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HEWLETT hp PACKARD

9825

HP 98032A
HP 98033A HP 98034A
INTERFACE CARDS

TECHNICAL DATA* MARCH 1976



AVAILABLE INPUT/OUTPUT CARDS

- 16-bit parallel I/O (HP 98032A) — Transfer speeds up to 400,000 16-bit words/sec.
- 8-digit BCD input (HP 98033A) — Transfer speeds up to 3125 readings/sec.
- Hewlett-Packard Interface Bus, HP-IB* (HP 98034A) — Transfer speeds up to 45,000 bytes/sec.

*Conforms to IEEE Specification 488-1975

These input/output cards are designed to meet a variety of interfacing needs. For the fundamental commands, the General I/O ROM is required. The Extended I/O ROM and the General I/O ROM together add the commands which give the HP 9825A computer-like capabilities. The combination of the right ROM and interface cable gives you compatibility with instruments equipped with HP-IB and BCD bit parallel. For special purpose interfacing, the 16-bit and BCD cards are available with the cable unterminated.

HP 98032A INTERFACE

DESCRIPTION

This interface provides the 9825 with a latched 16-bit input data bus and a latched 16-bit output data bus for bidirectional transfer of information. Operation of the 98032A requires the General I/O ROM for typical read/write functions and the Extended I/O ROM for advanced capabilities such as vectored interrupt, buffered I/O, and Direct Memory Access (DMA). I/O transfers can be in a 16-bit word format or in two independent 8-bit bytes. DMA transfers are word oriented with rates up to 400k 16-bit words/sec. Control of interrupt enable and priority is provided via select code settings and software commands.

Extended control and status lines are available for applications which require more than one signal from the calculator. These signals, combined with full word or byte data transfer modes, allow interfacing to a variety of equipment.

SPECIFICATIONS

Logic Configuration

Fifteen jumpers are provided within a removable cable boot to control the logic of I/O data, control signals, flag information, and peripheral status information. Such operating modes as handshake operation, DMA, and word/byte data are also controlled by these jumpers.

Data Input/Output

Sixteen input lines with 3k ohms to 5 V and 6.2k ohms to ground terminations accept standard TTL signal levels.

Sixteen output lines with high voltage/current (30V,40mA) open-collector transistor drivers.

Control Lines

PCTL Peripheral Control—indicates to the peripheral that data is ready for output or calculator is ready for input. PCTL is reset by a ready-to-busy transition on PFLG.

PFLG Peripheral Flag—indicates to the calculator completion of a data transfer. Also used to request peripheral interrupt when enabled.

PSTS Peripheral Status (optional)—indicates to the calculator the readiness of the I/O device (paper out, power off, etc.). PSTS is sampled by the calculator whenever communication with the peripheral is requested.

STIØ,STI1 Extended Status (optional)—examined by reading the 98032A I/O status register.

CTLØ,CTL1 Extended Control—setting or clearing these signals can be accomplished by writing into the 98032A I/O control register.

I/O Direction—indicates to the peripheral the direction of the current data transfer. Valid when PCTL is valid.

PRST Peripheral Reset—used to initialize a peripheral. PRST is pulsed low when the calculator is turned on, when the calculator RESET key is pressed, or when software requests a device to be reset.

EIR External Interrupt Request—used only during DMA when EIR can be used to abort the transfer prior to completion. Normal interrupt requests use the PFLG line.

Select Code Setting

Choose any one of 14 via an externally accessible rotary switch. Select codes 2-7 have low interrupt priority, while 8-15 have high interrupt priority. (The Extended I/O ROM is required to operate the 98032A under interrupt control.)

Options and Accessories

The standard 98032A Interface is shipped with a 4,5 m (15 ft) open-ended cable. Connections to the following HP instruments may be made by ordering the option shown below. The 98032A Interface is shipped with a 2 m (6.5 ft) cable terminated with the ordered option.

Opt. 062	9862A Plotter
Opt. 063	9863A Paper Tape Reader
Opt. 064	9864A Digitizer
Opt. 066	9866A/B Thermal Line Printer
Opt. 069	9869A Hopper Card Reader
Opt. 071	9871A Impact Line Printer
Opt. 083	9883A Paper Tape Reader
Opt. 084	9884A Paper Tape Punch

A 98241-67932 Test Connector is available to verify hardware operation of the 98032A Interface.

HP 98033A INTERFACE

DESCRIPTION

This interface connects the 9825 with bit-parallel, digit-parallel binary coded decimal devices for data input. Up to 10 BCD digits, with overload and sign information, can be input using the General I/O ROM with transfer rates to 250 readings/sec. An input format is selectable which allows two instruments to be read from a single interface card. The speed of the slowest device dictates the overall transfer rate. The Extended I/O ROM can extend transfer rates to 3125 readings/sec. This ROM also provides buffered I/O with peripheral interrupt for communication with slow devices.

SPECIFICATIONS

Data Formats

Data is serialized into the calculator in a 16-character sequence. Two data formats are switch selectable on the interface card:

8-digit signed mantissa with 1-digit signed exponent;
1-digit function code and overload indication.

or

4-digit signed mantissa;
5-digit signed mantissa with positive exponent.

Additional data formatting can be accomplished via formatted read statements in the calculator software.

Codes

Data—8421 binary coded decimal weighting with codes Ø-9 representing digits Ø-9 and other codes as follows:

1010	(L.F.) line feed
1011	(+) plus sign
1100	(,) comma
1101	(−) minus sign
1110	(E) character "E"
1111	(.) decimal point

Additional Input Information

Exponent, Function: 8421 binary coded decimal weighting: codes Ø-9 only.

Mantissa sign, Exponent sign, Overload: 1 binary bit: logic sense is selectable.

Logic Configuration

Switches are provided inside the interface to select the logic sense of the following signals: FLGA, FLGB, CTLA, CTLB, SGN1, SGN2, OVLD, and interface DATA. Selection of optional data format (2 devices) and pulsed operation of CTLA or CTLB (or both) is also accomplished via these switches.

Data Input

43 data input lines (10 BCD digits, mantissa sign, exponent sign, and overload) have low-power Schottky TTL receivers with V max. of 7 V. External device must sink 0.4mA to produce a low-level input. Data is not latched and, therefore, must be held stable while the calculator is reading.

Control Lines

CTLA, CTLB Peripheral Control A and B—CTLA and CTLB are open collector TTL inverts with 2.2k ohm pull-up resistors. V max. is 15 V and current sinking capability is 14mA. CTLA (B) can be reset by either edge (ready-to-busy or busy-to-ready) of FLGA (B), with the ready-to-busy option providing the pulsed mode of operation.

FLGA, FLGB Peripheral Flag A and B—FLGA and FLGB receiver circuits are low-power Schottky TTL Schmitt triggers with inputs that have 2.2k ohms to +5 V, 0.01μF capacitors to ground, and 47 ohms in series with the driver. Either FLG in a busy state will indicate busy to the calculator.

Select Codes

One of 14 select codes may be chosen via an externally accessible rotary switch. Select codes 2-7 have low interrupt priority, while 8-15 have high priority. (The Extended I/O ROM is required to operate the 98033A under interrupt control.)

Options and Accessories

A 98241-67933 Test Connector is available to verify hardware operation of the 98033A Interface.

The 98033A Interface has no options. It is shipped with a 4.5 m (15 ft) open-ended cable.

HP 98034A INTERFACE

DESCRIPTION

This interface allows the 9825 to communicate via the HP-IB to as many as 14 compatible instruments per interface. The 98034A utilizes a controlling processor with ROM to provide efficient management of interface bus protocol. The General I/O ROM and the Extended I/O ROM access all the capabilities of the 98034A. For example, with these ROM's, the 98034A provides such capabilities as peripheral interrupt for service requests and data transfer at rates up to 45k bytes/sec.

SPECIFICATIONS

The following specifications conform to the IEEE Standard Digital Interface for Programmable Instrumentation (IEEE 488-1975).

Data Input/Output

Eight bidirectional data lines provide data input/output.

Control Lines

DAV, NRFD, NDAC: provide handshake

Interface Management

IFC, ATN, SRQ, REN, EOI } provide control of the interface system

Interface Functions

SH1	source handshake
AH1	acceptor handshake
T5	talker
L3	listener
SR1	service request
RLØ	remote local
PP2	parallel poll
DC1	device clear
DTØ	device trigger
C1,2,3,4,5	controller

Interrupt Capability

When used with the Extended I/O ROM, the 98034A is capable of responding to any or all of the following interrupt requests:

Take active controller status,
Take active talker status,
Take active listener status,
Respond to service request,
Input buffer full,
Output buffer empty.

Switch Configuration

Select Code Setting—switch is externally accessible and allows one of 14 possible select codes to be set for the interface cards. Bus interface addresses then select the specified device.

Interface Bus Address—5-bit talker/listener address pair.

System Controller—switch allows the 98034A to act as a system controller. If not selected, the 98034A assumes the function given to it by the system controller if that status exists in the previous table of interface functions.

Parallel Poll Bit—select any one of the 8 data bits for response purposes.

Parallel Poll Bit Sense—selected parallel poll bit logic sense controlled with this switch.

Accessories Supplied

The 98034A is shipped with a 4 m (13 ft) interface cable terminated with the standard HP-IB connector with metric fasteners.

Accessories Available

Additional interface cables:

Length	Accessory Number
1 meter	HP 10631A
2 meters	HP 10631B
4 meters	HP 10631C

A 59405-66503 Test Connector is available to verify hardware operation of the 98034A Interface.

PHYSICAL SPECIFICATIONS FOR ALL INTERFACES

Temperature Range	0°C to 55°C ambient
Power	Supplied by the calculator
Dimensions	
Height:	163 mm (6.4 in)
Width:	89 mm (3.5 in)
Depth:	38 mm (1.5 in)
Maximum Shipping Weight:	2,3 kg (5 lb)

PURCHASE PLANS

Contact one of the Hewlett-Packard worldwide sales and service offices for specific prices and plans in your area.

MAINTENANCE AGREEMENTS

Maintenance agreements are available for all calculator products. Current U.S. rates are to be found in the Maintenance Service and Prices publication, Part Number 5952-2432D. These agreements represent HP's best level of support. Major advantages to the customer include:

- Fixed annual cost,
- Priority service response,
- On-site service,
- Regular maintenance,
- A complete package tailored to the customer's needs.

*Data subject to change.



For further information, contact your local Hewlett-Packard Sales and Service Office:

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