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# Direct I/O Asynchronous 8-Channel Multiplexer

## Technical Data

**Product Number**  
**HP 98638A**

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The HP 98638A Multiplexer (MUX) provides 8 asynchronous EIA RS-232-C compatible ports with full duplex modem control capability or an optional RS-422 interface in a direct connect mode. It connects up to 8 devices to the HP 9000 Series 300 DIO-II systems. A wide range of configurable transmission modes and formats permits hardwired and remote connection of various CRT terminals, printers, plotters, and other asynchronous devices.

### Features

- 8 full-duplex asynchronous serial I/O ports with 10-wire modem control capability, with the RS-232-C interface, satisfying European license requirements
- EIA RS-232-C, V.24 and V.28 compatibility
- Full-duplex modem support
- Programmable data rates for each channel up to 19.2 Kbaud
- Programmable character size: 7 or 8 data bits
- Parity, overrun, framing error check detects transmission faults

- Programmable parity: odd, even, or none
- Programmable number of stop bits: 1 or 2
- Firmware-based self-test helps assure interface integrity
- Programmable device Xon/Xoff handshaking to pace MUX input and output transmission
- Device CTS handshaking to pace MUX input and output data transmission
- Onboard buffering
- Programmable interrupt interval
- Special Character recognition
- System console support

### Functional Description

The HP 98638A MUX is used for interfacing either up to 8 EIA RS-232-C, or up to 8 RS-422 compatible devices to the HP Direct I/O backplane (all RS-232-C or all RS-422). The MUX provides a Z-80A microprocessor-based interface and accesses the 8K x 8 EPROM which contains power-up, self-test, and code necessary to manage the onboard FIFO buffers.

Data will be passed between the card and the host in circular FIFO data buffers. This buffering scheme allows the host to receive multiple characters per interrupt, thus decreasing the interrupt servicing overhead of the host.

### Functional Specifications

#### Capacity

**Channels:** 8 full duplex channels modem connect ports, with the RS-232-C interface. Full duplex refers to the card's ability to simultaneously transmit and receive data. However, this may be limited by the half-duplex nature of the Direct I/O backplane.

**Buffering:** There are a total of sixteen circular FIFO data buffers; eight (127 character) receive buffers and eight (16 character) transmit buffers (one for each port).

**Software:** Supported on all HP 9000 Series 300 computers running HP-UX version 6.5 or later.

## Communications

**Interface Level:** RS-232-C, CCITT V.24 and V.28. RS-422, V.11.

**Data Rates:** Baud rate defaults to 9600 and is software programmable to any of the following rates: 110, 134.5, 150, 300, 600, 1200, 2400, 4800, 7200, 9600, 19200.

### Modem Support includes:

- 2 modem modes: simple and CCITT
- 2 senses: originate mode/auto answer mode
- Timers available:

	CCITT Mode	Simple Mode
Connection timer	X	
DCD lost timer	X	
No-activity timer	X	
Hang-up timer	X	X

**Throughput:** The 98638A8-Channel MUX will support 8 interactive terminal users running character mode at 19.2K baud. Other RS-232 applications which may simultaneously send and receive data over all eight ports should be run at 9600 baud or slower. Aggregate MUX

throughput may be limited by the load present on the host processor.

**Handshaking:** The MUX card is capable of pacing both inbound and outbound data via CTS handshaking or via an Xon/Xoff type of protocol. The Xon/Xoff characters are software programmable and can be managed by a user application. Alternatively, the host can program the MUX card to automatically manage Xon/Xoff flow control, thus avoiding any character loss. Since Xon/Xoff may be under application control, no-data-loss is guaranteed only if the MUX is responsible for automatically managing flow control. CTS handshaking is available on all ports. Simple or unbuffered RS-232-C devices that use hardware handshaking can be connected.

**Communication Mode:** Asynchronous, bit serial

## Break Detection and

**Transmission:** Break condition is recognized by the interface and results in sending and interrupt to the host. Break condition can also be generated by the MUX at the request of the host.

## Interrupts

### Host-to-Card (non-specific):

- Modem Output Change
- Timer Off/On
- Self-Test On

### Host-to-Card (port-specific):

- Configuration Data Change
- Transmit Buffer not Empty
- Send Break

### Card-to-Host (non-specific):

- Timer
- Interrupts host every 16 milliseconds. This signals the host to receive any characters that might be in the receive buffers.
- Modem Input Change
- Self-Test Complete

### Card-to-Host (port-specific):

- Special Character Received
- Received character matches host programmed bit map character.
- Buffer Empty

## Supported Signal Lines - Table 1.

RS-232-C	V.24	Default	Description	I/O
AB	102	SG	Signal Ground	N/A
BA	103	SD	Transmitted Data	O
BB	104	RD	Received Data	I
CA	105	RS	Request to Send	O
CB	106	CS	Clear to Send	I
CC	107	DM	Data Set Ready	I
CD	108.2	TR	Data Terminal Ready	O
CF	109	RR	Received Line	I
			Signal Detector	
CH	111	SR	Signal Rate Selector	O
CE	125	IC	Ring Indicator	I

## Edit Functions

Edit functions such as backspace, character delete, and line delete are passed to the host and managed by the host operating system.

## Electrical Specification

### Direct Current Requirements RS-232:

Voltage	Typical Current	Two-Standard Deviation Current
+5	1.8A	1.8A
+12	0.12A	0.14A
-12	0.12A	-

### RS-232 (Option 1C8):

Voltage	Typical Current	Two-Standard Deviation Current
+5	1.8A	1.88A
+12	0.30A	0.33A
-12	0A	-

**Total Power Consumption:**  
10 watts (maximum)

## Physical Specifications

**Dimensions:** 290 mm (11.42 in) long, by 210 mm (8.27 in) wide.

**Weight:** Interface Card, 580 grams (20.7 oz); Cable and ADP panel, 740 grams (26.4 oz).

## Environmental Characteristics

**Operating Temperature:** 0°C to 70°C (32°F to 158°F). It survives (non-operating) from -40°C to 85°C (-40°F to 185°F).

**Operating Humidity:** 5% to 95% Relative Humidity at 40°C (104°F)

## Ordering Information

**98638A** 8 Port MUX for S/300 DIO-II Systems. Eight port asynchronous MUX with RS-232 interface and modem control on all ports. The base product includes the printed circuit assembly, cables, installation manual, and a distribution panel with an RS-232 interface.

### Interface Option (optional)

This option replaces the RS-232 interface with an RS-422 interface. 1C8 RS-422 Interface

### Media Options (must order one)

Software contains the Loopback Test Utility required for HP-UX 6.5 onwards, and 7.X. **must order one** option AA0 per system that is running HP-UX 6.5 onwards, and 7.X. **Option 1AW** may be ordered for additional MUX's on the same SPU.

**AA0** ¼-inch Cartridge Tape. For HP-UX 6.5 onwards, and 7.X This option is **not required** for HP-UX version 8.0 or later.

### 1AW Delete Software

This option should be ordered if the MUX is used with HP-UX 8.0 or later.

### Connection to RS-232 Modems

**40233A** 5-meter 25-pin M-25-pin M

Computer End Pin Number	Data Set End Pin Number
1	1
2	3
3	2
4	8
6	20
7	7
8	4
9	22
20	6
22	5

## Related Products

### Recommended Peripheral Cables

For direct connection to RS-232 terminals, printers, plotters, etc.

**40234A** 5-meter 25-pin M-25-pin M, pins 1-8, 20 wired end-to-end.

**92219R** 15-meter 25-pin Male to 25-pin Male direct connect cable (98642-66507).

**92219SD** 5-meter 25-pin Male to 25-pin Male modem cable (98642-66506).

The cables listed above are available from HP.

Self-test loopback connectors are available for optional use with the on-card self-test. Order 5181-2030 EIA 25-pin Test Hood from the HP Corporate Parts Center.

### Recommended Modems

- HP 37212A Standalone Modem
- 92205A Hayes Smart Modem 1200
- Racal-Milgo MPS 1222 (Europe)
- US Robotics 2400 Baud
- Bell 212A

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