Configuration Capabilities

The four analyzer models in the HP 1660CS-series offer a wide variety of channel widths and memory depth combinations. The number of data channels range from 34 channels with the HP 1663CS, up to 136 channels with the HP 1660CS. In addition, a half-channel acquisition mode is available which doubles memory depth from 4 K to 8 K per channel while reducing channel width by half. All models have two scope channels and an oscilloscope memory depth of 8 K.

The configuration guide below illustrates the memory depth/channel width combinations in all acquisition modes with all analyzer models.

Table 7-1 **State Analyzer Configurations**

Mode	HP 1660CS	HP 1661CS	HP 1662CS	HP 1663CS
half-channel 100 MHz	8K-deep / 68 chan. 65 data + 3 data or clock	8K-deep / 51 chan. 48 data + 3 data or clock	8K-deep / 34 chan. 32 data + 2 data or clock	8K-deep / 17 chan. 16 data + 1 data or clock
full-channel 100 MHz	4K-deep / 136 chan. 130 data + 6 data or clock	4K-deep / 102 chan. 96 data + 6 data or clock	4K-deep / 68 chan. 64 data +4 data or clock	4K-deep / 34 chan. 32 data + 2 data or clock

State Analyzer Configuration Considerations

- Unused clock channels can be used as data channels.
- With Time or State tags turned on, memory depth is reduced by half. However, full depth is retained if you leave one pod pair unassigned.

Table 7-2 **Timing Analyzer Configurations**

Mode	HP 1660CS	HP 1661CS	HP 1662CS	HP 1663CS
Conventional half-channel 500 MHz	8K-deep / 68 chan. 65 data + 3 data or clock	8K-deep / 51 chan. 48 data + 3 data or clock	8K-deep / 34 chan. 32 data + 2 data or clock	8K-deep / 17 chan. 16 data + 1 data or clock
Conventional full-channel 250 MHz	4K-deep / 136 chan. 130 data + 6 data or clock	4K-deep / 102 chan. 96 data + 6 data or clock	4K-deep / 68 chan. 64 data + 4 data or clock	4K-deep / 34 chan. 32 data + 2 data or clock
Transitional half-channel 250 MHz	8K-deep / 68 chan. 65 data + 3 data or clock	8K-deep / 51 chan. 48 data + 3 data or clock	8K-deep / 34 chan. 32 data + 2 data or clock	8K-deep / 17 chan. 16 data + 1 data or clock
Transitional full-channel 125 MHz	4K-deep / 136 chan. 130 data + 6 data or clock	4K-deep / 102 chan. 96 data + 6 data or clock	4K-deep / 68 chan. 64 data + 4 data or clock	4K-deep / 34 chan. 32 data + 2 data or clock
Glitch half-channel 125 MHz	4K-deep / 68 chan. 65 data + 3 data or clock	4K-deep / 51 chan. 48 data + 3 data or clock	4K-deep / 34 chan. 32 data + 2 data or clock	4K-deep / 17 chan. 16 data + 1 data or clock

Timing Analyzer Configuration Considerations

- Unused clock channels can be used as data channels.
- In Glitch half-channel mode, memory is split between data and glitches.

Probing

This section discusses the probing system for the logic analyzer. It also contains the information you need for connecting the probe system components to each other, to the logic analyzer and oscilloscope, and to the system under test.

Probing Options

You can connect the logic analyzer to your system under test in one of the following ways:

- Microprocessor- and bus-specific interfaces (optional).
- Standard general-purpose probing (provided).
- Direct connection to a 20-pin, 3M-Series type header connector using the optional termination adapter.

See Also *Accessories for HP Logic Analyzers* for additional information about the microprocessor interface kits and for any new probing solutions.

Microprocessor and Bus-Specific Interfaces

There are a number of microprocessor- and bus-specific interfaces available as optional accessories. Microprocessors are supported by Universal Interfaces or Preprocessor Interfaces, or in some cases, both.

Universal Interfaces are manufactured by other vendors. Universal Interfaces are aimed at initial hardware turn-on, and provide fast, reliable, and convenient connections to the microprocessor system. Many use passive probing and do not support inverse assembly.

Preprocessor interfaces are aimed at hardware turn-on and hardware/software integration, and provide the following:

- All clocking and demultiplexing circuits needed to capture the system's operation.
- Additional status lines to further decode the operation of the CPU.
- Inverse assembly software to translate logic levels captured by the logic analyzer into microprocessor mnemonics.

Bus interfaces will support bus analysis for the following:

- Bus support for HP-IB, RS-232-C, RS-449, SCSI, VME, and VXI.

General-Purpose Probing

General-purpose probing connects the logic analyzer probes directly to your target system without using any interface. General-purpose probing does not limit you to specific hookup schemes.

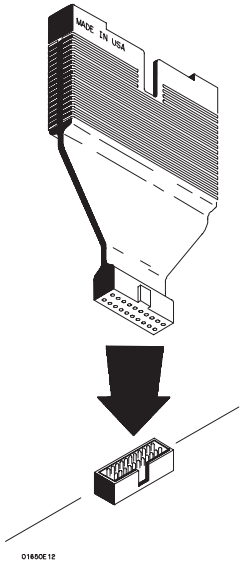
General-purpose probing uses grabbers that connect to both through-hole and surface-mount components. General-purpose probing comes as the standard probing option. You will find a full description of its components and use later in this section.

The Termination Adapter

The logic analyzer must be properly terminated to operate correctly. Most HP preprocessor interfaces have properly terminated state connectors; however, many of them require termination adapters for the timing connectors.

The optional termination adapter allows you to connect the logic analyzer probe cables directly to test ports on your target system without the probes.

The termination adapter is designed to connect to a 20-position (2x10), 4-wall, low-profile, header connector which is a 3M-Series 3592 or equivalent.



Termination adapter

General-purpose probing system description

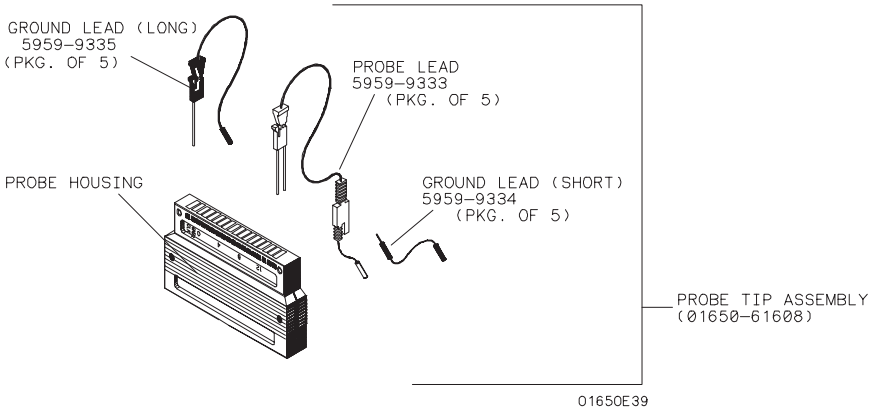
The standard probing system provided with the logic analyzer consists of a probe tip assembly, probe cable, and grabbers. Because of the passive design of the probes, there are no active circuits at the outer end of the cable. The rest of this chapter is dedicated to general-purpose probing.

The passive probing system is similar to the probing system used with high-frequency oscilloscopes. It consists of a series RC network (90 kΩ in parallel with 8 pF) at the probe tip, and a shielded, resistive transmission line. The advantages of this system include the following:

- 250 Ω in series with 8-pF input capacitance at the probe tip for minimal loading
- Signal ground at the probe tip for high-speed timing signals
- Inexpensive, removable probe tip assemblies

Probe Tip Assemblies

Probe tip assemblies allow you to connect the logic analyzer directly to the target system. This general-purpose probing is useful for discrete digital circuits. Each probe tip assembly contains 16 probe leads (data channels), 1 clock lead, a pod ground lead, and a ground tap for each of the 16 probe leads.



Probe tip assembly

Probe and Pod Grounding

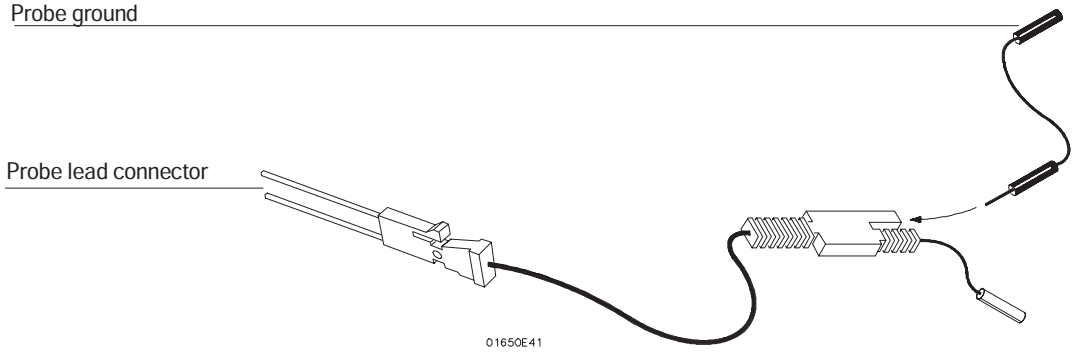
Each pod is grounded by a long, black, pod ground lead. You can connect the ground lead directly to a ground pin on your target system or use a grabber. To connect the ground lead to grounded pins on your target system, you must use 0.63-mm (0.025-in) square pins, or use round pins with a diameter of 0.66 mm (0.026 in) to 0.84 mm (0.033 in). The pod ground lead must always be used.

Each probe can be individually grounded with a short black extension lead that connects to the probe tip socket. You can then use a grabber or the grounded pins on your target system in the same way you connect the data lines. For extra confidence in your measurements, grounding every third or fourth probe is recommended.

When probing signals with rise and fall times of 1 ns or less, grounding each probe lead with the 2-inch ground lead is recommended. In addition, always use the probe ground on a clock probe.

Probe Leads

The probe leads consists of one 12-inch twisted-pair cable, one ground tap, and one grabber. The probe lead, which connects to the target system, has an integrated RC network with an input impedance of 100 kΩ in parallel with approximately 8 pF, and all in series with 250 Ω. The probe lead has a two-pin connector on one end that snaps into the probe housing.



Probe ground lead

Grabbers

The grabbers have a small hook that fits around the IC pins and component leads. The grabbers have been designed to fit on adjacent IC pins on either through-hole or surface-mount components with lead spacing greater than or equal to 0.050 inches.

Probe Cable

The probe cable contains 18 signal lines, 17 chassis ground lines and two power lines for preprocessor use. The cables are woven together into a flat ribbon that is 4.5 feet long. The probe cable connects the logic analyzer to the pods, termination adapter, or preprocessor. Each cable is capable of carrying 0.33 amps for preprocessor power.

CAUTION **DO NOT exceed 0.33 amps per cable, or the cable will be damaged.**

Preprocessor power is protected by a current limiting circuit. If the current limiting circuit is activated, the fault condition must be removed. After the fault condition is removed, the circuit will reset in one minute.

Minimum Signal Amplitude

Any signal line you intend to probe with the logic analyzer probes must supply a minimum voltage swing of 500 mV to the probe tip. If you measure signal lines with a voltage swing of less than 500 mV, you may not obtain a reliable measurement. Because the minimum input overdrive is the greater of 250 mV or 30% of input amplitude, be sure to correctly set the pod threshold in the Analyzer Format menu.

Pod Thresholds

Logic analyzer pods have two preset thresholds and a user-definable pod threshold. The two preset thresholds are ECL (–1.3 V) and TTL (+1.5 V). The user-definable threshold can be set anywhere between –6.0 volts and +6.0 volts in 0.05 volt increments.

All pod thresholds are set independently.

Oscilloscope probes

The two oscilloscope probes supplied with the logic analyzer are HP 10430A Miniature Passive Probes. These small, lightweight probes allow measurements that were previously very difficult in densely populated circuits.

For complete information on the operation, maintenance, and adjustments of the miniature passive probes, be sure to read the operating note that is packaged with the probes.

Probe Inputs

Probe inputs are located on the front panel to the right of the line switch. Input 1 is on the left. The probes may be connected directly to the BNC input connectors. The signal is dc-coupled to the oscilloscope.

BNC cables can be connected directly to the BNC connectors. A BNC-to BNC cable is not provided with the instrument, but you can order it separately.

Maximum Probe Input Voltage

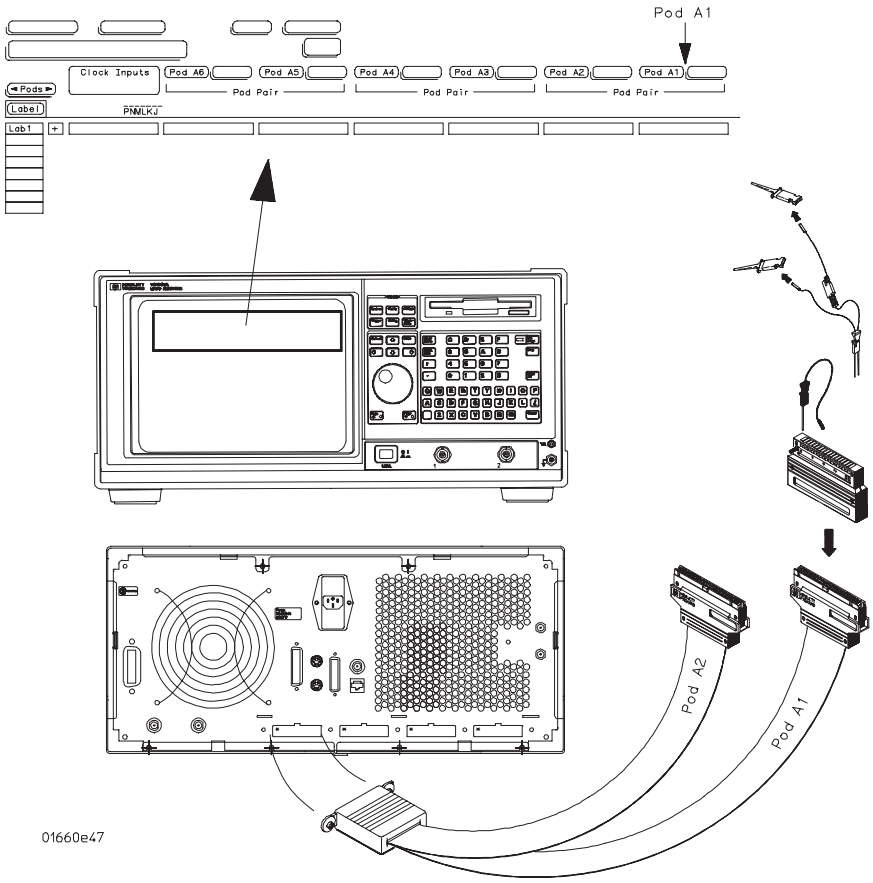
The maximum input voltage of each logic analyzer probe is ±40 volts peak. The maximum input voltage of the oscilloscope is ±250 volts dc at 1MΩ setting and ±5 volts rms at 50Ω setting.

Calibration Outputs

There are two calibration output BNCs located on the rear panel. One is the dc calibration signal source and the other is the ac calibration signal source. Both of these signals are used during calibration of the oscilloscope. The dc calibration signal can also be used for probe compensation adjustment (see your operating note).

Assembling the probing system

The general-purpose probing system components are assembled as shown to make a connection between the measured signal line and the pods displayed in the Analyzer Format menu.



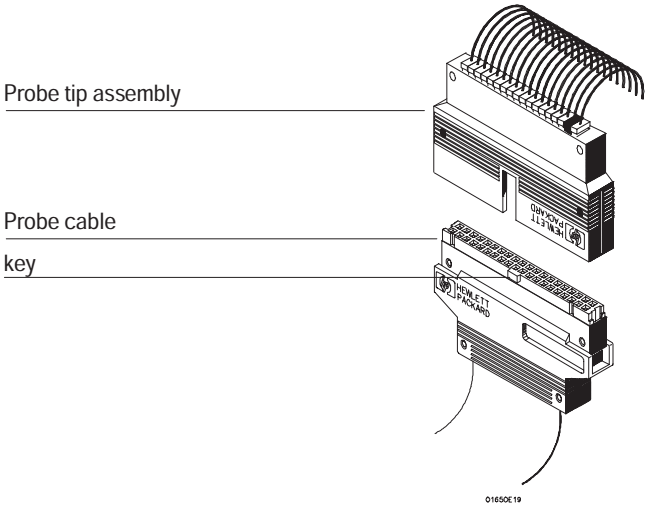
Connecting probe cables to the logic analyzer

Connecting Probe Cables to the Logic Analyzer

All probe cables are installed at Hewlett-Packard. If you need to replace a probe cable, refer to the *HP 1660CS/CS-Series Logic Analyzers Service Guide*, available from your HP sales office.

Connecting the Probe Tip Assembly to the Probe Cable

To connect a probe tip assembly to a cable, align the key on the cable connector with the slot on the probe housing and press them together.



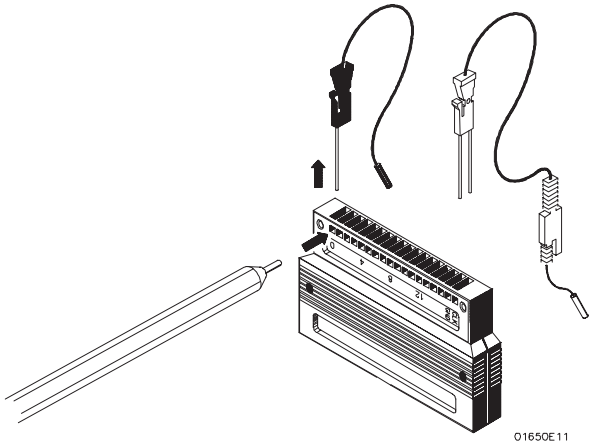
Connecting probe tip assembly

Disconnecting Probe Leads from Probe Tip Assemblies

When you receive the logic analyzer, the probe leads are already installed in the probe tip assemblies. To keep unused probe leads out of your way during a measurement, you can disconnect them from the pod.

To disconnect a probe lead, insert the tip of a ballpoint pen into the latch opening. Push on the latch while gently pulling the probe out of the pod connector as shown in the figure.

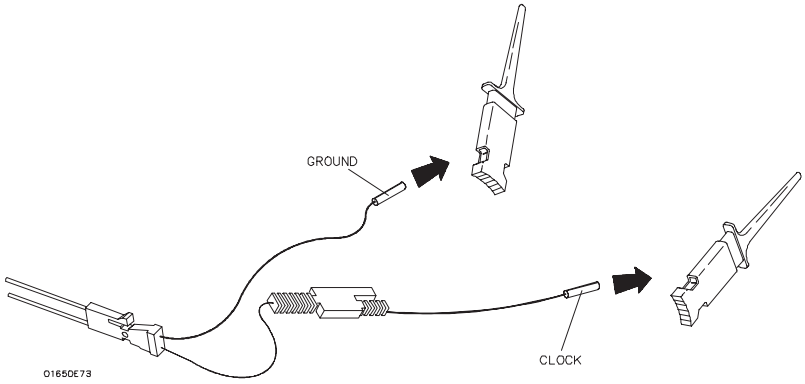
To connect the probes into the pods, insert the double pin end of the probe into the probe housing. Both the double pin end of the probe and the probe housing are keyed so they will fit together only one way.



Installing probe leads

Connecting the Grabbers to the Probes

Connect the grabbers to the probe leads by slipping the connector at the end of the probe onto the recessed pin located in the side of the grabber. If you need to use grabbers for either the pod or the probe grounds, connect the grabbers to the ground leads in the same manner.



Connecting grabbers to probes