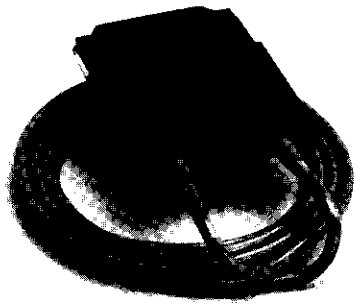

HP 82941A BCD Interface

BCD (Binary Coded Decimal) Interface

The HP 82941A BCD Interface lets you link BCD instruments to a Series 80 personal computer. A BCD instrument presents digits on a set of parallel lines. Common instruments with BCD interfaces are voltmeters, multimeters, medical equipment, and weighing systems. The HP 82941A provides the computer with 11 digits of 4-bit BCD input or output data plus four sign bits for one or two channels. It uses an interface processor to provide efficient management of the interface and can achieve data transfer rates of up to 1.4K readings/sec.

Specifications

DATA INPUT/OUTPUT

Twelve bidirectional ports, of four lines each, provide data input and output.

Electrical Characteristics for Data Lines

Parameter	Min.	Max.	Units
Input Low Voltage	0.0	0.8	V
Input High Voltage	2.0	5.0	V
Input Low Current		0.6	mA
Output Low Voltage @ 4.5 mA		0.45	V
Output High Voltage @ −450 μA	2.4		V
Output Low Current		4.5	mA
Output High Current		−450	μA

CONTROL LINES

Six lines allow for control information to be passed between the peripherals and the computer. The output control lines are implemented with standard TTL gate 7405 open-collector drivers.

I/OA, I/OB—Indicates the direction of the data transfer on channels A and B.
CTLA, CTLB—Ready for input or output.
FLGA, FLGB—Peripheral has completed its operation.

ELECTRICAL CHARACTERISTICS

Electrical Characteristics for CTL and I/O Direction Lines

Parameter	Min.	Max.	Units
Output Low Voltage @ 13 mA		0.4	V
Output High Voltage @ −1.0 mA	2.4		V
Output Low Current		13	mA
Output High Current		−1.0	mA

Electrical Characteristics for FLG Lines

Parameter	Min.	Max.	Units
Input Low Voltage	0.0	0.8	V
Input High Voltage	2.0	5.0	V
Input Low Current		4.0	mA

DATA FORMATS

The HP 82941A supports a wide variety of user-configurable data formats and two predefined data formats:

Single channel . . . . . 8-digit signed mantissa with 1-digit signed exponent and a 1-digit function code

Dual channel . . . . . each channel consists of a 4-digit signed mantissa and a 1-digit function code

TRANSFER RATES (maximum)

Type	Input (bytes/sec)	Output (bytes/sec)
TRANSFER INTR	400	400
ENTER & OUTPUT	1.4K	3K
TRANSFER FHS	20K	22K

ADDRESSING

The I/O ROM allows address information to be sent to all interfaces. The HP 82941A BCD Interface uses this addressing information to select which channel is being used for the data transfer and which of the fields are being read—numeric data (mantissa, exponent, and sign information) or function code. There are a total of seven valid addresses—0 through 6.

INTERRUPT CAPABILITY (with I/O ROM)

For each channel used, you can select an interrupt mask for the high order function digit from 16 possible masks. The event type interrupts on the BCD card are detected upon entering the function digits. These digits may be entered alone with partial field specifiers 305 or 306, or with mantissa, exponent, and function digits with partial field specifiers 301 or 302. Exponent and function digits may also be entered through the default 300.

DEVICE CONTROL

The HP 82941A Interface allows you to control a BCD device via one of the BCD digits. To OUTPUT control information to the device would require opening the module and reconfiguring it by setting a switch. To avoid this, Port 10, accessed via ASSERT, allows you to control the device without this reconfiguration.

SWITCH CONFIGURATION

The following switches can be set by opening the interface:

Select code	Sign bits sense
Format	Control line sense
Handshake	Flag line sense
Data line sense	Output enable

BCD INTERFACE STATEMENTS

The I/O ROM adds a set of statements to the computer that accesses capabilities determined by the interface being used. The following describes how the BCD Interface interprets these statements.

ABORTIO—Aborts the current TRANSFER and returns the interface lines to a tri-state high impedance state.
ASSERT—Allows access to control lines and Port 10.
HALT—Stops any TRANSFER; leaves the handshake and data lines unchanged.
SEND—Sends arbitrary data sequences.

CONTROL AND STATUS REGISTERS

The HP 82941A BCD Interface has 11 status registers and ten control registers implemented. The status and control registers allow a user to set and examine the logic sense for the handshake, data digit, function digit, and sign bit lines. The registers also allow access to the number of digits allocated to channels A and B for the mantissa, exponent, and function. There are two status registers common to all cards that contain the card identification number (3 for BCD) and the interrupt cause register. The common end-of-line count and character registers, and the interrupt mask register are not implemented on the BCD Interface.