

Logic Analyzer

Logic analyzers have historically been used by hardware designers to find tough design problems. Today, the logic analyzer is used in many embedded designs to solve both hardware and software problems. Technological advances such as LAN and X-Window interfaces have expanded the role of a logic analyzer across the entire design team. With an expanded-use model, the logic analyzer provides a powerful tool to address the problems associated with system integration.

Preprocessors are processor-specific mechanical and electrical interfaces between HP logic analyzers and the processor. An inverse assembler, which helps correlate measurements to assembly-level code, is included with the preprocessor. Other post-analysis software is available to show code coverage and filter out unexecuted prefetches.

There are several HP logic analyzer solutions depending on your requirements and budget constraints. The HP 1660C/CS or HP 1670D series provide a benchtop solution, while the HP 16500 series offers a modular solution. See page 370 for a complete overview of the logic analyzers available from HP.

Software Analyzer

The HP software analyzer provides a window interface that allows designers to view their actual source code time-correlated to the trace display. Trigger conditions can be set up using symbolic names instead of address values.

The HP software analyzer is available for several hosts, or on the HP 16505A Prototype Analyzer. See page 375 for a complete description of the HP software analyzer and the system requirements.

Symbol tables provide the link from your source code to the execution trace captured by the logic analyzer. This makes it possible to view symbols instead of addresses in the trace.

HP currently supports several file formats including IEEE-695, OMF86/286/386, OMF96, ELF/DWARF, Cygnus a.out, TI COFF, ELF/STAB, and general-purpose ASCII. Compiler vendors also offer translation tools between the various file formats.

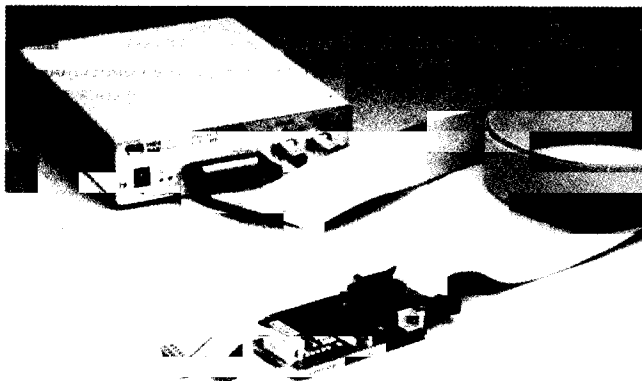
Processor Probes

HP processor probes allow you to solve many in-circuit debug problems at a lower cost-per-seat. The processor probes provide run control, high-speed code downloading and memory/register display and modification.

Connection to source level debuggers provides features for memory modification and code downloading. Program execution can also be controlled by setting software breakpoints from the debugger interface or with externally-generated breakpoints.

Access to the target for the processor probe doesn't require a physical connection to all the pins on the processor. A simple connector designed into the target board is all that is needed. The processor probe interfaces with the Background Debug Mode (BDM) pins found on Motorola processors or the J-TAG pins found on new generation Intel, Motorola, ARM and IBM processors.

Depending on future analysis needs, additional components may be purchased for a complete system debug environment. Your equipment investment is protected and you have a scalable solution for future needs.



HP E3458A CPU 32 Processor Probe

Full-Featured Debugger Interface

HP processor probes are currently supported by the following debugger vendors to provide complete emulation solutions: Cad-Ul, Green Hills Software, Microtec, Rational, PLS and SDS. A full-featured debugger is used to control the processor probe over the LAN and download code to the target.

For more information on debugger connections, contact your debugger vendor or local HP representative.

Ordering Information

All solutions listed below require a debugger unless otherwise stated.

Supported Processor	Processor Probe	Preprocessor Interface	Key Literature
Hitachi SH7050	E3473A	—	—
Hitachi SH7040	E3472A	—	5965-5180E
IBM and Motorola PowerPC 6xx	E3452A	—	5965-2789E
PowerPC 603/603e	E3452A	E2455B	5965-6037E
Intel Pentium processor	E3491A*	E2457A*	5963-6855E
Intel Pentium Pro	E3493A*	E2466B*	5965-6036E
Intel Pentium II processor	E3493A*	E2466C*	5965-6036E
Motorola 683xx	E3458A	—	5962-9539E
Motorola MPC 505/509	E3456A	E2490A	5966-0235E
Motorola MPC 821/860xxx	E3497A	E2476A	5965-5053E
Motorola MPC 850	E3497A	—	5965-5053E
Motorola MPC 801	E3497A	—	5965-5053E
Toshiba R3900 Series	E3429A	—	5965-1529E

* Only available with the HP 16505A Prototype Analyzer. No debugger required. Refer to page 372.

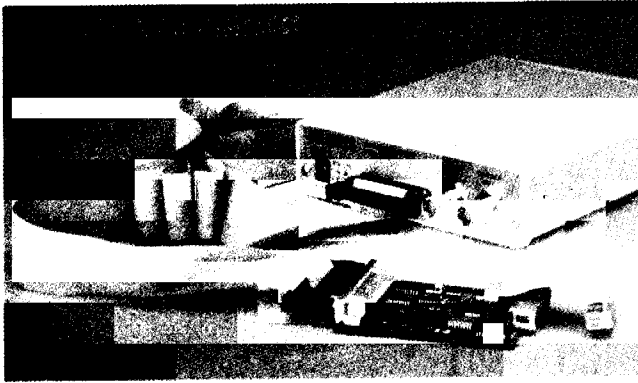
A processor probe is all that is needed for run control. A complete emulation solution configuration with run control and trace analysis requires a preprocessor interface, a processor probe and a logic analyzer. For the latest microprocessors support, contact your local HP representative.

Key Literature

- HP B3740A Software Analyzer, p/n 5962-7114E
- HP B4620A Software Analyzer Tool Set, p/n 5964-9333E
- HP Distributed Emulation—Flexibility for the Future, p/n 5964-9773E
- HP Distributed Emulation—color brochure, p/n 5964-9952E

Also see literature listed in chart above.

All solutions listed below require a debugger unless other wise stated.



HP Processor Probes for In-Target Debugging

HP processor probes allow you to get much of your day-to-day debugging done at a lower cost-per-seat. They easily integrate into your computer network and complement HP logic analyzers.

High-Speed Code Download

HP processor probes have been designed to the same high standards as our high-end HP 64700 series emulators. In general, the probes download code to your target system at a rate of 4 MB/minute, as fast as our high-end emulators. You'll also notice the speed of the processor probes when you single-step through your code.

Easy Connection to Your Target System

The HP processor probes do not directly probe the microprocessor. Instead, a standard connector provides access to the chip's internal debugging features. HP supports built-in debug features including Background Debug Mode (BDM), JTAG and others. This makes it much easier for you to connect to your target system and allows you to begin debugging quickly. This ease of connection is a benefit whether you're debugging a released product in the field or designing a new system.

Debugging Functionality

HP processor probes support much of the functionality you need to do day-to-day in-target debugging of software. For example, you can set breakpoints, symbolically modify registers and memory, and download code to the target system.

Integrated with Other HP Development Tools

HP processor probes can trigger or be triggered by other HP development tools such as the HP logic analyzers. For example, you can use the HP software analyzer to specify a trigger condition that will capture a real-time trace using the HP 16500C logic analysis system and display it as high-level source code. Simultaneously, the software analyzer can trigger the processor probe to generate a break in program execution.

Interfaces on UNIX and MS-Windows Platforms

Source level debuggers provide the interface for HP processor probes. From the debugger you can control the processor probe in the high-level source context you're familiar with. For example, you can set a breakpoint by simply "clicking" with your mouse on a source line. Modifying a variable is done by using a high-level language expression. Source level debuggers are available from Cad-UI, Green Hills Software, Microtec, Rational, PLS and SDS.

Lower Cost-Per-Seat

An ideal development system includes a high-end HP 64700 emulator/analyzer and/or an HP software analyzer along with processor probes for all engineers doing in-target debugging. The HP processor probes are one-quarter to one-third the price of a traditional emulator so you can outfit your entire design team at a lower cost-per-seat.

Supported Processors

HP processor probes support a variety of microprocessors. Because we are constantly adding support, please contact your HP sales representative if your chip is not listed on page 392.

Terminal Mode Operation

A firmware-resident ASCII terminal interface is embedded in the HP processor probes. Commands are ASCII strings; file transfers using industry-standard formats are accepted. Since a terminal can access these commands, host independence is realized. This interface is ideal for remote field applications, and for use of portable computers, field service, or other applications where a host is impractical or unavailable.

Key Literature

- HP Distributed Emulation—Flexibility for the Future, p/n 5964-9773E
- Solutions for the Motorola MPC 800 Embedded Power PC Microprocessor Family, p/n 5965-5053E
- HP E3458A Processor Probe for Motorola CPU32 Microcontrollers, p/n 5965-6676E
- HP E3491B Pentium Processor Probe, p/n 5963-6855E (see page 391 for more information)
- HP E3492B Distributed Emulation for Toshiba R3900 Family, p/n 5965-1529E
- HP E3452A Processor Probe for the Power PC 400 and 600, p/n 5965-2789E
- HP E3492A Embedded MIPS Processor Probe, p/n 5964-3958E