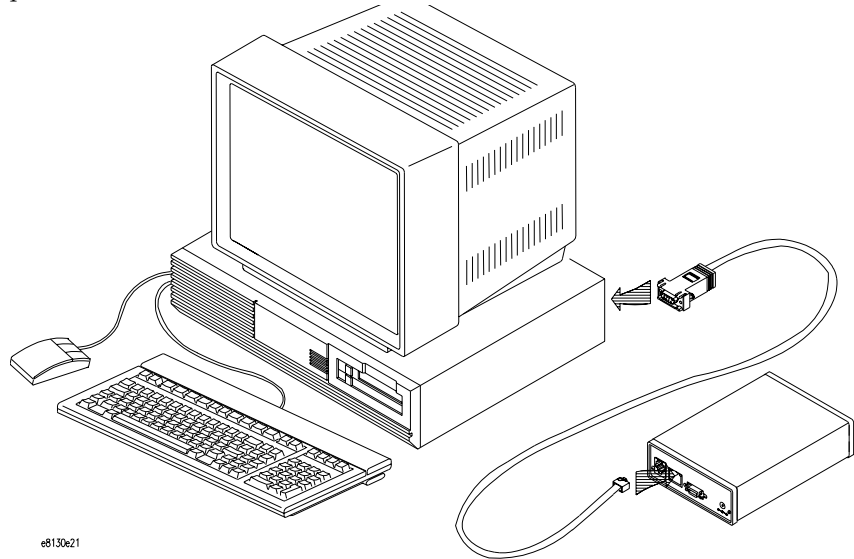
2 Start a terminal emulator program on the host computer.

If you are using a PC, the HyperTerminal application in Microsoft Windows will work fine.

If you are using a UNIX workstation, you can use a terminal emulator such as cu or kermit.

3 Configure the terminal emulator program for:

- Communication rate: 9600 baud
- Bits: 8
- Parity: none
- Stop bits: 1
- Flow control: none

4 Turn on power to the emulation probe.

When the emulation probe powers up, it sends a version message to the serial port, followed by a prompt.

5 Press the Return or Enter key a few times.

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You should see a prompt such as "p>" or "R>".

For information about the commands you can use, enter ? or help at the prompt.

6 Display the current LAN configuration values by entering the **lan** command:

```
R> lan
lan is enabled
   Link Status is UP
   100BaseTX
   lan -i 15.5.24.116
   lan -g 15.5.23.1
   lan -s 255.255.248.0
   lan -p 6470
   Ethernet Address : 08000909BAC1
R>
```

The Ethernet address, also known as the link level address, is preassigned at the factory, and is printed on a label on the emulation probe.

7 Enter the following command:

```
lan -i <internet> [-g <gateway>] [-p <port>] [-s
<subnet>]
```

The lan command parameters are:

-i <internet> The IP address which you obtained from your network administrator.

-g <gateway> The gateway address. Setting the gateway address allows access outside your local network or subnet.

-s <subnet> This changes the subnet mask.

-p <port> This changes the base TCP service port number, normally 6470.

Do not change the default port numbers (6470, 6471) unless they conflict with some other product on your network. The numbers must be greater than 1024. If you change the base port, enter the new value in the configuration of your debugger (and, for UNIX workstations, in the /etc/services file).

8 Cycle power on the emulation probe.

The IP address and any other LAN parameters you change are stored in nonvolatile memory and will take effect when the emulation probe is powered

off and back on again.

Example

To assign an IP address of 192.6.94.2 to the emulation probe, enter the following command:

```
R>lan -i 192.6.94.2
```

Cycle power on the emulation probe so that the new address will take effect.

---

9 Verify your emulation probe is now active and on the network. See "Verifying LAN Communications" on page 38.

Once you have set a valid IP address, you can use the telnet utility to connect to the emulation probe, and use the lan command to change LAN parameters.

To configure LAN parameters using DHCP

If there is a DHCP server on your network which responds to BOOTP requests and supports "static allocation" of IP addresses, it can be used to set the trace port analyzer's LAN parameters.

1 Ask your system administrator to set up an IP address for the emulation probe on the DHCP server.

You will need to supply the link-level address of the emulation probe.

The link-level address (LLA) is printed on a label above the LAN connector on the emulation probe. This address is configured in each emulation probe shipped from the factory and cannot be changed.

2 Connect the LAN cable to the connector on the emulation probe.

3 Cycle power on the emulation probe by powering it off then on again.

4 Wait at least 20 seconds for the emulation probe to receive the IP address from the DHCP server.

5 Verify that your emulation probe is now active and on the network. See "To verify LAN communications" on page 38.

What is DHCP?

DHCP (Dynamic Host Configuration Protocol) allows clients to obtain LAN parameters automatically from a server.

How does the emulation probe use DHCP?

The trace port analyzer uses "static allocation" (sometimes called "manual allocation") to obtain a permanent IP address. Every time the trace port analyzer is turned on, it sends out a BOOTP request packet. If the DHCP server on the network responds to BOOTP requests and has been configured to reply to the trace port analyzer's link-level address, it will respond with the IP address and other LAN parameters.

The trace port analyzer does not support "automatic allocation", which permanently allocates IP addresses from a pool of addresses.

Nor does the trace port analyzer support "dynamic allocation" of IP addresses—it does not track lease duration and request a new IP address when the lease is about to expire.

How does DHCP interact with other methods of setting LAN parameters?

Every time the trace port analyzer is turned ON, it sends out a BOOTP request packet (even if the LAN parameters have already been configured). As long as the DHCP server is configured to reply to BOOTP requests from the trace port analyzer's link-level address, it will respond with the IP address and other LAN parameters.

To configure LAN parameters using a logic analysis system without an emulation module

1 Connect the LAN cable to the connector on the emulation probe.

2 In the logic analysis system interface, open the Workspace window.

3 Drag the emulation probe tool from the toolbox to the workspace.

4 From the emulation probe icon, select Init Probe LAN Addresses....

5 Enter the link-level address of the probe you wish to set up.

6 Enter the internet address, gateway IP and subnet mask in the appropriate fields.

7 Select OK.

If "ERROR - no response from emulation probe" is displayed, check that the emulation probe is properly connected to the LAN. Then try selecting OK again.

If no error message is displayed, the internet address and other network parameters will be stored in nonvolatile memory when power is cycled.

8 Cycle power on the emulation probe by powering it off then on again.

To configure LAN parameters using a logic analysis system with an emulation module

1 Connect the emulation module to the emulation probe. (See page 45.)

2 Connect the LAN cable to the connector on the emulation probe.

3 Cycle power on the emulation probe by powering it off then on again.

4 Wait at least 20 seconds for the emulation probe to recognize the LAN.

5 From the E5901B emulation module icon, select Modify Interconnected Probe LAN Addresses....

6 Select Read Probe Addresses to read the current settings.

7 Enter the internet address, gateway IP and subnet mask in the appropriate fields.

8 Select OK.

9 Cycle power on the emulation probe. The new addresses will take effect after you do this.

Setting up a Point-to-Point Connection

A point-to-point connection creates an isolated network with only two nodes—the logic analysis system and the emulation probe.

There are two ways to set up the connection:

If you have this equipment..	Use this procedure
Emulation probe and a logic analysis system *with* an E5901B emulation module	"To set up a point-to-point connection with an emulation module" on page 36
Emulation probe and a logic analysis system *without* an E5901B emulation module	"To set up a point-to-point connection without an emulation module" on page 37

To set up a point-to-point connection with an emulation module

1 Connect the emulation module to the emulation probe (page 45).

2 Connect the crossover LAN cable between the logic analysis system and the emulation probe.

3 In the logic analysis system main window, open the System Administration dialog and check that networking is enabled.

4 Select the emulation module icon then select *Start Session...*.

This will automatically configure the LAN connection and start the Emulation Control Interface. There is no need to set the IP address of the emulation probe.

To set up a point-to-point connection without an emulation module

1 Connect the crossover LAN cable between the logic analysis system and the emulation probe.

2 Turn on power to the emulation probe.

3 In the logic analysis system main window, select the System Admin icon.

4 Select Network Setup....

5 Select Standard to turn on networking.

6 Select Default Network.

Leave the network parameters with the default values. The IP address should be 192.0.2.231.

7 In the Network Setup dialog, select OK.

8 In the main system window, select the Workspace icon.

9 Drag the emulation probe icon onto the workspace.

10 From the emulation probe icon, select Init Probe LAN Addresses....

11 Enter the link-level address of the emulation probe.

The link-level address (LLA) is printed on a label above the LAN connector on the emulation probe.

12 Enter the following IP address: 192.0.2.233

13 Select OK then follow the instructions.

Note about the Setup Assistant: If networking is *dis*abled for the 16700-series logic analysis system, the Setup Assistant will guide you through the process of setting up a point-to-point connection. If networking is *en*abled, the Setup Assistant assumes you want to connect the emulation probe to a site LAN.

Verifying LAN Communications

Verify your emulation probe is now active and on the network by issuing a **ping** or **telnet** command to the IP address.

To verify LAN communications using ping

These instructions assume you are using a PC running Microsoft® Windows® 95 or Windows® 98. The procedure for other operating systems is slightly different.

1 Open an MS-DOS window or select Start➔Run….

2 Enter the **ping** command followed by the IP address of the emulation probe.

Example

```
C:\WINDOWS>ping 192.35.12.6

Pinging 192.35.12.6 with 32 bytes of data:

Reply from 15.6.253.138: bytes=32 time=1ms TTL=254
Reply from 15.6.253.138: bytes=32 time=1ms TTL=254
Reply from 15.6.253.138: bytes=32 time=1ms TTL=254
Reply from 15.6.253.138: bytes=32 time<10ms TTL=254
```

If You Have Problems If the response is something like "100% packet loss" or "Destination host unreachable", see "Problems with the LAN Interface" on page 97.

To verify LAN communications using telnet

1 Verify your emulation probe is now active and on the network by issuing a telnet to the IP address.

This connection will give you access to the emulation probe's built-in terminal

interface.

2 To view the LAN parameters, enter the lan command at the terminal interface prompt.

3 To exit from this telnet session, type <CTRL>D at the prompt.

The best way to change the emulation probe's IP address, once it has already been set, is to telnet to the emulation probe and use the terminal interface lan command to make the change. Remember, after making your changes, you must cycle power before the changes take effect. Doing this will break the connection and end the telnet session.

To use telnet on a 16700-series logic analysis system, select the System Admin icon, select the Networking tab, then select telnet....

If You Have Problems "Problems with the LAN Interface" on page 97.

Example

```
$ telnet 192.35.12.6
R>lan
lan is enabled
lan -i 192.35.12.6
lan -g 0.0.0.0
lan -s 255.255.248.0
lan -p 6470
Ethernet Address : 08000F090B30
```

3

Installing the Emulation Module

This chapter shows you how to install an emulation module in your Agilent Technologies 16700-series logic analysis system and how to connect the emulation module to an emulation probe.

You need to set up a LAN connection for the E5900B emulation probe, even if you are using an E5901B emulation module.

If your emulation module is already installed in your logic analysis system frame, you may skip this chapter.

CAUTION: Electrostatic discharge can damage electronic components. Use grounded wrist straps and mats when you handle modules.

To install the emulation module in an Agilent 16700-series logic analysis system or expansion frame

You will need T-10 and T-15 Torx screw drivers (supplied with the emulation module)

1 Turn off the logic analysis system and wait for the system to power down, then REMOVE THE POWER CORD.
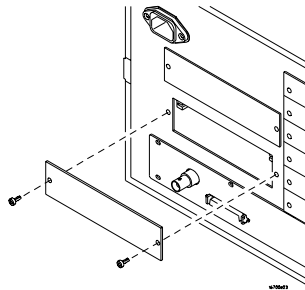
Remove any other cables (including mouse or video monitor cables).

2 Turn the logic analysis system frame upside-down.
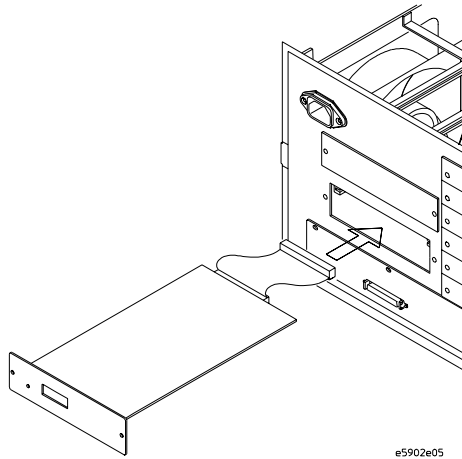
3 Remove the bottom cover.
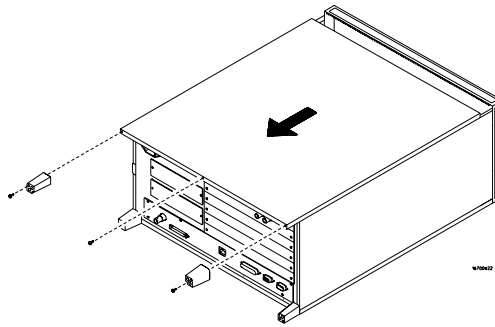
4 Remove the slot cover.
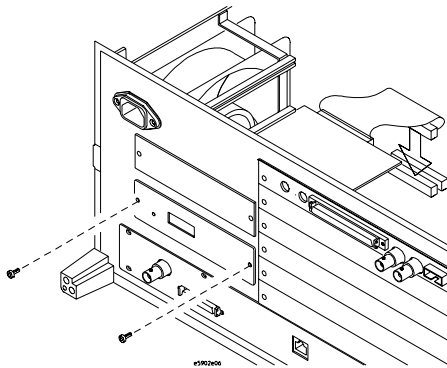
You may use either slot.

5 Install the emulation module.

e5902e05

6 Connect the cable and re-install the screws.

You may connect the cable to either of the two connectors.

e5902e06

7 Reinstall the bottom cover, then turn the frame right-side-up.

8 Plug in the power cord, reconnect the other cables, and turn on the logic analysis system.

The new emulation module will be shown as an "E5901B Emulation Module" in the system window.

To connect the E5901B emulation module to the E5900B emulation probe

1 Connect one end of the module/probe interconnect cable to the E5901B emulation module in the logic analysis system mainframe.

2 Connect other end of the module/probe interconnect cable to the "Emulation Module" connector on the E5900B emulation probe.

e8130e10
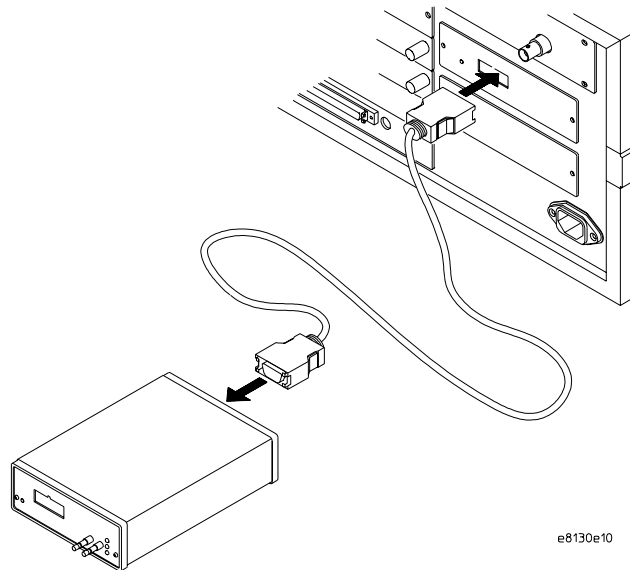
3 Power on the emulation probe.

The LED next to the switch is lit when the switch is turned on and the probe is being supplied with power.

Power is supplied by the 16700-series logic analysis system through the module/probe interconnect cable. The external power supply is not necessary for normal operation.

See Also   Chapter 2, "Connecting the Emulation Probe to a LAN," beginning on page 25. (You need to connect the emulation probe to the LAN, even when you are using an emulation module.)

Chapter 4, "Connecting the Emulator to Your Target System," beginning on page 47.

Installing the Emulation Module

4

Connecting the Emulator to Your
Target System

This chapter shows you how to connect the emulator to the target system and how to configure the emulator and target.

Here is a summary of the steps for connecting and configuring the emulator:

1 Make sure the target system is designed to work properly with the emulator. (See your processor-specific emulation or solution *User's Guide*.)

2 Install the emulation module in your logic analysis system, if necessary. (See page 41)

3 Connect the emulator to your target system using the ribbon cable. (See page 50 and see your processor-specific emulation or solution *User's Guide*.)

4 Update the firmware of the emulator, if necessary. (See page 67)

5 Verify communication between the emulator and the target. (See your processor-specific emulation or solution *User's Guide*.)

6 Configure the emulator. (See your processor-specific emulation or solution *User's Guide*.)

7 Test the connection between the emulator and the target. (See your processor-specific emulation or solution *User's Guide*.)

8 Connect a debugger to the emulator, if applicable. (See your processor-specific emulation or solution *User's Guide*.)

Designing a Target System

The target system or analysis probe must have the appropriate JTAG or BDM debug port connector, as specified in the processor-specific emulation or solution *User's Guide*.

ARM target systems

The emulation probe is compatible only with the "ARM Embedded ICE 14-pin Connector" and the "ARM/HP 20-pin Connector." If necessary, use the provided 14-to-20 pin adapter.

WARNING: **Do not connect the emulation probe to the TI XDS510 14-pin or the VLSI Jumpstart 14-pin connectors.** Connecting the emulation probe to to these connectors can damage the target system, the emulation probe, or both.

See Also For more information on the ARM 14-pin and the ARM/HP 20-pin connectors, see the HP/Agilent *Solutions for the ARM7/ARM9 User's Guide* or *Emulation for the ARM7/ARM9 User's Guide*.
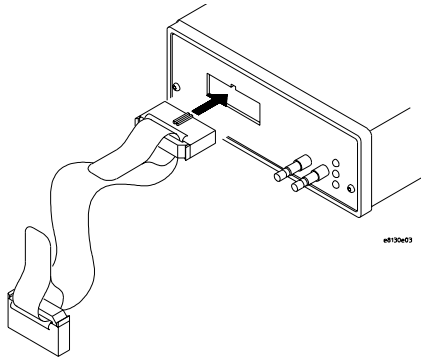
To connect the emulator to the target system

The emulation or solution *User's Guide* shows a target interface module and a 50-pin cable. These parts are not needed with the E5900B emulation probe.

The emulator should be connected to the target system using the ribbon cable provided. For the MPC8xx, two cables are provided. Use the short cable if at all possible.

1 Turn off power to the target system.

2 Turn off power to the emulation probe.

3 (Optional) Connect the analysis probe to the target system as described in the *User's Guide* for your emulation and analysis solution.

4 Plug one end of the ribbon cable into the emulation probe. (In most cases, the connectors are keyed, so there is only one way to plug them in.)

5 Plug the other end of the cable into the debug port on the target system or on the analysis probe.

CAUTION: Be careful to orient the connector as described in the emulation or solution *User's Guide*. If the connector is rotated, your target system or the emulator may be damaged.
For JTAG PowerPC processors (such as the MPC7xx), orient the red stripe *away* from pin 1 of the connector and towards the key pin.
For BDM PowerPC processors (such as the MPC8xx), orient the red stripe *toward* pin 1.

6 Turn on power to the emulation probe.

7 Turn on power to the target system.

After you have connected the emulator to your target system, you may need to update the firmware in the emulator.

Connecting the Emulator to Your Target System
To connect the emulator to the target system

5

Configuring the Emulator

The emulator has several user-configurable options. These options may be customized for specific target systems and saved in configuration files for future use.

The easiest way to configure the emulator is through the Emulation Control Interface in an HP16600A or HP16700A logic analysis system.

If you use the Emulation Control Interface, please refer to the online help in the Configuration window for information on each of the configuration options.

Other ways to configure the emulator are by using:

- the emulator's built-in terminal interface
- your debugger, if it provides an "emulator configuration" window which can be used with this HP emulator

What can be configured

See your processor-specific emulation or solution *User's Guide* for information on the configuration options for your emulator. The options are the same for the E5900A and the E5900B.

Configuring the Emulation Probe for Maximum Performance (JTAG)

The performance of the emulation probe depends on the speed at which it communicates with the target system. Better performance is obtained with faster communication speeds.

Setting TCK speed

On JTAG debug ports the communication speed is controlled by the clock signal TCK. This signal is generated by the emulation probe. You can set the speed of TCK using the Emulation Control Interface in a 16700-series logic analysis system or by using the **cf speed** command through a telnet or debugger connection to the emulation probe.

To change TCK speed, send a **cf speed=x** command to the probe. To restore default, send an **init -c** command. For more information about cf speed, send a **help cf speed** command to the probe. Also note that some debuggers allow the speed to be set from within their GUI or from a command file.

When to decrease TCK speed

Emulation probes are configured at the factory with a default TCK speed. In most cases, this is equal to the maximum allowable speed as specified by the manufacturer (see the table). This speed is suitable for most applications. However, this speed is only valid if 1) the processor is running at it's full rated speed, 2) trace lengths from the processor to the JTAG connector are short (less than about 5 centimeters or 2 inches), and 3) there are no stubs on the JTAG signals. If the emulation probe cannot communicate reliably with the target system using the factory default speed, TCK speed must be reduced.

When to increase TCK speed

Some target systems will allow TCK speeds greater than the default. The real maximum speed for a given target system can be determined empirically by increasing the speed and observing if the communication to the target is reliable. However, please note that speeds greater than the default are not officially supported by Agilent or the chip manufacturer.

JTAG Processor	Manufacturer Spec. Max TCK (MHz)	Emulation Probe Factory Default TCK (MHz)	Emulation Probe Max TCK (MHz)
PPC 6xx	16	16	50
MPC 7xx	25-33	30	50
ARM	—	10	40
PPC403GA/B/C	core clock/2	12	50
PPC403GCX PPC 401	core clock/2	32	50
PPC405	core clock/2	40	50
MPC82xx	25	20	30
Others	—	Use the "cf speed" command to determine factory default	—

Configuring the Emulation Probe for Maximum Performance (BDM)

The performance of the emulation probe depends on the speed at which it communicates with the target system. Better performance is obtained with faster communication speeds.

Setting DSCK speed

On BDM debug ports the communication speed is controlled by the clock signal DSCK. This signal is generated by the emulation probe. You can set the speed of DSCK using the Emulation Control Interface in a 16700-series logic analysis system or by using the **cf procck** command through a telnet or debugger connection to the emulation probe.

To change DSCK speed, send a **cf procck=**x (where x is the Microprocessor System Clock Speed defined in the table below) command to the probe. The DSCK speed will be set between 1/3 and 1/4 the Microprocessor System Clock Speed. To restore the factory default, send an **init -c** command. For more information about cf procck, send a **help cf procck** command to the probe. Also note that some debuggers allow the BDM communication speed to be set from within their GUI or from a command file.

cf procck=	Microprocessor System Clock Speed	Approximate BDM DSCK Speed
80	80 MHz or greater	26 MHz
66	66 MHz or greater	22 MHz
50	50 MHz or greater	16 MHz
33	33 MHz or greater	11 MHz
25	25 MHz or greater	8 MHz
20	20 MHz or greater	6 MHz
16	16 MHz or greater	5 MHz
8	8 MHz or greater	2 MHz
4	4 MHz or greater	1 MHz (Default)
1	1 MHz or greater	256 KHz
512	512 KHz or greater	128 KHz
32	32 KHz or greater	8 KHz

When to decrease DSCK speed

Emulation probes are configured at the factory with a default DSCK speed. This speed is suitable for most applications. However, this speed may be too high if the processor is being operated below the indicated default Microprocessor System Clock Speed. For speed settings above the factory default, trace lengths from the processor to the BDM connector must be short (less than about 5 centimeters or 2 inches), and without stubs. If the emulation probe cannot communicate reliably with the target system the DSCK speed must be reduced.

When to increase DSCK speed

Some target systems will allow DSCK speeds greater than the default. The real maximum speed for a given target system can be determined empirically by increasing the speed and observing if the communication to the target is reliable. However, please note that using a Microprocessor System Clock Speed setting higher than the actual processor capabilities (for example, settings above "25" for a 25 MHz processor) is not officially supported by Agilent or the chip manufacturer.

BDM Processor	Manufacturer Spec. Max DSCK (MHz)	Emulation Probe Factory Default DSCK (MHz)	Emulation Probe Max DSCK (MHz)
MPC8xx	CLKOUT/3	1 MHz	26 MHz

6

Using the Emulator with a Debugger

Several prominent companies design and sell state-of-the-art source debuggers which work with the Agilent emulation modules and emulation probes.

Follow the instructions in your emulation or solution *User's Guide* with the following differences:

Connecting to an Emulation Module

If you are using an E5901B emulation module, configure your debugger to use the IP address of the E5900B emulation probe, not the logic analysis system.

You may need to tell the debugger which port number to use. The default port number for a debugger connection is 6470.

Do not use the Emulation Control Interface at the same time as a debugger.

Web Interface

You can export the display of an Agilent 16700-series logic analysis system to your PC or workstation using a web browser. See the online help in your logic analysis system for more information.

7

Coordinating Logic Analysis with Processor Execution

This chapter describes how to use a logic analyzer and an emulation probe together to gain insight into your target system.

Before you trigger a logic analyzer (or another module) from the emulation module, you should understand a few things about the emulation module trigger:

The Emulation Probe TRIG OUT Signal

The trigger signal coming from the emulation probe is an "In Background Debug Monitor" ("In Monitor") signal. This may cause confusion because a variety of conditions could cause this signal and falsely trigger your analyzer.

The "In Monitor" trigger signal can be caused by:

- The most common method to generate the signal is to use the emulation probe to run then break processor execution (select Run and then select Break in the Emulation Control Interface). Going from "Run" (Running User Program) to "Break" ("In Monitor") generates the trigger signal.

- Another method to generate the "In Monitor" signal is to use the emulation probe to reset then break the processor. Going from the reset state of the processor to the "In Monitor" state will generate the signal.

- In addition, an "In Monitor" signal is generated any time a debugger or other user interface reads a register, reads memory, sets breakpoints or steps. Care must be taken to not falsely trigger the logic analyzers listening to the "In Monitor" signal.

Debuggers can cause triggers

Emulation module user interfaces may introduce additional states into your analysis measurement and in some cases falsely trigger your analysis measurement.

When a debugger causes your target to break into monitor it will typically read memory around the program stack and around the current program counter. This will generate additional states which appear in the listing.

You can often distinguish these additional states because the time tags will be in the microsecond and millisecond range. You can use the time tag information to determine when the processor went into monitor. Typically the time between states will be in the nanoseconds while the processor is running and will be in the microsecond and millisecond range when the debugger has halted the processor and is reading memory.

Note also that some debugger commands may cause the processor to break

temporarily to read registers and memory. These states that the debugger introduces will also show up in your trace listing.

If you define a trigger on some state and the debugger happens to read the same state, then you may falsely trigger your analyzer measurement. In summary, when you are making an analysis measurement be aware that the debugger could be impacting your measurement.

Important reminders

- Running a logic analyzer measurement does not run the processor. Usually you will need to start the logic analyzer measurement by selecting Run in the logic analyzer, then start the processor running by selecting Run in the Emulation Control Interface or your debugger.

- If the processor stops running during a logic analyzer measurement, you may need to manually stop the logic analyzer measurement before you see a listing.

See Also   The "Coordinating Logic Analysis with Processor Execution" chapter in your processor-specific *Solution User's Guide*.

"Emulation probe electrical characteristics" on page 80 for the electrical characteristics of the TRIG OUT and BREAK IN signals.

To connect the trigger signals to a logic analyzer with an emulation module

The module/probe interconnect cable connects the BREAK IN and TRIG OUT signals to the logic analysis system. You do not need to connect any cables to the SMB connectors on the emulation probe.

The module/probe interconnect cable carries the trigger signals.

The LAN cable carries data and most commands.

e5902e01
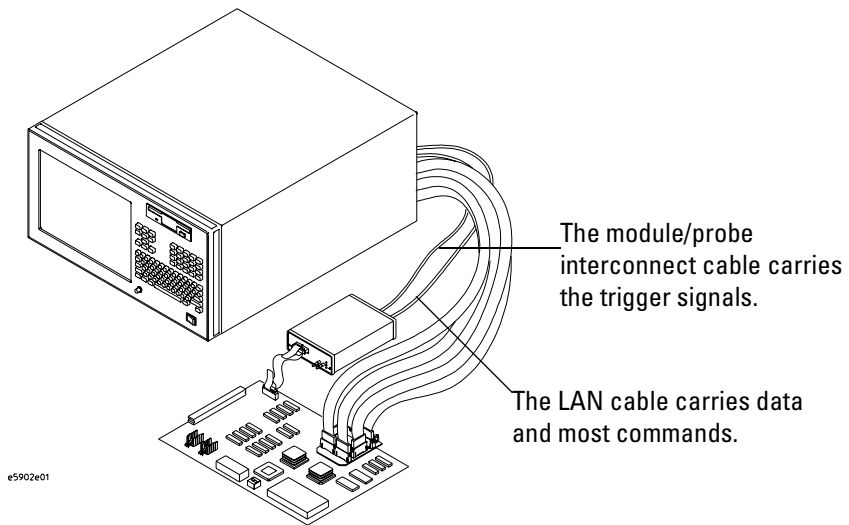
To connect the trigger signals to a logic analyzer without an emulation module

The cable used to connect the emulation probe to the logic analyzer should be a SMB to BNC adapter cable.

1 Connect the emulation probe's BREAK IN connector to the logic analyzer's Port Out connector.

2 Connect the emulation probe's TRIG OUT connector to the logic analyzer's Port In connector.
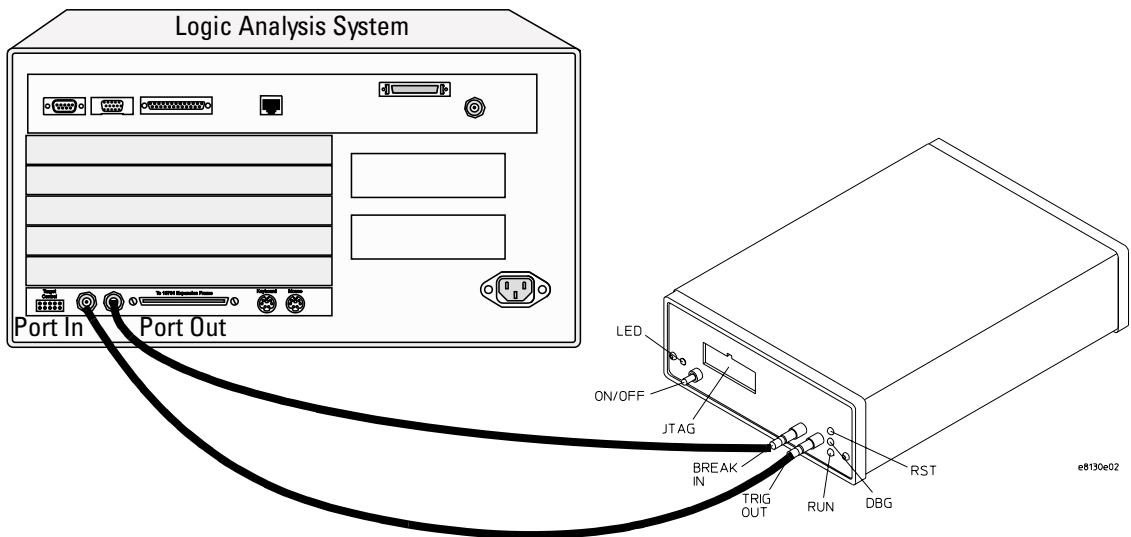
To cross-trigger the emulation probe and a 16700-series logic analysis system

Cross-triggering features are available in the following places:

- The Intermodule window.

  Select the Intermodule icon in the main system window.

- The Source Viewer window.

  This window is available if you are using the HP B4620B Source Correlation Tool Set. From the Listing window, select Source Viewer from the Source menu.

See Also　　For more detail on triggering features, see the online help in the Intermodule or Source Viewer window.

For some practical examples, select the Help icon in the main system window, then select "Measurement Examples."

8

Updating Firmware

Firmware gives your emulator a "personality" for a particular processor or processor family.

After you have connected the emulator to your target system, you may need to update the firmware to give it the right personality for your processor.

Update the firmware if:

- You need to change the personality of the emulator for a new processor.
- You have an updated version of the firmware from Agilent Technologies.

Updating Firmware When You Do Not Have a Logic Analysis System

To display current firmware version information

- Use `telnet` to access the built-in "terminal interface" and use the `ver` command to view the version information for firmware currently in the emulation probe.

To update firmware from the web

To update the firmware, you must have access to the World Wide Web and a PC or a workstation connected to your emulation probe.

1 Download the new firmware from the following World Wide Web site:

http://www.agilent.com/find/emulator

The firmware will be in the "Emulator and Emulation Solutions Software" or "Technical Support" section of this web site.

2 Follow the instructions on the web site for installing the firmware.

To update firmware from a floppy disk

- Follow the instructions on the README file on the floppy disk.

The firmware can be installed using either a PC or a workstation which can read PC disks.

Updating Firmware When You Have a Logic Analysis System

Always update firmware by installing a processor support package. This will ensure that the version of the Emulation Control Interface software is compatible the version of the emulator firmware. Logic analysis system operating system CD-ROMS include the processor support packages; versions 1.51 and later will include firmware which is compatible with E5900B emulation probes.

To display current firmware version information

1 In the Update Firmware window, select Display Current Version.

There are usually two firmware version numbers: one for "Generics" and one for the personality of your processor.

To update firmware using the Emulation Control Interface

1 End any run control sessions which may be running.

2 Install the processor support package from the CD-ROM, if necessary.

3 Open the Update Firmware window.

For an emulation module: In the system window, select the emulation module and select Update Firmware....

```
Slot 1  (255.213.221.213)
E5901B Emulation Module

  Start Session...
  Modify Interconnected Probe LAN Addresses...
  Update Firmware...
  Performance Verification...
  Help...
```

For an emulation probe: In the Workspace window, drag the emulation probe icon onto the workspace then select Update Firmware....

4 In the Update Firmware window, select the firmware to load into the emulation module.

5 Select Update Firmware.

In about 80 seconds, the firmware will be installed and the screen will update to show the current firmware version.

To update firmware for an emulation module using the Setup Assistant

The Setup Assistant is an online tool for connecting and configuring your logic analysis system for microprocessor and bus analysis. The Setup Assistant is available on Agilent 16700-series logic analysis systems.

This menu-driven tool will guide you through the connection procedures for connecting the logic analyzer to an analysis probe, an emulation module, or other supported equipment. It will also guide you through connecting an analysis probe to the target system.

1 Install the processor support package from the CD-ROM.

2 Start the Setup Assistant by selecting its icon in the system window.
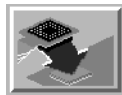
3 Follow the instructions displayed by the Setup Assistant.

9

Installing an Agilent E5902B
Emulation Migration

This chapter will tell you how to install an Agilent E5902B emulation migration so that you can use your emulation probe with a new processor family.

The E5902B emulation migration can be used with any E5900B emulation probe. It cannot be used with E5900A emulation probes.
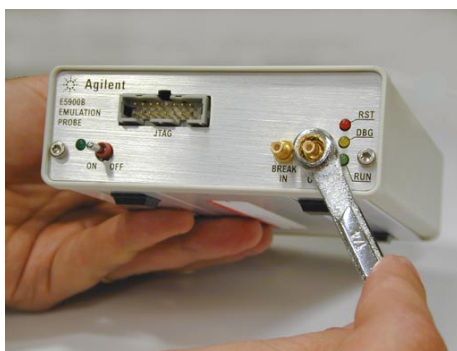
To install the emulation migration

CAUTION: Electrostatic discharge can damage electronic components. Use grounded wrist straps and mats.

The tools necessary for this procedure are supplied with the emulation migration.

1 Turn off power to the emulation probe.

2 Disconnect all cables from the emulation probe, including the power cord, LAN cable, serial cable, module/probe interconnect cable, and target cable.

3 Remove the cover from the emulation probe:

    a Remove the 2 nuts and 2 screws from the front of the emulation probe.

b Remove the front panel.

c Grasp the top cover with one hand. With the other hand, pull the plate on the bottom of the emulation probe, so that the top cover slides off.

4 Remove the 3 nylon screws from the target board adapter.
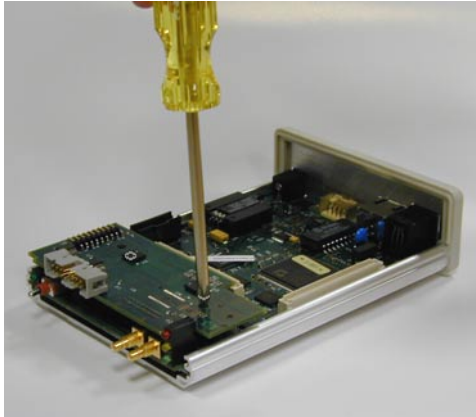
**5** Carefully lift the target board adapter from the main circuit board.
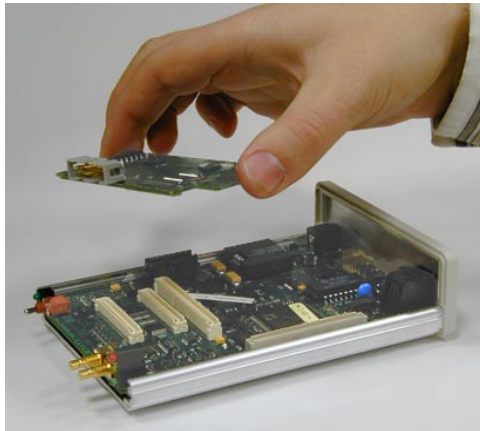
Do not turn on power to the emulation probe when no target board adapter is installed.

You cannot run performance verification tests or make any measurements without a target board adapter.

6 Install the new target board adapter on the main circuit board.

Align both connectors and press down firmly.

7 Replace the 3 nylon screws.

8 Reinstall the cover on the emulation probe:

    a Slide the top cover into place.

    b Assemble the new front panel.
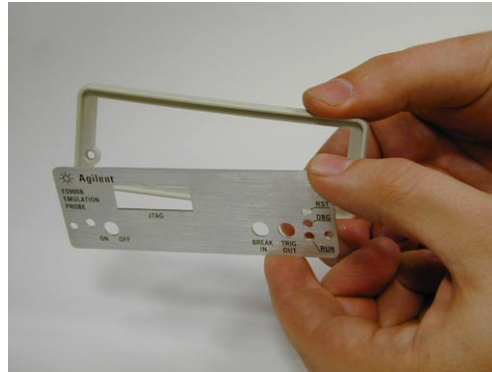
    c Attach the front panel using the 2 screws and 2 nuts.

9 Connect the LAN cable, module/probe interconnect cable (if you will be using the emulation probe with an emulation module), and the LAN cable to the emulation probe. Do not connect a target cable yet.

10 Turn on power to the emulation probe.

11 Update the emulation probe's firmware.

See Chapter 8, "Updating Firmware," beginning on page 67 for instructions on how to update firmware.

12 Run the performance verification test.

See page 103 for instructions on testing the emulation probe.

13 Connect the emulation probe to your target system.

See Chapter 4, "Connecting the Emulator to Your Target System," beginning on page 47, and your emulation or solution *User's Guide* for instructions on how to make this connection.

Installing an Agilent E5902B Emulation Migration

10

Specifications and Characteristics

The following operating characteristics are not specifications, but are typical operating characteristics for the Agilent Technologies E5900B emulation probe and E5901B emulation module.

Emulation probe electrical characteristics

Trigger Out SMB Port

With a 50 ohm load, a logic high is >= 2.0 V, and a low is <= 0.4 V. The output function is selectable .

Break In SMB Port

Edge-triggered TTL level input, 20 pF, with 4.6k ohms to ground in parallel. Maximum input: +5 V to -5 V when the trace port analyzer is powered OFF; +10 V to -5 V when the trace port analyzer is powered ON. Input function is selectable.

Communications

Serial Port. RJ12 connector. Data rate is 9600 baud, 8 bit, no parity, 1 stop bit.

10/100BASE-T LAN Port. RJ-45 connector. IEEE 802.3 Type 10BASE-T / 100BASE-TX.

Power Supply

Input. 100-240 V, 1.0 A, 50/60 Hz, IEC 320 connector.

Output. 12 V, 3.3 A

CAT I (Mains isolated). Pollution degree 2.

Emulation probe environmental characteristics

Temperature   Operating, +0 C to +40 C (+32 to +104 F); nonoperating, -40 to +60 C (-40 to +140 F).

Altitude   Operating/nonoperating 4600 m (15 000 ft).

Relative Humidity   15% to 95%.

Emulation module environmental characteristics

The Agilent E5901B emulation module meets the environmental characteristics of the logic analysis system in which it is installed.

For indoor use only.

11

Troubleshooting the Emulator

If you have problems with the emulation probe, your first task is to determine the source of the problem. Problems may originate in any of the following places:

- The connection between the emulation probe and your debugger
- The emulation module or emulation probe itself
- The connection between the emulation probe and the target system
- The target system

You can use several means to determine the source of the problem:

- The troubleshooting guide beginning on the next page
- The status lights on the emulation probe
- The emulation probe "performance verification" tests
- The emulation probe's built-in commands

Troubleshooting Guide

If you have trouble using the emulation probe, the following steps may help you identify the problem:

Step 1: Telnet to the emulation probe

Use telnet to connect to the emulation probe across the LAN. (For instructions on how to do this, see "Verifying LAN Communications" on page 38.

The emulation probe must be reachable via LAN before you can use it.

If you cannot connect to the emulation probe

If you cannot ping or telnet to the emulation probe ("Verifying LAN Communications" on page 38):

- See "Problems with the LAN Interface" on page 97.

- If you need to change the LAN parameters of the emulation probe, see Chapter 2, "Connecting the Emulation Probe to a LAN," on page 25.

Step 2: Check the prompt

Once you have connected to the emulation probe, press the Enter key a few times and look at the prompt which is displayed.

If a telnet connection to the emulation probe displays the prompt "->"

The "->" prompt indicates that the firmware loaded into the emulation probe is not compatible with the "target board adapter" which is located inside the emulation probe.

Try one of the following until you get a different prompt:

- Cycle power on the emulation probe. (Turn off your target power first.)

- Check that the proper firmware is installed for the target board adapter or the type of emulation probe shown on the front panel of the emulation probe.

  The proper firmware is installed at the factory but it could accidentally be changed. A "ver" command will display the firmware which is currently loaded. Refer to "Updating Firmware" on page 67 if the firmware is incorrect.

- Run the performance verification tests. Refer to "To run the emulation probe performance verification tests" on page 103.

  Connection to the wrong target or connection to the target with the pins connected backward could potentially damage the emulation probe. Use the performance verification tests to validate that the emulation probe itself is working correctly.

If a telnet connection to the emulation probe displays the prompt "?>"

The "?>" prompt indicates that the emulation probe is having trouble talking to the target and it doesn't know what state the target is in.

- Validate that the emulation probe is connect to a powered up target.

  Refer to Chapter 4, "Connecting the Emulator to Your Target System," beginning on page 47.

  Also refer to the processor-specific emulation or solution *User's Guide*.

- Try initializing the emulation probe with the "init -c" command.

  Some emulation probes need to read the Processor Version Register of the target processor as the emulation probe is initialized.

- Check the emulation probe configuration settings.

  Enter the `cf` command to display the configuration settings. Note that some emulation probes must set the processor type with
  `cf proc=processor_type`.

- Decrease the JTAG or BDM communication speed. Some targets need slower speeds to properly communicate.

  Use the `cf speed` command (`cf procck` for BDM).

- Check that the proper firmware is installed for this processor.

  Some PowerPC chips require different firmware to be installed for different mask revs or other slight differences of the processor. For example, the PowerPC 603ev processor requires that the E3479 firmware be installed and the Motorola PowerPC 603ei requires that the E3477i firmware be installed.

Step 3: Try some simple commands to control the target

Examples of some commands are listed on page 93 and page 96.

If the emulation probe has problems controlling the target

The emulation probe might be having problems controlling the target if you see messages such as:

```
"Cannot break"
"Processor is checkstopped"
"Bad status code (0xff) received from the processor"
```

Or the prompt changes to "?>"

Problems controlling the target can be caused by a variety of conditions. Typically the problem is in the configuration of the emulation probe or the configuration of the target.

Try the following to better control your target:

- Decrease the JTAG or BDM communication speed. Some targets need slower speeds to properly communicate.

  If you are using a telnet connection or a debugger command file, use the **cf speed** command (**cf procck** for BDM).

- Check the emulation probe configuration settings.

  If you are using a telnet connection, enter the **cf** command to display all of the configuration settings. Note that some emulation probes must set the processor type with **cf proc=***processor_type*.

- Check that the emulation probe is not restricted to real-time runs.

If you are using a telnet connection or a debugger command file, use the **cf rrt=no** command.

Restrict to real time will not allow you to access memory or registers while the target is running. By setting this option to no, you will be able to access the memory and registers while the target is running.

- Check that the target processor is configured.

Some target require configuration registers on the processor to be initialized before the emulation probe can properly communicate with the target.

For example, the MPC860 requires memory chip selects to be defined before the target memory can be accessed. Other processors need their memory controllers initialized.

To initialize the target processor, either run your target from reset (if you have a BOOT ROM) or define a series of emulation probe commands to initialize the target.

Also refer to "Emulation Probe Built-in Commands" on page 93 for additional information about testing a target.

- (MPC8xx) If you are using the long (12 inch) BDM cable, try using the short (5 inch) cable.

Step 4: Check the emulation module

If you are using an E5901B emulation module, select the emulation module icon and start the Emulation Control Interface.

If you have problems using the emulation probe as an emulation module in a 16700-series logic analysis system

To use the emulation probe as an emulation module in a 16700-series logic analysis system you must have installed an E5901B emulation module and you must connect the emulation probe to the emulation module using the module/probe interconnect cable. In addition, the emulation probe must be connected to the logic analysis system using a LAN.

- Check that the emulation probe and the logic analysis system are on

the LAN.

If you are using a site LAN you should be able to ping both the logic analysis system and the emulation probe.

If you are using a point-to-point LAN connection you must use a special crossover LAN cable, such as the one supplied with the emulation module.

The telnet window of the logic analysis system should be able to communicate with the emulation probe. This window can be found by selecting the "System Admin" icon in the main system window.

• Check that the emulation probe is connected to the emulation module with the module/probe interconnect cable.

  If this cable is connected, you should be able to display the firmware version from the "Update Firmware" window.

• Check that you have the proper processor support package installed.

  You can check this by selecting the System Admin icon in the main system window, then looking at the list of software packages installed.

• Test the emulation module. See page 102.

• Test the emulation probe. See page 103.

• Try using the Setup Assistant to configure your measurement setup.

Step 5: Check your debugger connection

If you are using a debugger, try connecting to the emulation probe.

If you have problems using the emulation probe with a debugger

Most problems are associated with not having the emulation probe and target properly configured or initialized.

Some debuggers have an initialization file that needs to be properly defined before a debugger can connect to the emulation probe.

• Make sure the PC or workstation where the debugger is running can

ping the emulation probe. (See "Verifying LAN Communications" on page 38.)

• Initialize the emulation probe and target so that the debugger can connect. Refer to your debugger manual for proper initialization.

• Refer to your debugger manual for proper operation.

If you need to obtain help

If, after following the troubleshooting steps and looking through the other sections in this chapter, the emulation probe still is not working:

1 Write down the target processor version, the emulation probe firmware version, and the type of emulation probe (E5900A or E5900B).

2 Call your nearest Agilent Technologies sales or service office.

To locate a sales or service office near you, go to **http://www.tm.agilent.com** and select Assistance.

Status Lights

Emulation Probe Target Status Lights

The emulation probe uses status lights to communicate various modes and error conditions.

The following table gives more information about the meaning of the power and target status lights.

❍ = LED is off
● = LED is on

Power/Target Status Lights

Pwr/Target LEDs	Meaning
❍ RST ❍ DBG ❍ RUN	No target system power, or emulation probe is not connected to the target system
● RST ❍ DBG ❍ RUN	Target system is in a reset state
❍ RST ● DBG ❍ RUN	The target processor is in Debug Mode
❍ RST ❍ DBG ● RUN	The target processor is executing user code
❍ RST ● DBG ● RUN	Only boot firmware is good (other firmware has been corrupted)
● RST ● DBG ● RUN	The emulation probe can no longer control the target. Reset the target, then initialize the emulation probe.

Emulation Probe LAN Status Lights
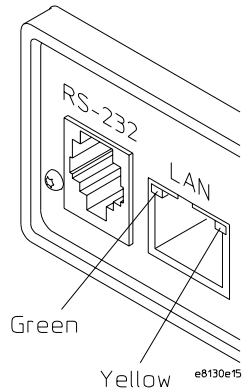
The yellow LED, on the right side of the connector, indicates LAN activity (receive or transmit).

The green LED, on the left side of the connector, is lit when the LAN interface is operating in 100Base-Tx mode.

Emulation Probe Power On Light
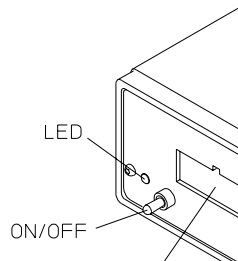
The green LED, to the left of the power switch, is lit when the emulation probe is connected to a power source and the power switch is on.

Emulation Probe Built-in Commands

The emulation probe has some built-in commands (sometimes called the "terminal interface") which you can use for troubleshooting.

You can enter the built-in commands using:

- A telnet (LAN) connection
- The Command Line window in the Emulation Control Interface
- A "debugger command" window in your debugger
- A serial connection (see page 30)

To telnet to the emulation probe

You can establish a telnet connection to the emulation probe if:

- A host computer and the probe are both connected to a local-area network (LAN), and
- The host computer has the telnet program (often part of the operating system or an internet software package).

To establish a telnet connection:

1 Find out the LAN address or LAN name of the emulation probe.

2 Start the telnet program.

If the LAN name of the emulation probe is "test2", the command might look like this:

```
telnet test2
```

3 If you do not see a prompt, press the <Return> key a few times.

To exit from this telnet session, type <CTRL>D at the prompt.

To use the built-in commands

Here are a few commonly used built-in commands:

Useful built-in commands

b	Break—go into the background monitor state
cf	Configuration—read or write configuration options
help	Help—display online help for built-in commands
init	Initialize—**init -c** re-initializes everything in the emulation probe except for the LAN software
lan	configure LAN address
m	Memory—read or write memory
reg	Register—read or write a register
mtest	Memory test—test target memory system
r	Run—start running user code
rep	Repeat—repeat a command or group of commands
rst	Reset—reset the target processor
s	Step—do a low-level single step
ver	Version—display the product number and firmware version of the emulation probe

Use **help *command_name*** to see the command syntax. For example, enter **help m** to get help on the memory command.

The prompt indicates the status of the emulation probe:

Emulation probe prompts

U	Running user program
M	Running in background monitor
p	No target power
R	Emulation reset
r	Target reset
c	Checkstop
?	Unknown state

Examples

To set register r0, then view r0 to verify that is was set, enter:

```
U>rst
M>b
M>reg r0=1234abcd
M>reg r0
  reg r0=1234abcd
```

To break execution then step a single instruction, enter:

```
U>b
M>s
 PC=fff00108
M>
```

To determine what firmware version is installed in the emulation probe, enter:

```
M>ver
```

See Also   Use the **help** command for more information on these and other commands. Note that some of commands listed in the help screens are generic commands for Agilent emulators and may not be available for your product.

If you are writing your own debugger, contact Agilent Technologies for more information.

Problems with the Target System

What to check first

Verify that the cf options are correct for your target.

1 Try some basic built-in commands using the Command Line window or a telnet connection:

```
U>rst
U>
```

This should reset the target and display a "U>" prompt if 'cf reset=run'.

```
U>rst
M>
```

This should reset the target and display an "M>" prompt (for some processors, this depends on the configuration of the emulation probe).

```
M>m 0..=abcd1234
M>m 0..
   00000000 abcd1234 abcd1234 abcd1234 abcd1234
   00000010 abcd1234 abcd1234 abcd1234 abcd1234
   00000020 abcd1234 abcd1234 abcd1234 abcd1234
   00000030 abcd1234 abcd1234 abcd1234 abcd1234
   00000040 abcd1234 abcd1234 abcd1234 abcd1234
   00000050 abcd1234 abcd1234 abcd1234 abcd1234
   00000060 abcd1234 abcd1234 abcd1234 abcd1234
   00000070 abcd1234 abcd1234 abcd1234 abcd1234
M>
```

This should display memory values starting at address 0.

```
M>s
```

This should execute one instruction at the current program counter.

If any of these commands don't work, there may be a problem with the design of your target system, a problem with the revision of the processor you are using, or a problem with the configuration of the emulation probe.

2 Check that the emulation probe firmware matches your processor. To do this, enter:

```
M>ver
```

Problems with the LAN Interface

If you cannot verify LAN communication

If you cannot verify connection using the procedure in "To verify LAN communication", or if commands are not accepted by the emulation probe:

❑ Make sure that you have connected the emulation probe to the proper power source and that the power light is lit.

❑ Make sure that you wait for the power-on self test to complete before connecting.

❑ Check that the Emulation Control Interface or debugger was configured with the correct LAN address. If the emulation probe is on a different subnet than the host computer, check that the gateway address is correct.

❑ Make sure that the emulation probe's IP address is set up correctly. To do this, connect the emulation probe to a terminal or terminal emulator and enter the **lan** command. (See "To configure LAN parameters using a serial connection" on page 30.)

❑ Make sure that the gateway address is set up correctly. The default gateway address of 0.0.0.0 does not allow the emulation probe to communicate with computers on other subnets.

❑ If you have just changed the IP address of the emulation probe, leave the emulation probe powered on and connected to the LAN for a few minutes, then try again. Some hubs, routers, and hosts maintain tables of IP addresses and link-level addresses. It may take a while for these tables to be updated.

❑ Make sure that the proper LAN cable is connected.

  • Use a Category 5 cable if your connection is running at 100 Mbps (100BASE-TX).
  • For a point-to-point connection, use a crossover cable.
  • For a LAN connection, use a regular LAN cable, not a crossover cable (the cable supplied with the emulation module, part number 5061-7342, is a crossover cable).

❏ Watch the LAN LED's to see whether the emulation probe is seeing LAN activity. The LED's are described on page 92 . Refer to your LAN documentation for information on testing connectivity.

❏ It's also possible for there to be a problem with the emulation probe firmware while the LAN interface is still up and running. In this case, you must reboot the emulation probe by turning the emulation probe power switch off then on again.

If you have LAN connection problems

❏ Verify the IP address and gateway mask of the emulation probe. To do this, connect the emulation probe to a terminal or terminal emulator and enter the `lan` command (see See "To configure LAN parameters using a serial connection" on page 30.).

If it takes a long time to connect to the network

❏ Check the subnet masks on the other LAN devices connected to your network. All of the devices should be configured to use the same subnet mask.

Subnet mask error messages do not indicate a major problem. You can continue using the emulation probe.

If there are many subnet masks in use on the local subnet, the logic analysis system may take a very long time to connect to the network after it is turned on.

If you have problems setting the LAN parameters using a logic analysis system

❏ If the E5900B emulation probe is not connected to an E5901B emulation module, then make sure the emulation probe is on the same subnet as the logic analysis system during initial setup; otherwise,

probe LAN address setup will fail. After initial setup, you can modify the emulation probe's LAN parameters using the Emulation Control Interface before moving the probe to a different subnet.

❏ Another thing that will cause emulation probe LAN address setup to fail is a BOOTP daemon, running elsewhere on your network, that is configured to respond to the link-level address of the emulation probe with a different IP address.

Problems with the Serial Interface

If you cannot verify RS-232 communication

If the emulation probe prompt does not appear in the terminal emulator window:

❏ Make sure that you have connected the emulation probe to the proper power source and that the power switch is on.

❏ Make sure that you have properly configured the data communications parameters on the host computer.

❏ Verify that you are using the correct cable. Use the cable and adapter which are supplied with the emulation probe.

If you have RS-232 connection problems with the MS Windows Terminal program

❏ Use the "HyperTerminal" program (usually found in the Accessories windows program group) and set up the "Communications..." settings as follows:

- Baud Rate: 9600
- Data Bits: 8
- Parity: None
- Flow Control: None
- Stop Bits: 1

When you are connected, hit the Enter key. You should get a prompt back.

❏ If you still don't get a prompt, make sure the serial cable is connected to the correct port on your PC.

❏ Make sure you are using the serial cable which was supplied with the emulation probe.

With certain RS-232 cards, connecting to an RS-232 port where the emulation

probe is turned off (or is not connected) will hang the PC. The only way to get control back is to reboot the PC. Therefore, we recommend that you always turn on the emulation probe before attempting to connect via RS-232.

Problems with the Emulation Module

Occasionally you may suspect a hardware problem with the emulation module. The procedure in this section describes how to test the emulation module hardware, and if a problem is found, how to repair or replace the broken component.

This procedure tests the hardware within the logic analysis system—the emulation module and its connection to the logic analysis system. To test the emulation probe, see page 103.

To test the emulation module

1 End any Emulation Control Interface or debugger sessions.

2 Disconnect the emulation probe from the target system.

3 In the system window, select the System Admin icon.

4 Select the Admin tab.

5 Select Self-Test....

6 Read the Question dialog and select Yes if you wish to run the self tests.

7 Select the Master Frame tab.

8 Select the E5901B Emulation Module.

9 Select Test All.

10 When you are finished running self tests, select Quit. Then restart your session from the Session Manager window.

Problems with the Emulation Probe

To run the emulation probe performance verification tests

In addition to the powerup tests, there are several additional performance verification (PV) tests available.

These tests can be performed through a 16700-series logic analysis system or via a serial or telnet connection.

Before running probe performance verification:

- Leave the emulation probe connected to the LAN and to the power supply or module/probe interconnect cable.
- Leave the target board adapter installed inside the emulation probe.
- End any Emulation Control Interface or debugger sessions.
- Disconnect the target cable from the target system. (Power off the emulation probe while you do this.)
- Connect an SMB cable from the "Break In" connector to the "Trigger Out" connector on the emulation probe. (If you aren't concerned about these signals, you may omit this step and ignore any related test failures.)

To run the performance verification tests using the logic analysis system

1 End any Emulation Control Interface or debugger sessions.

2 Turn off the emulation probe and disconnect the emulation probe from your target system, then turn the emulation probe on again.

CAUTION: Disconnect the emulation probe from your target system before running the tests. Running the Target Board Adapter Feedback Test with the target system connected can damage components on the target system.

3 In the system window, select the emulation probe icon then select Performance Verification.

4 Select Start PV.

The results will appear on screen.

To run complete performance verification tests using a serial or telnet connection

1 Connect an SMB cable between BREAK IN and TRIGGER OUT.

2 Disconnect the probe/module interconnect cable.

3 Turn off the emulation probe and disconnect the emulation probe from your target system, then turn the emulation probe on again.

CAUTION: Disconnect the emulation probe from your target system before running the tests. Running the Target Board Adapter Feedback Test with the target system connected can damage components on the target system.

4 Connect the emulation probe to your PC or workstation using a serial or LAN connection, as described in "Connecting the Emulation Probe to a LAN" on page 25.

5 Use a **telnet** or a terminal emulator to connect to the emulation probe.

6 Enter the **pv 1** command.

See Also   Options available for the **pv** command are explained in the help screen displayed by typing **help pv** or **? pv** at the prompt.

> **Examples**
>
> Here are some examples of ways to use the pv command.
>
> To execute all of the tests one time:
>
> pv 1

To execute test 2 with maximum debug output repeatedly until a Ctrl-c is entered:

```
pv -t2 -v9 0
```

The results on a good system, with the trigger out and break in SMBs connected, should similar to the following.

```
U>pv 1

  Testing: HPE8130A Series Emulation System
    Test  1: Powerup PV Results                            Passed!
    Test  2: Emulation Module Port Feedback Test           Passed!
    Test  3: Run Control FPGA Test                         Passed!
    Test  4: Run Control Clock Test                        Passed!
    Test  5: Break In and Trigger Out SMB Feedback Test    Passed!
    Test  6: Target Board Adapter Feedback Test (FACTORY ONLY) Not Executed
  FAILED  Number of tests: 1           Number of failures: 0


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prior
written permission is prohibited, except as allowed under copyright laws.

  HPE8130A Series Emulation System
    Version:   A.01.00 Dec 30 1999
    Location:  Generics

  HP E3454A  PowerPC 700 JTAG Emulator
    Version:   A.05.00 Oct 26 1999
R>
```

The product numbers and version information will be different for your emulation probe. The product numbers displayed are for the various pieces of firmware and will be different from the product number you used to order the product.

If a performance verification test fails

There are some things you can do if a failure is found on one of the tests. Details of the failure can be obtained through using a -v value ("verbose level") of 9.

If the particular failure you see is not listed below, contact Agilent Technologies for assistance.

Test 1: Powerup PV Results

Failure of this test indicates a hardware problem with the emulation probe.

Contact Agilent Technologies for assistance.

Test 2: Emulation Module Port Feedback Test

Failure of this test indicates a hardware problem with the emulation probe. Contact Agilent Technologies for assistance.

This test exercises the hardware which drives the connection to the emulation module. It does not test the module/probe interconnect cable.

The test is not executed if the emulation probe is connected to an emulation module.

Test 3: Run Control FPGA Test
Test 4: Run Control Clock Test

Failure of these tests indicates a hardware problem with the emulation probe. Contact Agilent Technologies for assistance.

If the emulation probe fails one of these tests, it may have been damaged by electrostatic discharge through the target cable. To prevent such damage in the future, follow standard ESD preventive practices.

Test 5: Break In and Trigger Out SMB Feedback Test

Before returning to Agilent Technologies, check to ensure that you have connected a good cable between the two SMB connectors.

Test 6: Target Board Adapter Feedback Test

Failure of this test indicates a hardware problem with the emulation probe. Contact Agilent Technologies for assistance.

This test exercises the I/O circuitry. If the test passes, but the emulation probe seems to have trouble communicating with the target system, the problem is probably with the target system.

If this test was not executed, it means that the target board adapter you are using does not support the test.

Returning Parts for Service

The repair strategy for this emulation solution is board replacement.

Exchange assemblies are available when a repairable assembly is returned to Agilent Technologies. These assemblies have been set up on the "Exchange Assembly" program. This lets you exchange a faulty assembly with one that has been repaired, calibrated, and performance verified by the factory. The cost is significantly less than that of a new assembly.

To return a part to Agilent Technologies

1 Follow the procedures in this chapter to make sure that the problem is caused by a hardware failure, not by configuration or cabling problems.

2 In the U.S., call 1-800-403-0801. Outside the U.S., call your nearest Agilent sales office. Ask them for the address of the nearest service center.

To locate a sales or service office near you, go to **http://www.tm.agilent.com** and select Assistance.

3 Package the part and send it to the Agilent service center.

Keep any parts which you know are working. For example, if only a cable is broken, keep the emulation probe.

4 When the part has been replaced, it will be sent back to you.

The unit returned to you will have the same serial number as the unit you sent to Agilent.

In some parts of the world, on-site repair service is available. Ask an Agilent sales or service representative for details.

To obtain replacement parts

The following table lists some parts that may be replaced if they are damaged or lost. The part numbers are subject to change. Contact your nearest Agilent Technologies sales office for further information.

Exchange assemblies

Part number	Description
E3452-69501	Rebuilt assembly (PowerPC 60x)
E3453-69501	Rebuilt assembly (MPC 82xx)
E3454-69501	Rebuilt assembly (PowerPC 7xx)
E3459-69501	Rebuilt assembly (ARM)
E3497-69501	Rebuilt assembly (MPC 860)

Replacement assemblies

Part number	Description
0950-3043	Power supply for emulation probe (marked F1044B)
E3494-61604	Ribbon cable (PowerPC 60x, PowerPC 7xx, MPC 82xx)
E3459-61602/3	Ribbon cable (ARM 14/20-pin)
E3496-61603	Ribbon cable (MPC 860)
16700-61608	Expansion cable for emulation module
E8130-68702	Serial cable and adapter
5061-7342	LAN cross-over cable
E8130-61601	14-pin module/probe interconnect cable

To clean the instrument

If the instrument requires cleaning:

1 Remove power from the instrument.

2 Clean the instrument using a soft cloth that has been moistened in a mixture of mild detergent and water.

3 Make sure that the instrument is completely dry before reconnecting it to a power source.

Glossary

Analysis Probe A probing solution connected to the target microprocessor. It provides an interface between the signals of the target microprocessor and the inputs of the logic analyzer. Formerly called a "preprocessor."

Background Debug Monitor In Also called Debug Mode, In Background, and In Monitor. The normal processor execution is suspended and the processor waits for commands from the debug port. The debug port commands include the ability to read and write memory, read and write registers, set breakpoints and start the processor running (exit the Background Debug Monitor).

Debug Mode See *Background Debug Monitor*.

Debug Port A hardware interface designed into a microprocessor that allows developers to control microprocessor execution, set breakpoints, and access microprocessor registers or target system memory using a tool like the emulation probe.

Elastomeric Probe Adapter A connector that is fastened on top of a target microprocessor using a retainer and knurled nut. The

conductive elastomer on the bottom of the probe adapter makes contact with pins of the target microprocessor and delivers their signals to connection points on top of the probe adapter.

Emulation Migration The hardware and software required to use an emulation probe with a new processor family.

Emulation Module An emulation module is installed within the mainframe of a logic analysis system. An E5901A emulation module is used with a *target interface module* (TIM) or an analysis probe. An E5901B emulation module is used with an E5900B *emulation probe* and does not use a TIM.

Emulation Probe An emulation probe is a standalone instrument connected via LAN to the mainframe of a logic analyzer or to a host computer. It provides run control within an emulation and analysis test setup. Formerly called a "processor probe" or "software probe."

Extender A part whose only function is to provide connections from one location to another. One or more extenders might be stacked to raise a probe above a target microprocessor to avoid mechanical

contact with other components installed close to the target microprocessor. Sometimes called a "connector board."

Flexible Adapter Two connection devices coupled with a flexible cable. Used for connecting probing hardware on the target microprocessor to the analysis probe.

Gateway Address An IP address entered in integer dot notation. The default gateway address is 0.0.0.0, which allows all connections on the local network or subnet. If connections are to be made across networks or subnets, this address must be set to the address of the gateway machine.

General-Purpose Flexible Adapter A cable assembly that connects the signals from an elastomeric probe adapter to an analysis probe. Normally, a male-to-male header or transition board makes the connections from the general-purpose flexible adapter to the analysis probe.

High-Density Adapter Cable A cable assembly that delivers signals from an analysis probe hardware interface to the logic analyzer pod cables. A high-density adapter cable has a single Mictor connector that is installed into the analysis probe, and two cables that are connected to corresponding odd and even logic analyzer pod cables.

High-Density Termination Adapter Cable Same as a High-Density Adapter Cable, except it has a termination in the Mictor connector.

In Background, In Monitor See *Background Debug Monitor.*

Inverse Assembler Software that displays captured bus activity as assembly language mnemonics. In addition, inverse assemblers may show execution history or decode control busses.

IP address Also called Internet Protocol address or Internet address. A 32-bit network address. It is usually represented as decimal numbers separated by periods; for example, 192.35.12.6.

Jumper Moveable direct electrical connection between two points.

JTAG (OnCE) port See *debug port.*

Label Labels are used to group and identify logic analyzer channels. A label consists of a name and an

Glossary

associated bit or group of bits.

Link-Level Address The unique address of the LAN interface. This value is set at the factory and cannot be changed. The link-level address of a particular piece of equipment is often printed on a label above the LAN connector. An example of a link-level address in hexadecimal: 0800090012AB. Also known as an LLA, Ethernet address, hardware address, physical address, or MAC address.

Mainframe Logic Analyzer A logic analyzer that resides on one or more board assemblies installed in a 16500, 1660-series, or 16600/700-series mainframe.

Male-to-male Header A board assembly that makes point-to-point connections between the female pins of a flexible adapter or transition board and the female pins of an analysis probe.

Monitor, In See *Background Debug Monitor*.

Pod A collection of logic analyzer channels associated with a single cable and connector.

Preprocessor See *Analysis Probe*.

Preprocessor Interface See *Analysis Probe*.

Probe Adapter See *Elastomeric Probe Adapter*.

Prototype Analyzer The 16505A prototype analyzer acts as an analysis and display processor for the 16500B/ C logic analysis system. It provides a windowed interface and powerful analysis capabilities. Replaced by 16600/700-series logic analysis systems.

Run Control Probe See Emulation Probe and Emulation Module.

Setup Assistant Wizard software which guides a user through the process of connecting and configuring a logic analyzer to make measurements on a specific microprocessor. The Setup Assistant icon is located in the main system window.

Shunt Connector. See *Jumper*.

Solution A set of tools for debugging your target system. A solution includes probing, inverse assembly, the B4620B Source Correlation Tool Set, and an emulation module.

State Analysis When the logic analyzer is configured to capture data

Glossary

synchronously with a clock signal in the target system.

Subnet Mask A subnet mask blocks out part of an IP address so that the networking software can determine whether the destination host is on a local or remote network. It is usually represented as decimal numbers separated by periods; for example, 255.255.255.0.

Symbol Symbols represent patterns and ranges of values found on labeled sets of bits. Two kinds of symbols are available:
1) Object file symbols — Symbols from your source code, and symbols generated by your compiler. Object file symbols may represent global variables, functions, labels, and source line numbers.
2) User-defined symbols — Symbols you create.

Target Board Adapter A daughter board inside the E5900B emulation probe which provides an interface to the ribbon cable for a particular microprocessor family.

Target Control Port An 8-bit, TTL port on a logic analysis system that you can use to send signals to your target system. It does not function like a pattern generator or emulation module, but more like a remote control for the target's switches.

Target Interface Module A small circuit board which connects the 50-pin cable from an E5901A emulation module or E5900A emulation probe to signals from the debug port on a target system. Not used with the E5900B emulation probe.

TIM See *Target Interface Module*.

Timing Analysis When the logic analyzer is configured to capture data at a rate determined by an internal sample rate clock, asynchronous to signals in the target system.

Transition Board A board assembly that obtains signals connected to one side and rearranges them in a different order for delivery at the other side of the board.

Trigger Specification A set of conditions that must be true before the instrument triggers. See the printed or online documentation of your logic analyzer for details.

1/4-Flexible Adapter An adapter that obtains one-quarter of the signals from an elastomeric probe adapter (one side of a target microprocessor) and makes them available for probing.

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	DECLARATION OF CONFORMITY
Agilent Technologies	According to ISO/IEC Guide 22 and CEN/EN 45014

Manufacturer's Name: Agilent Technologies, Inc. / Digital Design PGU

Manufacturer's Address: 1900 Garden of the Gods Road
Colorado Springs, Colorado 80907 USA

Declares, that the product

Product Name: Emulation Probe

Model Number(s): Agilent Technologies E5900B, E5902B

Product Option(s): All options based on the above

is in conformity with:

EMC IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998
CISPR 11:1990 / EN 55011:1991—Group 1 Class A[1]
IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995 (ESD 4kV CD, 8kV AD)
IEC 61000-4-3:1995 / EN 61000-4-3:1995 (3 V/m 80% AM)
IEC 61000-4-4:1995 / EN 61000-4-4:1995 (0.5kV line-line, 1kV line-earth)
IEC 61000-4-6:1996 / EN 61000-4-6:1996 (3V 80% AM, power line)
Australia/New Zealand: AS/NZS 2064.1

Safety IEC 1010-1: 1990+A1:1992+A2:1995 / EN 61010-1: 1994+A2:1995
Canada: CSA-C22.2 No. 1010.1:1992
USA: UL 3111-1:1994

Additional Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE marking accordingly (European Union).

[1]This product was tested in a typical configuration with Agilent Technologies test systems.

Date: 12/30/99

Ken Wyatt

Ken Wyatt / Product Regulations Manager

For further information, please contact your local Agilent Technologies sales office, agent or distributor.

Product Regulations

EMC   IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998   Performance Criteria[2]
CISPR 11:1990 / EN 55011:1991—Group 1 Class A[1]
IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995 (ESD 4kV CD, 8kV AD)   D
IEC 61000-4-3:1995 / EN 61000-4-3:1995 (3 V/m 80% AM)   A
IEC 61000-4-4:1995 / EN 61000-4-4:1995 (EFT 0.5kV line-line, 1kV line-earth)   A
IEC 61000-4-6:1996 / EN 61000-4-6:1996 (3V 80% AM, power line)   A
Australia/New Zealand: AS/NZS 2064.1

Safety   IEC 1010-1: 1990+A1:1992+A2:1995 / EN 61010-1: 1994+A2:1995
Canada: CSA-C22.2 No. 1010.1:1992
USA: UL 3111-1:1994 {optional}

Additional Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE marking accordingly (European Union).

Performance Criteria:
A Pass - Normal operation, no effect.
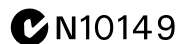B Pass - Temporary degradation, self recoverable.
C Pass - Temporary degradation, operator intervention required.
D Fail - Not recoverable, component damage.

Note:
Use standard ESD preventive practices while handling and connecting the E5900B to its target to avoid component damage.

Sound   N/A
Pressure
Level

N279   CE
                                       ISM 1-A
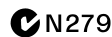
Agilent Technologies **DECLARATION OF CONFORMITY**

According to ISO/IEC Guide 22 and CEN/EN 45014

Manufacturer's Name:	Agilent Technologies, Inc. / Digital Design PGU
Manufacturer's Address:	1900 Garden of the Gods Road Colorado Springs, Colorado 80907 USA

Declares, that the product

Product Name:	Emulation Module
Model Number(s):	Agilent Technologies E5901B
Product Option(s):	All options based on the above

is in conformity with:

EMC   IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998
CISPR 11:1990 / EN 55011:1991—Group 1 Class A[1]
IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995 (ESD 4kV CD, 8kV AD)
IEC 61000-4-3:1995 / EN 61000-4-3:1995 (3 V/m 80% AM)
IEC 61000-4-4:1995 / EN 61000-4-4:1995 (0.5kV line-line, 1kV line-earth)
IEC 61000-4-6:1996 / EN 61000-4-6:1996 (3V 80% AM, power line)
Australia/New Zealand: AS/NZS 2064.1

Safety   IEC 1010-1: 1990+A1:1992+A2:1995 / EN 61010-1: 1994+A2:1995
Canada: CSA-C22.2 No. 1010.1:1992
USA: UL 3111-1:1994

Additional Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE marking accordingly (European Union).

[1]This product was tested in a typical configuration with Agilent Technologies test systems.

Date: 12/30/99

Ken Wyatt

Ken Wyatt / Product Regulations Manager

For further information, please contact your local Agilent Technologies sales office, agent or distributor.

Product Regulations

EMC IEC 61326-1:1997+A1:1998 / EN 61326-1:1997+A1:1998   Performance Criteria[2]
CISPR 11:1990 / EN 55011:1991—Group 1 Class A[1]
IEC 61000-4-2:1995+A1:1998 / EN 61000-4-2:1995 (ESD 4kV CD, 8kV AD)   A
IEC 61000-4-3:1995 / EN 61000-4-3:1995 (3 V/m 80% AM)   A
IEC 61000-4-4:1995 / EN 61000-4-4:1995 (EFT 0.5kV line-line, 1kV line-earth)   A
IEC 61000-4-6:1996 / EN 61000-4-6:1996 (3V 80% AM, power line)   A
Australia/New Zealand: AS/NZS 2064.1

Safety IEC 1010-1: 1990+A1:1992+A2:1995 / EN 61010-1: 1994+A2:1995
Canada: CSA C22.2 No. 1010.1:1992
USA: UL 3111-1:1994 {optional}

Additional Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC (including 93/68/EEC) and carries the CE marking accordingly (European Union).

Performance Criteria:
A Pass - Normal operation, no effect.
B Pass - Temporary degradation, self recoverable.
C Pass - Temporary degradation, operator intervention required.
D Fail - Not recoverable, component damage.

Sound N/A
Pressure
Level

N10149   CE
ISM 1-A

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This apparatus has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Measuring Apparatus, and has been supplied in a safe condition. This is a Safety Class I instrument (provided with terminal for protective earthing). Before applying power, verify that the correct safety precautions are taken (see the following warnings). In addition, note the external markings on the instrument that are described under "Safety Symbols."

Warning

• Before turning on the instrument, you must connect the protective earth terminal of the instrument to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. You must not negate the protective action by using an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.

• Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuseholders. To do so could cause a shock of fire hazard.

• Service instructions are for trained service personnel. To avoid dangerous electric shock, do not perform any service unless qualified to do so. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

• If you energize this instrument by an auto transformer (for voltage reduction), make sure the common terminal is connected to the earth terminal of the power source.

• Whenever it is likely that the ground protection is impaired, you must make the instrument inoperative and secure it against any unintended operation.

• Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

• Do not install substitute parts or perform any unauthorized modification to the instrument.

• Capacitors inside the instrument may retain a charge even if the instrument is disconnected from its source of supply.

Safety Symbols

⚠

Instruction manual symbol: the product is marked with this symbol when it is necessary for you to refer to the instruction manual in order to protect against damage to the product.

⚡

Hazardous voltage symbol.

⏚

Earth terminal symbol: Used to indicate a circuit common connected to grounded chassis.

WARNING

The Warning sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a Warning sign until the indicated conditions are fully understood and met.

CAUTION

The Caution sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a Caution symbol until the indicated conditions are fully understood or met.