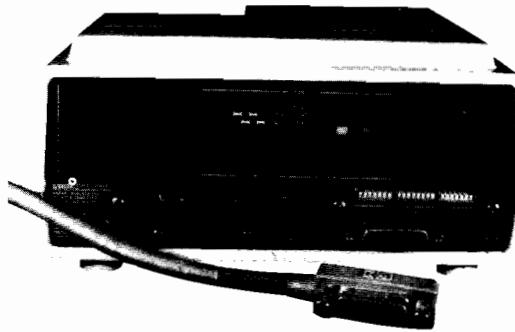


HP-IB I/O Interface Option

For HP 3075A And HP 3076A Terminals



3075A, 3076A Option 011



Features

- Versatile connection system for instruments and peripheral devices
- Extensive range of HP-IB compatible instruments and accessory devices
- IEEE 488-1978 compatible
- Controls up to 14 HP-IB devices
- 180 characters input and output buffer
- Maximum distance between terminal and HP-IB device: 20 metres
- Local control mode capability for program development local operation
- Multifield operation (multiple entries)
- Device enabled/disabled under program control

Note: The HP-IB Interface is not used with the 3077A Time Reporting Terminal.

General

The HP-IB interface is Hewlett-Packard's implementation of IEEE Standard 488-1978. It allows the 3075/3076 terminals to be connected to a wide range of instrumentation devices and data collection peripherals.

This option features a printed circuit HP-IB control card (i.e. HP-IB Controller) mounted in the terminal, which is wired to an HP-IB female connector on the terminal rear panel. The HP-IB connector may be connected via HP-IB cables to up to 14 user HP-IB compatible devices, for example:

- Voltmeters, ammeters, power meters and LCR meters
- Logic state analysers, scopes
- Thermometers
- Spectrum analysers
- Counters, clocks
- Printers

This enables several user devices (i.e. devices not offered as terminal options) to be connected to the terminal and program controlled via the terminal.

Note:

- 1) Only one HP-IB controller must be used for each HP-IB cluster. i.e. NO HP-IB user device may be an HP-IB system controller.
- 2) The HP-IB Controller CANNOT be used to connect the terminal to the computer.

The HP-IB employs the following allowable subsets of the IEEE Standard 488-1978 controller interface functions:

- C1 - system controller
- C2 - send IFC (Interface Clear) and take charge
- C3 - send REN (Remote Enable)
- C4 - respond to SRQ (Service Request)
- C28 - send I.F. (Interface) messages

Not provided by this controller are parallel poll and pass control, i.e. the HP-IB Controller always has control over the HP-IB bus (it cannot pass control to a connected device).

The HP-IB Controller may also be operated in a local control mode (i.e. self operation) in order to allow the user to practice using the high level COMMANDS and develop and debug programs.

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HP-IB Interface control

The functions are controlled by the system application programs using control sequences starting with the ESCape character. The available control sequences are as follows:

- HP-IB Interface selection: ESC-cNh
Where: N = 0 disable interface
N = 1 enable interface
- Enable/disable input data: ESC-hNi
Where: N = 0 disable input of HP-IB device RESULTS
N = 1 enable input of HP-IB device RESULTS
When enabled (i.e. N = 1) all RESULTS from the HP-IB Controller are transferred to the computer.
- Enable/disable output data: ESC-hNo
Where: N = 0 disable output of HP-IB DATA and COMMANDS
N = 1 enable output of HP-IB DATA and COMMANDS
When enabled (i.e. N = 1) all COMMANDS from the computer are transmitted (output) to the HP-IB Controller for execution.
- Display input data: ESC-hNd
Where: N = 0 disable local echo
N = 1 enable local echo
When enabled (i.e. N = 1) all ASCII and STATUS information received by the HP-IB Controller (from the HP-IB devices) and all HP-IB Controller STATUS information will be displayed on the terminal display and (if fitted) the terminal printer.
- Multifield operation: ESC-hNm
Where: N = 0 inhibits multifield operation
N = 1 enables multifield operation
Multifield operation allows multiple DATA entries in the same transaction. It prevents the HP-IB Controller entering its DATA to the computer at the end of a single DATA transaction. The DATA from several input modules (operating in multifield) is transmitted to the computer as one DATA block.
- Send binary data: ESC-bNW
Where: 0 ≤ N ≤ 170 number of bytes
W: specifies write binary

HP-IB Controller operation

The HP-IB Controller is microprocessor controlled to:

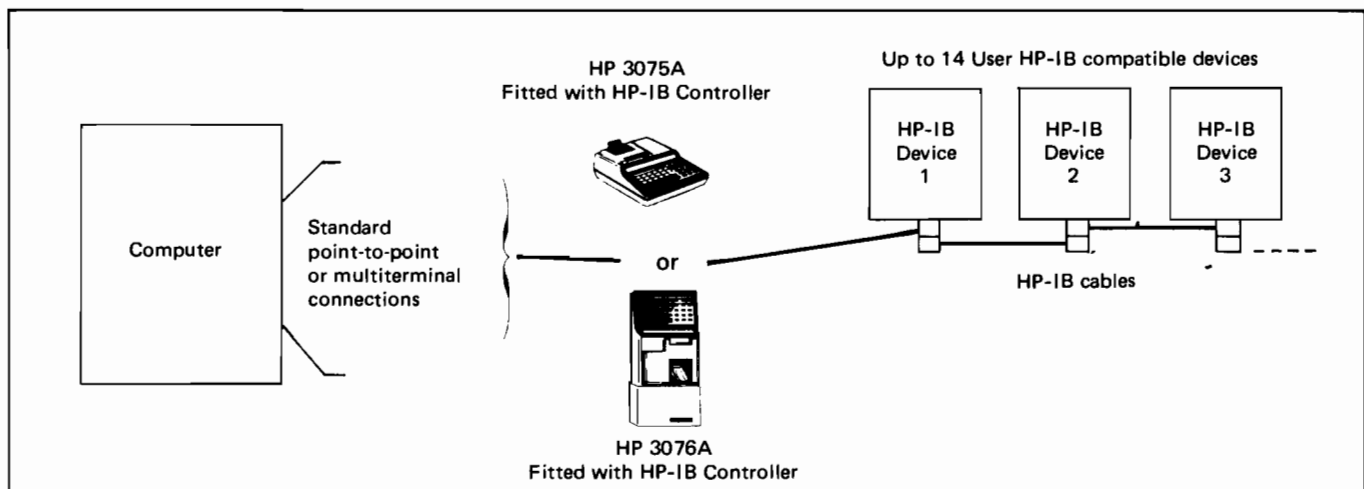
- 1) Decode and execute HP-IB high level COMMANDS
- 2) Control the HP-IB protocol (which is transparent to the computer program)
- 3) Convert serial computer data (in either ASCII or binary format) to parallel data required by the HP-IB devices, and vice-versa
- 4) Buffer data sent to the HP-IB devices (maximum 180 characters) and buffer data received from the HP-IB devices (maximum 180 characters)

19 HP-IB high level COMMANDS are employed to control the operation of the HP-IB Controller over the HP-IB devices. Within the HP-IB Controller, all HP-IB COMMANDS and computer originated data are buffered in a 180 character long REQUEST buffer. The task processor within the controller decodes all the COMMANDS and executes the COMMAND instructions. If a REQUEST causes a RESULT to be generated, the RESULT is buffered in a 180 character long RESULT buffer before being sent to the computer.

Request format

The 19 HP-IB high level COMMANDS are listed below:

HFR	Full reset
HPS	Priority HP-IB Controller status
HCO	Communications between two HP-IB devices
HCS	Standard HP-IB Controller status
HDC	Clear HP-IB device
HDS	HP-IB device status
HIC	Re-initialises HP-IB Bus
HLC	Clear HP-IB local lockout
HLK	Lockout HP-IB devices (local lockout)
HLO	Set HP-IB device to local state
HPL	Set device polling list
HRD	Read from HP-IB device
HRE	Set HP-IB device to remote state
HRT	Set terminator character for read command
HSP	Serial poll
HTO	Set time-out
HTR	Trigger HP-IB device
HWR	Write to HP-IB device
HWT	Set terminator character for write command



The HP-IB Controller Interface

Installation

The HP-IB Controller is connected to the computer via the terminal's point-to-point or multiterminal connector, and is connected to the HP-IB compatible devices via an HP-IB cable. This latter cable plugs into the HP-IB female connector on the rear of the terminal, the other end of this cable plugs into the HP-IB female connector on the first HP-IB compatible device. Subsequent HP-IB devices are connected in any configuration (e.g. star, daisy-chain, etc.) to the first device using the HP-IB cable. Four lengths of HP-IB cable are available, namely:

- 1 metre (3.3 feet) HP part number 10833A or 10631A
- 2 metres (6.6 feet) HP part number 10833B or 10631B
- 4 metres (13.2 feet) HP part number 10833C or 10631C
- 0.5 metres (1.6 feet) HP part number 10833D or 10631D

These cables conform to IEEE Standard 488-1978.

Up to 14 user HP-IB devices may be connected to one terminal fitted with an HP-IB Controller option. The communications between the HP-IB Controller and the devices are hardwired, i.e. no modems can be used. The only restrictions for connecting these devices are:

- 1) The maximum distance between the terminal and the first device is 4 metres (13.2 ft).
- 2) The maximum distance between devices is 2 metres (6.6 ft).
- 3) The maximum distance between the terminal and the last device is 20 metres (66 ft).

Note: For the 3076A terminal, as this terminal is housed in a Wall Mounting Cradle, the HP-IB cable must be passed through the cradle to be connected to the rear panel HP-IB female connector.

Local control mode

When the terminal is equipped with:

- 1) An Alphanumeric Keyboard (option 004) or a Multifunction Reader (option 007).
- and
- 2) A CRT display (option 006) or an Alphanumeric Display (option 005) or a Strip Printer (option 009).

It may be used to provide local control over the HP-IB Controller in order to allow the user to practice using the high level COMMANDS and develop and debug programs.

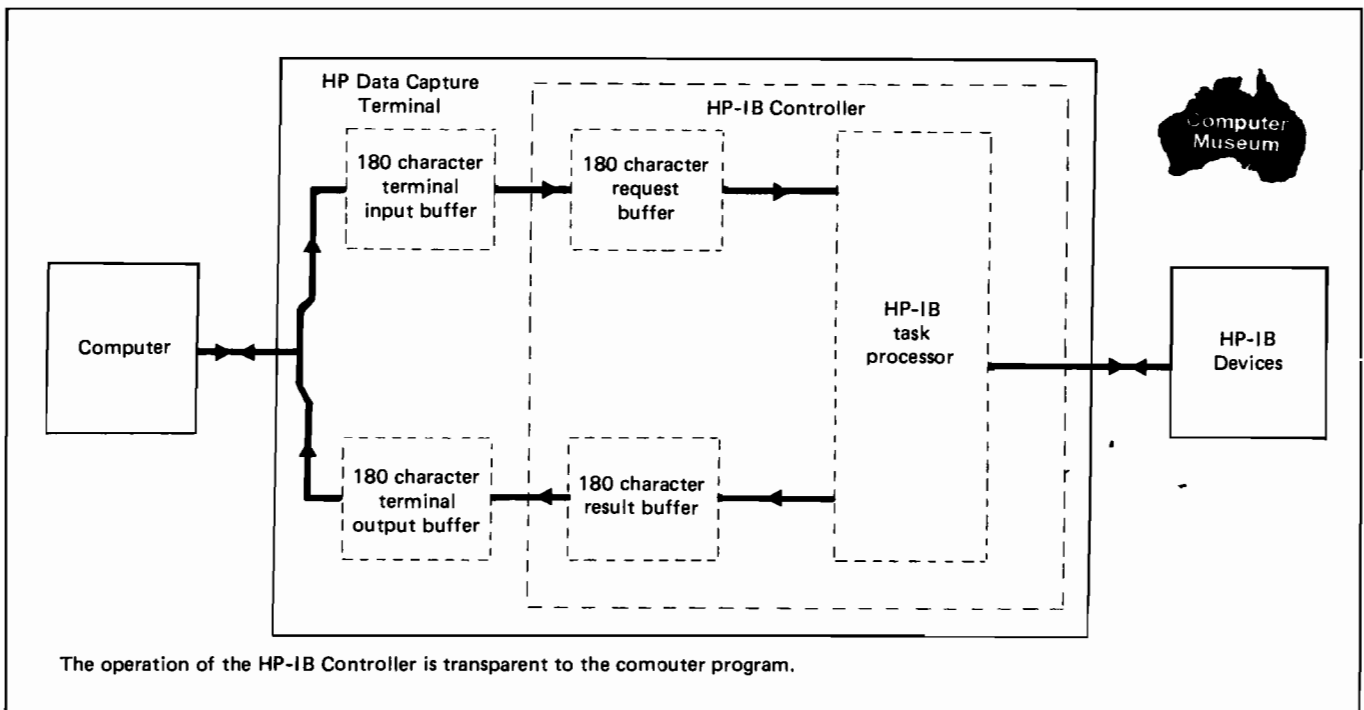
Note: Only ASCII data transfers are possible.

The terminal may be set for local control over the HP-IB Controller by setting the rear panel terminal configuration switches.

When in the local mode the terminal is isolated from the computer. The user may then type HP-IB REQUESTS on the Alphanumeric Keyboard and/or enter REQUESTS using the Multifunction Reader. The RESULTS will then appear on the terminal display or printer.

This operating mode is identical to the normal on-line mode except:

- 1) A program is not required, the user merely types instructions on the terminal keyboard.
- 2) The RESULTS appear on the terminal display in the same format as they would be if sent to the computer.
- 3) If the terminal generates a break it is displayed on the terminal as the character ? (question mark).



HP-IB Controller Internal Configuration

HP-IB Interface characteristics

Input buffer: 180 characters

Output buffer: 180 characters

Environmental conditions

Temperature:

- operating: 0°C to 55°C (32°F to 131°F)

- non operating: -40°C to 75°C (-40°F to 167°F)

Humidity: 5% to 95% (non condensing)

Vibration: 0.38 mm point-to-point (0.015 ins.) at 5-55 Hz

Altitude:

- operating: 4 600 m (14 400 ft)

- non operating: 15 000 m (48 000 ft)

Physical description

The HP-IB Interface is composed of a printed circuit board, totally housed in the terminal. The only visible part is the HP-IB female connector situated on the rear panel of the terminal.

Safety approvals

UL, CSA and VDE.

Supplied with option

Keyboard overlay for local control mode
(HP part no. 03075-00027)

Documentation available

3075A/3076A/3077A Reference Manual
(HP part no. 03075-90011)

Ordering information

Product number	Description
3075A/3076A option 011	HP-IB Interface

Data subject to change.



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