HP E2411C and HP E5344A

Intel80486*
Preprocessor Interface

**For use with
HP logic analyzers**

The Hewlett-Packard E2411C preprocessor supports the Intel486DX, DX2, DX4, 486SX, 486SL Enhanced, and 487SX, as well as the OverDrive for the 486DX chip. The preprocessor interface provides an electrical and mechanical connection between your target system and an HP logic analyzer. Preprocessor software configures the logic analyzer labeling address, data, and status lines. Additionally, when a state trace is displayed, the data is disassembled and listed in 80486 mnemonics. The disassembler also decodes FPU instructions for target systems that use the Intel486DX and Intel487SX chips.
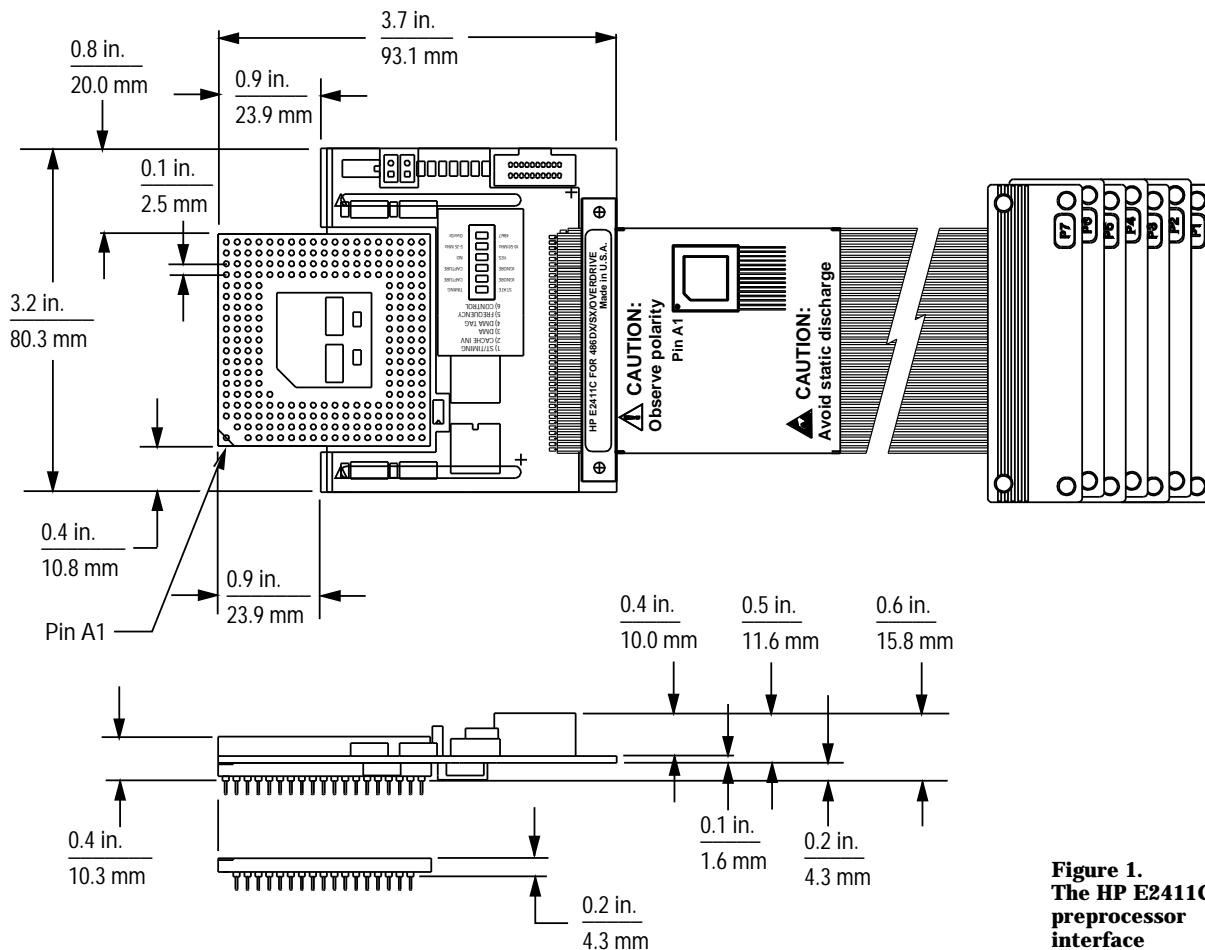
**Figure 1.
The HP E2411C preprocessor interface**

Key Specifications

Microprocessors Supported

•486DX, DX2, DX4	168-pin PGA
•486DX4	208-pin PQFP (1)
•486SX	168-pin PGA
•486SX	196-pin PQFP (2)
•486SL Enhanced	168-pin PGA
•486SL Enhanced	208-pin PQFP (1)
•487SX	169-pin PGA
•Pentium® OverDrive	235-pin PGA

Notes:
(1) HP E5344A CQFP/PQFP adapter required
(2) Emulation Technology† adapter required

Supply Voltage
The HP E2411C supports both 3.3V and 5V versions of the Intel486 family of processors.

Clock Frequency
• Processor core clock frequency to 100 MHz
• Minimum bus clock frequency 5 MHz
• Maximum bus clock frequency 50 MHz

Capabilities
State per clock mode—provides a complete display of all bus activity, including wait states, idle states, and cache invalidation cycles.

State per transfer mode — filters out wait and idle states , providing an easier to read display.

Timing mode — timing analysis is supported up to 500 MHz. Channel-to-channel skew is 1 ns.

The preprocessor allows you to improve trace readability by controlling the amount of information being sent to the analyzer. For example, you can configure the preprocessor to filter out cache invalidation cycles from the analyzer. For DMA transfers you can configure the preprocessor to send all DMA cycles, to send just one cycle which indicates a DMA transfer occurred, or to send no DMA cycles to the analyzer.

The following types of instructions can be selected to be displayed or suppressed: unexecuted prefetches, jumps, calls/returns, and other instructions. In addition, the following operations can be displayed or suppressed: memory read/writes, I/O read/writes, special cycles, and interrupt acknowledge cycles. Also, FPU instructions are decoded in the display.

Logic Analyzer Configurations
Includes all Intel486 processors listed above
• HP 16511B††
• HP 16540A, D with two HP 16541A, D cards
• HP 16550A (one card required)
• HP 16554A (two cards required)
• HP 16555A (two cards required)
• HP 16556A (two cards required)
• HP 1660-series

Number of Probes Required
Five, sixteen-channel probes are required for complete state disassembly. Two additional pods can be used to monitor AHOLD, INTR, RESET, FLUSH#, BREQ, HOLD, A20M#, PLOCK, PWT, ADS#, RDY#, BRDY#, CACHE#, BLEN#, HITM#, HIT#, UP#, BRDYC#, INV, R/S#, PRDY, NMI, INIT, IGNNE#, FERR#, ETRDY#, ETADS#, SMIACT#, SMI#, PCHK#, EWBE#, and WB/WT#.

Termination Adapters Required
None. All pods are terminated on the preprocessor.

HP E5344A CQFP/PQFP Adapter

A CQFP/PQFP adapter is available from HP that is designed to support the Intel80486 microprocessor in a 208-pin CQFP/PQFP package. This product includes a PGA transition board (shown in figure 2) that allows an HP E2411C preprocessor with a PGA connector to be plugged directly onto the PGA socket of the transition board. An overview of the HP E5344A physical dimensions is provided in figure 3. For complete dimensions and specifications, refer to the HP CQFP/PQFP probe adapter technical data sheet, pub number 5963-9497E.
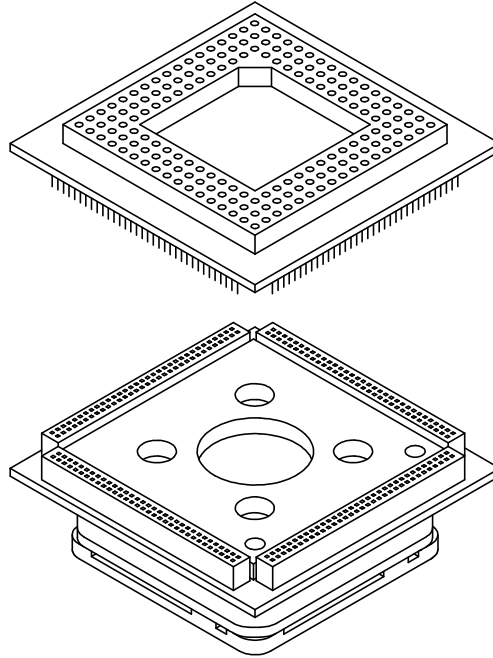
Figure 2. 208-pin CQFP/PQFP adapter with 80486 transition board.

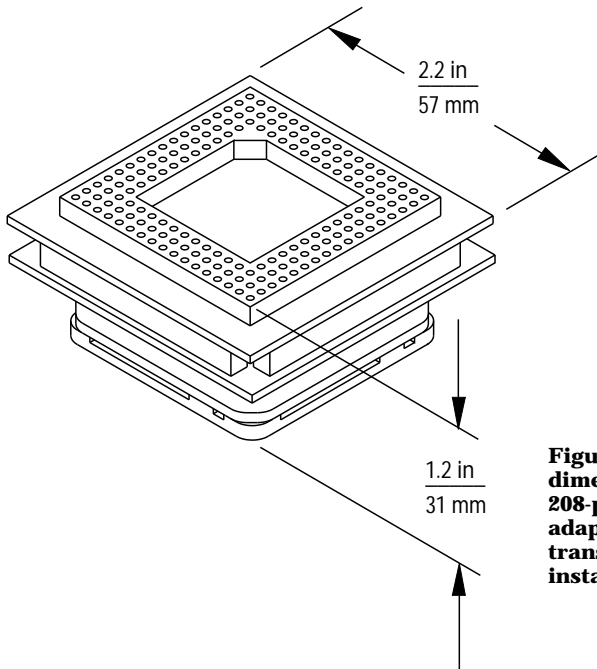| Electrical Characteristics	Signal loading in addition to HP E2411C preprocessor load	9 pF to Vss
Environmental Characteristics	Identical to the general-purpose probe Refer to publication number 5963-9497E	

2.2 in / 57 mm

1.2 in / 31 mm

Figure 3. Physical dimensions of 208-pin probe adapter with PGA transition board installed.

Ordering Information

HP E2411C
Preprocessor interface for the Intel80486 microprocessor

HP E5344A
208-pin CQFP/PQFP probe adapter transitions from Intel80486 in CQFP/PQFP package to HP E2411C PGA connector

HP 16554A
500K-Sample, 70-MHz state/250-MHz timing logic analyzer module
(Requires an HP 16500B mainframe)

HP 16555A
1M-Sample, 110-MHz state/500-MHz timing logic analyzer module
(Requires an HP 16500B mainframe)

HP 16556A
1 M-Sample, 100-MHz state/400-MHz timing logic analyzer module
(Requires an HP 16500B mainframe)

10390A, Option 006
System Performance Analysis software for HP 16554A, HP 16555A, and HP 16556A

HP 16550A
100-MHz state/500-MHz timing logic analyzer module

10390A, Option 004
System Performance Analysis software for HP 16550A

HP 16500B
Logic Analysis System mainframe

HP 16505A
Prototype Analysis System
(Requires an HP 16500B mainframe)

HP 16500U
Upgrades an HP 16500A mainframe to an HP 16500B mainframe

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P.O. Box 999
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The Netherlands

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