

HP-IB Interface for HP 1000 A-Series Computer Systems

Technical Data

For HP 1000 A-Series
Computer Systems
Product Number
HP 12009A

The HP 12009A HP-IB Interface provides for connection of up to 14 Hewlett-Packard Interface Bus compatible devices to HP 1000 A-Series computers or systems. HP-IB compatible devices include flexible and hard disk drives, printers, magnetic tape drives, plotters, graphics digitizers, and an extensive list of measurement instruments.

* The Hewlett-Packard Interface Bus (HP-IB) is HP's implementation of IEEE Standard 488-1978: "Digital Interface for programmable instrumentation" and identical ANSI Standard MC 1.1. The term "HP-IB" is also used to identify Hewlett-Packard instruments conforming with this standard.

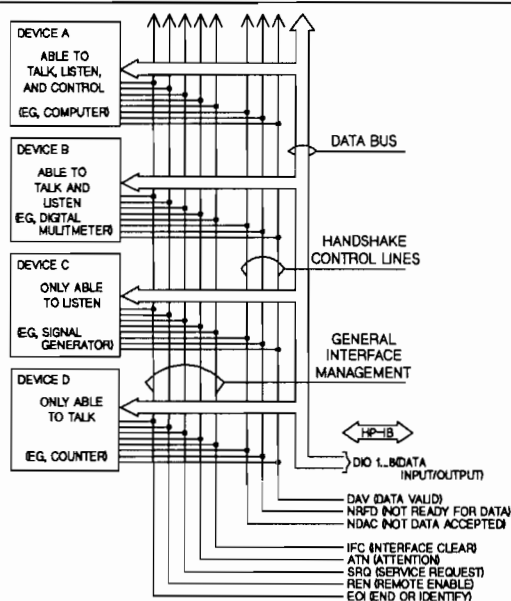
Features

- Interface to low-cost peripherals
- Capacity of up to 14 instruments
- Simple software control of HP-IB based instrumentation systems
- Built-in DMA capability for optimum I/O efficiency
- Burst transfer rates to 940 Kbytes/second
- Concurrent operation of multiple HP-IB buses under control of the RTE-L/A operating system
- I/O driver support with RTE-XL, RTE-A, RTE-L operating system

HP-IB Capabilities

The HP 12009A HP-IB interface connects to the signal lines shown in Figure 1, acting as DEVICE A. Eight bidirectional data bus lines carry coded messages in bit-parallel-byte-serial to/from other devices on the bus, with each byte transferred from one "talker" to one or more "listeners." Data is exchanged asynchronously using interface messages to set up, maintain,

Figure 1



and terminate an orderly flow of device-dependent messages. Three data byte transfer control lines control the transfer of each byte of coded data on the eight data lines. The five general interface management lines ensure an orderly flow of information within the HP-IB.

The HP-IB functions of the HP 12009A interface are largely embodied in a CMOS/SOS LSI integrated circuit chip that works with the I/O master processor LSI chip and circuits to manage HP-IB control and communications.

Functional Specifications

Capacity

HP 7906H/7910HR Disks per HP 12009A Interface: Up to two, maximum, in addition to single or dual flexible disk

Other HP-IB Devices/Interface: Up to 14

Switch-Selectable Operating Modes

High-speed Mode: Selects operation at data rates to 940 Kbytes/second, maximum. Only 7 high-speed devices plus the HP 12009A allowed on bus.

Normal Mode: Selects operation at data rates to 500 Kbytes/second, maximum; 14 normal speed devices may be on the bus.

Matching Requirements: All devices connected to the same bus must be compatible with the selected mode. For that reason, separate HP 12009A interfaces will be required to interface both high-speed mode and normal mode devices to the same A-Series computer or system.

System Controller Mode: A two-position switch enables HP 12009A operation as system controller (supported by RTE-L/XL/A) or disables such operation (not supported by RTE-L).

Bus Characteristics

Bus Signal Lines:

DIO	1-8 Data I/O Lines 1 through 8
DAV	Data Valid
NRFD	Not Ready for Data Accepted
IFC	Interface Clear
ATN	Attention
SRQ	Service Request
REN	Remote Enable
EOI	End or Identify

Logic Levels, Line Drivers, Line Terminations, and Line Receivers: All characteristics conform to IEEE Standard 488-1978.

Maximum Cable Length for Normal-Mode Operation: 2 meters (6.5 ft) per device connected, with a 20-meter (65 ft) total length. The maximum number of devices is accommodated by interconnection using shorter than maximum cable length.

Maximum Cable Length for High-speed Operation: 2 meters (6.5 ft) per device connected, with 15-meter (48.75 ft) total length. Additional load resistors, provided with the interface, are required.

Direct Memory Access (DMA) Operation

The HP 12009A can directly access computer memory under control of its I/O master processor regardless of how many other interfaces in the system are also accessing memory via DMA.

Transfer Rates

High-speed Mode: Up to 940 Kbytes per second via Direct Memory Access when HP-IB interface is plugged into the highest priority I/O slot (next to the central processor board) in the cardcage.

Normal Mode: Up to 500 Kbytes per second via Direct Memory Access.

Configuration Information

Computer and System

Compatibility: The HP 12009A HP-IB Interface is compatible with all HP 1000 A-Series Computers and Systems.

Software Support: The HP 12009A interface is supported by RTE-L/XL/A interface driver ID.37. Use of Hewlett-Packard disk memories and printers with the HP 12009A interface is supported by RTE-L device drivers DD.30 and DD.12 respectively, which work with interface driver ID.37.

Diagnostic Support: A diagnostic for the HP 12009A interface is provided in the HP 24612A Diagnostic Package.

Installation: Set interface card switches to select (or unselect) operation as bus controller, normal or fast settling time, appropriate HP-IB address and control functions and appropriate I/O address select code; turn off power to the computer; plug the interface into the computer backplane*; connect the bus cable from the interface to HP-IB devices; integrate the interface driver into the operating system if that was not done previously.

Note: To achieve maximum data rate in high-speed mode, the HP-IB interface must be plugged into the cardage slot next to the central processor; I/O address setting of the interface select code switches is independent of the interface card's position in the computer backplane.

Electrical Specifications

Direct Current

Requirements: 2.1 A (+5 V), 0.084 A (+12 V)

Physical Characteristics

Dimensions: 28.9 cm long by 17.2 cm wide by 0.16 cm board thickness (11.48 in by 6.75 in by 0.063 in), with 1.0 cm (0.4 in) top-of-board parts clearance and 0.5 cm (0.2 in) beneath-board clearance.

Weight: 710 grams (25 oz) with HP-IB cable

Ordering Information

The HP 12009A Interface includes:

12009-60020 HP-IB Interface Card
12009-60014 HP-IB 2-meter RFI Filter Cable
12009-90001 Reference Manual

HP 12009A Option

001 Replaces 12009-60014 2-meter cable with 12009-60015 4-meter RFI Filter Cable.

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