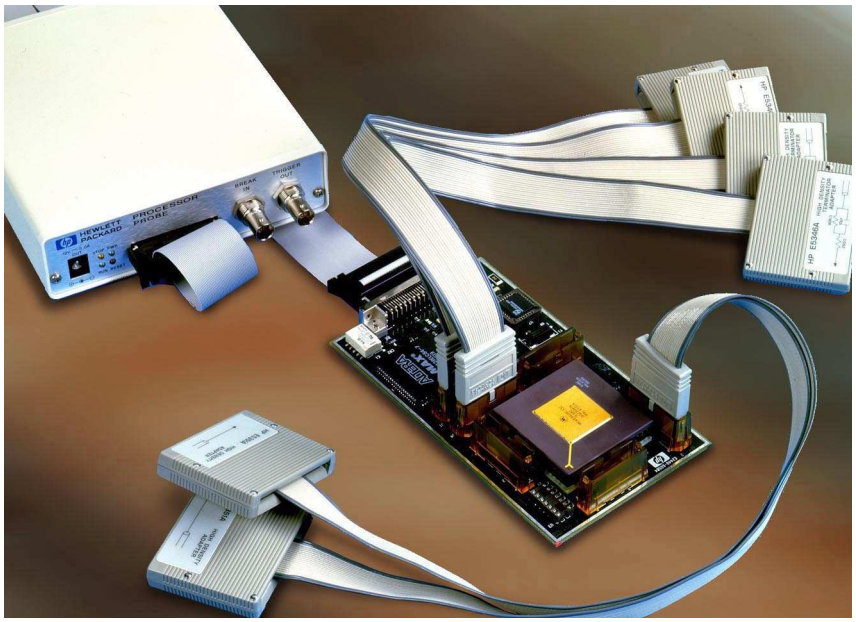
HP E2448B, E8123A Motorola 68360/EN360/MH360 Preprocessor Interface

Product Overview

For use with HP Logic Analyzers



A Preprocessor for Hardware and Software Designers

The HP E2448B and E8123B preprocessors provide an extensive set of analysis capabilities to meet the needs of both hardware and software designers in the prototype debug and software development phases of Motorola 68360-based systems.

From Signal-Level to High-Level Source Code Analysis

While hardware designers need to analyze the prototype at the signal or bus level, software designers expect C source-level visibility during real-time code execution.

All this analysis capability can be delivered simultaneously by an HP E2448B or E8123A preprocessor connected to any HP logic analyzer with an HP B4620A or B3740A software analyzer tool set.

Easy Probing of Your Target System

The HP preprocessor provides an easy way to connect an HP logic analyzer to a target system using the following Motorola microcontrollers:

68360 68EN360 68MH360 68MH360V	PGA 241 pin PQFP 240 pin

Control Your Target System with the HP E3458A Processor Probe

In addition to analysis capabilities, hardware and software designers may need to control target processor operation, download new software, and display or modify target memory or internal registers.

These features can be obtained by connecting the preprocessor to the HP E3458A processor probe (figure 2). This tool uses the Motorola BDM port to provide full internal and external visibility of the microcontroller. Please refer to the *HP E3458A Processor Probe* Product Overview for more information.

Data Sampling Modes

Timing Analysis

Each preprocessor provides unbuffered timing analysis for all signals.

State-Per-Clock

In state-per-clock mode, every clock cycle is captured by the logic analyzer, including idle and wait states. Address, data, status

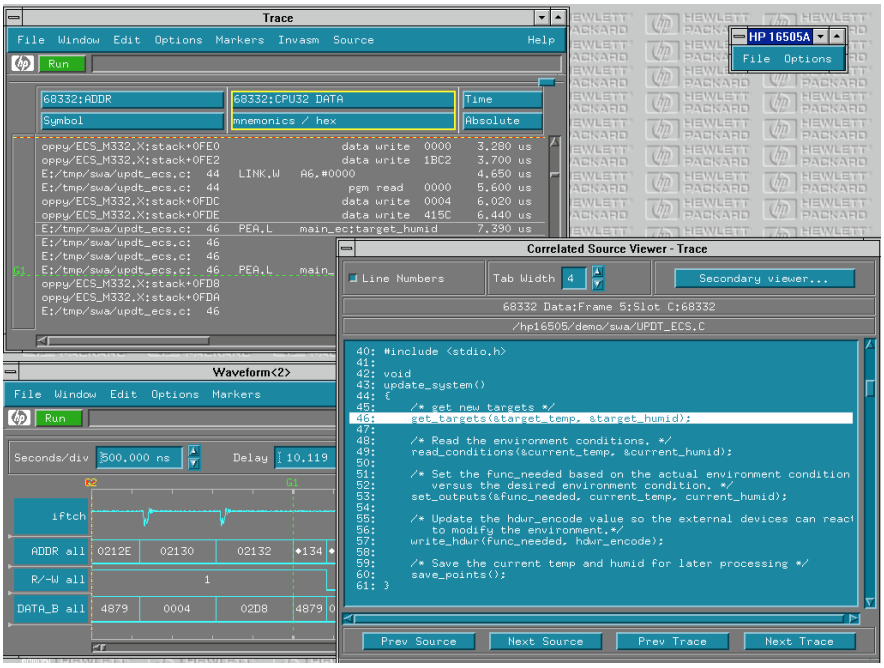


figure 1: Get a real-time window into 68360 behavior with source code, time corelated timing trace

and I/O ports are captured on each CPU clock. This mode is useful in hardware validation and when debugging system crashes.

State-Per-Bus Cycle

In the state-per-bus cycle mode, the analyzer samples address, data, status and I/O ports once per bus cycle. This mode is useful in software debugging because it increases the readability of the executed code and stores more instructions in the logic analyzer's trace memory.

Enhanced Disassembler

A disassembler included with the preprocessor displays execution traces in Motorola 68360 mnemonics. Instructions that are prefetched but not executed are marked in the trace display. Coprocessor operations can also be displayed or removed from the trace. Additionally, when the target microcontroller is configured in show mode, the preprocessor will capture and disassemble internal cycles.

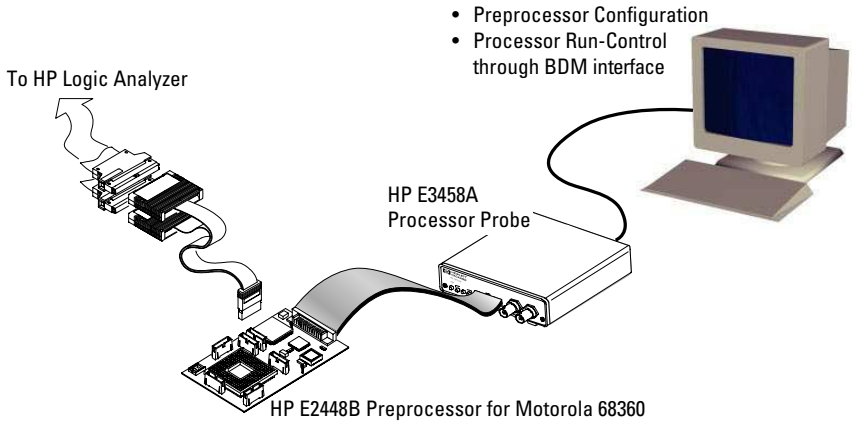


figure 2: Control target microcontroler and configure preprocessor with HP E3458A

Address Reconstruction and Source-Level Display

For software designers who need C source-level visibility during real-time code execution, the preprocessor has been designed to be used in conjunction with the HP B3740A or B4620A software analyzer tool set.

The HP software analyzer tool set provides a correlation between a microcontroller's execution trace window and the corresponding high-level source code window. The HP Software Analyzer reads the microcontroller's address bus value in each trace sample and finds the corresponding source line by using the symbolic information provided in the code's object file.

The preprocessor supports all Motorola 68360 working modes, even those using address bus pin reallocation. For example, an address bus pin can be reallocated as an Chip Select pin. Since the HP software analyzer tool set expects a complete address value to perform mnemonic-to-source translation, the preprocessor reconstructs address bits as needed and provides the analyzer with a complete 32-bit address.

To reconstruct the address bus, the preprocessor needs to be configured at least once for each different setup of the Motorola 68360 Chip Select registers. This configuration is done with the HP

E3458A processor probe connected to the preprocessor and to any ASCII terminal via RS-232 or LAN. Once configured, the preprocessor keeps the address reconstruction parameters in a local EEPROM. The analyzer or the target system can be powered down without having to reload the preprocessor's configuration.

Product Structure

By ordering the following preprocessor model numbers, you will receive all necessary boards, probes, high-density adapter cables and configuration files to analyze and disassemble microcontroller address, data, status and I/O ports lines in state or timing mode.

Preprocessor Model

E2448B	Processor : 68360, 68EN360, 68MH360	Package : PGA 241 pin
E8123A	Processor : 68360, 68EN360, 68MH360	Package : PQFP 240 pin

The E8123A includes the following products:
E2448B, E8124A, E5372A, E5363A

Analysis Pod Requirements

State analysis of reconstructed address, data and status busses. Allows trace disassembly and source-level analysis.	State/timing analysis of I/O ports.
6 analyzer pods required (102 channels)	6 analyzer pods required (102 channels)

Each preprocessor contains all necessary cables for connection to twelve analyzer pods.

Key Specifications

Active preprocessor. Power supplied by the HP logic analyzer.

Voltages
Both 3.3 volts and 5 volts are supported

Maximum Clock Speed
33 MHz

Termination Adapters
None are required.

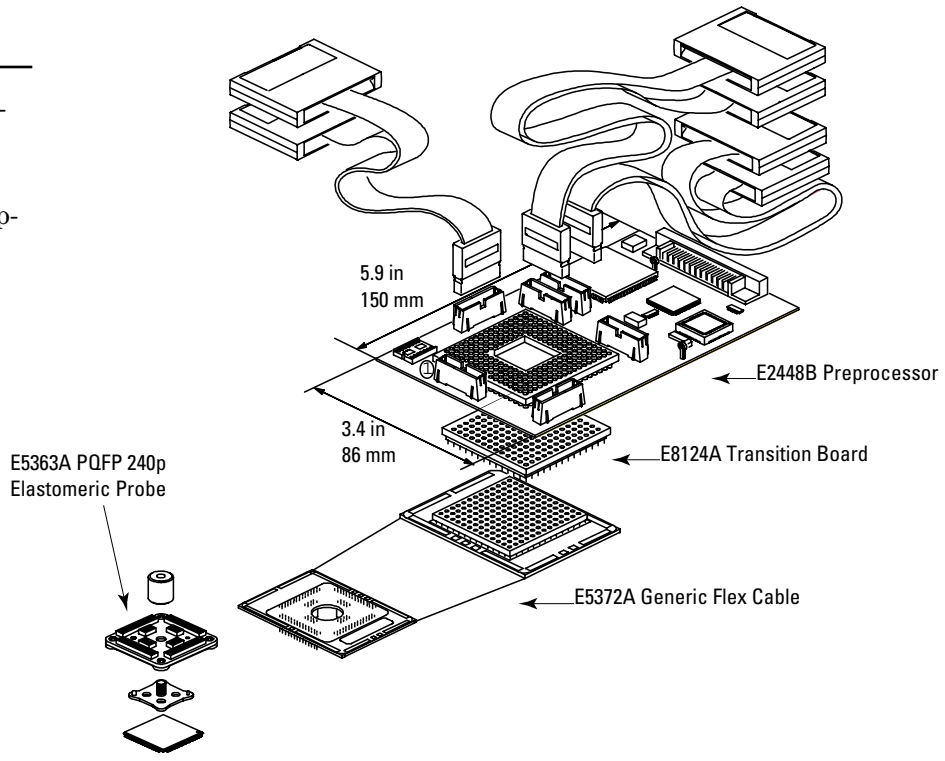


Figure 3: Preprocessor Architecture

Signal Loading

See figure 4, for the following signals

BKPT,DSCLK

C ~ 25 pF, R = 2.61 Kohms

FREEZE

C ~ 13 pF, R= 51.1 Kohms

BCLR0, MODCK0, TRIS, RMC

C ~ 1 pF, R = 51.1 Kohms

See figure 5, for the following signals

IFETCH/DSI

C ~ 13 pF, R = 17.8 Kohms

See figure 6, for the following signals

CLK01

C ~ 18 pF

DS,AS,IPIPE0/DS0

C ~ 13 pF

A24-A31, CS0-CS7

C ~ 16 pF

See figure 7, for the following signals

RESETH, BERR

remaining signals : C ~ 1pF

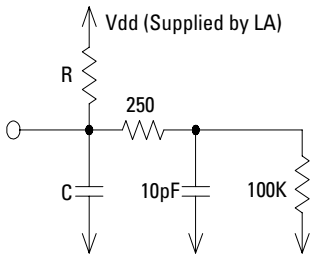


Figure 4

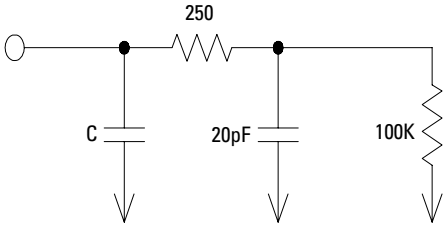


Figure 6

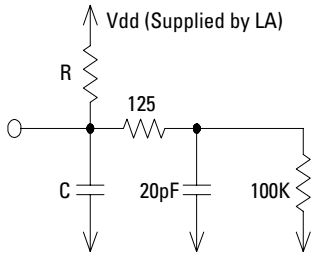


Figure 5

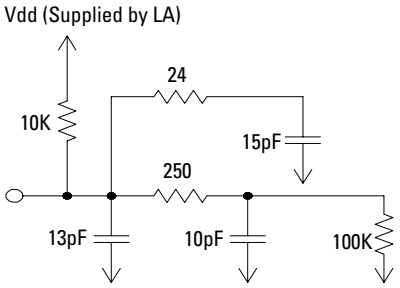
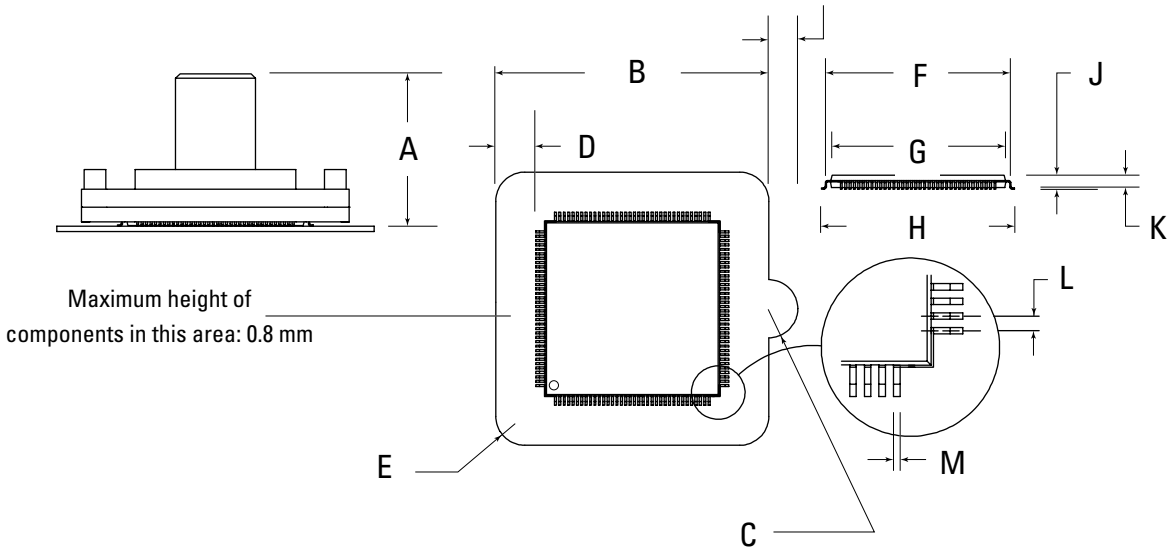


Figure 7

Elastomeric Probe Dimensions for 240-pin PQFP



Adapter	A	B	C	D	E	F	G	H	J	K	L	M
240-Pin PQFP												
(inches)	0.76	1.740	0.16	0.19	0.15	1.293 (min)	1.268 (max)	1.362 +/- 0.008	0.136 to 0.161	0.126 to 0.142	0.0197	0.0067 to 0.0106
(millimeters) (max)	19.2	44.2	4	4.9	3.8	32.85 (min)	32.20 (max)	34.60 +/- 0.20	3.45 to 4.10	3.20 to 3.60	0.5	0.17 to 0.27

Ordering Information

Logic analysis system

- 166xC/CS/D/DS	Portable logic analyzers
- 167xA/D	Deep memory portable logic analyzers
- 16500C	Modular logic analyzer with HP 1655xA analysis boards
- 16505A	Prototype analyzer

Preprocessor

- E2448B	Preprocessor for 68360, 68EN360, 68MH360, 68MH360V in PGA package
- E8123A	Preprocessor for 68360, 68EN360, 68MH360, 68MH360V in PQFP 240 pin package

Software analysis tool set

- B3740A	Software analysis tool for PC or workstation
#AAV	Sun SPARCstation, media and manuals
#AAY	HP 9000 series 700, media and manuals
#AJ4	IBM, 3 1/2" media and manuals
#UBK	Sun SPARCstation, single-user license
#UBY	HP 9000 series 700, single-user license
#UDY	IBM, single-user license
- B4620A	Software analysis tool set for the HP 16505A prototype analyzer

Processor probe

- E3458A	Processor probe for run-control through BDM interface and preprocessor configuration. Includes graphical interface on HP 16505A prototype analyzer

Note : The HP E3458A processor probe can also be controlled by third-party debuggers on HP or Sun workstations

Warranty Information

This Hewlett-Packard product has a warranty against defects in material and workmanship for a period of one year from date of shipment. During this warranty period, Hewlett-Packard Company will, at its option, either repair or replace products that prove to be defective.

Related HP Literature

HP 16500C Logic Analysis and HP16505A Prototype Analyzer, 5965-3187E

The HP 166OC/CS and HP 1670-Series Logic Analyzers, 5964-3665E

The HP B4620A Software Analyzer Tool Set, 5964-9333E

The HP B3740A Software Analyzer, 5962-7114E

The HP E3458A Processor Probe for the Motorola CPU 32 Series Microcontroller, 5965-6676E

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