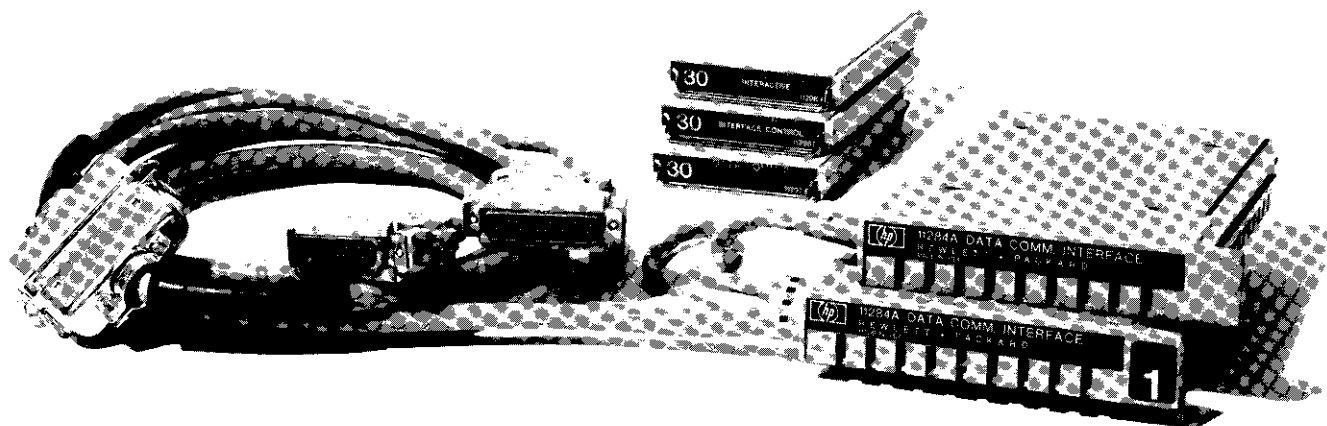


HEWLETT **hp** PACKARD

MODEL
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11285A Data Communications Interface

TECHNICAL DATA MAY 1974



DESCRIPTION

The HP 11285A Data Communications Interface allows a 9830A Calculator to communicate with other 9830A Calculators and computers via telephone lines and modems which meet EIA Specification RS-232-C. It can also interface to automatic dialers which meet EIA Specification RS-366. The 11285A includes the 11284A Interface Cable and the 11296B Interface Control ROM.

Two new BASIC statements defined by the 11296B/F ROM enable the 9830 to write (TWRITE) messages in strings to or read (TREAD) messages from a remote terminal or computer via telephone lines. Other new BASIC statements allow configuring the 9830 as a terminal to conform to a variety of telecommunication environments. Asynchronous or synchronous data rates from 110 to 9600 bits/second are available, as well as programmable parity, automatic dialing and answering, programmable EOT

and SYNC characters, and half- or full-duplex mode.

Two other ROM's may be added to further enhance the capabilities of the 9830 as a terminal. These are the 11297B Data Communications 2 ROM (binary synchronous) and the 11298B Data Communications 3 ROM (interactive).

The 11297B adds the IBM defined "Binary Synchronous Protocol" to the programmable read-and-write statements of the 11296B/F ROM. It also provides communication error detection and ASCII to EBCDIC conversion so that the 9830 can be programmed to look like a binary synchronous, remote-batch terminal to an IBM computer system for remote job entry.

The 11298B enables the 9830 to function like a teleprinter for low-speed, interactive communications; such as, time-sharing. The calculator can also transmit or receive BASIC language programs or "free text" which can include programs written in other languages; such as, FORTRAN.

CONFIGURATIONS AND FEATURES

The 11285A is the basic data communications configuration which includes the interface cable and interface control ROM. Two additional configurations are available by including the 11297B or 11298B ROM's. These are the binary synchronous terminal and interactive terminal, respectively.

Basic Data Communications:

This configuration requires only the 11285A and is useful for applications which may not need the binary synchronous protocol or "free text" capability. Examples include 9830-to-9830 communication or 9830-to-terminal communication. For asynchronous data rates 1800 bits/second or less, a remote terminal can be used to call up and run programs on the 9830 calculator.

Features:

- Automatic answer
- Automatic dialing (programmable)
- 110, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600 bits/sec.
- Asynchronous or synchronous mode
- Half- or full-duplex mode
- Programmable one- or two-stop bits in async mode
- Programmable parity (odd, even, none)
- Programmable number of bits/character (5-8)
- Programmable EOT (End-of-Transmission character)
- Programmable Sync character in synchronous mode
- Remote control of 9830 keyboard (including remote STOP) (1100 to 1800 bits/sec asynchronous mode)
- Automatic cassette reload from cassette file 0 with power turn on
- Programmable receiver timer for TREAD operations

Binary Synchronous Terminal:

This configuration requires the 11285A and the 11297B. By adding the 11297B ROM and operating in synchronous mode, the 9830 can communicate with a computer as a programmable binary synchronous terminal. It is also possible with a BASIC program to allow the 9830 calculator to look (to the computer) like a particular binary synchronous terminal (e.g., the IBM 2780). This enables the user to easily connect a 9830 as a remote-batch terminal to his computer without modifying software drivers at the computer.

Additional features provided by the 11297B ROM:

- IBM binary synchronous line protocol
- ASCII to EBCDIC conversion
- EBCDIC to ASCII conversion
- VRC, LRC, CRC error checking on communication line
- Error recovery (programmable) for 9830 BASIC language programs
- Transparent text mode (BWRITE)
- Ability to act as a primary or secondary terminal in contention mode

Interactive Terminal:

This configuration requires the 11285A and the 11298B. Adding the 11298B Interactive ROM and operating in asynchronous mode will allow the 9830 calculator to look like an interactive teleprinter to a time-sharing computer. "Free text" mode is provided so that programs written in languages other than BASIC may be transmitted or received. Two 9830 SPECIAL FUNCTIONS are defined to correspond to the teleprinter SHIFT and CTRL keys. Two other SPECIAL FUNCTIONS are defined as TRANSMIT - to send a line from the 9830 display - and SAVE - to receive program lines to the 9830 memory.

Additional features provided by the interactive ROM:

- Terminal mode, including the following:
 - Teleprinter SHIFT and CTRL keys
 - COMPile command to compile "free text" BASIC programs
 - LISTX to send programs from the 9830 without line numbers
- Terminal batch (TBATCH) for "free text" input to the 9830
- Automatic line numbering on TBATCH'ed lines (optional)
- Programmable end-of-line sequence
- ECHON (echo on) command to handle "echoed" characters in full-duplex system

Combination Terminal:

The 11297B and 11298B are compatible in the same system. Thus, the combined capabilities of binary synchronous batch and interactive time-share communications can be provided by one 9830 and one data communications interface, if all three ROM's are installed. This capability provides all of the previous features and may be very useful where low-speed time-sharing and



high-speed batch are offered by the same service bureau. An RS-232 switch will be needed, however, since no one modem currently exists which can cover low-speed asynchronous and high-speed synchronous communication.

SPECIFICATIONS

Interface Connectors:

Modem Interface

The 25-pin, male MODEM connector conforms to the EIA RS-232-C* specification for pin assignments and electrical signal characteristics. The following interchange circuits of the RS-232-C Interface Specification are used by the 11284A Data Communications Interface:

Pin No.	Signal
1	Protective Ground
2	Transmitted Data
3	Received Data
4	Request to Send
5	Clear to Send
6	Data Set Ready
7	Signal Ground
8	Received Line Signal Detector (Carrier Detect)
17	Receiver Signal Element Timing
20	Data Terminal Ready
24	Transmit Signal Element Timing

Automatic Dialer Interface

The 25-pin, male AUTOMATIC DIALER connector conforms to the EIA RS-366 specification for pin assignments and electrical signal characteristics. All of the interchange circuits required for a Type III Interface between data terminal equipment and automatic calling equipment are used by the 11284A Data Communications Interface.

9830 Interface

Two standard 9800 Series interface connectors are provided for the 9830 end of the 11284A Interface. These are connected by a molded cable assembly which will allow them to be plugged into any two of the I/O slots on the rear of the 9830 calculator. The 11284A may also be used in the 9868A I/O Expander if the ability to remotely STOP (remote keyboard STOP) the 9830 is not required.

Data Rates:

For 9830-to-terminal transmission, using the 11296B/F Control ROM, data rates up to 9600 bits/second asynchronous or synchronous are possible.

For 9830-to-batch-computer transmission, using the 11297B Binary Synchronous ROM, data rates up to 4800 bits/second synchronous are possible.

For 9830-to-time-share-computer transmission, using the 11298B Interactive ROM with the 11296B/F Control ROM, data rates up to 300 bits/second asynchronous are possible.

Transmission Codes:

American Standard Code for Information Interchanges (ASCII) — available for use with the 11296B/F, 11297B, and 11298B ROM's.

Extended Binary Coded Decimal Interchange Code (EBCDIC) — available with the 11297B Binary Synchronous ROM only.

Binary data — available for use with the 11296B/F Control and 11298B Interactive ROM's. Transparent text capability is provided by the 11297B Binary Synchronous ROM.

Error Detection:

No error detection is provided by the 11296B/F Control ROM or the 11298B Interactive ROM. Only the ability to send characters with character parity is available.

With the 11297B Binary Synchronous ROM, the following error detection is provided:

- 7-bit ASCII code, no transparency = VRC/LRC,
- 8-bit ASCII code, with transparency = CRC-16,
- 8-bit EBCDIC code = CRC-16 all cases.

VRC (Vertical Redundancy Check) — character parity

LRC (Longitudinal Redundancy Check) — message parity

CRC-16 (Cyclic Redundancy Check) — message check

Select Code:

The 11284A Interface is set at the factory for select code 1; select codes 1 through 9 are selectable by a switch on the interface card. Select codes other than 1 require certain considerations; refer to the operating and service manual.

*In Europe, CCITT V-24 applies

Power:

The 11284A Interface is powered from the calculator.

Dimensions:

The standard length of the 11284A Interface cable is nine feet.

SUPPORT AND SERVICE

The 11284A Interface hardware and 11296B/F, 11297B, 11298B Read-Only-Memory (ROM) modules are fully supported products of Hewlett-Packard. Support of these products is made available to users through HP application engineers and service engineers located in U.S. sales offices and international locations.

Hewlett-Packard does not assume system responsibility for user-written 9830 software, modems, lines or other manufacturer's computer; only the HP portion of the system will be serviced.

The responsibility for obtaining modems and common-carrier facilities between the HP 9830 and the other terminal or computer is left to the user. This information can be obtained from your local telephone company marketing representative or from independent modem manufacturers.

ORDERING INFORMATION

1. For basic (asynchronous) data communications capability (9830-to-9830 or 9830-to-another-terminal), order:
 - a) 11285A to obtain the control ROM in EXTERNAL form with the interface cable (11284A + 11296B); or
 - b) 11296F to obtain the control ROM in field-installable, INTERNAL form and 11284A for the interface cable; or
 - c) 9830, Option 296, to obtain the control ROM as an INTERNAL ROM in a new 9830 and 11284A for the interface cable.
2. For binary synchronous data communications (9830-to-9830 synchronous with error checking or 9830 as a remote-batch terminal to a central computer), order the basic data communications (as in #1 above) and the 11297B Data Communications 2 ROM.
3. For time-sharing data communications (9830 as a terminal to a time-share computer), order the basic data communications (as in #1 above) and the 11298B Data Communications 3 ROM (interactive).
4. If additional sets of data communications hardware only are required, order the 11284A Data Communications Interface.



Sales and service from 172 offices in 65 countries.
Loveland, Colorado 80537.