

HP 9000 Instrument Controllers

Technical Specifications Guide

Effective October, 1989



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Introduction

HP BASIC

The HP BASIC language is the heart of Hewlett-Packard instrument control. It is a simple and straightforward development environment that is ideal for automated test and measurement applications. HP BASIC has features that will give you a distinct competitive edge – in fact, it was created for HP engineers to assist in the complex task of developing test systems.

HP BASIC has a powerful command language, a highly optimized program development environment, easy-to-use graphics, and exceptional device I/O. A sophisticated program editor is incorporated into the language, which provides

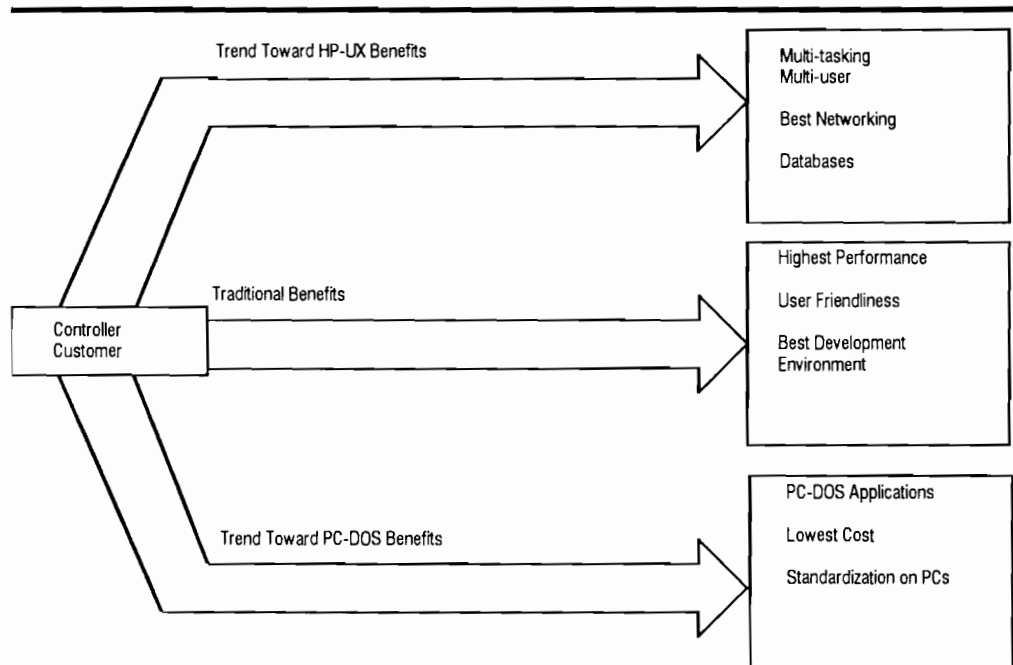
immediate detection of syntax errors as each program statement is entered. Tasks such as search-and-replace and moving large blocks of code are accomplished with ease. A variety of test and debugging tools helps cut development time to a minimum.

All of this makes HP BASIC the most powerful yet easy-to-use tool for instrument control or test and measurement applications available anywhere.

HP Operating System Platforms

The following diagram shows how the HP BASIC language is positioned across the spectrum of

Hewlett-Packard operating systems. For the “dedicated” HP BASIC workstation, the HP BASIC language includes its own operating system, optimized for instrument control. However, HP BASIC also runs as a language on two other industry-standard operating systems – UNIX® (Hewlett-Packard’s implementation is called HP-UX) and MS-DOS® – giving you a wide and comprehensive choice in how to use this powerful instrument control language.



HP-UX is based on the UNIX® System V Interface Definition, and will be fully compliant with OSF, X/Open™ and POSIX specifications as they emerge.

UNIX® is a registered trademark of AT&T in the U.S. and other countries.

MS-DOS® is a registered U.S. trademarks of Microsoft Corporation.

HP Hardware Platforms

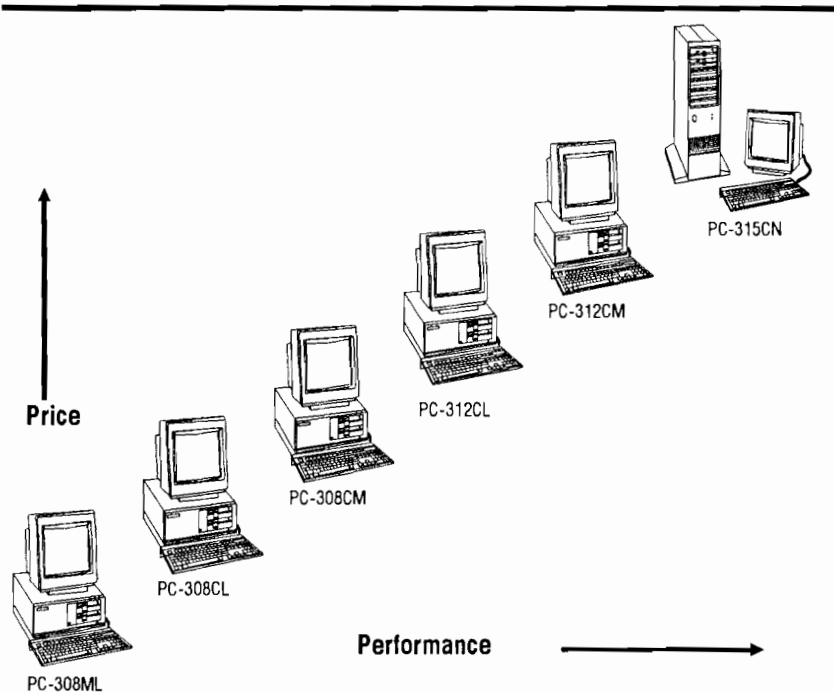
Hewlett-Packard has a wide range of instrument controllers to fit every need and budget – in fact, the widest choice in the industry based on hardware, processor architecture and operating system. The hardware platform includes both the HP 9000 Series 300 workstations and the HP Vectra personal computers. The processor architecture includes both Intel and Motorola. With HP's many years of experience in supplying automated test and measurement systems, we can help you select the exact hardware system that is best suited to your application.

PC Instrument Controllers

HP's personal computer (PC) controllers link the world of test and measurement with the world of personal computing. Based on the HP Vectra personal computer, these controllers run the MS-DOS operating system in normal operating mode. But with the HP BASIC Language Processor, the Vectra also runs the powerful HP BASIC instrument control language. Data files created with the HP BASIC Language Processor are completely compatible with MS-DOS files and accessible from MS-DOS applications, while programs developed on the Language Processor can also run on dedicated HP BASIC controllers.

The HP BASIC Language Processor is available either as a plug-in card or in three pre-packaged PC controllers based on the HP Vectra — PC-308, PC-312 and PC-315. Each of these models in turn comes in several pre-configured "bundles" (noted by their suffixes) which contain a variety of interfaces, peripherals and accessories suited for particular applications.

PC Controller Price/Performance Chart



Series 300 Instrument Controllers

Although all Series 300 instrument controllers are capable of running all Series 300 operating systems – HP BASIC, HP-UX and HP BASIC/UX and Pascal – a variety of pre-configured systems have been packaged for certain applications. These include dedicated HP BASIC Controllers, HP BASIC/UX Controllers, and HP-UX Controllers.

All Series 300 controllers are built on the powerful MC68000 family of Motorola microprocessors, which include both 16- and 16/32-bit bus architectures and a variety of clock speeds. Floating point co-processors and accelerators complement this powerful line.

Dedicated HP BASIC Controllers

Designed for state-of-the art performance in design, test, and measurement, Dedicated HP BASIC controllers include the Models 332, R/332 and 360. Selected pre-configured “bundles” are available with built-in RAM, color or monochrome displays, interfaces, peripherals and other accessories. The Model R/332 is an integrated, ruggedized, rack-mountable controller that runs the same software as other Series 300 controllers and uses the same accessories.

HP BASIC/UX Controllers

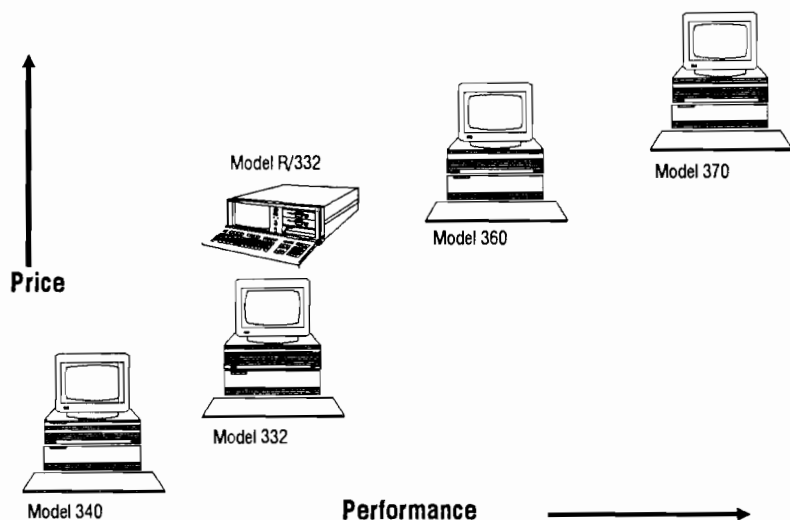
By combining the power of the UNIX operating system and HP BASIC to create HP BASIC/UX, HP has created instrument control whose power and versatility is without equal. HP BASIC/UX controllers are built on Models 332 and 360, with numerous pre-configured versions available with a variety of options and accessories. HP's

implementation of the UNIX operating system, HP-UX, adds numerous enhancements necessary for instrument control – graphics, windowing, industry-standard networking and a Device I/O Library (DIL). DIL, in particular, provides extremely high-performance instrument control through its DMA (direct memory access) and memory-mapped I/O.

HP-UX Controllers

HP-UX Controllers can provide C, FORTRAN and other language compilers with which instrument control programs can be custom-created by the user. HP-UX controllers include the Models 340, 360 and 370.

Series 300 Instrument Controller Price/Performance Chart



Comparison Chart

The following chart shows a detailed breakdown of important features for each instrument controller represented in this Specification Guide. For additional detail, see the individual models' specification sheets on the following pages.

Complete "bundling" and configuration information for each model, including what comes standard with the System Processing Unit (SPU), can be found in the HP 9000 Computing Systems Price Guide (pub. no. 5953-3791D) and the HP 9000 Workstations Configuration Guide (pub. no. 5954-8593).

Model	PC Controllers			Dedicated HP BASIC Controllers			HP-UX Controllers			
	PC-308	PC-312	PC-315	332	360	R/332	332	340	360	370
Processor:										
HP BASIC	68000	68000	68000	68030	68030	68030	68030	68030	68030	68030
PC	80286	80386	80386	N/A						
Clock speed(MHz):										
HP BASIC	8	8	8	16.7	25	16.7	16.7	16.7	25	33
PC	12	16/20	25	N/A						
Capacity Memory (std/max)										
HP BASIC	1M/4M	1M/4M	1M/4M	1M/8M	4M/16M	1M/8M	1M/8M	4M/16M	4M/16M	8M/48M
PC	640K	1M	1M							
I/O slots*	6	6	7	4/12	2/18	8/8	4/12	1/1	2/18	0/16
Displays/Graphics†	M/C	C	C							
(640x480) VGA	M/C	C	C							
512x400				M/C	M/C	M	M/C	M/C	M/C	M/C
1024x768				M/C	M/C		M/C	M/C	M/C	M/C
1280x1024				M/C	M/C		M/C	M/C	M/C	M/C
Interfaces										
HP-IB	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD
RS-232	STD	STD	STD	STD	STD	STD	STD	STD	STD	STD
RS-232 MUX							‡	‡	‡	‡
BCD				‡	‡				‡	
Custom				‡	‡		‡	‡	‡	‡
VME				‡	‡	‡	‡	‡	‡	‡
Networking										
LAN	‡	‡	‡	‡			‡	‡	‡	‡
SRM	‡	‡	‡	‡	‡*	‡	‡	‡	‡	‡
X.25	‡	‡	‡	‡	‡		‡	‡	‡	‡

* Number of available slots for I/O and accessory cards in a standard system, and in system with expanders.

† M = monochrome; C = color.

‡ May be installed in systems with available slots or in expanders.

PC-308 Instrument Controllers

Technical Data*



Introduction

Hewlett-Packard's 12 MHz PC-308 HP BASIC Controllers offer a powerful yet easy-to-use controller and IBM-compatible personal computer with state-of-the-art graphics in one affordable package. You have your choice of three PC-308 models: the PC-308ML includes HP's VGA-compatible monochrome video graphics subsystem; the PC-308CL and PC-308CM include the HP VGA-compatible color video graphics subsystem. The PC-308 includes a special installation disk with a set-up program that will format the system disk and install DOS and HP BASIC.

* Data subject to change without notice.

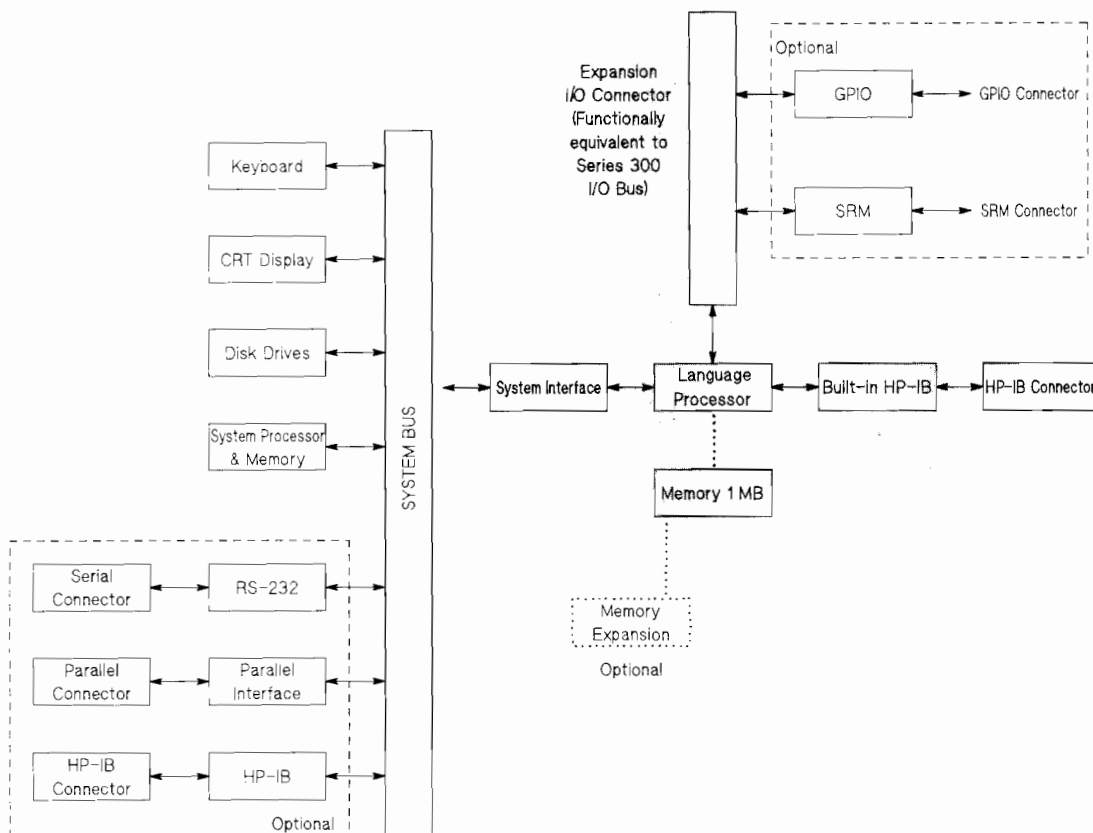


Diagram showing functional relationship of the HP BASIC Language Processor to the host HP Vectra or IBM PC/AT.

The PC-308 is based on the HP Vectra ES/12 PC (80286 CPU) personal computer. At the heart of the PC-308 is the HP BASIC Language Processor which provides the capabilities of an HP 9000 Series 300 workstation on a plug-in board. This plug-in accessory contains a Motorola 68000 CPU, 1 Mbyte of RAM (expandable to 4 Mbytes), HP-IB interface, DIO interface bus, and HP BASIC on flexible discs. With the HP BASIC Language Processor, the Vectra PC allows programming and execution of BASIC software. Software and data compatibility with PC-DOS files is assured.

Two Series 300 interfaces, GPIO and SRM, have been redesigned to meet the Vectra size and form specifications. They connect to the HP BASIC Language Processor through a DIO-equivalent bus, achieving maximum performance and compatibility. Vectra PC interfaces, such as serial (RS-232) and parallel (Centronics), are also supported.

Through a "pop-up" window, the BASIC Language Processor allows the user to communicate with BASIC and not even disturb a simultaneously running PC application.

As data is acquired by BASIC, it can be transmitted to an active DOS application such as Lotus 1-2-3®, Memomaker, and others, as well as to DOS data files on the internal hard disk. Because this capability is bi-directional, DOS applications can send commands or data to background BASIC files if desired.

HP Computer Museum
www.hpmuseum.net

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Technical Specifications

System Processing Unit

PC-308 (dual processors)		
Central Processor	MC68000	80286-compatible
Clock	8 MHz	12 MHz
Wait states	0	1
Floating Point	N/A	Intel 80287
Clock frequency (standard)	N/A	D1387A, 8 MHz
Accelerator	N/A	N/A
Main Memory		
Type	No parity	Byte parity error checking
RAM	1 Mbyte on-board	640 Kbytes on-board
Bus width	24b address, 16b data	24b address, 16b data
System RAM access time	500 nsec	375 nsec
Additional Memory	82305A 82303A	45944A Opt. 001/002/003
Maximum Memory	4 Mbytes	640 Kbytes Main; 8 Mbytes Expanded Memory Systems (EMS)

Standard System Interfaces and Features

Interface	PC-308	Series 300 DIO Equivalent
HP-IB	Yes	98624A
RS-232C	Yes	98644A
HP-HIL	Yes	—
RS-422	Optional*	98628A
LAN	Optional	98643A
DMA	No	98620B
High-speed HP-IB disk	No	98625B
SCSI	N/A	98265A 98658A
System timer	Yes	—
User timer	Yes	—
Battery-backed real-time clock	Yes	—
DOS software compatibility	Yes	98286A†
SoftPC®	N/A	

Physical and Environmental Specifications

SPU Power Specifications

PC-308

Source Consumption	3.85A @ 115V 2.12A @ 230V
Line Frequency	50 – 60 Hz
Power Consumption:	
Watts maximum	465W‡
BTU/hour	710
Power Availability:	
Power supply maximum:	134W
At + 5 volts	9.0A @ 5V
At + 12 volts	0.39A @ 12V
At - 12 volts	0.25 @ -12V

Physical Dimensions

PC-308

Height	160 mm (6.3 in.)
Width	425 mm (16.7 in.)
Depth	390 mm (15.4 in.) Additional 4 inches in depth should be allowed for interface cables
Net weight	13.9 kg (30.5 lbs.)

SPU Environmental Range

Operating temperature	+5°C to 40°C
Storage temperature	-40°C to 70°C
Humidity	15% to 80% R.H. (non-condensing)
Maximum altitude	4,570m (15,000 ft.)
EMI	Conducted and radiated interference meets FTZ Level B; FCC Class B

Clock and Timers

Real-time Clock

Resolution	0 milliseconds
Accuracy	+ 5 seconds/day
Battery backup	Lithium, expected life= 1 year

Timers

Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4sec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.

Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	01 sec. to 2.55 second/tone

* Not supported on HP BASIC

† Requires 98531A DOS Co-processor software.

‡ Includes 150W convenience outlet.

PC-308ML

The HP 82314E PC-308ML is a pre-configured HP Vectra ES/12 that includes the following:

- HP Vectra ES/12 SPU with 640 Kbyte RAM
- 20 Mbyte hard disk subsystem
- 1.44 Mbyte 3 1/2-inch flexible disk drive
- 14-inch monochrome video graphics display; choice of white, green or amber phosphor
- Video graphics adapter
- HP BASIC Language Processor with 1 Mbyte RAM and built-in HP-IB interface
- HP BASIC Language Processor Software Release II
- Serial, parallel interfaces
- HP Vectra DOS/PAM

Options

- 001 VGA (white)
- 002 VGA (green)
- 003 VGA (amber)

Accessories

Along with the HP BASIC Language Processor, there are many accessories that you can purchase to enhance your PC-308ML controller. These are:

General

- HP 82303A 512 Kbyte RAM expansion kit for the HP BASIC Language Processor
- HP 82305A RAM expansion board (512 Kbyte included) for the HP BASIC Language Processor, expandable to 3 Mbytes
- HP 45811A 360 Kbyte 5 1/4-inch flexible disk drive
- HP 45812A 1.2 Mbyte, 5 1/4-inch flexible disk drive
- HP 45813A 1.44 Mbyte 3 1/2-inch flexible disk drive
- HP D1387A 8087 numeric co-processor
- HP 45944A 001/002/003 Vectra ES expanded memory card

Interfaces

- HP 82306A GPIO interface
- HP 82307A GPIO cable
- HP 50963A Shared Resource Manager (SRM) interface

Rack Mounting

- HP 35199A Vectra rack
- HP 35199B VGA monitor rack
- HP 12131A keyboard rack
- HP 12679C rail kit

PC-308CL

The HP 82315E PC-308CL is a pre-configured HP Vectra ES/12 that includes the following:

- HP Vectra ES SPU with 640 Kbyte RAM
- 20 Mbyte hard disc subsystem
- 1.44 Mbyte 3 1/2-inch flexible disk drive
- 14-inch color video graphics display
- Video graphics adapter
- HP BASIC Language Processor with 1 Mbyte RAM and built-in HP-IB interface
- HP BASIC Language Processor Software Release II
- Serial, parallel interfaces
- HP Vectra DOS/PAM
- Tilt/Swivel base for display

Accessories

Along with the HP BASIC Language Processor, there are many accessories that you can purchase to enhance your PC-308ML controller. These are:

General

- HP 82303A 512 Kbyte RAM expansion kit for the HP BASIC Language Processor
- HP 82305A RAM expansion board (512 Kbyte included) for the HP BASIC Language Processor , expandable to 3 Mbytes
- HP 45811A 360 Kbyte 5 1/4-inch flexible disk drive
- HP 45812A 1.2 Mbyte 5 1/4-inch flexible disk drive
- HP 45813A 1.44 Mbyte 3 1/2-inch flexible disk drive
- HP D1387A 8087 numeric co-processor
- HP 45944A 001/002/003 Vectra ES expanded memory card

Interfaces

- HP 82306A GPIO interface
- HP 82307A GPIO cable
- HP 50963A Shared Resource Manager (SRM) interface

Rack Mounting

- HP 35199A Vectra rack
 - HP 35199B VGA monitor rack
 - HP 12131A keyboard rack
 - HP 12679C rail kit
-

PC-308CM

The HP 82319E PC-308CM is a pre-configured HP Vectra ES/12 that includes the following:

- HP Vectra ES SPU with 640 Kbyte RAM
- 40 Mbyte hard disc subsystem
- 1.44 Mbyte 3 1/2-inch flexible disk drive
- 14-inch color video graphics display
- Video graphics adapter
- HP BASIC Language Processor with 1 Mbyte RAM and built-in HP-IB interface
- HP BASIC Language Processor Software Release II
- Serial, parallel interfaces
- HP Vectra DOS/PAM
- Tilt/Swivel base for display

Accessories

Along with the HP BASIC Language Processor, there are many accessories that you can purchase to enhance your PC-308ML controller. These are:

General

- HP 82303A 512 Kbyte RAM expansion kit for the HP BASIC Language Processor)
- HP 82305A RAM expansion board (512 Kbyte included) for the HP BASIC Language Processor , expandable to 3 Mbytes
- HP 45811A 360 Kbyte 5 1/4-inch flexible disk drive
- HP 45812A 1.2 Mbytes 5 1/4-inch flexible disk drive
- HP 45813A 1.44 Mbyte 3 1/2-inch flexible disk drive
- HP D1387A 8087 numeric co-processor
- HP 45944A 001/002/003 Vectra ES expanded memory card

Interfaces

- HP 82306A GPIO interface
- HP 82307A GPIO cable
- HP 50963A Shared Resource Manager (SRM) interface

Rack Mounting

- HP 35199A Vectra rack
- HP 35199B VGA monitor rack
- HP 12131A keyboard rack
- HP 12679C rail kit

PC-312 Instrument Controllers

Technical Data*



Introduction

Hewlett-Packard's PC-312 HP BASIC controller offers engineers and scientists 80386 performance in the PC instrument controller family. This system includes HP BASIC which runs from RAM and a special installation disk that formats the built-in hard disk, installs MS-DOS and helps install HP BASIC. There are two PC-312 models: the PC-312CL based on the Vectra QS/16S and the PC-312CM based on the Vectra QS/20. Users can collect data via the HP-IB interface on the HP BASIC language processor and transfer it into widely available software packages for statistical or graphical analysis.

* Data subject to change without notice.

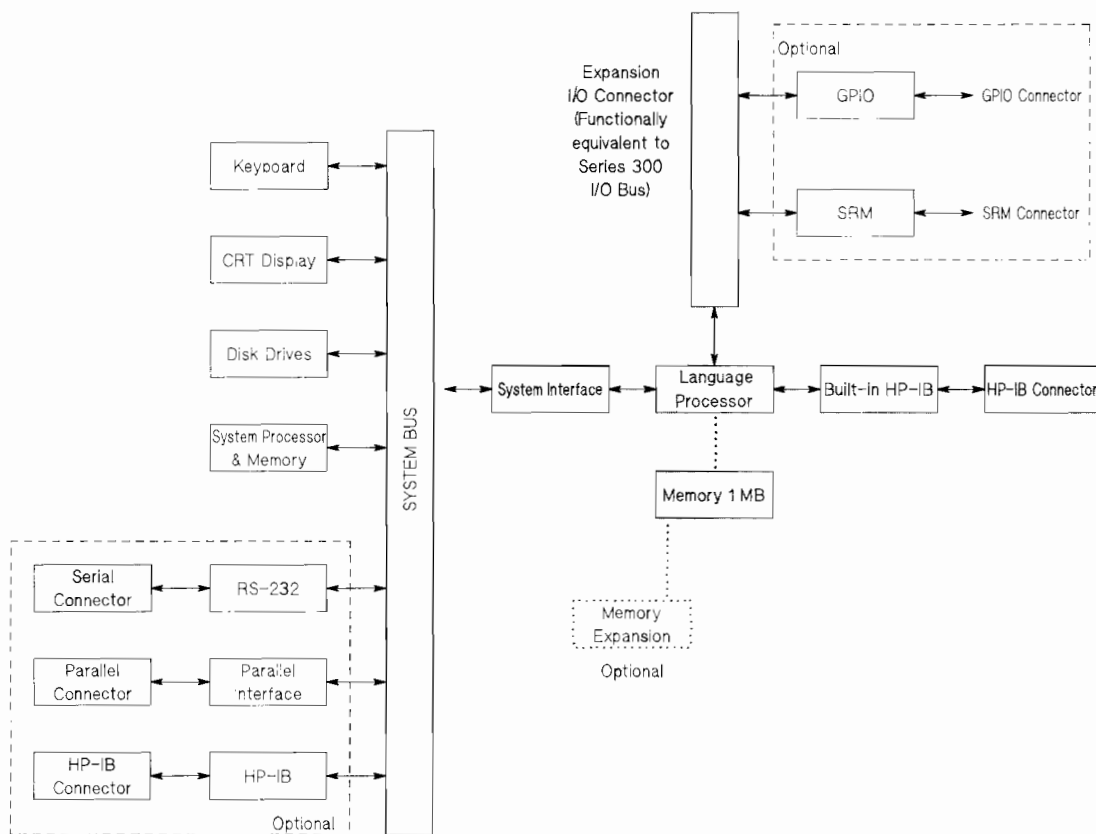


Diagram showing functional relationship of the HP BASIC Language Processor to the host HP Vectra or IBM PC/AT.

The HP BASIC language processor is based on the MC68000 microprocessor operating at 8 MHz. The language processor is provided with 1 Mbyte of RAM – it supports up to 4 Mbytes of RAM with a RAM expansion board, which does not use another I/O slot. The HP BASIC software enables the language processor to provide a complete HP BASIC programming environment. In addition an HP BASIC program can run unattended as a background task while the MS-DOS environment is active on the display. The language processor also supports the GPIO and SRM (Shared Resource Manager) interfaces.

The system processing unit (SPU) is based on the Intel 80386 microprocessor operating at 16 or 20 MHz. It supports up to 16 Mbytes of 32-bit RAM without using an I/O slot - this RAM is available to MS-DOS applications. (HP BASIC operates in its own RAM, as described above.) The PC-312 includes Hewlett-Packard's VGA color graphics subsystem featuring up to 640 x 480 resolution.

Technical Specifications

System Processing Unit

PC-312 (dual processors)		
Central Processor	MC68000	80386-compatible
Clock frequency	8 MHz	16 or 20 MHz
Wait states	N/A	0 to 1
Floating Point	N/A	Intel 80387 D1453A or D1670A
Clock frequency (standard)	N/A	16 MHz
Accelerator	N/A	N/A
Memory Management Unit		
Type	N/A	Intel 80386
Virtual memory (HP-UX only)	N/A	N/A
Contexts	N/A	N/A
Cache Memory		
Type	N/A	N/A
Size	N/A	N/A
Average cycle time	N/A	N/A
Main Memory		
Type	No parity	Byte parity error checking
RAM	1 Mbyte on-board	640 Kbytes on-board; 384 Kbytes reserved
Bus width	24b address, 16b data	24 address, 16b data
System RAM access time	500 nsec	100 nsec
Additional Memory Enhancements		
		QS/16S D1354A D1542A QS/20 D1640A D1642A
Memory Expansion Adaptor (16S/20)		
Maximum Memory	4 Mbytes	1 Mbyte Main; 16 Mbytes Expanded Memory System (EMS)

Standard System Interfaces and Features

Interface	PC-312	Series 300 DIO Equivalent
HP-IB	Yes	98624A
RS-232C	Yes	98644A
HP-HIL	Yes	—
RS-422	Optional	98628A
LAN	Optional	98643A
DMA	No	98620B
High-speed HP-IB disk	No	98625B
SCSI	N/A	98265A 98658A
System timer	Yes	—
User timer	Yes	—
Battery-backed real-time clock	Yes	—
DOS software compatibility	Yes	98286A
SoftPC®	N/A	

Physical and Environmental Specifications SPU Power Specifications

PC-312	
Source Consumption	4.05A @ 115V 2.12A @ 230V
Line Frequency	50 – 60 Hz
Power Consumption: Watts maximum	456W @ 110V* 487W @ 220V
BTU/hour	710
Power Availability: Power supply maximum:	134W
	9.0A @ 5V .39A @ 12V .25A @ -5V .25A @ -12V

Physical Dimensions

PC-312

Height	160 mm (6.3 in.)
Width	425 mm (16.7 in.)
Depth	391 mm (15.4 in.) Additional 4 inches in depth should be allowed for interface cables
Net weight	15 kg (33 lbs.)

SPU Environmental Range

Operating temperature	+5°C to 40°C
Storage temperature	-40°C to 70°C
Humidity	15% to 80% (non-condensing)
Maximum altitude	4,570m (15,000 ft)
EMI	Conducted and radiated interference meets FTZ level B FCC Class B

Clock and Timers

Real-time Clock

Resolution	10 milliseconds
Accuracy	+ 5 seconds/day
Battery backup	Lithium, expected life= 1 year

Timers

Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4msec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.

Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	01 sec. to 2.55 second/tone

* Includes ISOW convenience outlet.

PC-312CL

The HP 82332E PC-312CL is a pre-configured HP Vectra QS/16S computer that includes the following:

- HP Vectra QS/16S Model 47 SPU with 1 Mbyte RAM
- 40 Mbyte hard disk subsystem
- 1.44 Mbyte 3 1/2-inch flexible disk drive
- 14-inch video graphics color display
- Video graphics adapter
- Tilt/swivel base for the display
- HP BASIC Language Processor with 1 Mbyte RAM and built-in HP-IB interface
- HP BASIC Language Processor Software Release II
- Serial, parallel, and HP-HIL interfaces
- HP Vectra DOS/PAM

Accessories

Along with the HP BASIC Language Processor, there are many accessories that you can purchase to enhance your PC-312CL controller. These are:

General

- HP 82303A 512 Kbyte RAM expansion kit for the HP BASIC Language Processor
- HP 82305A RAM expansion board (512 Kbyte included) for the HP BASIC Language Processor, expandable to 3 Mbytes
- HP 45811A 360 Kbyte 5 1/4-inch flexible disk drive
- HP 45812A 1.2 Mbyte 5 1/4-inch flexible disk drive
- HP 45813A 1.44 Mbyte 3 1/2-inch flexible disk drive
- HP D1453A 80387 numeric co-processor QS/16

Interfaces

- HP 82306A GPIO interface
- HP 82307A GPIO cable
- HP 50963A Shared Resource Manager (SRM) interface

Rack Mounting

- HP 35199A Vectra rack
 - HP 35199B VGA monitor rack
 - HP 12131A keyboard rack
 - HP 12679C rail kit
-



PC-312CM

The HP 82333E PC-312CM is a pre-configured HP Vectra QS/20 computer that includes the following:

- HP Vectra QS/20 Model 47 SPU with 1 Mbyte RAM
- 40 Mbyte hard disk subsystem
- 1.44 Mbyte 3 1/2-inch flexible disk drive
- 14-inch video graphics color display
- Video graphics adapter
- Tilt/swivel base for the display
- HP BASIC Language Processor with 1 Mbyte RAM and built-in HP-IB interface
- HP BASIC Language Processor Software Release II
- Serial, parallel, and HP-HIL interfaces
- HP Vectra DOS/PAM

Accessories

Along with the HP BASIC Language Processor, there are many accessories that you can purchase to enhance your PC-312CM controller. These are:

General

- HP 82303A 512 Kbyte RAM expansion kit for the HP BASIC Language Processor)
- HP 82305A RAM expansion board (512 Kbyte included) for the HP BASIC Language Processor, expandable to 3 Mbytes
- HP 45811A 360 Kbyte 5 1/4-inch flexible disk drive
- HP 45812A 1.2 Mbyte 5 1/4-inch flexible disk drive
- HP 45813A 1.44 Mbyte 3 1/2-inch flexible disk drive
- HP D1670A 80387 numeric co-processor QS/20

Interfaces

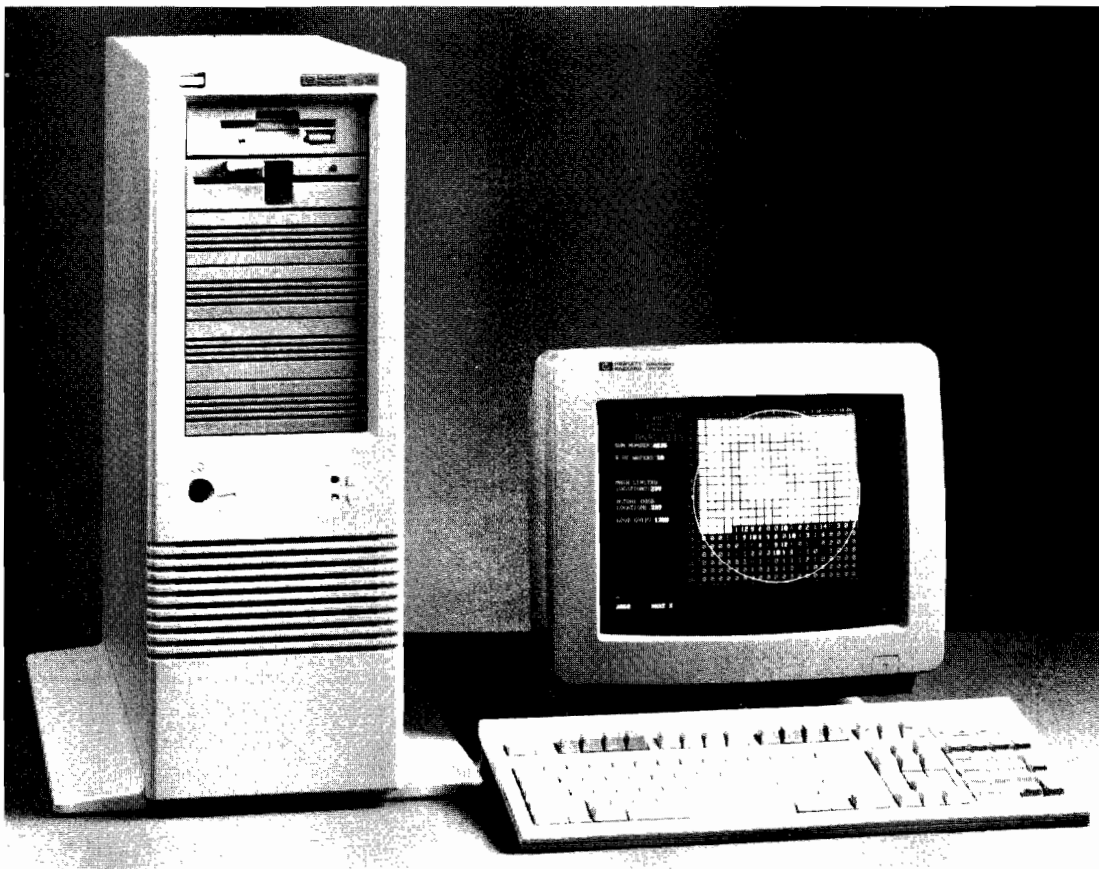
- HP 82306A GPIO interface
- HP 82307A GPIO cable
- HP 50963A Shared Resource Manager (SRM) interface

Rack Mounting

- HP 35199A Vectra rack
- HP 35199B VGA monitor rack
- HP 12131A keyboard rack
- HP 12679C rail kit

PC-315 Instrument Controllers

Technical Data*



Introduction

The PC-315 is Hewlett-Packard's leading high-performance personal computer controller. It is based on the HP Vectra RS/25C, HP's highest-performance Vectra personal computer. It combines the power of the Intel 80386

processor at 25 MHz, state-of-the-art cache memory architecture, high-speed disk drives and a superbly designed floor mount package. The PC-315 has more I/O and mass storage slots than any other PC controller, making it a good choice machine for advanced instrument control.

* Data subject to change without notice.

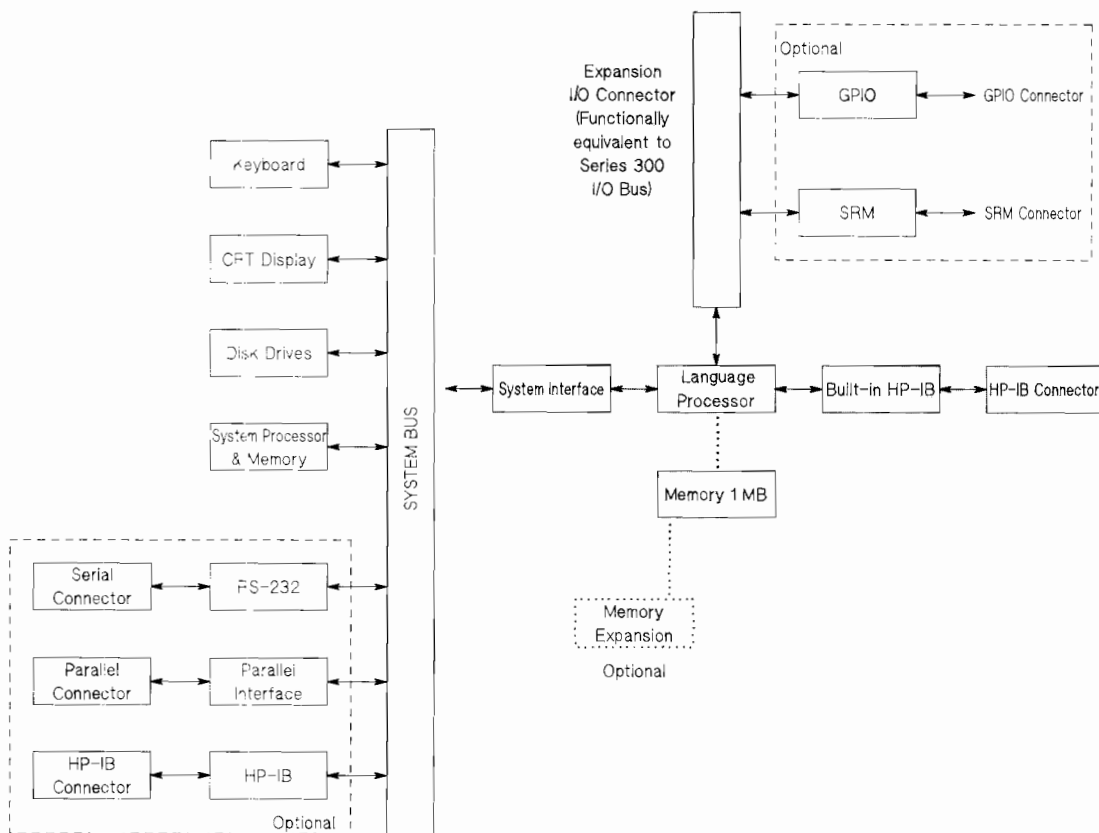


Diagram showing functional relationship of the HP BASIC Language Processor to the host HP Vectra or IBM PC/AT.

The PC-315 uses a finely tuned CPU architecture and subsystems to achieve superior performance with the latest components. The heart of the design is the Intel 80386 processor coupled with the powerful 82835 cache memory controller. This combination provides the fastest memory architecture available for 80386 computers today. Compatibility with the Intel 80387 co-processor and the new Weitek one-chip 3167 floating point accelerator further bolsters overall computational speed.

The PC-315 supports high-speed (17 ms seek time), high-capacity

(up to 620 Mbytes) hard disk subsystems using the Enhanced Small Device Interface (ESDI). These disk drives provide, at the PC level, technology formerly available only on minicomputers. The PC-315 has eight industry-standard AT type accessory slots, room for up to 16 Mbytes of 32-bit memory on the processor board, six mass storage shelves, and a power supply large enough to support these accessories and still leave room for growth.

The HP BASIC language processor used in the PC-315 is based on the MC68000 microprocessor operating at 8

MHz. The language processor is provided with 1 Mbyte of RAM – it supports up to 4 Mbytes of RAM with a RAM expansion board, which does not use another I/O slot. The HP BASIC software enables the language processor to provide a complete HP BASIC programming environment. In addition an HP BASIC program can run unattended as a background task while the MS-DOS environment is active on the display. The language processor also supports the GPIO and SRM (Shared Resource Manager) interfaces.

Technical Specifications

System Processing Unit

PC-315 (dual processors)		
Central Processor	MC68000	80386-compatible
Clock frequency	8 MHz	25 MHz
Wait states	N/A	Near 0
Floating Point	N/A	Intel 80387 D2070A
Clock frequency (standard)	N/A	25 MHz
Accelerator	N/A	N/A
Memory Management Unit		
Type	N/A	Intel 80386
Maximum memory	4 Mbyte	16 Mbyte
Contexts	N/A	N/A
Cache Memory		
Type	No parity	Byte parity error checking
Size	N/A	32 Kbytes
Average cycle time	N/A	120 to 150 nsec
Main Memory		
Type	No parity	Byte parity error checking
RAM	1 Mbyte on-board	640 Kbytes on-board
Bus width	24b address, 16b data	24b address, 16b data
System RAM access time	500 nsec	80 nsec
Additional Memory		
Maximum Memory	82305A 823053A 4 Mbytes	D1640A D1642A 1 Mbyte Main; 16 Mbytes Expanded Memory Systems (EMS)

Standard System Interfaces and Features

Interface	PC-315	Series 300 DIO Equivalent
HP-IB	Yes	98624A
RS-232C	Yes	98644A
HP-HIL	Yes	—
RS-422	Optional	98628A
LAN	Optional	98643A
DMA	No	98620B
High-speed HP-IB disk	No	98625B
SCSI	No	98265A 98658A
System timer	Yes	—
User timer	Yes	—
Battery-backed real-time clock	Yes	—
DOS software compatibility	Yes	98286A
SoftPC®	N/A	—

Physical and Environmental Specifications SPU Power Specifications

PC-315

Source Consumption	60 Amp @ 100 –125V 3.5 Amp @ 200 – 240V
Line Frequency	50 – 60 Hz
Power Consumption:	
Watts maximum	440
BTU/hour	910
Power Availability:	
Power supply maximum:	460
At + 5 volts	7.6A
At + 12 volts	0.5A
At - 12 volts	0.3A

Physical Dimensions

PC-315

Height	600 mm (24 in.)
Width	210 mm (8.3 in.)
Depth	500 mm (20 in.) Additional 4 inches in depth should be allowed for interface cables
Net weight	27 kg (60 lbs.)

SPU Environmental Range

Operating temperature	0°C to 55°C
Storage temperature	-40°C to 70°C
Humidity	15% to 95% R.H. (non-condensing)
Maximum altitude	4,570m (15,000 ft.)
EMI	Conducted and radiated interference meets FTZ Level B; FCC Class B

Clock and Timers

Real-time Clock

Resolution	10 milliseconds
Accuracy	+ 5 seconds/day
Battery backup	Lithium, expected life= 1 year

Timers

Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4msec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.

Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	01 sec. to 2.55 second/tone

PC-315CN

The HP 82334E PC-315CN is a pre-configured HP Vectra RS/25C computer that includes the following:

- HP Vectra RS/25C SPU with 1 Mbyte RAM
- 103 Mbyte hard disk subsystem
- 1.44 Mbyte 3 1/2-inch flexible disk drive
- 1.2 Mbyte 5 1/4-inch flexible disk drive
- 14-inch video graphics color display
- Video graphics adapter
- Tilt/swivel base for the display
- HP BASIC Language Processor with 1 Mbyte RAM and built-in HP-IB interface
- HP BASIC Language Processor Software Release II
- Serial, parallel, and HP-HIL interfaces
- HP Vectra DOS/PAM

Accessories

Along with the HP BASIC Language Processor, there are many accessories that you can purchase to enhance your PC-315CN controller. These are:

General

- HP 82303A 512 Kbyte RAM expansion kit for the HP BASIC Language Processor
- HP 82305A RAM expansion board (512 Kbyte included) for the HP BASIC Language Processor, expandable to 3 Mbytes
- HP 45811A 360 Kbyte 5 1/4-inch flexible disk drive
- HP 45812A 1.2 Mbyte 5 1/4-inch flexible disk drive
- HP 45813A 1.44 Mbyte 3 1/2-inch flexible disk drive
- HP D1640A 1 Mbyte expansion kit
- HP D1642A 4 Mbyte expansion kit
- HP D2070A 80387 numeric co-processor

Interfaces

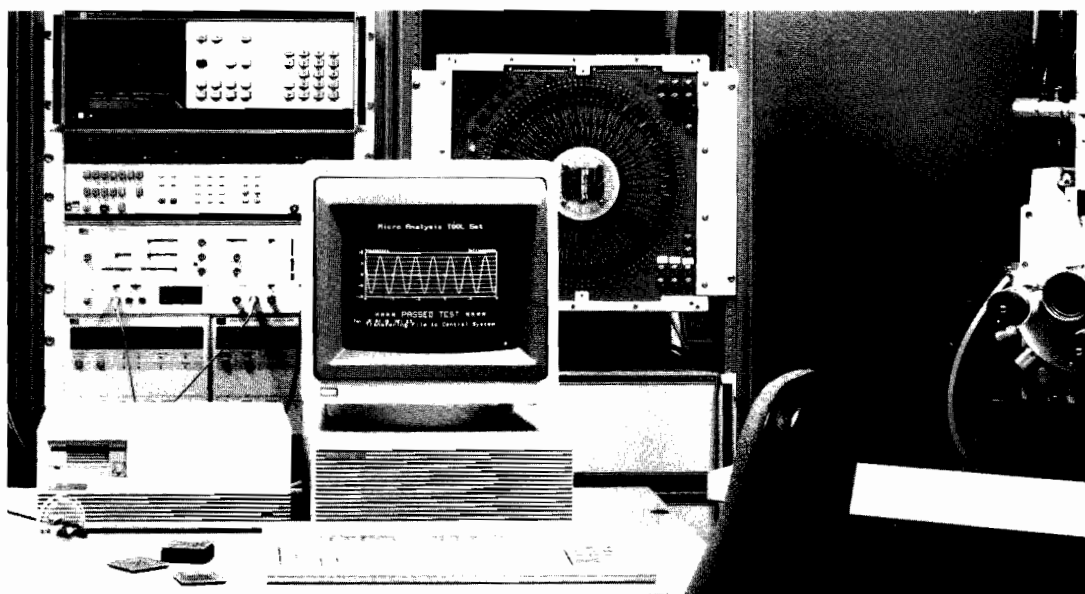
- HP 82306A GPIO interface
- HP 82307A GPIO cable
- HP 50963A Shared Resource Manager (SRM) interface

Rack Mounting

- HP 35199A Vectra rack
- HP 35199B VGA monitor rack
- HP 12131A keyboard rack
- HP 12679C rail kit

Series 300 Model 332 Instrument Controllers

Technical Data*



Introduction

The Model 332 provides very high performance in a low-cost package ideal for measurement automation applications. The CPU performance is based on a MC68030 processor operating at 16.7 MHz. A MMU (Memory Management Unit), 256 byte data cache, and 256 byte instruction cache are all included on the MC68030 processor chip. RAM access is optimized by use of 32-bit data and address buses. I/O is via the DIO backplane, featuring a 16-bit bi-directional data bus, 24-bit address bus, and

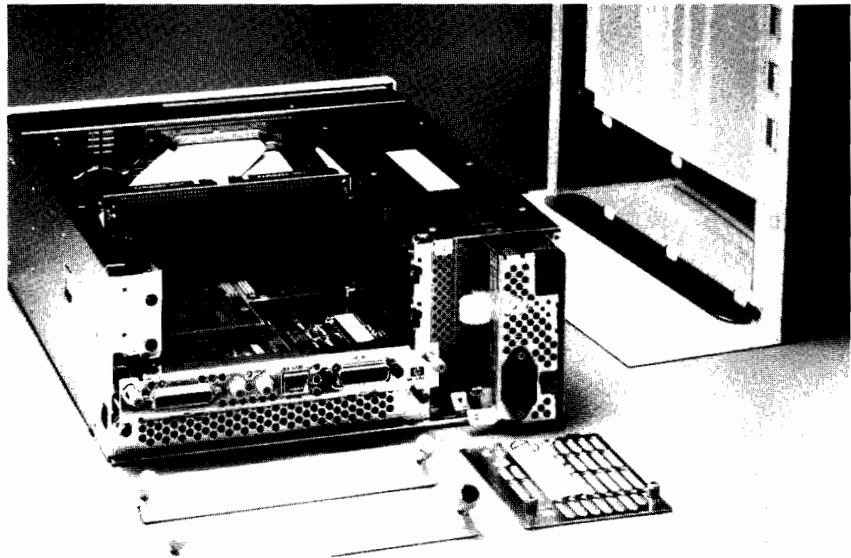
bus arbitration logic to permit multiple bus masters. The transfer rate achieved is 1.5 Mwords (3.0 Mbytes) per second. The Models 332MMA and CMA are supplied with the HP BASIC Language System, while the Models 332MMAX and CMAX are supplied with HP BASIC/UX.

* Data subject to change without notice.

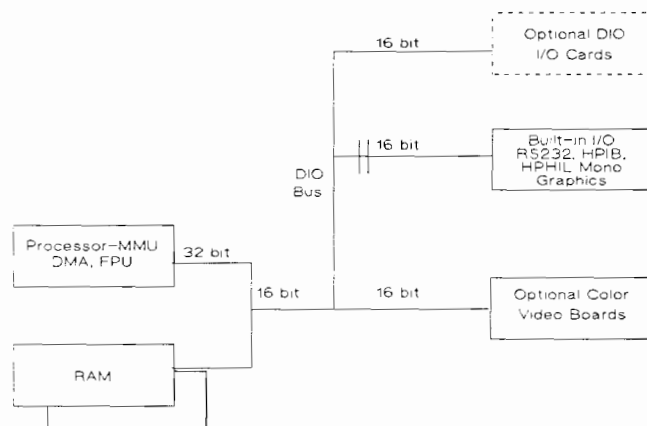
Standard on the CPU board are HP-IB, RS-232C with DB25 connector, HP-HIL, and system and user timers. Two-channel DMA controller logic is also included. Floating-point math performance may be enhanced with an optional MC68882 co-processor, which is installed in a socket on the CPU board. Several graphics options are available. Standard is 512 x 400 resolution monochrome, implemented through logic on the CPU board. The medium resolution may be replaced with 1024 x 768 monochrome logic through either a factory- or field-installed option. The CPU board is also available without graphics, allowing any of the available DIO graphics cards to be installed in the SPU's remaining system slot.

Two connectors are provided on the CPU board for installation of RAM "daughter" boards. The parity-checking RAM is available in sizes of 1 or 4 Mbytes, thus allowing total memory of 1, 2, 4, 5, or 8 Mbytes.

Interface cards are connected to the CPU through a DIO backplane. The Model 332 has four available accessory slots. These may be increased through use of an expander. Due to the cover plates used with DIO interface cards, one interface card may be used in each pair of DIO accessory slots. The remaining slots may be used for accessory cards such as a breadboard interface or a DOS co-processor card.



Model 332 SPU Configuration



Functionality diagram of Model 332

In addition to HP BASIC, the Model 332 is also available with HP-UX, (including HP BASIC/UX) and all the SPU accessories necessary to configure a complete system. This provides a powerful HP-UX

platform that offers low cost, expandability and extremely high performance in measurement automation applications.

Technical Specifications

System Processing Unit

Model 332	
Central Processor	MC68030
Clock	16.7 MHz
Wait states	0
Floating Point	MC68882 (optional)
Clock frequency	16.7 MHz
Accelerator	N/A
Memory Management Unit	
Type	On chip
Virtual memory (HP-UX only)	4 Gbyte/process
Contexts	84 default user-settable
Cache Memory	
Type	Instruction cache and data cache on CPU chip
Size	512 bytes
Main Memory	
Type	Byte parity error checking
RAM	1, 2, 4, 5, or 8 Mbyte via daughter boards
Bus width	32b address, 32b data
System RAM access time	80 nsec min. 200 nsec max. (worst case)
Additional Memory	
Maximum Memory	8 Mbytes

Standard System Interfaces and Features

Interface	DIO Equivalent	Model 332
HP-IB	98624A	Yes
RS-232C	98644A	Yes
HP-HIL	—	Yes
RS-422	98628A	No
LAN	98643A	Optional*
DMA	98620B	Yes
High-speed HP-IB disk	98625B	Optional
SCSI	98658A	Optional
System timer	—	Yes
User timer	—	Yes
Battery-backed real-time clock	—	Yes
DOS software compatibility	98286A†	Yes*

Physical and Environmental Specifications

Source Consumption	5.0A @ 90 – 132V, switch selectable 3.0A @ 180 – 250V, switch selectable
Line Frequency	48 – 66 Hz
Power Consumption:	
Watts maximum	250
BTU/hour	853
Kcal/hour	250
Power Availability:	
Power supply maximum:	150 Watts
At + 5 volts	20 Amps
At + 12 volts	3.6 Amps
At - 12 volts	1.1 Amps
DIO Backplane Power:	
At + 5 volts	—
At + 12 volts	—
At - 12 volts	—
DIO II Backplane Power:	
At + 5 volts	N/A
At + 12 volts	N/A
At - 12 volts	N/A

Physical Dimensions

Model 332	
Height	130 mm (5.12 in.)
Width	325 mm (12.8 in.)
Depth	376 mm (14.8 in.) Additional 4 inches in depth should be allowed for interface cables
Net weight	11.8 kg (26 lbs.)

Environmental Range

Operating temperature	0°C to +55°C to 2286m (7500 ft.)
Storage temperature	-40°C to +70°C
Maximum wet-bulb temperature	40°C
Humidity:	
Operating	40°C 15% to 95% R.H.
Non-operating	65°C @90% R.H.
Altitude:	
Operating	4,570m (15,000 ft.) to 47C
Non-operating	15,240m (50,000 ft.)
EMI	Conducted and radiated interference meets FCC Class A, VCCI Class 1; VDE 1046/84 Level B
Regulatory Compliance	UL 478, 5th edition; CSA 22.2 No. 220, M-1986; IEC 950, 1st edition 1986

Clock and Timers

Real-time Clock	
Resolution	10 milliseconds
Accuracy	+5 seconds/day
Battery backup	Lithium, expected life= 1 year
Expected run time after power loss	12 hours
Timers	
Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4msec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.	
Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	01 sec. to 2.55 second/tone

* Not supported on HP BASIC.

† Also requires 98531A DOS Co-processor software.

Model 332MMA

The HP 98580C Model 332MMA is a pre-configured Series 300 computer that includes the following:

- Model 332 SPU with 1 Mbyte RAM
- 12-inch medium-resolution monochrome monitor (512 x 400)
- HP BASIC Language System software on 3 1/2-inch single-sided disks
- Keyboard

Options

- Opt. 008 – 98546A display compatibility interface
- Opt. 102 – 1 Mbyte RAM (for total of 2 Mbytes)
- Opt. 104 – Substitute 4 Mbyte RAM board for 1 Mbyte RAM board for total of 4 Mbytes
- Opt. 618 – HP BASIC Compiler, including disk and manual
- Opt. 882 – 98284A MC68882 floating point co-processor

Accessories

There are many accessories that you can purchase to enhance your Model 332MMA controller. These include:

General

- HP 98269A 1 Mbyte parity RAM daughterboard
- HP 98269B 4 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 9888A 16-slot DIO expander
- HP 46060A HP-HIL 2-button mouse
- HP 46084A HP-HIL ID module
- HP 98253A EPROM programmer

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit
- HP 98567A rack adapter for mono monitor

Suggested Peripherals

- HP 9122C dual 3 1/2-inch flexible disk drive
- HP 9153C 10-40 Mbyte fixed hard disk (with or without built-in 3 1/2-inch flexible disk drive)
- HP 2225A ThinkJet printer
- HP 7475A plotter

Model 332CMA

The HP 98581C Model 332CMA is a pre-configured Series 300 computer that includes the following:

- Model 332 SPU with 1 Mbyte RAM
- 12-inch medium-resolution color monitor (512 x 400)
- HP BASIC Language System software on 3 1/2-inch single-sided disks
- Keyboard

Options

- Opt. 008 – 98546A display compatibility interface
- Opt. 102 – 1 Mbyte RAM (for total of 2 Mbytes)
- Opt. 104 – Substitute 4 Mbyte RAM board for 1 Mbyte RAM board for total of 4 Mbytes
- Opt. 618 – HP BASIC 5X Compiler, including disk and manual
- Opt. 882 – 98284A MC68882 floating point co-processor

Accessories

There are many accessories that you can purchase to enhance your Model 332CMA controller. These include:

General

- HP 98269A 1 Mbyte parity RAM daughterboard
- HP 98269B 4 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 9888A 16-slot DIO expander
- HP 46060A HP-HIL 2-button mouse
- HP 46084A HP-HIL ID module
- HP 98253A EPROM programmer

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit
- HP 98567A rack adapter for color monitor

Suggested Peripherals

- HP 9122C dual 3 1/2-inch flexible disk drive
 - HP 9153C 10-40 Mbyte fixed hard disk (with or without built-in 3 1/2-inch flexible disk drive)
 - HP 2225A ThinkJet printer
 - HP 7475A plotter
-

Model 332MMAX

The HP 98580CX Model 332MMAX is a pre-configured Series 300 computer that includes the following:

- Model 332 SPU with 4 Mbytes RAM
- 17-inch high-resolution monochrome monitor (1024 x 768)
- HP-UX license-to-use, media and manuals, with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- HP-HIL ID module

Options

- Opt. 108 – 4 Mbyte RAM (for total of 8 Mbytes)
- Opt. 402 – 7958B 152 Mbyte hard disk subsystem with all system software pre-installed
- Opt. 403 – 7959B 304 Mbyte hard disk subsystem with all system software pre-installed

Accessories

There are many accessories that you can purchase to enhance your Model 332MMAX controller. These include:

General

- HP 98269A 1 Mbyte parity RAM daughterboard
- HP 98269B 4 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 9888A 16-slot DIO expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
 - HP 33440A LaserJet Printer
 - HP 7550 plotter
-

Model 332CMAX

The HP 98581CX Model 332CMAX is a pre-configured Series 300 computer that includes the following:

- Model 332 SPU with 4 Mbytes RAM
- 16-inch high-resolution color monitor (1024 x 768)
- HP-UX license-to-use, media and manuals, with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- HP-HIL ID module
- HP-HIL buffer box with speaker

Options

- Opt. 108 – 4 Mbyte RAM (for total of 8 Mbytes)
- Opt. 402 – 7958B 152 Mbyte hard disk subsystem with all system software pre-installed
- Opt. 403 – 7959B 304 Mbyte hard disk subsystem with all system software pre-installed

Accessories

There are many accessories that you can purchase to enhance your Model 332CMAX controller. These include:

General

- HP 98269A 1 Mbyte parity RAM daughterboard
- HP 98269B 4 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 9888A DIO 16-slot expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

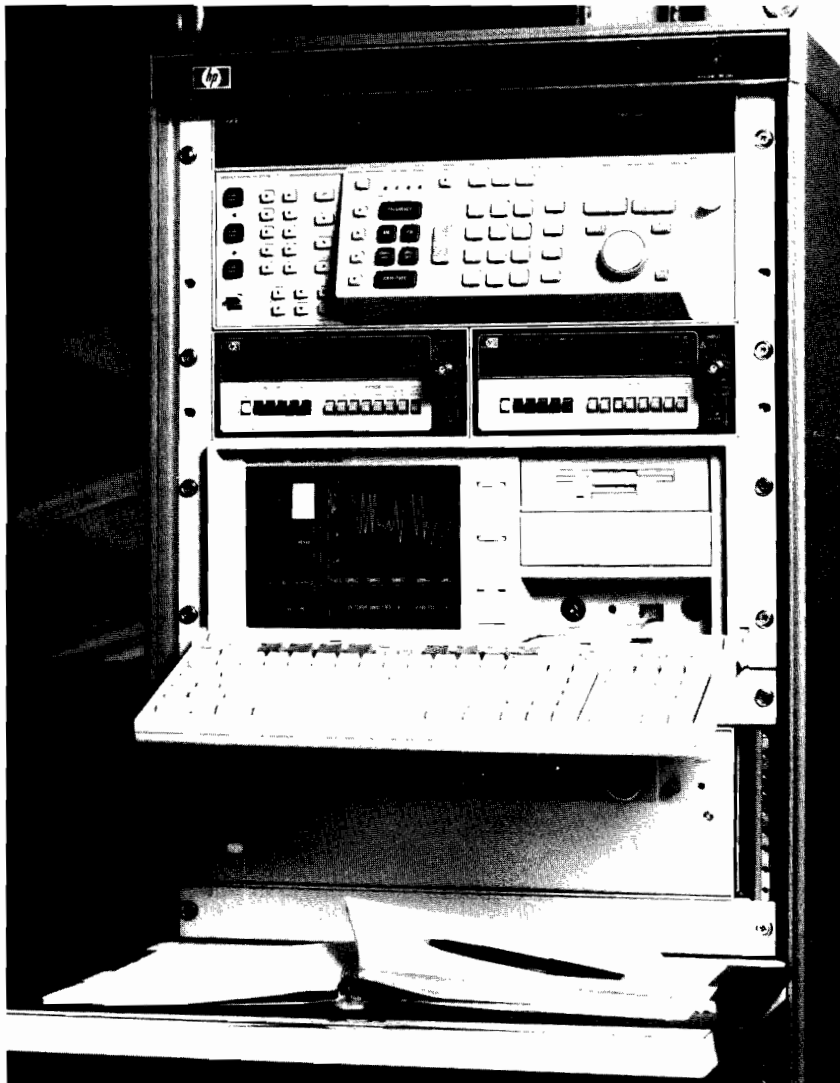
Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 33440A LaserJet printer
- HP 7550 plotter

Series 300 Model R/332 Instrument Controllers



Technical Data*

Introduction

Now engineers and scientists have a new choice for measurement automation and process control. The Model R/332 Controller gives you the computer power you want in a form ideally suited for control applications. The Model R/332 is fully compatible with Series 300 software and enhancement accessories. In addition, it is designed to survive in demanding applications and difficult environments. And, the controller can easily be mounted in an EIA 19-inch rack, requiring only 7 inches of rack height.

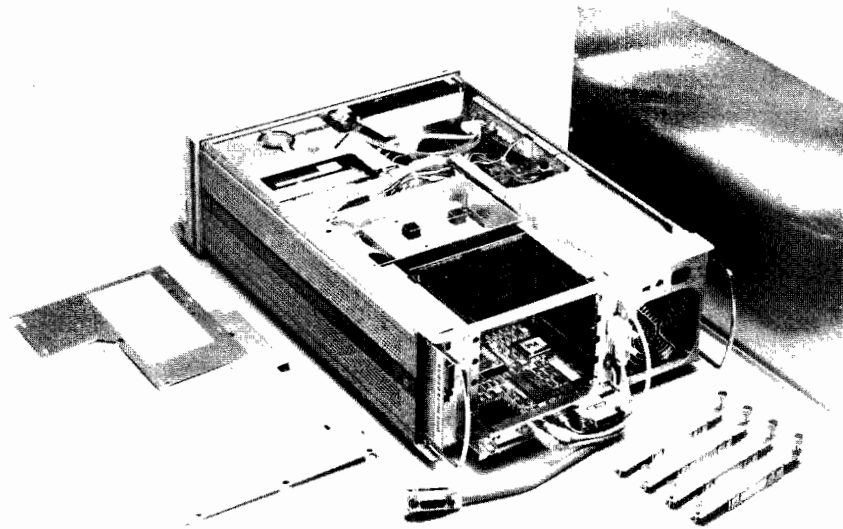
* Data subject to change without notice.

The Model R/332 contains HP's Model 332 CPU board, a built-in display, hinged keyboard, built-in flexible and hard disk drives, and a touch-screen input device. Construction includes a cast-aluminum frame for strength, and double-wall shielding throughout to minimize electromagnetic emissions and susceptibility. The Model R/332 runs HP BASIC.

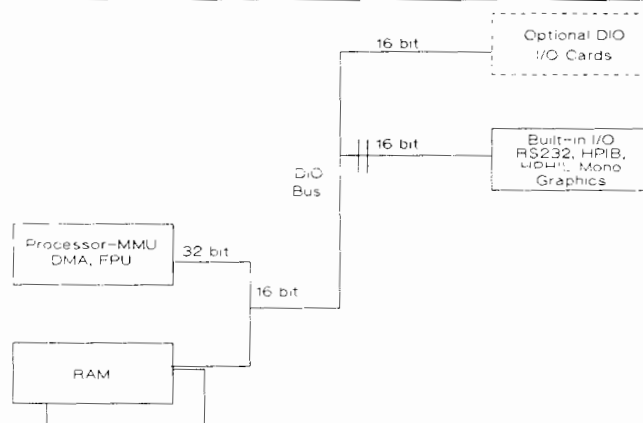
The Model R/332 CPU board features Motorola's 68030 processor with up to 8 Mbytes of memory and an optional 68882 math co-processor. On-board interfaces connect to HP-IB (IEEE-488), RS-232, and all internal peripherals and user interface devices. Eight expansion slots are available for additional interfaces and accessories.

The hard disk drives built into the R/332 are exceptionally rugged by design. In addition, special shock mounting is provided for failure-free operation in the most demanding environment. The flexible disk drive will read single- and double-sided 3 1/2-inch disks as well as newer, 2 MByte (unformatted capacity) 3 1/2-inch disks.

The R/332 display is a 9-inch diagonal monochrome CRT with 80-column alpha and 512x400 graphics resolution. This resolution corresponds to the monochrome monitor most commonly used with Series 300 controllers. The touch-screen input device, while smaller than the HP 35723A Touchscreen bezel, has equal resolution and is software-compatible.



R/332 SPU Configuration



Functionality diagram of R/332

The ITF-style keyboard is designed for use in a rack. It swings up to protect the front panel when not in use and can be locked in any of several convenient positions. Or, remove the keyboard entirely and use the touch-screen display or other input device.

Eight DIO expansion slots (behind four interface panels) allow you to add standard HP Series 300 interfaces and expansion accessories.

To customize the Model R/332 controller, a space below the flexible disk drive may be modified using parts from the Custom Engineering Kit. This space may be used as a storage compartment or for custom circuitry. The front surface of the drawer may serve as a panel to mount knobs, lights, switches, connectors, or other devices.

Technical Specifications

System Processing Unit

Central Processor	MC68030
Clock	16.7 MHz
Wait states	0
Floating Point	MC68882 (optional)
Clock frequency	16.7 Mhz
Accelerator	N/A
Memory Management Unit	
Type	on CPU chip
Virtual memory (HP-UX only)	4 Gbytes/process
Contexts	84 default, user-settable

Cache Memory

Type	InStruction cache and data cache on CPU chip
Size	512 bytes

Main Memory

Type	Byte parity error checking
RAM	1, 2, 4, 5 or 8 Mbytes via daughter boards
Bus width	32b address 32b data
Additional Memory	98269A/B
Maximum Memory	8 Mbytes

Standard System Interfaces and Features

Interface	DIO Equivalent	Model R/332
HP-IB	98624A	Yes
RS-232C	98644A	Yes
HP-HIL	—	Yes
RS-422	98628A	No
LAN	98643A	Optional
DMA	98620B	Yes
High-speed HP-IB disk	98625B	Optional
SCSI	98658A	Optional
System timer	—	Yes
User timer	—	Yes
Battery-backed real-time clock	—	Yes

Physical and Environmental Specifications

SPU Power Specifications

Source Consumption	5.5A @ 100 – 120V 2.5A @ 220 – 240V
Line Frequency	50/60 Hz (400 Hz with higher leakage current)
Power Consumption:	
Watts maximum	375
BTU/hour	1280
Kcal/hour	375
Power Availability:	
Power supply maximum:	244 Watts
At + 5 volts	25 Amps
At - 5 volts	1 Amp
At + 12 volts	8 Amps
At - 12 volts	1.5 Amp
DIO Backplane Power:	25 Watts per 2-slot pair
DIO II Backplane Power:	N/A

Physical Dimensions

Model R/332

Height	189 mm (7.5 in.)
Width	440 mm (17.3 in.)
Depth, keyboard up	704 mm (27.7 in.)
Minimum inside dimensions of rack:	
Height	177 mm (7.0 in.)
Width	425 mm (16.7 in.)
Depth	653 mm (25.7 in.)
Net weight	20 kg (45 lbs.) typical

Environmental Range

Operating temperature	5°C to +50°C to 2286m (7500 ft.)
Storage temperature	-40°C to +60°C
Maximum wet-bulb temperature	40°C
Humidity:	
Operating	40°C 5% to 95% R.H.
Non-operating	40°C 95% R.H.
Altitude:	
Operating	4,570m (15,000 ft.) at 25°C
Non-operating	15,240m (50,000 ft.) at 25°C
EMI	Certified to FCC Part 15, subpart J, Class B; VDE 0871, Class B; CISPR 22, Class B.
Regulatory Compliance	UL certified, CSA certified, certified to IEC 950

Clock and Timers

Real-time Clock

Resolution	10 milliseconds
Accuracy	+5 seconds/day
Battery backup	Lithium, expected life=1 year
Expected run time after power loss	12 hours

Timers

Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4msec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.

Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	.01 sec. to 2.55 second/tone

Model R/332 (A1303A)

The A1303A is a pre-configured R/332 rack-mount controller that includes the following:

- Model R/332 SPU with 1 Mbyte RAM
- 3 1/2-inch 1.4 Mbyte flexible disk drive
- 9-inch monochrome CRT (512 x 400) with Touchscreen surface
- HP BASIC Language System software on 3 1/2-inch double-sided disks
- Removable keyboard

Options

- Opt. 001 – Delete Touch
- Opt. 102 – 2 Mbyte total RAM
- Opt. 104 – 4 Mbyte total RAM
- Opt. 105 – 5 Mbyte total RAM
- Opt. 108 – 8 Mbyte total RAM
- Opt. 882 – MC68882 floating-point co-processor
- Opt. 908 – Add A1309A Rack Mount Flange kit (see below).

Accessories

There are several accessories that you can purchase to enhance your A1303A R/332 controller. These include:

General

- A1308A Custom Engineering Kit
- HP 98269A 1 Mbyte parity RAM daughterboard
- HP 98269B 4 Mbyte parity RAM daughterboard
- HP 98284A MC68882 Floating-Point Coprocessor
- HP 46060A HP-HIL 2-button mouse
- HP 46080A HP-HIL keyboard extension cable
- HP 46084A HP-HIL ID module

Interfaces

- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98625B HP-IB disk interface, high-speed
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface
- HP 98658A DIO-I SCSI host adaptor
- HP 98643A LAN/300 Link with ThinMau

Rack Mounting

- A1309A Rack Mount Flange Kit
Use in combination with one of:
1494-0059 standard slide kit
1494-0063 standard tilting slide kit
12679B stationary rails for HP rack

Suggested Peripherals

- HP 2225A ThinkJet printer
- HP 7475A plotter

Model R/332 (A1305A)

The A1305A is a pre-configured R/332 rack-mount controller that includes the following:

- Model R/332 SPU with 1 Mbyte RAM
- 3 1/2-inch 1.4 Mbyte flexible disk drive
- 20 Mbyte hard disk subsystem
- 9-inch monochrome CRT (512 x 400) with Touchscreen surface
- HP BASIC Language System software on 3 1/2-inch double-sided disks
- Removable keyboard

Options

- Opt. 001 – Delete Touch
- Opt. 102 – 2 Mbyte total RAM
- Opt. 104 – 4 Mbyte total RAM
- Opt. 105 – 5 Mbyte total RAM
- Opt. 108 – 8 Mbyte total RAM
- Opt. 882 – MC68882 floating-point co-processor
- Opt. 908 – Add A1309A Rack Mount Flange Kit (see below)

Accessories

There are several accessories that you can purchase to enhance your A1305A R/332 controller. These include:

General

- A1308A Custom Engineering Kit
- HP 98269A 1 Mbyte parity RAM daughterboard
- HP 98269B 4 Mbyte parity RAM daughterboard
- HP 98284A MC68882 Floating-Point Coprocessor
- HP 46060A HP-HIL 2-button mouse
- HP 46080A HP-HIL keyboard extension cable
- HP 46084A HP-HIL ID module

Interfaces

- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98625B HP-IB disk interface, high speed
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface
- HP 98643A LAN/300 Link with ThinMau
- HP 98658A DIO-I SCSI host adaptor

Rack Mounting

- A1309A Rack Mount Flange Kit
Use in combination with one of:
1494-0059 standard slide kit
1494-0063 standard tilting slide kit
12679B stationary rails for HP rack

Suggested Peripherals

- HP 2225A ThinkJet printer
- HP 7475A plotter

Model R/332 (A1307A)

The A1307A is a pre-configured R/332 rack-mount controller that includes the following:

- Model R/332 SPU with 1 Mbyte RAM
- 3 1/2-inch 1.4 Mbyte flexible disk drive
- 40 Mbyte hard disk subsystem
- 9-inch monochrome CRT (512 x 400) with Touchscreen surface
- HP BASIC Language System software on 3 1/2-inch double-sided disks
- Removable keyboard

Options

- Opt. 001 – Delete Touch
- Opt. 102 – 2 Mbyte total RAM
- Opt. 104 – 4 Mbyte total RAM
- Opt. 105 – 5 Mbyte total RAM
- Opt. 108 – 8 Mbyte total RAM
- Opt. 882 – MC68882 floating-point co-processor
- Opt. 908 – Add A1309A Rack Mount kit (see below)

Accessories

There are several accessories that you can purchase to enhance your A1307A R/332 controller. These include:

General

- A1308A Custom Engineering Kit
- HP 98269A 1 Mbyte parity RAM daughterboard
- HP 98269B 4 Mbyte parity RAM daughterboard
- HP 98284A MC68882 Floating-Point Coprocessor
- HP 46060A HP-HIL 2-button mouse
- HP 46080A HP-HIL keyboard extension cable
- HP 46084A HP-HIL ID module

Interfaces

- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98625B HP-IB disk interface, high speed
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface
- HP 98643A LAN/300 Link with ThinMAU
- HP 98658A DIO-I SCSI host adaptor

Rack Mounting

- A1309A Rack Mount Flange Kit
Use in combination with one of:
1494-0059 standard slide kit
1494-0063 standard tilting slide kit
12679B stationary rails for HP rack

Suggested Peripherals

- HP 9122C dual 3 1/2-inch flexible disk drive
- HP 9153C 10-40 Mbyte fixed hard disk (with or without built-in 3 1/2-inch flexible disk drive)
- HP 2225A ThinkJet printer
- HP 7475A plotter

Series 300 Model 340 Instrument Controllers



Technical Data*



Introduction

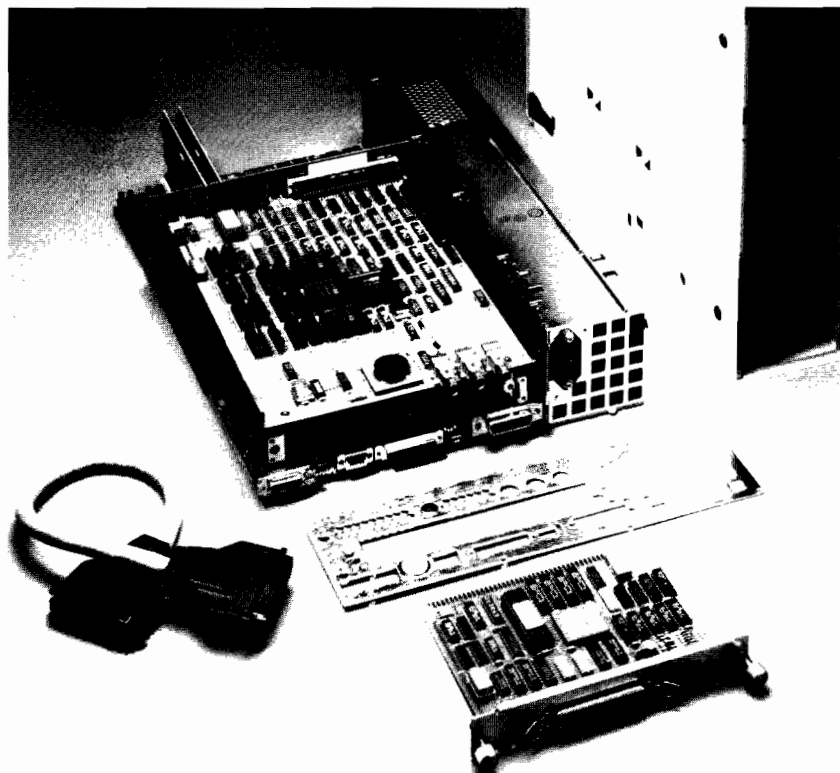
The Model 340 is the entry system for HP's family of low-cost, high-performance workstations. The CPU uses the Motorola MC68030 processor operating at 16.7 MHz to reach performance of 4 VAX MIPS. Also standard is the MC68882 floating point co-processor for accelerated math operations. A 32-bit wide private memory bus connects 4 Mbytes of parity checking main memory, expandable to 16 Mbytes. The result is a powerful technical workstation ideal for applications requiring limited expandability.

The Model 340 will run HP BASIC or HP-UX (including HP BASIC/UX). The pre-configured bundles are all supplied with HP-UX.

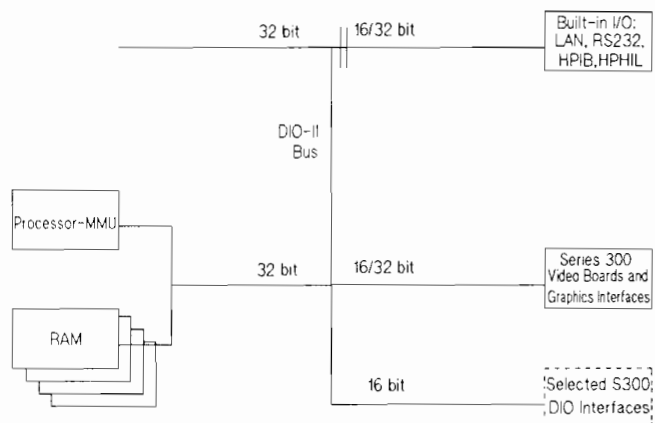
* Data subject to change without notice.

All major interfaces are packaged on the same PC board as the CPU. Standard are HP-IB, DMA, RS-232C with DB25 connector, HP-HIL, and ThinLAN with built-in ThinMAU. Optionally the standard LAN interface may be replaced with the AUI LAN, for access to ThickLAN, StarLAN 10, or third-party fiber optic networks. An audio speaker is also a standard component of the CPU assembly. The Model 340 is bundled with various graphics cards and monitors to provide a range of solutions for technical applications. Field upgrades to the graphic boards are not available.

For increased flexibility, a single 16-bit DIO interface slot may be added to the SPU as an option. This slot may be used for either a high speed disk interface or any of the wide variety of available DIO interface cards. For higher disk throughput, either a high speed HP-IB (98625B) or SCSI (98658A) interface may be purchased with the DIO slot. Alternatively, the DIO slot may be used for an HP-IB card, a 4-port RS-232C multiplexer, GPIO interface, or most other cards currently available.



Model 340 SPU Configuration



Model 340 Bus Architecture

Technical Specifications

System Processing Unit

Central Processor	MC68030
Clock	16.7 MHz
Wait states	2
Floating Point	MC68882
Clock frequency	16.7 Mhz
Accelerator	N/A
Memory Management Unit	
Type	on CPU chip
Virtual memory (HP-UX only)	4 Gbytes/process
Contexts	84 default, user-settable
Cache Memory	
Type	Instruction cache and data cache on CPU chip
Size	512 bytes
Main Memory	
Type	Byte parity error checking
RAM	4 Mbytes on-board
Bus width	32b address, 32b data
System RAM access time	60 nsec min. 240 nsec max
Additional Memory	98268A
Maximum Memory	16 Mbytes

Standard System Interfaces and Features

Interface	DIO Equivalent	Model 340
HP-IB	98624A	Yes
RS-232C	98644A	Yes
HP-HIL	—	Yes
RS-422	98628A	Yes
LAN	98643A	Yes*†
DMA	98620B	Yes
High-speed HP-IB disk	98625B	Optional
SCSI	98265A 98658A	Optional‡
System timer	—	Yes
User timer	—	Yes
Battery-backed real-time clock	—	Yes
DOS software compatibility	98286A†	Yes‡

Physical and Environmental Specifications

SPU Power Specifications

Source Consumption	2.6A @ 115V, switch 1.5A @ 230V, switch
Line Frequency	50-60 Hz
Power Consumption:	
Watts maximum	155
BTU/hour	527
Kcal/hour	155
Power Availability:	
Power supply maximum:	N/A
At + 5 volts	
At + 12 volts	
At - 12 volts	
DIO Backplane Power:	
At + 5 volts	8.4 Watts
At + 12 volts	2.4 Watts
At - 12 volts	1.6 Watts
DIO II Backplane Power:	
Power:	N/A
At + 5 volts	
At + 12 volts	
At - 12 volts	

Physical Dimensions

Model 340

Height	104 mm (4.1 in.)
Width	325 mm (12.8 in.)
Depth	444 mm (17.5 in.) Additional 4 inches in depth should be allowed for interface cables
Net weight	8.2 kg (18 lbs.)

Environmental Range

Operating temperature	0°C to +55°C to 2286m (7500 ft.)
Storage temperature	-40°C to +70°C
Maximum wet-bulb temperature	40°C
Humidity:	
Operating	40°C 15% to 95% R.H.
Non-operating	65°C @90% R.H.
Altitude:	
Operating	4,570m (15,000 ft.) to 47°C
Non-operating	15,240m (50,000 ft.)
EMI	Conducted and radiated interference meets FCC Class A, VCCI Class 1; VDE 1046/84 Level B
Regulatory Compliance	UL478, 5th edition; CSA 22.2 No. 220, M-1986; IEC 950, 1st edition 1986

Clock and Timers

Real-time Clock

Resolution	10 milliseconds
Accuracy	+ 5 seconds/day
Battery backup	Lithium, expected life = 1 year
Expected run time after power loss	2 hours

Timers

Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4sec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.	
Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	01 sec. to 2.55 second/tone

* The built-in LAN interface is either AUI (which can be used for ThickLAN, ThinLAN, or StarLAN) or ThinLaAN BNC "T" connector and ThinMAU.

† Requires 98531A DOS Co-processor software.

‡ Not supported by HP BASIC.

Model 340M

The HP 98563E Model 340M is a pre-configured Series 300 computer that includes the following:

- Model 340 SPU with 4 Mbytes RAM
- 17-inch high-resolution monochrome monitor (1024 x 768)
- HP-UX license-to-use with NS-ARPA, NFS Services/300, and X11
- Keyboard

Options

- Opt. 006 – one DIO slot
- Opt. 010 – 98625B high-speed HP-IB disk interface
- Opt. 011 – 98658A SCSI interface with cable
- Opt. 060 – 46060A HP-HIL 2-button mouse
- Opt. 084 – 46084A HP-HIL ID module
- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)

Accessories

There are many accessories that you can purchase to enhance your Model 340M controller. These include:

General

- HP 98013A DIO I/O slot upgrade
- HP 98237A 4 Mbyte parity RAM daughterboard
- HP 98235A AUI upgrade for built-in LAN interface
- HP 98237A ThinLan upgrade for built-in LAN interface

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit.
- HP 12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
 - HP 7958 or 7959B 81-152 Mbyte fixed hard disk
 - HP 2225A ThinkJet printer
 - HP 7475 plotter
 - HP 7550 plotter
-

Model 340MH

The HP 98563G Model 340MH is a pre-configured Series 300 computer that includes the following:

- Model 340 SPU with 4 Mbytes RAM
- 19-inch high-resolution monochrome monitor (1280 x 1024)
- HP-UX license-to-use with NS-ARPA, NFS Services/300, and X11
- Keyboard

Options

- Opt. 006 – one DIO slot
- Opt. 010 – 98625B high-speed HP-IB disk interface
- Opt. 011 – 98658A SCSI interface with cable
- Opt. 060 – 46060A HP-HIL 2-button mouse
- Opt. 084 – 46084A HP-HIL ID module
- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)

Accessories

There are many accessories that you can purchase to enhance your Model 340MH controller. These include:

General

- HP 98013A DIO I/O slot upgrade
- HP 98237A 4 Mbyte parity RAM daughterboard
- HP 98235A AUI upgrade for built-in LAN interface
- HP 98237A ThinLan upgrade for built-in LAN interface

Interfaces

- HP 98624A HP-IB intrface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 intrface
- HP 9864A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP 12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 7958 or 7959BB 81-152 Mbyte fixed hard disk
- HP 2225A ThinkJet printer
- HP 7475 plotter
- HP 7550 plotter

Model 340C+

The HP 98564C Model 340C+ is a pre-configured Series 300 computer that includes the following:

- Model 340 SPU with 4 Mbytes RAM
- 16-inch high-resolution color monitor (1024 x 768)
- HP-UX license-to-use with NS-ARPA, NFS Services/300, and X11
- Keyboard

Options

- Opt. 006 – one DIO slot
- Opt. 010 – 98625B high-speed HP-IB disk interface
- Opt. 011 – 98658A SCSI interface with cable
- Opt. 060 – 46060A HP-HIL 2-button mouse
- Opt. 084 – 46084A HP-HIL ID module
- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)

Accessories

There are many accessories that you can purchase to enhance your Model 340C+ controller. These include:

General

- HP 98013A DIO I/O slot upgrade
- HP 98237A 4 Mbyte parity RAM daughterboard
- HP 98235A AUI upgrade for built-in LAN interface
- HP 98237A ThinLan upgrade for built-in LAN interface

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP 12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 7958 or 7959B 81-152 Mbyte fixed hard disk
- HP 2225A ThinkJet printer
- HP 7475 plotter
- HP 7550 plotter

Model 340CH

The HP 98564G Model 340CH is a pre-configured Series 300 computer that includes the following:

- Model 340 SPU with 4 Mbytes RAM
- 16-inch high-resolution color monitor (1280 x 1024)
- HP-UX license-to-use with NS-ARPA, NFS Services/300, and X11
- Keyboard

Options

- Opt. 006 – one DIO slot
- Opt. 010 – 98625B high-speed HP-IB disk interface
- Opt. 011 – 98658A SCSI interface with cable
- Opt. 060 – 46060A HP-HIL 2-button mouse
- Opt. 084 – 46084A HP-HIL ID module
- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)

Accessories

There are many accessories that you can purchase to enhance your Model 340CH controller. These include:

General

- HP 98013A DIO I/O slot upgrade
- HP 98237A 4 Mbyte parity RAM daughterboard
- HP 98235A AUI upgrade for built-in LAN interface
- HP 98237A ThinLan upgrade for built-in LAN interface

Interfaces

- HP 98624A HP-IB interface3
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP 12131A keyboard rack kit

Suggested Peripherals

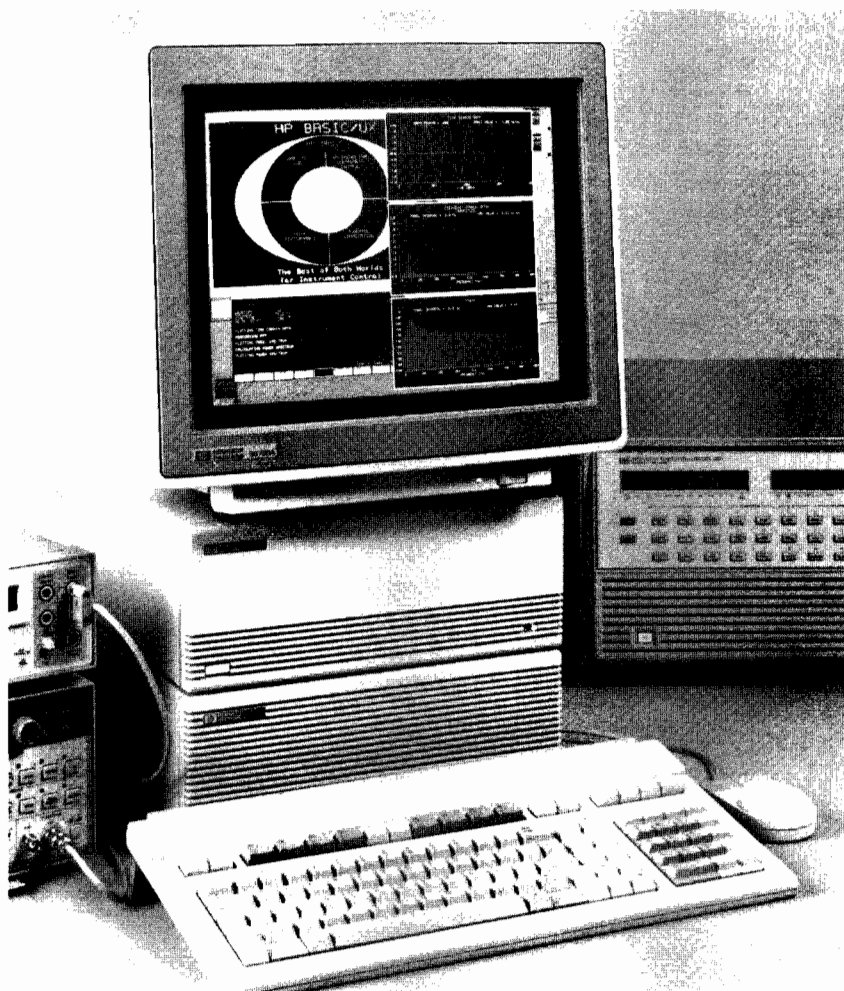
- HP 9145A cartridge tape subsystem
 - HP 7958 or 7959B 81-152 Mbyte fixed hard disk
 - HP 2225A ThinkJet printer
 - HP 7475 plotter
 - HP 7550 plotter
-

Series 300 Model 360 Instrument Controllers

Technical Data*

Introduction

The Model 360 sets a new standard for a mid-range controller. Based on the 25 MHz Motorola MC68030 processor, the Model 360 is rated at 4.5 to 5.0 VAX MIPS and 210 Kflops on the Linpack benchmark. The Model 360 will run HP BASIC or HP-UX (including HP BASIC/UX). The Models 360MMA and CMA are supplied with the HP BASIC Language System, while the Models 360MMAX and CMAX are supplied with HP BASIC/UX.

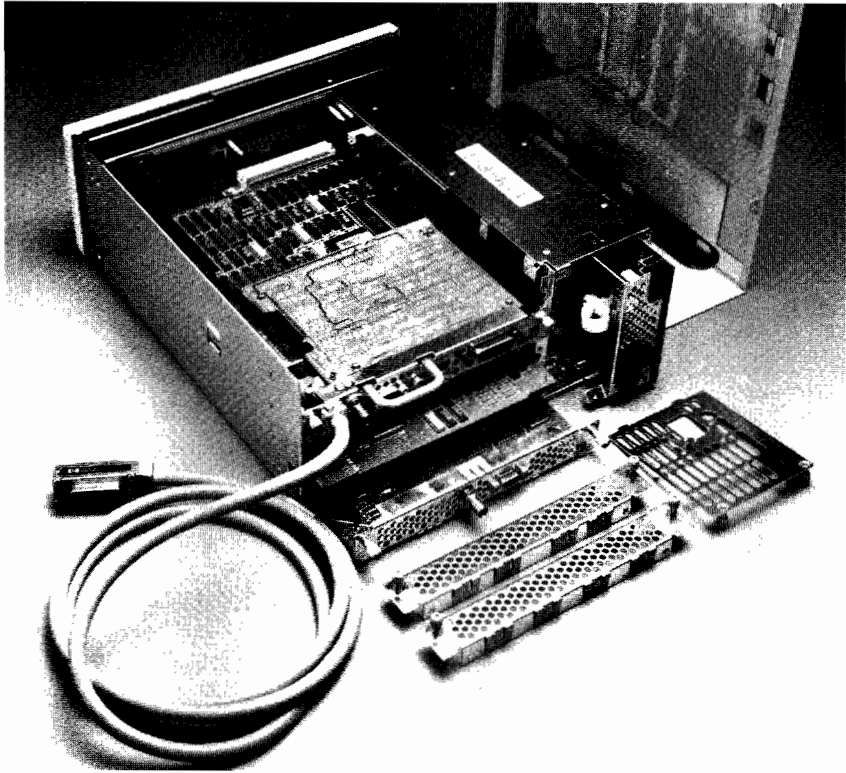


* Data subject to change without notice.

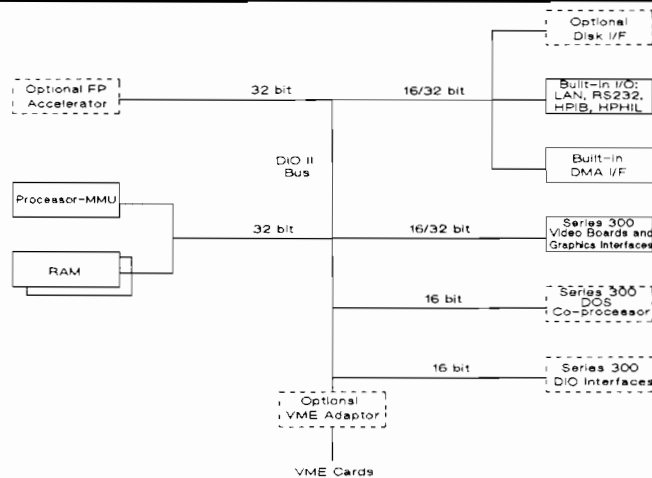
The Model 360's architecture is based on 25 MHz VLSI technology from Motorola, which includes the MC68030 processor and MC68882 floating point co-processor. The floating point co-processor is standard to facilitate floating point mathematical operations frequently encountered in the technical computing environment. Both single- and double-precision floating point operations conform to the IEEE 754 standard for floating point formats.

System performance of 4.5 to 5.0 VAX MIPS is ensured by operating up to 16 Mbytes of main memory synchronously with the 25 MHz 68030 processor. Main memory is connected to the processor over a full 32-bit private-memory bus.

The Model 360's CPU, floating point hardware, memory manager and memory electronics are contained on the processor boards, while all necessary system I/O is located on the system interface board. Two DIO slots are available for adding a graphics board and a 2-slot DIO backplane for Series 300 accessories such as HP's DOS co-processor, a four-port RS-232C multiplexer card, or any of a host of other interface cards. For the Model 360 without a graphics board, the 4-slot DIO backplane may be added to allow insertion of two additional Series 300 I/O cards.



Model 360 SPU Configuration



Model 360 Bus Architecture

The standard configuration for the Model 360 includes 4 Mbytes of RAM. One 4, 8 or 12 Mbyte parity checking RAM daughter

board may be added for a total of 8, 12 or 16 Mbytes. HP-IB, RS-232C and LAN interfaces are also included.

Technical Specifications

System Processing Unit

Central Processor	MC68030
Clock	25 MHz
Wait states	1.5 (on-board RAM)
Floating Point	MC68882
Clock frequency (standard)	25 Mhz
Accelerator	Optional 98248B
Memory Management Unit	
Type	on CPU chip
Virtual memory (HP-UX only)	4 Gbytes/process
Contexts	84 default, user-settable
Cache Memory	
Type	Instruction cache and data cache on CPU chip
Size	512 bytes
Main Memory	
Type	Byte parity error checking
RAM	4 Mbytes on-board
Bus width	32b address, 32 b data
System RAM access time	80 nsec min. 200 nsec max (worst case)
Additional Memory	98267A/B/C
Maximum Memory	16 Mbytes

Standard System Interfaces and Features

Interface	DIO Equivalent	Model 360
HP-IB	98624A	Yes
RS-232C	98644A	Yes
HP-HIL	—	Yes
RS-422	98628A	No
LAN	98643A	Yes*†
DMA	98620B	Yes
High-speed HP-IB disk	98625B	Optional
SCSI	98265A 98658A	Optional‡
System timer	—	Yes
User timer	—	Yes
Battery-backed real-time clock		Yes
DOS software compatibility	98286A†	Optional‡

Physical and Environmental Specifications

SPU Power Specifications

Model 360

Source Consumption	5.0A @ 90 – 132V, switch selectable 3.0A @ 180 – 250V, switch selectable
Line Frequency	48 – 66 Hz
Power Consumption:	
Watts maximum	250
BTU/hour	853
Kcal/hour	250
Power Availability:	
Power supply maximum:	150 Watts
At + 5 volts	20 Amps
At + 12 volts	3.6 Amps
At - 12 volts	1.1 Amps
DIO Backplane Power:	
At + 5 volts	N/A
At + 12 volts	
At - 12 volts	
DIO II Backplane Power	
At + 5 volts	85 Watts
At + 12 volts	40 Watts
At - 12 volts	12 Watts

Physical Dimensions

Model 360

Height	130 mm (5.12 in.)
Width	325 mm (12.8 in.)
Depth	376 mm (14.8 in.) Additional 4 inches in depth should be allowed for interface cables
Net weight	11.8 kg (26 lbs.)

Environmental Range

Operating temperature	0°C to +55°C to 2286m (7500 ft.)
Storage temperature	-40°C to +70°C
Maximum wet-bulb temperature	40°C
Humidity:	
Operating	40C 15% to 95% R.H.
Non-operating	65C @90% R.H.
Altitude:	
Operating	4,570m (15,000 ft.) to 47°C
Non-operating	15,240m (50,000 ft.)
EMI	Conducted and radiated interference meets FCC Class A, VCCI Class 1; VDE 1046/84 Level B; VCCI Class 1.
Additional Regulatory Compliance	UL478, 5th edition; CSA 22.2 No. 154, M-1983; IEC 380, 2nd edition; IEC

Clock and Timers

Real-time Clock	
Resolution	10 milliseconds
Accuracy	+ 5 seconds/day
Battery backup	Lithium, expected life=1 year
Expected run time after power loss	12 hours
Timers	
Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4msec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.	
Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	01 sec. to 2.55 second/tone

* The built-in Lan interface is either AUI (which can be used for ThickLAN, ThinLAN, or StarLAN 10) or ThinLAN BNC "T" connector and ThinMAU.

† Requires 98531A DOS Co-processor software.

‡ Not supported for HP BASIC.

Model 360MMA

The HP 98580W Model 360MMA is a pre-configured Series 300 computer that includes the following:

- Model 360 SPU with 4 Mbytes RAM
- 12-inch medium-resolution monochrome monitor (512 x 400)
- HP BASIC Language System software on 3 1/2-inch single-sided disks
- Keyboard

Options

- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)
- Opt. 618 – HP BASIC 5X compiler, including disk and manual

Accessories

There are many accessories that you can purchase to enhance your Model 360MMA controller. These include:

General

- HP 98267A 4 Mbyte parity RAM daughterboard
- HP 98267B 8 Mbyte parity RAM daughterboard
- HP 98267C 12 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander
- HP 46060A HP-HIL 2-button mouse
- HP 46084A HP-HIL ID module
- HP 98253A EPROM programmer

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit
- HP 98567A rack adapter for mono monitor

Suggested Peripherals

- HP 9153C 10-40 Mbyte fixed hard disk (with or without built-in 3 1/2-inch flexible disk drive)
- HP 2225A ThinkJet printer
- HP 7475A plotter

Model 360CMA

The HP 98581W Model 360CMA is a pre-configured Series 300 computer that includes the following:

- Model 360 SPU with 4 Mbytes RAM
- 12-inch medium-resolution color monitor (512 x 400)
- HP BASIC Language System software on 3 1/2-inch single-sided disks
- Keyboard

Options

- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)
- Opt. 618 – HP BASIC 5X compiler, including disk and manual

Accessories

There are many accessories that you can purchase to enhance your Model 360CMA controller. These include:

General

- HP 98267A 4 Mbyte parity RAM daughterboard
- HP 98267B 8 Mbyte parity RAM daughterboard
- HP 98267C 12 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander
- HP 46060A HP-HIL 2-button mouse
- HP 46084A HP-HIL ID module
- HP 98253A EPROM programmer

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit
- HP 98567A rack adapter for color monitor

Suggested Peripherals

- HP 9153C 10-40 Mbyte fixed hard disk (with or without built-in 3 1/2-inch flexible disk drive)
- HP 2225A ThinkJet printer
- HP 7475A plotter

Model 360MMAX

The HP 98580WX Model 360MMAX is a pre-configured Series 300 computer that includes the following:

- Model 360 SPU with 4 Mbytes RAM
- 17-inch high-resolution monochrome monitor (1024 x 768)
- HP-UX license-to-use, media and manuals, with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard

Options

- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)
- Opt. 402 – 7958B 152 Mbyte hard disk subsystem with all system software pre-installed
- Opt. 403 – 7959B 304 Mbyte hard disk subsystem with all system software pre-installed

Accessories

There are many accessories that you can purchase to enhance your Model 360MMAX controller. These include:

General

- HP 98267A 4 Mbyte parity RAM daughterboard
- HP 98267B 8 Mbyte parity RAM daughterboard
- HP 98267C 12 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
 - HP 33440A LaserJet Printer
 - HP 7550 plotter
-

Model 360CMAX

The HP 98581WX Model 360CMAX is a pre-configured Series 300 computer that includes the following:

- Model 360 SPU with 4 Mbytes RAM
- 16-inch high-resolution color monitor (1280 x 1024)
- High-resolution color graphics interface
- HP-UX license-to-use, media and manuals, with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- Buffer box with speaker
- HP-HIL ID module

Options

- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)
- Opt. 402 – 152 Mbyte hard disk subsystem with all system software pre-installed
- Opt. 403 – 7959B 304 Mbyte hard disk subsystem with all system software pre-installed

Accessories

There are many accessories that you can purchase to enhance your Model 360CMAX controller. These include:

General

- HP 98267A 4 Mbyte parity RAM daughterboard
- HP 98267B 8 Mbyte parity RAM daughterboard
- HP 98267C 12 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
 - HP 33440A LaserJet printer
 - HP 7550 graphics plotter
-

Model 360MH

The HP 98589W Model 360MH is a pre-configured Series 300 computer that includes the following:

- Model 360 SPU with 4 Mbytes RAM
- 19-inch high-resolution monochrome monitor (1280 x 1024)
- HP-UX license-to-use with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- Buffer box with speaker
- HP-HIL ID module

Options

- Opt. 006 – 98242B 2-slot DIO expander
- Opt. 010 – 98262A high-speed HP-IB disk interface
- Opt. 011 – 98265A SCSI interface
- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)

Accessories

There are many accessories that you can purchase to enhance your Model 360MH controller. These include:

General

- HP 98267A 4 Mbyte parity RAM daughterboard
- HP 98267B 8 Mbyte parity RAM daughterboard
- HP 98267C 12 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 7958B or 7959B 152-304 Mbyte fixed hard disk
- HP 33440A LaserJet printer
- HP 7550 plotter

Model 360C+

The HP 98583W Model 360C+ is a pre-configured Series 300 computer that includes the following:

- Model 360 SPU with 4 Mbytes RAM
- 16-inch high-resolution color monitor (1024 x 768)
- HP-UX license-to-use with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- Buffer box with speaker
- HP-HIL ID module

Options

- Opt. 006 – 98242B 2-slot DIO expander
- Opt. 010 – 98262A high-speed HP-IB disk interface
- Opt. 011 – 98265A SCSI interface
- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)

Accessories

There are many accessories that you can purchase to enhance your Model 360C+ controller. These include:

General

- HP 98267A 4 Mbyte parity RAM daughterboard
- HP 98267B 8 Mbyte parity RAM daughterboard
- HP 98267C 12 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
 - HP 7958B or 7959B 152-304 Mbyte fixed hard disk
 - HP 33440A LaserJet printer
 - HP 7550 plotter
-

Model 360CH

The HP 98588W Model 360CH is a pre-configured Series 300 computer that includes the following:

- Model 360 SPU with 4 Mbytes RAM
- 16-inch high-resolution color monitor (1280 x 1024)
- High-resolution color graphics interface
- HP-UX license-to-use with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- Buffer box with speaker
- HP-HIL ID module

Options

- Opt. 006 – 98242B 2-slot DIO expander
- Opt. 010 – 98262A high-speed HP-IB disk interface
- Opt. 011 – 98265A SCSI interface
- Opt. 108 – 4 Mbytes RAM (for total of 8 Mbytes)
- Opt. 112 – 8 Mbytes RAM (for total of 12 Mbytes)
- Opt. 116 – 12 Mbytes RAM (for total of 16 Mbytes)

Accessories

There are many accessories that you can purchase to enhance your Model 360CH controller. These include:

General

- HP 98267A 4 Mbyte parity RAM daughterboard
- HP 98267B 8 Mbyte parity RAM daughterboard
- HP 98267C 12 Mbyte parity RAM daughterboard
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 7958B or 7959B 152-304 Mbyte fixed hard disk
- HP 33440A LaserJet printer
- HP 7550 plotter

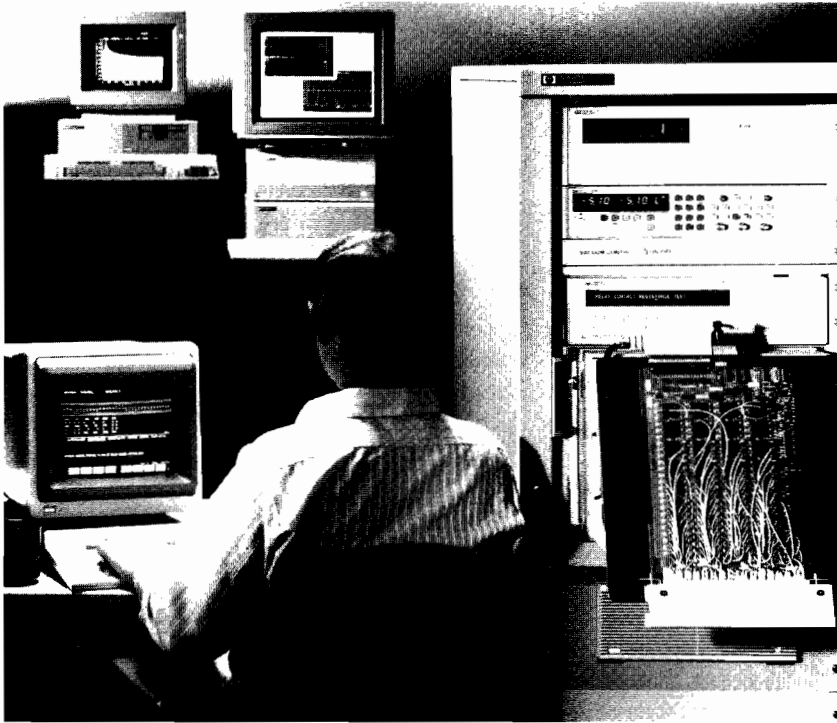
Series 300 Model 370 Instrument Controllers

Technical Data*

Introduction

The Model 370 is the high-performance choice of the Motorola MC68030-based workstations. Using the new 33 MHz MC68030, the fastest available from Motorola, the Model 370 is rated at 8 VAX MIPS and 270 Kflops on the Linpack standard (double precision). The Model 370 will run HP BASIC or HP-UX (including HP BASIC/UX). The pre-configured bundles are supplied with HP-UX.

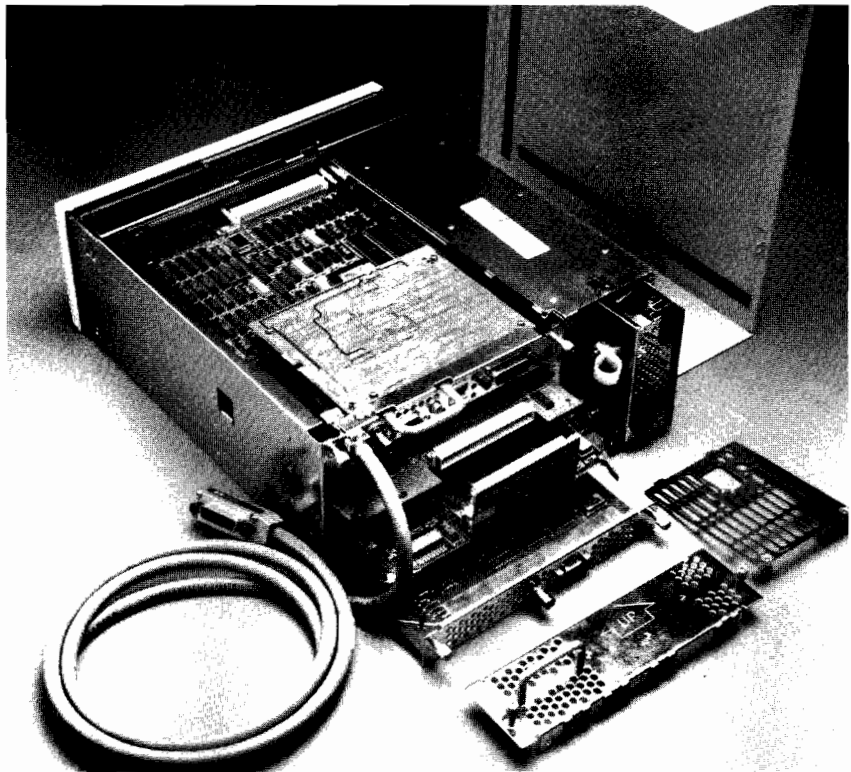
The combination of the 33 MHz 68030 and 33 MHz MC68882 floating point co-processor gives the Model 370 over twice the floating-point performance of its predecessor, the Model 350, and 50% better integer performance than the Model 350.



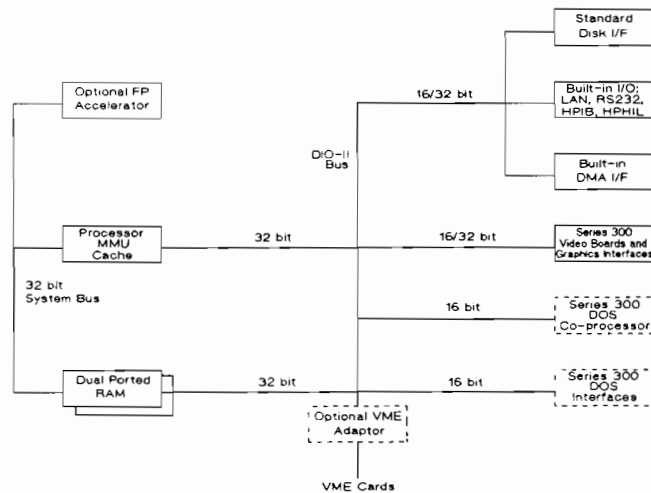
* Data subject to change without notice.

The Model 370 SPU includes three standard boards – the CPU board with processor, memory management unit, floating point hardware and cache; the system interface board with HP-IB IEEE 488 port, RS-232C port, HP-HIL, 2-channel DMA controller, LAN interface, system and user timers, and high-speed disk interface; and 8 Mbyte parity-checking RAM board standard, or optionally, 16 Mbyte parity-checking RAM, 8, 16 or 32 Mbytes Error-Checking and Correcting (ECC) RAM.

The SPU leaves one slot free for adding either a graphics board, 2-slot DIO adapter, or graphics system interface board. A 2-slot system bus connector couples the CPU board with the memory board installed in the Model 370. Up to two additional memory boards can be installed (for a maximum of three) on the system bus via 3-slot and 4-slot system bus connectors. The recommended maximum for parity-checking RAM is 32 Mbytes, while ECC maximum supported memory is 48 Mbytes.



Model 370 SPU Configuration



Model 370 Bus Architecture

Technical Specifications

System Processing Unit Model 370

Central Processor	MC68030
Clock	33 MHz
Wait states	0 (cache)
Floating Point	MC68882
Clock frequency (standard)	33Mhz
Accelerator	Optional 98248B
Memory Management Unit	
Type	on CPU chip
Virtual memory (HP-UX only)	4 Gbytes/process
Contexts	84 default, user-settable
Cache Memory	
Type	Write through instruction and data (external to MC 68030 on chip caches)
Size	64 bytes
Average cycle time	60 nsec
Main Memory	
Type	Byte parity error checking; Optional Ecc
RAM	8 Mbytes
Bus width	32 b address, 32b data
System RAM access time	170 nsec min. 390 nsec max. 60 nsec cache
Additional Memory	98258A/B/C
Maximum Memory	32 Mbytes Parity 48 Mbytes (ECC)

Standard System Interfaces and Features

Interface	DIO Equivalent	Model 370
HP-IB	98624A	Yes
RS-232C	98644A	Yes
HP-HIL	—	Yes
RS-422	98628A	Optional
LAN	98643A	Yes*†
DMA	98620B	Yes
High-speed HP-IB disk	98625B	Yes
SCSI	98265A 98658A	Optional‡
System timer	—	Yes
User timer	—	Yes
Battery-backed real-time clock	—	Optional‡
DOS software compatibility	98286A†	Optional

Physical and Environmental Specifications SPU Power Specifications Model 370

Source Consumption	5.0A @ 90 – 132V, switch selectable 3.0A @ 180 – 250V, switch selectable
Line Frequency	48 – 66 Hz
Power Consumption:	
Watts maximum	250
BTU/hour	853
Kcal/hour	250
Power Availability:	
Power supply maximum:	150 Watts
At + 5 volts	20 Amps
At + 12 volts	3.6 Amps
At - 12 volts	1.1 Amps
DIO Backplane Power:	
At + 5 volts	N/A
At + 12 volts	
At - 12 volts	
DIO II Backplane Power:	
At + 5 volts	85 Watts
At + 12 volts	20 Watts
At - 12 volts	12 Watts

Physical Dimensions Model 370

Height	130 mm (5.12 in.)
Width	325 mm (12.8 in.)
Depth	376 mm (14.8 in.) Additional 4 inches in depth should be allowed for interface cables
Net weight	11.8 kg (26 lbs.)

Environmental Range

Operating temperature	0°C to +55°C to 2286m (7500 ft.)
Storage temperature	-40°C to +70°C
Maximum wet-bulb temperature	40C
Humidity:	
Operating	40°C 15% to 95% R.H.
Non-operating	65°C @90% R.H.
Altitude:	
Operating	4,570m (15,000 ft.) to 47°C
Non-operating	15,240m (50,000 ft.)
EMI	Conducted and radiated interference meets FCC Class A, VCCI Class 1; VDE 1046/84 Level B
Additional Regulatory	UL478, 5th edition; CSA Compliance 22.2 No. 154, M-1983; IEC 380, 2nd edition; IEC

Clock and Timers

Real-time Clock	
Resolution	10 milliseconds
Accuracy	+5 seconds/day
Battery backup	Lithium, expected life=1 year
Expected run time after power loss	12 hours
Timers	
Match interrupt	Match on time of day 0.00 to 84600.00 sec.
Delay interrupt	10 msec. to 1.94 days
Cyclical interrupt	10 msec. to 1.94 days
System timer	4sec. resolution accurate to 25 ppm

Audio

Three independent tone generators controllable over 30 db.	
Frequency range	81.46 Hz to 83.3 KHz
Resolution	Capable of approximate chromatic scale over five octaves
Duration	01 sec. to 2.55 second/tone

* The built-in LAN interface is either AUI (which can be used for ThickLAN, ThinLAN, or StarLAN 10) or ThinLAN BNC "T" connector and ThinMAU.

† Requires 98531A DOS DOS Co-processor software.

‡ Not Supported by HP BASIC

Model 370MH

The HP 98589G Model 370MH is a pre-configured Series 300 computer that includes the following:

- Model 370 SPU with 8 Mbytes RAM
- 19-inch high-resolution monochrome monitor (1280 x 1024)
- HP-UX license-to-use with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- Buffer box with speaker
- HP-HIL ID module

Options

- Opt. 011 – 98265A SCSI interface
- Opt. 116 – 8 Mbytes RAM (for total of 16 Mbytes)
- Opt. 208 – Substitute 8 Mbytes error checking and correcting RAM for 8 Mbytes parity RAM
- Opt. 216 – Substitute 16 Mbytes error checking and correcting RAM for 16 Mbytes parity RAM

Accessories

There are many accessories that you can purchase to enhance your Model 370MH controller. These include:

General

- HP 98258A 4 Mbyte parity checking RAM controller
- HP 98258B 4 Mbyte parity checking RAM
- HP 98258C 12 Mbyte parity checking RAM
- HP 98264A 8 Mbyte error checking and correcting RAM controller
- HP 98264B 16 Mbyte error checking and correcting RAM controller
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 7959B 304 Mbyte fixed hard disk
- HP 33440A LaserJet printer
- HP 7550 plotter



Model 370C+

The HP 98583G Model 370C+ is a pre-configured Series 300 computer that includes the following:

- Model 370 SPU with 8 Mbytes RAM
- 19-inch high-resolution monochrome monitor (1024 x 768)
- HP-UX license-to-use with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- Buffer box with speaker
- HP-HIL ID module

Options

- Opt. 011 – 98265A SCSI interface BNC connector
- Opt. 116 – 8 Mbytes RAM (for total of 16 Mbytes)
- Opt. 208 – Substitute 8 Mbytes error checking and correcting RAM for 8 Mbytes parity RAM
- Opt. 216 – Substitute 16 Mbytes error checking and correcting RAM for 16 Mbytes parity RAM

Accessories

There are many accessories that you can purchase to enhance your Model 370C+ controller. These include:

General

- HP 98258A 4 Mbyte parity checking RAM controller
- HP 98258B 4 Mbyte parity checking RAM
- HP 98264A 8 Mbyte error checking and correcting RAM
- HP 98258C 12 Mbyte parity checking RAM
- HP 98264B 16 Mbyte error checking and correcting RAM
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander Interfaces
- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 7959B 304 Mbyte fixed hard disk
- HP 33440A LaserJet printer
- HP 7475 plotter
- HP 7550 graphics plotter

Model 370CH

The HP 98588G Model 370CH is a pre-configured Series 300 computer that includes the following:

- Model 370 SPU with 8 Mbytes RAM
- 19-inch high-resolution color monitor (1280 x 1024)
- HP-UX license-to-use with HP BASIC/UX, NS-ARPA, NFS Services/300, and X11
- Keyboard
- HP-HIL two-button mouse
- Buffer box with speaker
- HP-HIL ID module

Options

- Opt. 011 – 98265A SCSI interface
- Opt. 116 – 8 Mbytes RAM (for total of 16 Mbytes)
- Opt. 208 – Substitute 8 Mbytes error checking and correcting RAM for 8 Mbytes parity RAM
- Opt. 216 – Substitute 16 Mbytes error checking and correcting RAM for 16 Mbytes parity RAM

Accessories

There are many accessories that you can purchase to enhance your Model 370CH controller. These include:

General

- HP 98258A 4 Mbyte parity checking RAM controller
- HP 98258B 4 Mbyte parity checking RAM
- HP 98264A 8 Mbyte error checking and correcting RAM
- HP 98258C 12 Mbyte parity checking RAM
- HP 98264B 16 Mbyte error checking and correcting RAM
- HP 98568A 8-slot DIO expander
- HP 98570A 4-slot DIO and 2-slot DIO II expander Interfaces
- HP 98622A GPIO interface
- HP 98623A BCD interface
- HP 98629A Shared Resource Manager interface
- HP 98640A analog input, 7-channel A to D interface

Interfaces

- HP 98624A HP-IB interface
- HP 98628A Datacomm interface
- HP 98642A 4-channel RS-232-C MUX interface
- HP 98644A RS-232 interface
- HP 98646A VME connection
- HP 98622A GPIO interface
- HP 98629A Shared Resource Manager interface

Rack Mounting

- HP 19500B SPU rack mount kit
- HP12131A keyboard rack kit

Suggested Peripherals

- HP 9145A cartridge tape subsystem
- HP 7959B 304 Mbyte fixed hard disk
- HP 33440A LaserJet printer
- HP 7475 plotter
- HP 7550 graphics plotter

HP BASIC Language Processor II for the HP Vectra and other MS-DOS Personal Computers



HP 82300C Technical Data*

Overview

HP BASIC Language Processor II (BLP-II) provides the capabilities of HP Series 300 BASIC to the owners of HP Vectra, IBM PC/AT and compatible personal computers. The processor allows the PC to work like an HP Series 300 workstation, providing the benefits of a superior instrument controller while providing access to the wealth of PC-DOS application software.

The BLP-II increases disk and graphics speed, provides a much faster boot operation and improves the accessibility of BASIC data files to DOS applications, as well as providing a more integrated environment.

Features and Benefits Common with Previous BLP Releases

Features	Benefits
Special hardware and software allow the PC to function as an HP Series 300 Workstation.	Powerful, sophisticated instrument control on a PC.
Run the same HP BASIC as HP Series 300 Workstations and BLP-I.	Your PC becomes a cost-effective flexible controller.
Look and feel of HP BASIC Workstations.	Software transportability.
Built-in HP-IB interface.	Protection of software investment.
Up to 4 MB RAM available.	Consistent user interface.
I/O capabilities for standard interfaces are part of the language, no separate libraries are needed.	Easy interface to instruments.
SRM Interface, OfficeShare, other PC LANs.	Expands to run large HP BASIC programs, not limited by DOS memory barriers.
	Rapid program development.
	Easy to change test conditions.
	Access to popular Local Area Networks.

*Data subject to change without notice.

New HP BASIC Language Processor Release II Enhancements

Features	Benefits
BASIC uses entire PC display.	No clipping or window adjustments. Bigger effective screen size.
Bit-mapped Series 300 display capability.	Series 300 programs run with fewer modifications.
Graphics performance up to 3.7 times faster than BLP-I, 90% of HP 310.	Get HP 310 speed AND access to DOS applications.
BASIC uses DOS file system.	Disk performance similar to HP Model 332 workstation. Access to any file or subdirectory on DOS disk drive. Convenient, DOS-like references to disk drives (A, B, C, etc.). Easier, faster data transfer to DOS applications.
Boots in less than 10 seconds.	Get productive in less time.
Optional file system compatibility with BLP-I.	Run existing BLP applications without MSI modifications. Read/write/format 5.25" and 3.5" LIF disks.
Background access to PC disk drive.	Collect BASIC data and log to PC's disk drive while running DOS applications.
Improved, expanded documentation.	Introduction to DOS helps HP users adjust to the MS-DOS world. Porting guide saves time, support costs. More examples to speed learning, code development.
Language processor includes 1 MB RAM, standard.	Easier to configure and order. Enough memory to run a full BASIC system.

Hardware

Hardware for the HP BASIC Language Processor consists of the following:

Language Processor

- 8 MHz MC68000.
 - 1 Megabyte of RAM (standard) expandable to 4 MB with RAM Expansion Board.
 - New Boot ROMs (provide quick system boot).
 - HP-IB interface.
 - DIO Bus interface for GPIO, SRM.
 - PC Bus interface/emulation hardware.
- In addition to the language processor, the following optional hardware is also available:

RAM Expansion Board (HP 82305A)

- Includes 512 KB of RAM.
- Expandable to 3 MB (System total = 4 MB).
- Connects directly to language processor (takes 1/2 PC expansion slot).

RAM Expansion Kit (HP 82303A)

- Includes 512 KB of user installable RAM for use with HP 82305A.

GPIO Interface (HP 82306A)

- DIO GPIO Interface Board.
- Equivalent to Series 200/300 (takes one PC expansion slot).
- Requires HP 82307A GPIO Cable.

Shared Resource Manager (SRM) Interface (HP 50963A)

- Equivalent to Series 200/300 (takes one PC expansion slot).
- BASIC Language Processor can serve as SRM node.
- Provides "Diskless Boots" from the SRM file server.

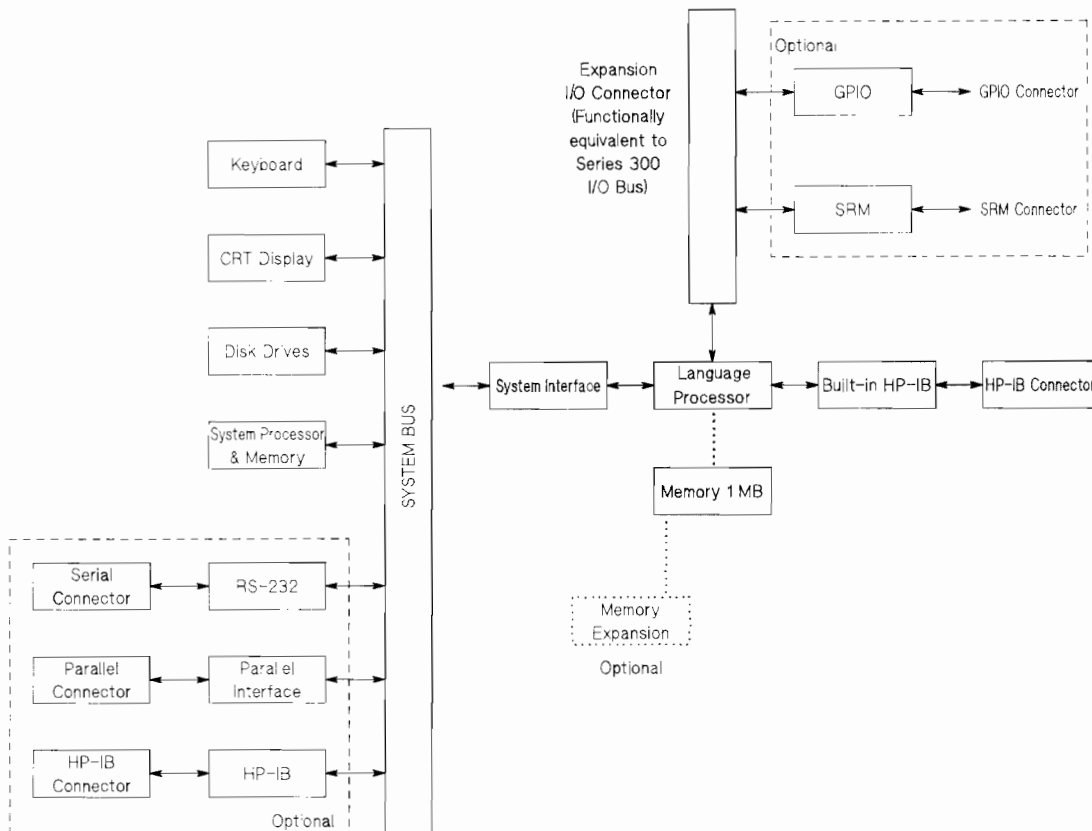


Diagram showing functional relationship of the HP BASIC Language Processor to the host HP Vectra or IBM PC/AT.

Software

- Supplied on 5 ea. 5 1/4" and 2 ea. 3.5" MS-DOS format disks.
- HP BASIC 5.13.
- PC Emulator Software.
- Supports HP 98618A BASIC Compiler.
- Supported PC video displays: Multimode, Monochrome Plus/Hercules, AT&T Monochrome, Compaq Portable III Plasma, EGA, VGA. (CGA displays not supported.)
- Supported Keyboards: HP Vectra CS/ES/QS/RS & IBM Enhanced (101/102-keys) Keyboard. Old Vectra PC Keyboard (HP- HIL). Old IBM AT (84-key) Keyboard. HP 46021A ITF Keyboard (Series 300). (BASIC only, does not support DOS.) HP 98203C Keyboard (Series 200).
- (BASIC only, does not support DOS.)
- PC HP-IB (up to three total per system: 1 resident on BASIC Language Processor, add up to 2 HP 82990A Interfaces). (NOTE: DOS applications do not support peripherals on BLP HP-IB. Use Centronics or HP 82990A HP-IB Interface.)
- PC Serial Interface. (Serial TRANSFERS not supported.)
- PC Parallel Printer Interface.

Documentation

Provided with 82300C:

"Programming with HP BASIC"
"Installing and Using HP BASIC
in the MS-DOS Environment"
"Porting Guide for the HP
BASIC Language Processor"
"BASIC 5.0/5.1 Language
Reference"
"BASIC 5.0/5.1 Condensed
Reference"

For additional documentation of
HP BASIC, users are referred to:

"BASIC 5.0/5.1 Programming
Techniques" P/N 98613-90012
"BASIC 5.0/5.1 Graphics
Techniques" P/N 98613-90032
"BASIC 5.0/5.1 Interfacing
Techniques" P/N 98613-90022

Also of interest:

"BASIC 5.0 Compiler User's
Manual" P/N 98618-90000

Display Systems

Emulates a Series 300
bit-mapped display. Compatible
with most popular PC display
systems.

PC Display Type	Display Resolution	Alpha Lines X Characters
Multimode	640 x 400	28 X 80
Compaq Portable Plasma	640 x 400	25 X 80
AT&T Monochrome	640 x 400	25 X 80
Monochrome Plus (Hercules)	720 x 348	25 X 90
EGA	640 x 350	25 X 80
VGA (monochrome and color)	640 x 480	34 X 80

Mass Storage File Systems and Formats

- There are three ways files may
be stored in the BLP-II/PC
environment:

DOS - the default file format.
Used by BASIC & supported by
BLP-II DFS binary.

LIF - allows reading, writing
and formatting of Series 200/
300 disks.

HPW - Virtual-LIF file system
used by BLP-I. Supported by
HPWLIF.DIR and retained for
compatibility.

- Formatted capacity of the
supported disk media are:

Disk Size	Disk Size & Formatted Capacity	
	3.5*	5.25*
DOS format	720 KB 1.44 MB	360 KB 1.2 MB
LIF format	264 KB	264 KB
256 bytes/sector	616 KB 1.232 MB	-
LIF format	770 KB	-
1024 bytes/ sector	1.54 MB	-

- Supports all PC internal hard
disks.

Supported MS-DOS® Personal Computers:

HP Vectra CS, ES, QS, & RS
IBM-AT Model 339
Zenith Model 248
Compaq Deskpro 286, 386/16 &
Compaq Portable 386/20
AT&T Model 248
Wyse PC-286
(HP Vectra LS/12 Laptop PC not
supported.)

Performance Comparison

This data is based on representative tests in measurement automation.

The data show relative times to complete the task, normalized to the HP 310.

The SHORTER the bar the HIGHER the performance.

Environmental Specifications

HP Vectra CS, ES, ES/12 & QS/16 PCs

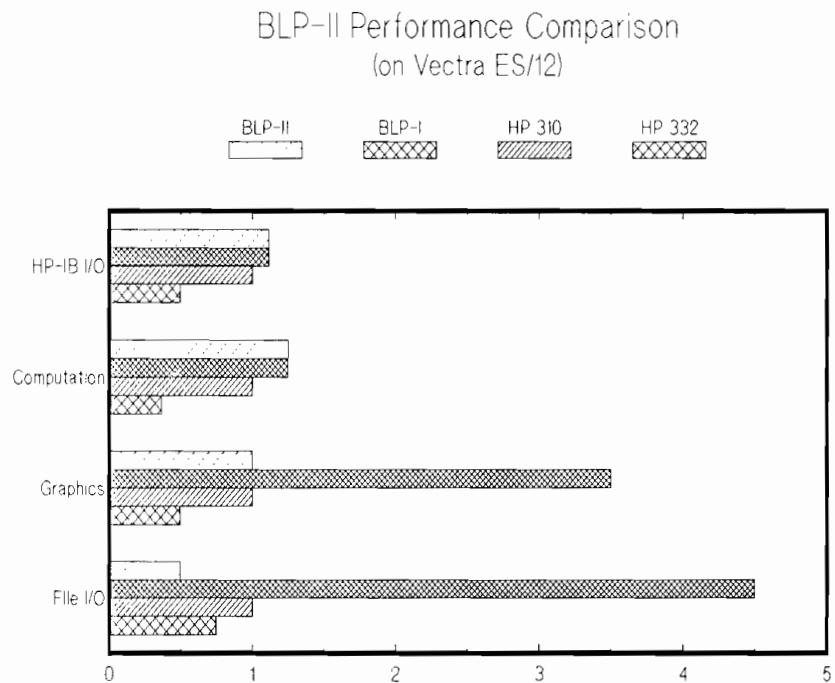
Operating temp.: 41 to 104 deg. F (5 to 40 deg. C).

Non-operating temp.: -40 to 158 deg. F (-40 to 70 deg. C)

Humidity: 15% to 80% RH (non-condensing).

Operating altitude: 15,000 ft. (4.6 km)

Non-operating altitude: 50,000 ft. (15.2 km)



BAR chart showing comparative performance

HP Vectra RS/20C & RS/25C PCs

Operating temp.: 32 to 131 deg. F (0 to 55 deg. C).

Non-operating temp.: -40 to 158 deg. F (-40 to 70 deg. C)

Humidity: 15% to 95% RH at 104 deg. F operating (40 C). 90% RH at 149 deg. F non-operating (65C)- 24 hours

Operating altitude: 15,000 ft. (4.6 km)

Non-operating altitude: 50,000 ft. (15.2 km)

Note: Operating temperature and humidity range may vary with data storage media or input voltage.

HP 82300C Language Processor

Operating temp.: 32 to 131 deg. F (0 to 55 deg. C) ambient to PC Assembly.

Non-operating temp.: -67 to 158 deg. F (-55 to 70 deg. C).

Humidity: 5% to 95% RH @ 65 deg. C.

Note: Operating temperature and humidity range may vary with data storage media.

Ordering Information

Product	Description
82300C	HP BASIC Language Processor (1 MB RAM, includes BASIC Language Processor system software on 5.25 and 3.5 inch floppy disks)
82323A	Upgrade Kit, upgrades 82300A/B users to 82300C (includes new software, manuals and boot ROMs).
82303A	RAM Expansion Kit (512 KB)
82305A	RAM Expansion Board (512 KB plus space for additional 82303As)
82306A	GPIO Interface
82307A	GPIO cable for 82306A
50963A	Shared Resource Manager (SRM) Interface
82313A	Hierarchical File System (HFS)

HP PC Controllers:

Instrument Controller

Bundles consisting of an HP Vectra PC with 640 KB RAM and a preinstalled 82300C BASIC Language Processor:

Product	PC Controller Designation	Vectra SPU	Display	Floppy Drive(s)	Hard Disc
82314E	PC-308ML	ES/12	VGA Mono	3.5" 1.44 MB	20 MB
82315E	PC-308CL	ES/12	VGA Color	3.5" 1.44 MB	20 MB
82319E	PC-308CM	ES/12	VGA Color	3.5" 1.44 MB	40 MB
82332E	PC-312CL	QS/16S	VGA Color	3.5" 1.44 MB	40 MB
82333E	PC-312CM	QS/20	VGA Color	3.5" 1.44 MB	40 MB
82334E	PC-315CN	RS/25C	VGA Color	3.5" 1.44 MB & 5.25" 1.2 MB	100 MB

Upgrading to the HP 82300C HP BASIC Language Processor II

HP 82323A Technical Data*

Overview

The HP 82323A Upgrade Kit provides a convenient way of upgrading existing HP 82300A/B BASIC Language Processors to provide the full functionality of the HP 82300C BASIC Language Processor (Release II).

The HP 82323A also includes trade-in options for HP 82304B BASIC ROM owners. Release II does not support HP BASIC in ROM, and therefore the HP 82323A provides a convenient way to get additional RAM at a reduced price.

Product Structure

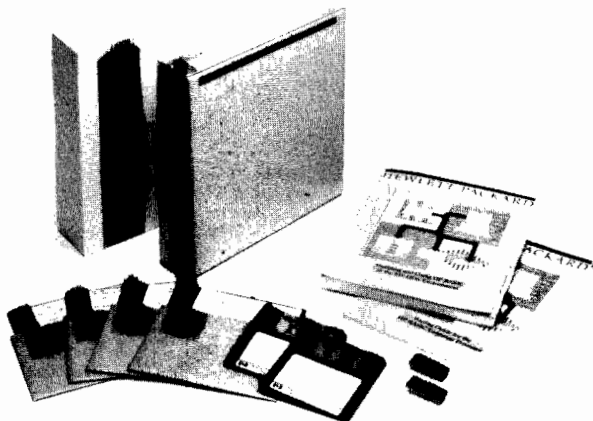
- HP 82323A Upgrade Kit:
- A complete set of Release II software is provided on both 5 1/4" and 3 1/2" disk media.
 - A set of new HP BASIC Language Processor documentation including:

Title	Part Number
Programming with HP BASIC	82301-90015
Installing and Using HP BASIC in the MS-DOS Environment	82301-90013
Porting Guide for the HP BASIC Language Processor	82301-90021

- A complete set of Key Function Guides and Overlays.
 - A complimentary pair of new HP BASIC Language Processor Boot ROMs for fast HP BASIC boot speed.
- A multi-lingual Upgrade Kit Installation Manual.

Option #001: BASIC ROM/Additional RAM
Trade-in. Trade-In of 82304B BASIC ROM for HP 82303A 512 KB RAM Expansion Kit. Required for BASIC ROM owners with less than 1 MB RAM on the BASIC Language Processor (Optional for BASIC ROM owners with more than 1 MB RAM.)

Option #002: BASIC ROM/Additional RAM
Trade-in. Trade-In of 82304B BASIC ROM for HP 82305A 512 KB RAM Expansion Board including 512 KB RAM. (Optional for BASIC ROM owners with 1 MB RAM on the BASIC Language Processor.)



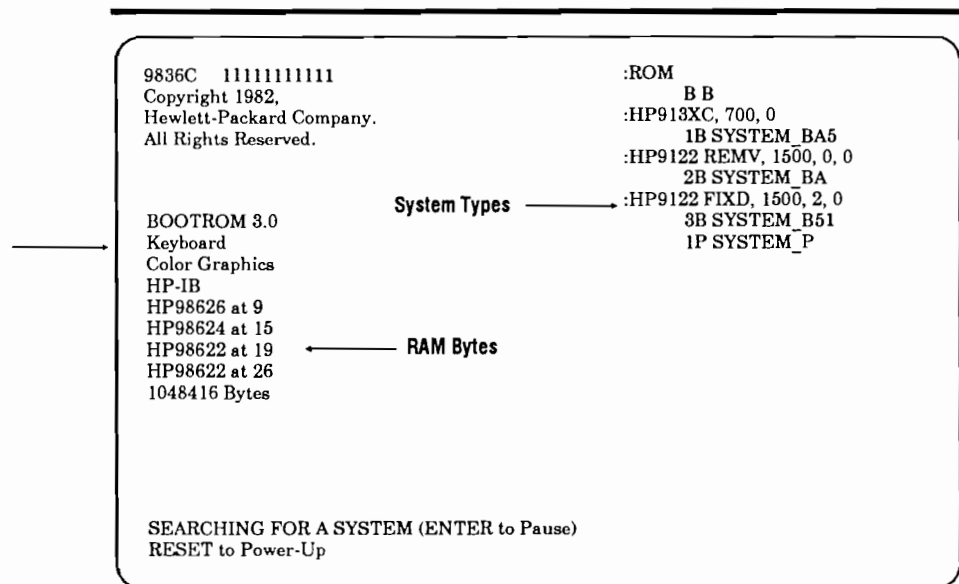
* Data subject to change without notice.

What to Order

Before you order the 82323A Kit, it is suggested that you perform the following procedure in order to receive the correct upgrade configuration:

Step 1 Power-up your personal computer and activate HP BASIC in the usual manner.

*However, when the boot screen begins, hold down the spacebar - release it a few seconds after the word **Keyboard** appears in the sixth line of the display:*



Boot screen display for BASIC Language Processor.

Step 2 The **System Types** lines in the upper right corner display the addresses of installed systems including BASIC. If any of the lines reads:

:ROM B B

you have a system equipped with an HP 82304B BASIC ROM.

Step 3 A line on the left side of the display shows the approximate number of bytes of RAM installed on the Language Processor system. Use the table showing the amount of RAM installed in your system to help you choose the necessary option (if required).

The HP 82323A Upgrade Kit for your 82300A/B BASIC Language Processor requires a minimum of 1 MB of RAM (Random Access Memory) installed on the processor board. Many current systems, particularly those equipped with the HP 82304B BASIC ROM, may have only 512 KB of RAM installed, since the 82304B BASIC ROM made possible the use of less RAM. The 82323A Upgrade Kit software does not support the 82304B BASIC ROM, therefore it may be necessary for you to add additional RAM, as shown in the table.

System Type	RAM Bytes*	Order
:ROM	524114 Bytes	HP 82323A Option 001
B B	1048402 Bytes	HP 82323A Option 002
	1572960 Bytes to	HP 82323A or
	3669842 Bytes	HP 82323A Option 001
	4194130 Bytes	HP 82323A
:HP9122 FIXD,1500,2,0	524114 Bytes	HP 82323A plus HP 82303A
1B SYSTEM_BA5		
(or similar, but not :ROM)	1048402 Bytes to	HP 82323A
	4194130 Bytes	

* These values will vary slightly depending on configuration

When you receive the upgrade kit, enclosed instructions will enable you to install the RAM and new BASIC Language Processor software. If you ordered the BASIC ROM trade-in (Options 001 or 002) you will be asked to return your old 82304B BASIC ROM in accordance with enclosed instructions.

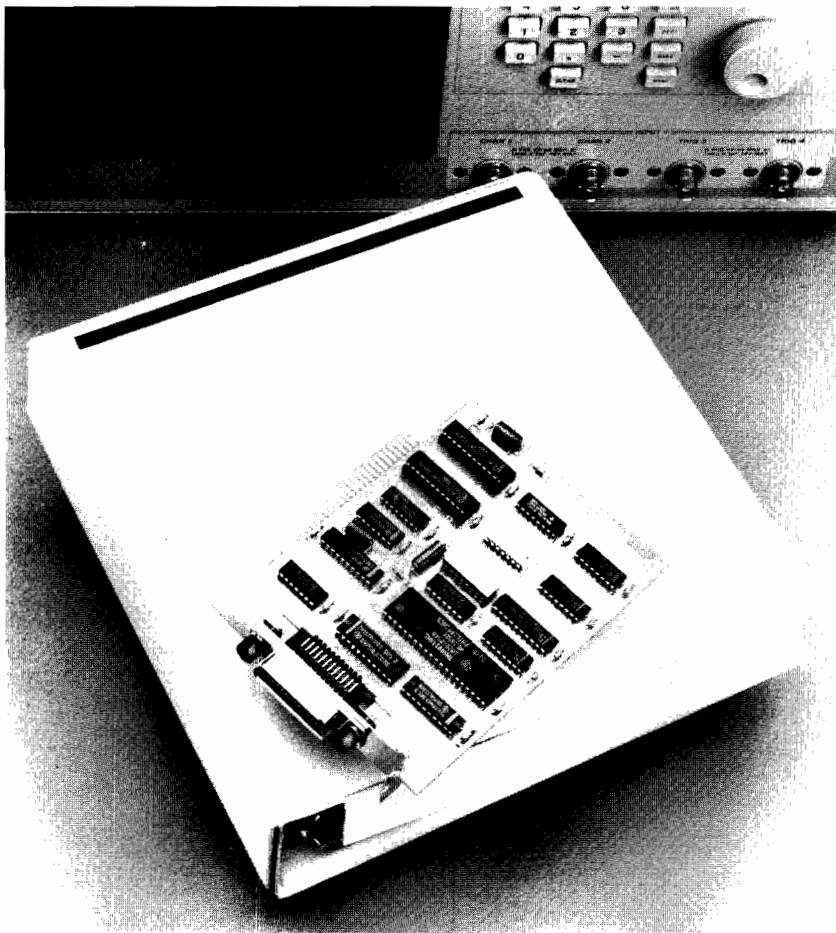
Also enclosed is a set of new Boot ROMs. Installation of these ROMs is necessary only if you desire the fast Boot process. (Release II software supports previous Boot ROMs.) If you desire to install them, follow the instructions enclosed with the product.

Note: Language processors ordered prior to August, 1988, have soldered Boot ROMs. The new Boot ROMs can be installed by your Hewlett-Packard Field Repair Center.

HP 82335A HP-IB Interface and Command Library

Technical Data*

**for HP Vectra Series,
IBM PC, PC XT, PC AT
and IBM compatibles.**



The Hewlett Packard HP-IB Interface and Command Library for MS-DOS® computers provides instrument control capability for the HP Vectra Series as well as the IBM PC, PC XT, PC AT and all true IBM PC compatibles computers. The HP-IB Command Library includes support for all of the most popular programming languages and an HP-IB peripheral driver which provides support for HP-IB printers and plotters.

The HP-IB Command Library lets you include commands in your BASIC, Pascal or C programs to control HP-IB instruments, and provides the capability for high-speed string and binary data transfers using DMA.

Feature	Benefit
End-of-the line interrupt support	Reduces the size of the required code and increases execution speed for branch on interrupt ability
Unformatted binary data transfers	Transfer large blocks of data from instruments to the PC without first converting the raw binary data to ASCII format. Complies with the IEEE-488.2 specification.
Peripheral driver	Redirect output from serial and parallel ports to HP-IB port.
Automated installation	Easy installation procedure. Simply type "install".

* Data subject to change without notice.

Command Listings

Ten commands allow you to enter and output ASCII strings, real numbers and arrays of real numbers. They are:

IOENTER - Reads a single real number from a device.

IOENTERA - Reads an array of real numbers.

IOENTERAB - Is used to enter unformatted data compatible with the IEEE-488.2 binary data format.

IOENTERB - Used to enter data in any format your device can use.

IOENTERS - Reads a character string from a device.

IOOUTPUT - Outputs a real number to a specified device.

IOOUTPUTA - Outputs an array of real numbers to a device.

IOOUTPUTAB - Used to output unformatted data compatible with the IEEE-488.2 binary data format.

IOOUTPUTB - Used to output data in any format you desire.

IOOUTPUTS - Outputs an ASCII string to a device.

Other commands provide access to individual control lines and bus commands. They are:

IOABORT - Aborts all interface activity.

IOCLEAR - Returns a device to a known state.

IOCONTROL - sets certain status conditions of the interface.

IODMA - Used to setup DMA transfers.

IOEOI - Enables/disables the End-or-Identify (EOI) mode for transferring data.

IOEOL - Used to define the End-Of-Line (EOL) string for output.

IOFASTOUT - Enables or disables high speed timing when outputting data.

IOGETTERM - Determines the reason for a read termination.

IOLLOCKOUT - Used to send a Local Lockout (LLO) to disable front panel operation.

IOLOCAL - Enables device front panel operation.

IOMATCH - Used to define the character which is used to terminate the IOENTERS and IOENTERB commands.

IOPEN - Will cause an SRQ to generate an interrupt in BASIC.

IOPOLL - Performs a parallel poll.

IOPOLLCC - Used to prepare an instrument for a parallel poll command.

IOPOLLU - Used to unconfigure an instrument for a parallel poll.

IOREMOTE - Used to place a device into its remote mode.

IORESET - Sets the interface to its power-up state.

IOSEND - Sends user-specified HP-IB commands.

IOSPOLL - Performs a serial poll of a device.

IOSTATUS - Determines the status of the bus.

IOTIMEOUT - Sets a timeout value.

IOTRIGGER - Triggers a device.

Printers and Plotters

The HP 82335A Command Library includes the HP-IB Peripheral driver. This driver adds HP-IB capability directly to the DOS operating system. You can redirect output from both COM and LPT ports to an HP-IB printer or plotter.

Systems Requirements

The HP-IB Command Library must have at least 256 Kbytes of system memory available and be running DOS 3.1 or higher.

Supported Languages

Vectra BASIC	3.11,3.22
GW BASIC	3.11,3.22
BASICA	3.11,3.22
Microsoft® QuickBASIC	3.0,4.0,4.5
Microsoft Compiled BASIC	6.0
Microsoft Pascal	3.32,4.0
Borland Turbo Pascal	4.0,5.0,5.5
Borland Turbo C	2.0
Microsoft C	4.0,5.0,5.1
Microsoft Quick C	1.01,2.0

Ordering Information*

HP 82335A - HP-IB Interface and Command Library for the Vectra Series, IBM PC, PC XT, PC AT and true compatibles. Supports HP-IB instruments, printers and plotters. Includes HP-IB interface card, HP-IB Command Library on 5 1/4 inch and 3 1/2 inch media.

HP 82335A Option 001 - HP-IB Command Library. Includes all of the above except for the interface card.

HP-IB Cables

HP 10833A	1 Meter HP-IB Cable
HP 10833B	2 Meter HP-IB Cable
HP 10833C	4 Meter HP-IB Cable
HP 10833D	.5 Meter HP-IB Cable

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- * HP-IB disk and tape support and HP PC Instrument Support have been removed and are not supported.





For more information, call your local HP sales office listed in your telephone directory or an HP regional office listed below for the location of your nearest sales office.

United States:

Hewlett-Packard Company 4 Choke
Cherry Road Rockville, MD 20850 (301)
670-4300

Hewlett-Packard Company 5201
Tollview Drive Rolling Meadows, IL
60008 (312) 255 9800

Hewlett-Packard Company 5161
Lankershim Blvd. No. Hollywood, CA
91601 (818) 505 5600

Hewlett-Packard Company 2015 South
Park Place Atlanta, GA 30339 (404) 955
1500

Canada:

Hewlett-Packard Ltd. 6877 Goreway
Drive Mississauga, Ontario L4V1M8
(416) 678 9430

European Headquarters:

Hewlett-Packard S.A. 150, Route du
Nant d'Avril 1217 Meyrin 2
Geneva—Switzerland 41/22 780 8111

Japan:

Yokogawa-Hewlett-Packard Ltd. 29-21,
Takaide-Higashi 3-chome Suginami-ku,
Tokyo 168 (03) 331 6111

Latin America:

Latin American Region Headquarters
Monte Pelvoux No. 111 Lomas de
Chapultepec 11000 Mexico, D.F. Mexico
(905) 202 0155

Australia/New Zealand:

Hewlett-Packard Australia Ltd. 31-41
Joseph Street Blackburn, Victoria 3130
Melbourne, Australia (03) 895 2895

Far East:

Hewlett-Packard Asia Ltd. 22/F Bond
Centre, West Tower 89 Queensway,
Central, Hong Kong (5) 8487777