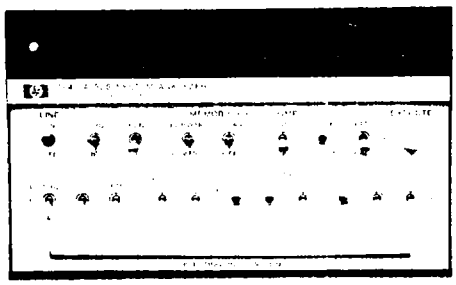
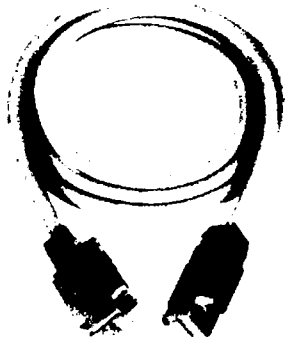
HEWLETT-PACKARD INTERFACE BUS

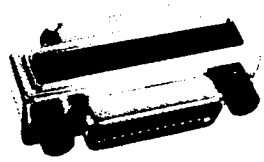
Versatile Interconnect System for Instruments and Controllers



HP 59401A



HP 10833A/B/C/D



HP 10834A

HP 59401A Bus System Analyzer

The HP-IB (IEEE 488) concept has greatly simplified many of those things which have in the past made instrument interfacing a burdensome task. Even so, software errors can occur if the system designer does not completely understand the bus system or the capabilities of the instruments and other devices being interfaced. Hardware problems can occur if the instruments/devices are not functioning properly, or if they are not completely compatible with the bus standard.

The HP 59401A Bus System Analyzer is especially useful in design and service work. It simplifies and speeds up the diagnosis of software and hardware problems by allowing the user to see the status of all bus lines, including the actual characters on the bus data lines. Because the HP 59401A can also drive all bus lines, it can completely exercise another Talker, Listener or Controller—which is especially useful in verifying compatibility of new or user-designed products with the HP-IB.

There are several choices of analyzer operating speed. It may be operated at one character at a time (useful for software debugging), at 2 characters per second, or at regular bus speed. It may also be operated at a variable rate as determined by the external clock input.

The analyzer's 32 character memory can be used to store bus characters in the Listen mode, or to output characters to the bus in the Talk mode. When the analyzer is in the Compare mode, a stream of bus traffic may be stopped on a pre-selected character—and at that time a trigger pulse is available, which is very useful when analyzing transient or timing problems related to the bus.

HP 59401A Specifications

Display: monitors all bus lines. Represents data lines, any memory location, or DIO front panel switch settings; in octal code and ASCII character.

Listen mode: stores up to 32 characters of bus traffic in memory for real time and repetitive testing. In Compare mode, halts bus traffic when a selected character is present, and user can display any one of the previous 31 characters stored in memory.

Timing: accept <750 ns; ready <750 ns.

Talk mode: bus lines can be driven directly from front panel switches; memory can be loaded from front panel switches for driving bus with a 32 character sequence.

Timing: (1) data changed >500 ns before DAV pulled low; (2) ATN driven low >1 μs before DAV pulled low; (3) DAV driven high <700 ns after NDAC is false. (4) DAV driven low <700 ns after NRFD is false, if conditions 1 and 2 are met.

Operating speeds: one character at a time, 2 characters per second, regular bus speed, or variable rate determined by external clock input; in either Listen or Talk mode.

External clock input: 1 standard power TTL gate input; <10 MHz repetition rate.

Compare output: provides 1 standard power TTL gate output (LOW TRUE) sync pulse when bus character is same as front panel switches.

HP-IB load: 1 bus load (capable of driving 14 other bus devices).

General

Temperature ranges: operating, 0 to 50°C; storage, −40 to +75°C.

Humidity: 95% relative, 0 to 40°C.

Power requirements: 100, 120, 220, or 240 V +5%, −10%; 48 to 66 Hz; ≤42 VA.

Size: 145.5 H, 205.1 W, 495.3 mm D (5.730" x 8.075 " x 19.500").

Weight: net, 5.64 kg (12.44 lb).

Accessories	Price
HP 5061-0089 front handle kit	$55
HP 10833B 2 m (6.6 ft) bus cable, furnished	N/C
HP 59401A Bus System Analyzer	**$3500**

HP-IB Interconnection Cables

Cables for interconnecting HP-IB devices are available in four different lengths. The connector block at both ends of each HP-IB cable (photo above) has a plug on one side and a matching receptacle on the other, so that several cables may be conveniently connected in parallel, thus simplifying system interconnection. Lock screws provide for secure mounting of each connector block to an HP-IB instrument, or to another cable connector block.

SPECIAL NOTE: HP-IB cables are not always included with individual HP-IB devices, particularly those that normally connect directly to an HP computing controller. (The HP-IB interface for HP computing controllers contains the necessary cable and connector). Product listings in this catalog should be checked to see if HP-IB cables are furnished.

The HP 10833 series of cables feature an improved shielding design to help improve RFI levels in systems. This series of cables, with the RFI shielding, exhibits significantly lower radiated emissions than previous HP-IB cables.

The HP 10834A adapter is a shielded HP-IB to HP-IB adapter. It provides additional clearance between the HP-IB cable and the rear panel of the instrument. This allows easier access to switches, cables, and other connectors that may be in close proximity to the HP-IB connector.

Ordering Information	Price
HP 10833A HP-IB Cable, 1m (3.3 ft)	$80
HP 10833B HP-IB Cable, 2m (6.6 ft)	$90
HP 10833C HP-IB Cable, 4m (13.2 ft)	$100
HP 10833D HP-IB Cable, 0.5m (1.6 ft)	$80
HP 10834A Adapter	$30

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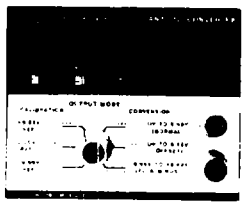
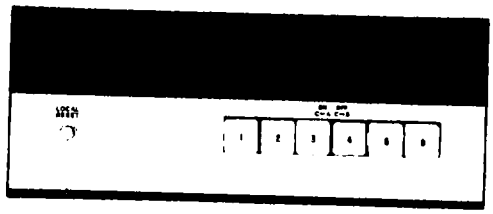
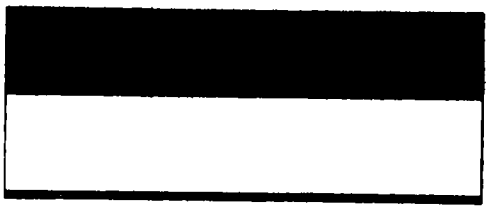


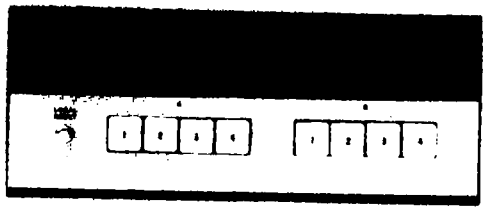
HP 59303A



HP 59306A



HP 59301A



HP 59307A

HP-IB Accessory Modules

Modules in the HP 59300, 59400 and 59500-series are ideal building blocks for use with instruments to extend measurement capabilities. Modules listed here can be interconnected via the HP-IB to HP measuring instruments, signal sources and recording devices capable of operating directly on the HP-IB. In addition, these modules frequently serve as useful ways to interconnect with devices which are not themselves capable of direct HP-IB operation.

Instrument requirements differ. Some only output or accept data on the HP-IB. Others can be remotely programmed by ASCII characters sent along the HP-IB. These modules can work with instruments on any of these levels with or without a controller. Each module having controls can be operated stand-alone from its front panel, or it can be placed in automatic operation under program control.

Module provision for stand-alone, local operation also has important system benefits. The operator can set up and check out the system under manual control, avoiding otherwise complex and time consuming error tracing. Each module has status indicator lights that make it easy to monitor operation.

HP 59301A ASCII-to-Parallel Converter

Accepts byte-serial ASCII characters from the HP-IB and converts them to parallel output. In operation, ASCII characters transmitted serially along the bus are converted into 4-bit characters with the first ASCII character received being interpreted as the most significant digit. A string of up to 16 characters terminated by linefeed is converted and placed upon the output lines. The linefeed character causes the HP 59301A to output a print command (strobe).

With the HP 59301A, instruments controlled via BCD or binary can be operated using HP-IB. For example, the HP 59301A can be used with HP 6129C through 6131C and 6140A (Option J99 or P05) digitally-controlled power supplies for HP-IB programmable voltage and current. The HP 59301A can additionally be used to control other functions using its hexadecimal format.

General

Size: 101.6 mm H[1] x 212.9 mm W x 294.6 mm D (4" x 8.38" x 11.6").
Weight: net 1.70 kg (3.78 lb). Shipping 2.33 kg (5.16 lb).

HP 59301A ASCII-to-Parallel Converter **$800**

HP 59303A Digital-to-Analog Converter

Accepts a string of serial ASCII characters and converts any three consecutive input digits to an analog output voltage, accurate to 0.1% in 30 μs. Fully programmable via the HP-IB or manually operated from the front panel. A concentric control on the front panel makes it easy to select the digit group for conversion and the output mode. The conversion switch is used to select the three digits of the character string that the DAC will change into analog voltage. The three output modes (NORMAL, OFFSET, and PLUS/MINUS) make the converter convenient for use directly with a variety of data logging devices, avoiding the need for auxiliary equipment to shift zero level or change polarity.

A primary application for the HP 59303A is to present on a logging device the data points being taken with a measuring instrument (like a frequency counter). A controller is not required for operation. Compatible logging devices include strip chart recorders, X-Y plotters, and displays.

General

Size: 101.6 mm H[1] x 105.9 mm W x 294.6 mm D (4" x 4.17" x 11.6").
Weight: net 2.61 kg (5.80 lb). Shipping 3.17 kg (7.04 lb).

HP 59303A Digital-to-Analog Converter **$2000**

HP 59306A Relay Actuator

Has six Form-C relays that provide for control of external devices either manually from front panel pushbuttons or remotely from the HP-IB. Relay contacts are specified to switch 24 V dc or 115 V ac at 0.5 A. Each relay can be programmed independently or multiple relays can be switched together. Front panel pushbuttons light to indicate the state of each relay.

The HP 59306A is ideal for providing control of microwave coaxial switches (HP 8761 A/B) as well as control of microwave programmable step attenuators (HP 8494 through 8496 G/H) using external dc power supplies.

General

Size: 101.6 mm H[1] x 212.9 mm W x 294.6 mm D (4" x 8.38" x 11.6").
Weight: net 2.64 kg (5.87 lb). Shipping 3.23 kg (7.18 lb).

HP 59306A Relay Actuator **$1100**

HP 59307A Dual VHF Switch

This module provides two single pole 4-throw switches controlled from front panel pushbuttons or remotely from the HP-IB. The HP 59307A is a dc to 500 MHz 50 Ω switch designed to maintain fast pulse transition times. The switches are independent and bidirectional for optimum use in multiplexing 50 Ω signal lines into measuring instruments. The HP 59307A is ideal to switch a standard delay, frequency, or voltage into a measurement loop for purposes of system calibration.

General

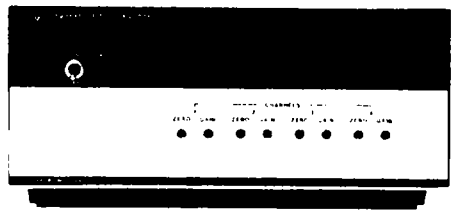
Size: 101.6 mm H[1] x 212.9 mm W x 294.6 mm D (4" x 8.38" x 11.6").
Weight: net 2.64 kg (5.87 lb). Shipping 3.23 kg (7.18 lb).

HP 59307A VHF Switch **$950**

[1]Height includes feet. With feet removed height is 88.1 mm (3.45").

HP-IB SYSTEMS

HP 59309A



HP 59313A

HP 59309A HP-IB Digital Clock

Displays month, day, hour, minute, and second, and upon command will output time via the interface bus. Time can be set into the clock by local control, or by remote commands received from the HP-IB. The clock accepts a small internal battery which can provide more than a day's standby in case of short power interruptions. Additionally, an auxiliary power supply such as the K10-59992 can sustain the clock for up to one year.

General

Size: 101.6 mm H[1] x 105.9 mm W x 294.6 mm D (4" x 4.17" x 11.6").
Weight: net 1.70 kg (3.78 lb). Shipping 2.84 kg (6.31 lb).

HP 59309A HP-IB Digital Clock **$1500**

[1]Height includes feet. With feet removed height is 88.1 mm (3.45").

HP 59313A Analog-to-Digital Converter

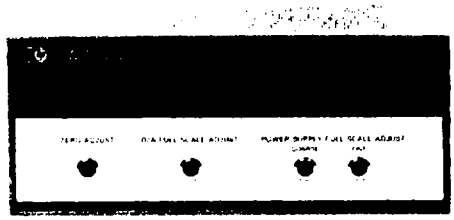
Four channel converter allows analog data with a full scale range of up to ± 10 V dc to be digitized and transmitted via HP-IB to a computing controller.

On command from the controller, the instrument can be programmed to perform a single conversion or a series of internally-paced conversions in six selectable rates of up to 200 per second on one channel, or up to 50 per second on each of four channels. Sampling can also be initiated externally by a TTL transition or contact closure to ground. Included is a program-controlled reverse channel capable of driving small lamps, relays or TTL devices.

General

Size: 101.6 mm H[1] x 212.9 mm W x 345.4 mm D (4" x 8.38" x 13.6").
Weight: net 5.45 kg (12.0 lb). Shipping 6.36 kg (14.0 lb).

HP 59313A Analog-to-Digital Converter **$2300**



HP 59501B

HP 59501B Power Supply Programmer (isolated DAC)

This single-channel digital-to-analog converter can control a wide range of power supplies (output voltage, or current), as well as other analog programmable devices. It may also be used as a low level signal source, depending on the speed of the controller. It has two output ranges (0–1 and 0–10 V dc in unipolar mode; –1 to +1 and –10 to +10 V dc in bipolar mode), as well as photo-isolators which electrically separate HP-IB control and data lines from power supply circuitry by up to 600 V dc. (For additional details see page 327)

General

Size: 101.6 mm H[1] x 212.9 mm W x 194.6 mm D (4" x 8.38" x 11.6").
Weight: net 2.61 kg (5.80 lb). Shipping 3.17 kg (7.04 lb).

HP 59501B Power Supply Programmer **$760**

HP Model	Description	Dimensions—max. height x width x depth mm (inches)	Net Weight kg (lb)	Shipping Weight kg (lb)	Price
59301A	ASCII-to-Parallel Converter	101.6 x 212.9 x 294.6 (4 x 8.38 x 11.6)	1.70 (3.78)	2.32 (5.16)	$ 800
59303A	Digital-to-Analog Converter	101.6 x 105.9 x 294.6 (4 x 4.17 x 11.6)	2.61 (5.80)	3.17 (7.04)	$2000
59306A	Relay Actuator	101.6 x 212.9 x 294.6 (4 x 8.38 x 11.6)	2.64 (5.87)	3.23 (7.18)	$1100
59307A	VHF Switch	101.6 x 212.9 x 294.6 (4 x 8.38 x 11.6)	2.64 (5.87)	3.23 (7.18)	$ 950
59309A	HP-IB Digital Clock	101.6 x 105.9 x 294.6 (4 x 4.17 x 11.6)	1.70 (3.78)	2.84 (6.31)	$1500
59313A	Analog-to-Digital Converter	101.6 x 212.9 x 345.4 (4 x 8.38 x 13.6)	5.45 (12.0)	6.36 (14.0)	$2300
59401A	Bus System Analyzer	145.5 x 205.1 x 495.3 (5.73 x 8.08 x 19.5)	5.64 (12.44)	9.1 (20)	$3500
59501B	Power Supply Programmer	101.6 x 212.9 x 294.6 (4 x 8.38 x 11.6)	2.61 (5.80)	3.17 (7.04)	$ 760