HEWLETT PACKARD

9825B/T Desktop Computer Specifications

hp museum

TECHNICAL DATA* MAY 1980

The 9825B/T is HP's fastest desktop computer for data acquisition, instrument control and computation. It maintains the same high-speed performance as its predecessor, the 9825A/S.

The 9825B has 22 918 bytes of read/write memory and built-in String, Advanced Programming, Plotter, General I/O and Extended I/O ROMs (read-only memories).

The 9825T is a desktop computer system consisting of:

- a 9825B Desktop Computer,
- 61 670 bytes of read/write memory,
- a built-in Systems Programming ROM.

Whichever model you choose, you get a 32-character LED display, 16-character thermal strip printer, a typewriter keyboard that lets you use both uppercase and lowercase alphanumerics, three I/O ports, four option-ROM slots, a 250K-byte tape cartridge drive and powerful interfacing features such as buffered I/O, direct memory access and interrupt.

Using DMA, the 9825 can acquire data at speeds up to 400k transfers per second. Each transfer can be either eight or 16 bits wide. Interrupt allows the 9825 to perform useful computation and other tasks between communications with devices that require attention at irregular intervals.

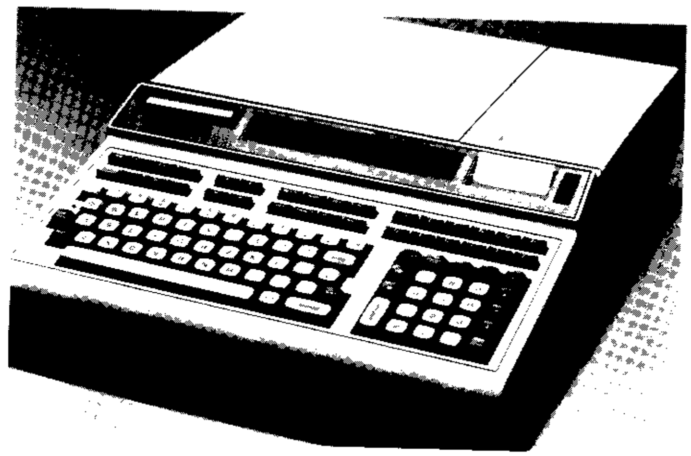
The 9825 allows flexible interfacing with more than a hundred HP-IB instruments for stimulus and measurement, as well as with plotters, printers, digitizers, flexible disc drives and paper-tape and card input and output devices.

HPL, the 9825's high-level programming language, offers power and efficiency for handling equations and input/output operations, yet is easy to learn and use.

The live keyboard allows you to perform calculations, execute subroutines, list the current program and examine or change variables while a program is running.

Features

- Up to 62K bytes user read/write memory
- Alphanumeric keyboard
- 32-character LED display
- Built-in tape cartridge drive
- High-level programming language (HPL)
- Interrupt capability
- Plug-in read-only memories (ROMs)
- 12 Special Function Keys (24 with shift)
- 12 significant digits
- Live keyboard
- Direct memory access
- Trigonometric capability
- Boolean algebraic capability



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General Information

Read/Write Memory

9825B .... 22 918 bytes
9825T .... 61 670 bytes

Range

Dynamic range:
10^{99} to 10^{-99}, 0, -10^{-99} to -10^{99}

Internal calculation range:
10^{511} to 10^{-511}, 0, -10^{-511} to -10^{511}

*Data subject to change.

Tape Cartridge

Memory capacity	250 000 bytes
Read/write speed	559 mm/s (22 in./s)
Search speed (bidirectional)	2 286 mm/s (90 in./s)
Transfer rate	2 750 bytes/s
Typical rewind time	19 s (end-to-end)
Typical erase time	40 s (one track)
Tape length	42.67 m (140 ft)
Size	63.5 x 82.5 x 12.7 mm (2.5 x 3.25 x 0.5 in.)
Verification	automatic on recording

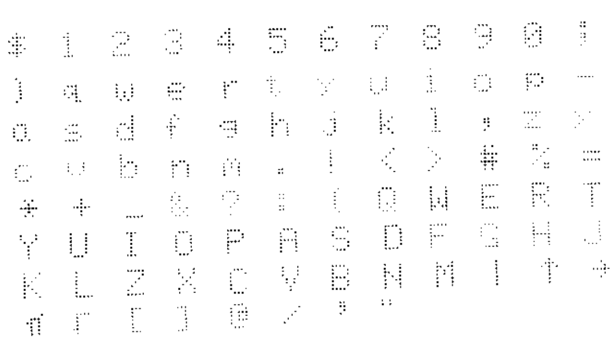
Tape cartridges are intended for nominal program or data storage; the typical life cycle is 50-100 hours, depending on the application. Environmental conditions of 25°C (77°F) and 20 to 50% relative humidity are most favorable for a long tape life. Tape life is decreased by a high duty cycle (percent of of time the tape is accessed during the total time the 9825 is in use), high turning resistance and continuous use for long periods of time (longer than one-half hour). It is suggested that tape transports be regularly cleaned and cartridges removed from drives after use.

For heavy usage of mass storage files, such as in consecutive file sorts or data base management applications, flexible disc drives are recommended for optimum performance and reliability.

Printer

Paper width	57.15 mm (2.25 in.)
Speed	180 lines/min
Font	5 x 7 dot matrix; prints all the following characters in upper- and lowercase; up to 16 characters/line

Character Set



Built-in Functions

Mathematical and trigonometric functions and operations are included in the following with average execution times.

Absolute (abs)	0.19 ms
Fraction (frc)	0.37 ms
Integer (int)	0.47 ms
Maximum (max)	variable
Minimum (min)	variable
Modulus (mod)	3.1 ms
log	8.6 ms
ln	6.7 ms
e^x	5.5 ms
10^x	7.6 ms
Raise to power	15 ms
Random number (rnd)	1.8 ms
Sign (sgn)	0.20 ms
$\sqrt{}$	2.5 ms
Sine (sin)	18 ms
Cosine (cos)	18 ms
Tangent (tan)	13 ms
Arcsine (asn)	22 ms
Arccosine (acs)	22 ms
Arctangent (atn)	15 ms
+	0.32 ms
–	0.37 ms
*	0.88 ms
/	2.5 ms
Power of ten round (prnd)	0.74 ms
Digit round	0.53 ms

Logic operators
AND, NOT, OR, XOR (exclusive or)

Relational operators
= equal to
>= or => greater than or equal to
> greater than
<= or =< less than or equal to
< less than
or <> not equal to

Environmental Range

Operating temperatures	5°C to 40°C ambient
Storage temperature	–40°C to 65°C
Ambient humidity	<80%

Size/Weight

Height	129.5 mm (5.1 in.)
Width	383.5 mm (15.1 in.)
Depth	495.3 mm (19.5 in.)
Weight:	
Net	11.8 kg (26 lb)
Shipping	19.5 kg (42 lb)
Cube	0.12 m^3 (4 ft^3)

Power Requirements

Source	110 V +5%, –10%
	120 V +5%, –10%
	220 V +5%, –10%
	240 V +5%, –10%

Note: Voltage is switch-selectable.

Line frequency	48 to 66 Hz
Consumption	1.7 A @ 100V
	1.5 A @ 120V
	0.8 A @ 220V
	0.75 A @ 240V

Operating System

The 9825 operating system allows high-level HPL commands to control directly the mainframe hardware, including its built-in input, output and mass storage devices. The operating system resides in read-only memory (ROM), allowing read/write memory to be completely available for HPL programs.

The operating system allows relative and absolute program branching by line numbers, line labels or subroutine identifiers. Multiple HPL statements per program line allow faster program execution, more efficient program storage and a more structured programming format.

The 9825's single-line display and thermal strip printer are written to with HPL commands for text and data output or program listings. An executing HPL program can overlay and chain programs from the tape cartridge, as well as transfer data to and from the tape cartridge.

HPL statements and numeric computations can be executed immediately from the keyboard while a program is running. The operating system also coordinates the programmable Special Function Keys, allowing them to interrupt a running program.

Extensive line and character editing capabilities allow program editing prior to and during program execution. Program syntax and format are checked by the operating system as each line is entered, not at run time. This allows syntax errors to be corrected prior to program execution, greatly reducing run-time overhead.

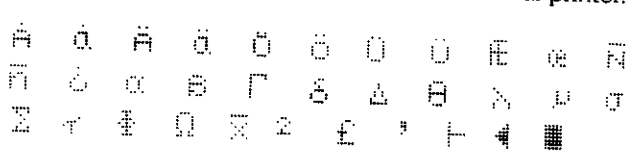
To simplify debugging, HPL program lines can be traced during execution by printing line numbers executed and any variable assignments occurring in those lines.

Several ROMs, which were plug-in options for the 9825A/S, are included and internally integrated in the 9825B/T:

STRING ROM

The String ROM allows the 9825B/T to accept and manipulate alphabetic and numeric information in string form. It provides 26 single string variables or string array variables. Maximum length is 32 767 characters, but in practice it is limited by the memory size of the 9825.

This ROM allows comparisons of strings and substrings. All the relational operations allowed in numeric comparisons apply to string comparisons. In addition to the standard characters, this ROM permits the following special characters to be displayed and to be printed on the internal printer:



ADVANCED PROGRAMMING ROM

The Advanced Programming ROM provides parameter-passing functions and subroutines with local variables. It includes for-next statements and a cross-reference operator.

It also allows numbers to be packed with split or integer precision. Split precision allows six digits, a mantissa sign and exponent (−63 to +63), and provides a packing density of 2:1 over floating point. Integer precision allows integers in the range of −32768 to +32767 and provides a packing density of 4:1 over floating point.

PLOTTER ROM

The Plotter ROM provides the statements necessary for the 9825 to control the 9872 Plotter. These commands are designed to simplify the task of producing graphic representations of data. Statements to control the 9862 Plotter can be internally selected to replace the 9872 Plotter statements. (For details, contact your local HP Sales Office.) This ROM will also control the 7225 Plotter.

GENERAL I/O ROM

The General I/O ROM provides basic input/output capabilities including read/write with format control, binary read/write, status testing, code conversion and program listing on peripheral printers. It provides fundamental input/output operations with HP-IB (IEEE 488-1978) peripherals.

In addition to controlling external devices, this ROM can address the 9825's internal printer, display and keyboard.

EXTENDED I/O ROM

The Extended I/O ROM has complete HP-IB control, vectored interrupt, buffered I/O, fast handshake, Direct Memory Access (DMA), bit manipulation and testing, code conversion, error trapping, time out and AUTO START.

This ROM allows for user-written, keyboard language, interrupt service routines. When devices interrupt, program control is passed to a service routine at the end of the current program line. After service, your program executes a special return statement that polls for other interrupt requests. Control is then returned to the next line of the main program. Select codes 8 through 15 have priority over select codes 0 through 7, with provisions for abortive interruptions for emergencies.

When using an interrupt transfer for output, data is put into a buffer from which the I/O ROM will automatically transfer it to the device when the device is ready. This frees up the CPU for other processing between the output of each element in the buffer. For input, the ROM automatically fills a buffer as the device provides it with data.

For fast handshake transfers, the CPU is dedicated to handshaking data into or out of the buffer. No interleaving of other operations is allowed, thus achieving high transfer rates.

For DMA, the I/O card requests a Direct Memory Access channel and is allowed to "steal" a processor cycle to transfer data elements directly into or out of memory. The highest transfer rates can be achieved using this method, and it also allows other processing to continue concurrently.

SYSTEMS PROGRAMMING ROM

The Systems Programming ROM is built into the 9825T, but is a plug-in option for the 9825B. It is described in the following section with the other optional ROMs.

9825B/T Optional ROMs

Three optional ROMs (read-only memories) are available to extend the language capabilities of the 9825B/T (part numbers are in parentheses):

- Matrix ROM (98211A)
- 9885M Flexible Disc ROM (98217A)
- Systems Programming ROM (98224A) (part of standard 9825T)

Physical Specifications

All ROMs described herein conform to these physical specifications.

POWER

Provided by the 9825

ENVIRONMENTAL RANGE

5°C to 40°C
< 80% ambient humidity

SIZE/WEIGHT

Width	71.6 mm (2.82 in.)
Length	115.8 mm (4.56 in.)
Depth	15.5 mm (0.61 in.)

Matrix ROM

The HP 98211A Matrix ROM provides matrix and array operations to augment the multidimensional array capability of the 9825.

The matrix inversion technique employs a modified Gauss-Jordan reduction using the maximum pivot strategy. This method is superior to the standard Gauss-Jordan elimination or the diagonal pivot strategy because it will sucessfully invert all but singular or near-singular matrices. Pivoting on the maximum elements maximizes the accuracy of the results.

This ROM uses no read/write memory except during matrix inversion. It can invert a 20 x 20 matrix in 10 seconds.

The Matrix ROM will not operate with the Systems Programming ROM (98224A) in a 9825B, but will work with the internal Systems Programming ROM in a 9825T.

9885M Flexible Disc ROM

The 9885M Flexible Disc ROM adds statements to the HPL language for controlling 9885 Flexible Disc Drives. The ROM is shipped with a set of "bootstraps" supplied on a data cartridge. These bootstraps are moved to the disc when it is initialized.

The system requires 1140 bytes of the 9825's read/write memory for data buffer, bootstrap area, pointers and status words. It maintains user files and available space in a file-by-name directory.

This ROM is included with every 9885M Flexible Disc Drive that is ordered with Option 025.

Systems Programming ROM

The 98224A ROM enhances the I/O capability of the 9825 and is particularly useful for:

- asynchronous terminal emulation,
- program input from ASCII-coded devices,
- control of the 98036A Serial Interface Card,
- remote keyboard operation of the 9825,
- dynamic program modification,
- keyboard redefinition,
- annotating HPL programs,
- efficient use of memory,
- high-speed data logging.

The ROM includes three types of programming statements: terminal emulator aids, 98036A Interface control instructions and system programming instructions. It uses 160 bytes of read/write memory.

The Systems Programming ROM is a standard, built-in part of the 9825T, but is a plug-in option for the 9825B. It will work with the Matrix ROM in the 9825T, but not in the 9825B.

9825B/T Interfaces

There are four interface cards designed for use with the 9825:

- 16-Bit Parallel I/O (98032A)
- BCD Input (98033A)
- HP-IB† (98034A)
- Real Time Clock (98035A)
- Serial I/O (98036A)

†Conforms to IEEE Specification 488-1978

Physical Specifications

These interfaces conform to the following specifications.

POWER

Provided by the 9825

SIZE/WEIGHT

Length	163 mm (6.5 in.)
Width	89 mm (3.5 in.)
Depth	38 mm (1.5 in.)
Shipping weight	2.3 kg (5 lb)

16-Bit Parallel I/O

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 uses the Extended I/O ROM for advanced capabilities such as vectored interrupt, buffered I/O and DMA.

Input/output 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/s. Enabling/disabling and interrupt priority are controlled by select code settings and software commands.

Extended control and status lines are available for applications that require more than one signal from the 9825. 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 operations, DMA, and word/byte data are also controlled by these jumpers.

Data Input/Output

Sixteen input lines with 3K Ω to 5 V and 6.2K Ω to ground terminations accept standard TTL signal levels. Sixteen output lines have high voltage/current (30 V, 40mA) open-collector transistor drivers.

Control Lines

PCTL Peripheral Control — indicates to the peripheral that data is ready for output or 9825 is ready for input; PCTL is reset by a ready-to-busy transition on PFLG.

PFLG Peripheral Flag — indicates to the 9825 completion of a data transfer; also used to request peripheral interrupt when enabled.

PSTS Peripheral Status (optional) — indicates to the 9825 the readiness of the I/O device (paper out, power off, etc.); PSTS is sampled by the 9825 whenever communication with the peripheral is requested.

STI0,STI1 Extended Status (optional) — examined by reading the 98032A I/O status register.

CTL0,CTL1 Extended Control — setting or cleaning 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 9825 is turned on, when the 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 Settings

Choose any one of 14 select codes via an externally accessible rotary switch. Select codes 2-7 have low interrupt priority.

Accessories

The standard 98032A Interface is shipped with a 4.5 m (15 ft) open-ended cable but is also available with a 2 m (6.6 ft) cable terminated with a specific option for connection to various peripherals. A 98241-67932 Test Connector is available to verify hardware operation of the interface.

BCD Input Interface

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/s.

An input format is selectable that 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/s and also provides buffered I/O with peripheral interrupt for communication with slow devices.

SPECIFICATIONS

Data Formats

Data is serialized into the 9825 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 software.

Codes

Data — 8421 binary coded decimal weighting with codes 0-9 representing digits 0-9 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 Functions	8421 binary coded decimal weighting: codes 0-9 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) are also accomplished via these switches.

Data Input

Forty-three 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 0.4 mA to produce a low-level input. Data is not latched and, therefore, must be held stable while the 9825 is reading.

Control Lines

CTLA, CTLB Peripheral Control A and B — CTLA and CTLB are open collector outputs with 2.2k Ω pull-up resistors. V max is 15 V and current sinking capability is 14 mA. 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 whose inputs have 2.2k Ω to +5 V, 0.01 μF capacitors to ground, and 47 Ω in series with the driver. Either FLG in a busy state will indicate busy to the 9825.

Select Codes

One of 14 select codes may be chosen via an externally accessible rotary switch. Select codes 2-7 have low interrupt priority; codes 8-15 have high priority.

Accessories

A 98241-67933 Test Connector is available to verify hardware operation of the 98033A Interface. This interface has no options; it is shipped with a 4.5 m (15 ft) open-ended cable.

HP-IB Interface

This interface allows the HP 9825 to communicate via the HP-IB to as many as 14 compatible instruments per interface. The 98034A uses a controlling processor 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 ROMs, the 98034A provides such capabilities as peripheral interrupt for service request and data transfer at rates up to 45k bytes/s.

SPECIFICATIONS

The following specifications conform to the IEEE Standard Digitial Interface for Programmable Instrumentation (IEEE 488-1978).

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	RL0 — remote local
AH1 — acceptor handshake	PP2 — parallel poll
T5 — talker	DC1 — device clear
L3 — listener	DT0 — device trigger
SR1 — service request	C1,2,3,4,5 — controller

Interrupt Capability

Using 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 logical sense controlled with this switch.

Accessories

The 98034A is shipped with a 4 m (13 ft) interface cable terminated with the standard HP-IB connector and metric fasteners. Additional lengths of interface cables are available. A 59405-66503 Test Connector is available to verify hardware operation of the 98034A Interface.

Real Time Clock

The 98035A adds a real time reference and time-related control capabilities to the 9825. It provides:

- real time information in the form of month, day, hour, minute and second;
- real time in U.S. (month first) or European (day first) format, jumper selectable;
- internal battery to hold real time when 98035A is not in use;
- four independent timing units which can be used in interrupt or counting mode;
- direct I/O operations on external lines;
- status monitoring;
- synchronization of four independent timing units.

The 98035A uses the General I/O ROM for typical read/write functions and the Extended I/O ROM for vectored interrupt on the basis of a real time match, a periodic time interval or a specific time delay. The String ROM is useful in reading the real time from the 98035A.

SPECIFICATIONS

Setting and Reading Real Time

The 98035A real time is set using the wrt command of the General I/O ROM to specify month, day, hour, minute and second. Execution of this command starts the processor, which will update the time while the clock chip is set. The real time can then be read by using the red command in either U.S. or European format.

Timing Units

Four timing units are available to be used in either interrupting or counting mode. Interrupt can occur (using these units) at a specified real time, after a specified time delay, at a specified periodic interval, or at any combination of these to request service from the 9825. These units can also be used as counters, incremented every millisecond, to determine time intervals for such things as the length of an event or the time elapsed between events.

Synchronization

The four independent timing units can be started simultaneously. An output line is provided to synchronize the input lines with the internal timing. This line will output a pulse every millisecond indicating when the inputs are valid, i.e., synchronized.

Error Codes

An 8-bit word can be read from the 98035A to determine if any software or hardware errors have occurred. The 98035A is a multioperational card due to the four independent timing units. An error which stops program execution would affect all operations of the 98035A. The error word is used in lieu of the normal 9825 error codes to prevent all operations from stopping when only one operation may be in error.

Optional Cable

The optional cable would be used in situations where the normal 9825 end-of-the-line interrupt would not be fast enough, i.e., if your program consisted of long lines. The cable output lines could then be used to trigger the external device for interrupt at a particular time. With the optional cable, output pulses can be sent to an external device and input can be received from an external device. However, this input and output can only be in the form of a 4-bit word. Normally, one of the other four interface cards, 98032A, 98033A, 98034A or 98036A, will be used for transfer of data between the 9825 and a peripheral device.

Select Codes

One of 14 select codes may be chosen via an externally accessible rotary switch. Select codes 2-7 have low interrupt priority; codes 8-15 have high priority.

Options

The 98035A Opt. 001 provides the time in U.S. format, while the 98035A Opt. 002 provides the time in European format. If Opt. 100 is ordered, the 98035A is shipped with optional cable. Opt. 025 should be ordered for use of the 98035A with the 9825.

Serial I/O Interface

The 98036A Interface provides bit serial communication between the 9825 Desktop Computer and asynchronous EIA RS-232-C devices such as data terminals and modems. Data rates range from 75 to 9600 bits/second (baud) and are set via an externally accessible rotary switch. Allowable data formats include 5,6,7 or 8 bits/character with 1, 1.5 or 2 stop bits.

Information can be sent and received in either EIA RS-232-C voltage specification or 20-mA current loop configuration. Receive-only capability in 60-mA current loop is also possible.

The Extended I/O ROM is used for interrupt, buffered input/output operations, and extended RS-232-C control/status capability.

SPECIFICATIONS

Two cables are available for use with the 98036A. The standard cable is suitable for connection to data terminal equipment; the optional cable is used for connection to data set equipment. (See options below.)

Data

All signals present at the connector conform electrically to EIA RS-232-C and CCITT V.24 specifications. The interface operates in an asynchronous mode providing 5-, 6-, 7- or 8-bit data formatting with 1, 1.5 or 2 stop bits and odd, even or no parity. Additionally, the interface will detect framing errors (invalid stop bit), parity errors, and overrun errors; these errors will be indicated in a status byte.

Data rates available are 75, 110, 150, 300, 600, 1200, 1800, 2400, 4800, and 9600 baud. Data-rate selection is via an externally accessible rotary switch. Under program control of the 9825, the switch-selected data rate can be reduced to half its set value.

Additional Operating Information

The transmitter and receiver sections of the 98036A each have a separate one-character buffer. The status of these buffers can be iterrogated by the 9825.

The interface can be programmed by the 9825 to interrupt when either the input buffer is full or the output buffer is empty. This interrupt capability allows the interface to operate in a full duplex fashion in that information can be input under interrupt control while information is being output by standard 9825 write commands.

Options

The standard 98036A is shipped with a 2 m (6.6 ft) cable terminated with a standard EIA 25-pin female connector. If Opt. 001 is ordered, the cable is terminated with a similar male-type connector. A 98241-67936 Test Connector is supplied with each 98036A Interface.

Ordering Information

Optional ROMs

Item	HP Part No.
Matrix ROM*	98211A
9885 Flexible Disc ROM**	98217A
Systems Programming ROM+	98224A

*Will not operate with Systems Programming ROM (98224A) in 9825B.

**Supplied with 9885M, Opt. 025.

+ Part of standard 9825T. Will not operate with Matrix ROM (98211A) in 9825B.

Interfaces

Item	HP Part No.
16-Bit Parallel I/O	98032A
BCD Input	98033A
HP-IB	98034A
HP-IB Interconnection Cables	
0.5 m (1.6 ft)	10631D
1 m (3.3 ft)	10631A
2 m (6.6 ft)	10631B
4 m (13.1 ft)	10631C
Real Time Clock	98035A
RS-232-C Serial I/O	98036A

Manuals Supplied

Item	HP Part No.
9825B Manual Kit (09825-87901):	
Operating and Programming Reference	09825-90200
I/O Control Reference	09825-90210
Pocket Reference	09825-90012
Documentation Binders	9282-0885
Manuals supplied with optional ROMs:	
9885 Disc Programming	09885-90000
Matrix Programming	09825-90022

Accessories Supplied

Item	HP Part No.
Blank data cartridge	
Utility pack	09825-10000
Dust cover	9222-0495
Tape head cleaner	8500-1251
Special Function Key overlays — blank (5)	7120-4802
System Test cartridge	09825-90036
System Test Booklet	09825-90037
Spare fuses	
1.5A	2110-0043
3.0A	2110-0003
I/O slot covers (3)	5040-7723
Power cord	depends on orgin of sale

Accessories Available

Item	HP Part No.
Vinyl carrying case	98025A
Thermal paper (black, 6 rolls)	9270-0664
Thermal paper (blue, 6 rolls)	9270-0479
Blank data cartridge (pkg. of 5)	98200A
Cradle for 9866B Printer	98226A

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 desktop computer products. 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,
- individualized contracts.

For assistance call the HP regional office nearest you: Eastern 301/258-2000, Midwest 312/255-9800, Southern 404/955-1500, Western 213/877-1282, Canadian 416/678-9430. Or write to Hewlett-Packard, 3404 East Harmony Road, Fort Collins, Colorado 80525; in Europe, Hewlett-Packard GmbH, Desktop Computer Division, Herrenberger Strasse 110, D-703 Boeblingen, Postfach 1430, West Germany; elsewhere in the world, Hewlett-Packard Intercontinental, 3495 Deer Creek Road, Palo Alto, California 94304.

9825B/T Peripherals

Description	HP Part No.	Interface Card Required*
Printers		
Thermal Line Printer	9866B, Opt. 025	98032A, Opt. 066
Serial Impact Printer	9871A, Opt. 025	98032A, Opt. 071
HP-IB Serial Impact Printer	9871A, Opt. 001	98034A
Thermal Graphics Printer	9876A, Opt. 025	98034A
Dot Matrix Serial Impact Printer	2631A, Opt. 825	98034A
Plotters		
Four-Color Plotter	9872B/S, Opt. 025	98034A
Plotter	7225A with 17600A, Opt. 025	98032A, Opt. 062
HP-IB Plotter	7225A with 17601A, Opt. 025	98034A
Plotter/Printer	7245A, Opt. 025	98034A
Mass Storage		
Cartridge Tape Unit	9875A, Opt. 025	98034A
Flexible Disc Drive (Master)	9885M, Opt. 025	98032A, Opt. 085
Flexible Disc Drive (Slave)	9885S	not applicable
Miscellaneous		
Digitizer	9874A, Opt. 025	98034A
I/O Expander	9878A	not applicable
Paper Tape Reader	9883A, Opt. 025	98032A, Opt. 083
Paper Tape Punch	9884A, Opt. 025	98032A, Opt. 084

* Interface cards are supplied with some peripherals. Consult your local HP sales representative.

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