

**HP 12587B  
ASYNCHRONOUS DATA  
SET INTERFACE  
DRIVER-DVR72**

**reference manual**



HEWLETT-PACKARD COMPANY  
11000 WOLFE ROAD, CUPERTINO, CALIFORNIA, 95014

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## 1-1. GENERAL DESCRIPTION

The Asynchronous Data Set Interface Driver — DVR72 (software part number 24350-16001) is a Hewlett-Packard DOS-III privileged physical driver which controls from one to eight HP 12587 Asynchronous Data Set Interfaces. Each HP 12587 interface has one hardwired terminal or one Bell System Type 103 or 202 Data Set (or equivalent) connected to it. With DVR72, the user's program can exchange data with Electronic Industries Association (EIA) RS-232-C compatible terminals or with other computers. Assuming ten bits per character (start bit, seven data bits, parity bit, and stop bit), DVR72 can transmit or receive data at a maximum rate of 120 characters-per-second for up to eight devices.

This manual assumes that the reader is already familiar with the HP DOS-III Disc Operating System as described in HP 24307B DOS-III Disc Operating System (24307-90006).

## 2-1. HARDWARE AND SOFTWARE REQUIREMENTS

DVR72 is designed to run under the Hewlett-Packard DOS-III Disc Operating System (HP product number 24307B) and requires the minimum DOS-III hardware configuration. In addition, it requires one to eight (depending upon the user's needs) HP 12587 Asynchronous Data Set Interfaces, an HP 12936 Privileged Interrupt Fence, and one asynchronous terminal or one Bell System Type 103 or 202 Data Set (or equivalent) connected to each HP 12587 interface. If a terminal is to be hardwired to the HP 12587 interface, the HP 12587B Option 001 cable must be used. Since it is a physical driver, DVR72 requires a device-dependent logical driver or an application program which acts as a logical driver.

Insert the HP 12587 Asynchronous Data Set Interface printed-circuit assemblies on the "privileged" side of the privileged interrupt fence. Observe the normal precautions for avoiding damage to the assemblies and their components. Attach the interconnecting cables to the HP 12587 assemblies and to the terminals or data sets.

Note: If a type 202 data set is being used at full duplex, the interconnecting cable must be modified (at the interface end) so that the wire which is normally connected to pin 16 is connected to pin U instead.

DVR72 must be generated into DOS-III as a main-memory resident driver. The procedure for doing so is described in Section X of DOS-III Disc Operating

System. DMA is not used by DVR72 and **must not** be specified for DVR72 during system generation. If multiple HP 12587 interfaces are used, each must be assigned a unit number (0-7). For example, if three HP 12587 interfaces are being used, they would be assigned unit numbers 0, 1, and 2 as follows:

### \*EQUIPMENT TABLE

```
10, DVRxx, R
11, DVR72, R, 0
12, DVR72, R, 1
13, DVRyy, R
14, DVR72, R, 2
```

The interrupt linkage for DVR72 must be to P.72x, where x is the unit number assigned to the particular equipment table entry. For example, the interrupt linkage for the five equipment table entries shown above would be as follows:

### \*INTERRUPT TABLE

```
10, EQT, 1
11, ENT, P.720
12, ENT, P.721
13, EQT, 4
14, ENT, P.722
```

## 3-1. FUNCTIONAL CAPABILITIES

There are seven DVR72 functions which the user's program can invoke by way of DOS-III EXEC calls. They are summarized in the following paragraphs. The associated DOS-III EXEC calls are discussed in paragraphs 4-1 through 4-5 of this manual.

### 3-2. INITIALIZE

This function links DVR72 to the logical driver and provides parameters describing the physical characteristics of both the communications line and the remote station.

### 3-3. CLEAR

This function terminates any operation currently in progress and breaks the linkage between DVR72 and the logical driver.

### 3-4. LINE OPEN

This function links DVR72 to the communications line and establishes the initial state of both. The Line Open function must be invoked before issuing the first Read or Write request.

### 3-5. LINE CLOSE

This function breaks the linkage between DVR72 and the communications line.

### 3-6. SET ECHO

This function enables or disables the echoplex operation of the HP 12587.

### 3-7. READ

Read requests issued by the user's program are automatically passed to the logical driver by DVR72.

### 3-8. WRITE

Write requests issued by the user's program are automatically passed to the logical driver by DVR72.

## 4-1. USER INTERFACE

The user's program passes control to DVR72 by executing DOS-III I/O Status, Read, Write, and I/O Control EXEC calls. The various EXEC calls are described in the following paragraphs.

### 4-2. I/O STATUS REQUESTS [RCODE = 13]

If an I/O request (except a "Clear" I/O Control request) is executed before the logical driver has been initialized, DVR72 passes a completion code of "1" when returning control to DOS-III. Under all other circumstances, DVR72 passes a completion code of "0" indicating normal completion; the actual completion code is in bits 0-7 of EQT4 (deposited there by the logical driver). Thus, after each I/O request is finished, the user's program must execute an I/O Status EXEC call to obtain the actual completion code and the transmission log.

The format of the I/O Status EXEC call is as follows:

```

JSB EXEC
DEF *+5
DEF RCODE
DEF LUN

```

```

DEF STAT
DEF TLOG
(return point)
.
.
.
RCODE DEC 13
LUN DEC logical-unit-number
STAT OCT 0
TLOG OCT 0

```

where **logical-unit-number** is the logical unit number of the terminal.

After the I/O Status EXEC call has been executed, bits 0-7 of STATS contain the actual completion code for the previous I/O request. The various completion codes are defined by the particular logical driver being used.

### 4-3. READ REQUESTS [RCODE = 1]

Read EXEC calls are automatically passed to the logical driver by DVR72. The format of the Read EXEC call is as follows:

```

JSB EXEC
DEF *+5
DEF RCODE
DEF CONWD
DEF BUFR
DEF BUFL
(return point)
.
.
.
RCODE DEC 1
CONWD OCT conwd
BUFR BSS n (OR -2n)
BUFL DEC n (OR -2n)

```

where

**conwd**  
is an octal control word. Bits 14 and 15 of **conwd** should be clear (zeros), bit 13 specifies whether the read operation is with or without wait (0 = with wait; 1 = without wait), bits 6 through 12 should be set as defined by the particular logical driver being used, and bits 0 through 5 specify the logical unit number of the terminal.

**n**  
Specifies the length of the input buffer (- = number of characters, + = number of words).

#### 4-4. WRITE REQUESTS [RCODE = 2]

Write EXEC calls are automatically passed to the logical driver by DVR72. The format of the Write EXEC call is as follows:

```

      JSB EXEC
      DEF *+5
      DEF RCODE
      DEF CONWD
      DEF BUFFR
      DEF BUFFL
      (return point)
      .
      .
      .
RCODE DEC 2
CONWD OCT conwd
BUFFR BSS n (OR -2n)
BUFFL DEC n (OR -2n)

```

where

**conwd**

is an octal control word. Bits 14 and 15 of **conwd** should be clear (zeros), bit 13 specifies whether the write operation is with or without wait (0 = with wait; 1 = without wait), bits 6 through 12 should be set as defined by the particular logical driver being used, and bits 0 through 5 specify the logical unit number of the terminal.

**n**

specifies the length of the output buffer (- = number of characters, + = number of words).

#### 4-5. I/O CONTROL REQUESTS [RCODE = 3]

The format of the I/O Control EXEC call is as follows:

```

      JSB EXEC
      DEF *+n (n = 3, 4, OR 5)
      DEF RCODE
      DEF CONWD
      [DEF PARM1]
      [DEF PARM2]
      (return point)
      .
      .
      .
RCODE DEC 3
CONWD OCT conwd
[PARM1 OCT first-parameter]
[PARM2 DEF second-parameter]

```

where

**n**

specifies the return point. For the "Clear" and "Line Close" I/O Control requests, **n** should be 3; for the "Set Echo" and "Line Open" I/O Control requests, **n** should be 4; for the "Initialize" I/O Control request, **n** should be 5.

**conwd**

is an octal control word. Bits 14 and 15 of **conwd** should be clear (zeros), bit 13 specifies whether the I/O control operation is with or without wait (0 = with wait; 1 = without wait), bits 6 through 12 specify the desired function code, and bits 0 through 5 specify the logical unit number of the terminal.

**first-parameter**

and

**second-parameter**

(if present) are as defined by the particular logical driver being used.

The various I/O Control function codes are as follows:

- 0 = Clear.
- 1 = Initialize.
- 2 = Line Open.
- 3 = Line Close.
- 4 = Set Echo.



The "Initialize" I/O Control request is normally issued by the logical initialization routine associated with the particular logical driver being used. It should be noted that the logical driver may define additional function codes.

For the "Clear" and "Line Close" I/O Control requests, PARM1 and PARM2 are not used and should be omitted from the calling sequence. For the "Set Echo" I/O Control request, PARM1 = 0 disables the echoplex operation of the HP 12587 and PARM1 = 1 enables it; PARM2 is not used and should be omitted. For the "Line Open" I/O Control request, bits 0 and 1 of PARM1 specify the line open options as shown in Table 4-1; PARM2 is not used and should be omitted. For the "Initialize" I/O Control request, PARM1 is a "dummy" parameter (zero) and PARM2 supplies the address of the EQT extension.

Table 4-1. Line Open Options

Bits 0 and 1	Option	Meaning
0	RING	Detect incoming calls only (do <b>not</b> answer). The request is completed when a ringing signal is detected by the interface. DVR72 does <b>not</b> set "Data Terminal Ready" (CD).
1	RECEIVE	Receive data. DVR72 sets "Data Terminal Ready" (CD), thus making it possible for the interface to receive data. The request is completed when "Data Set Ready" (CC) is detected by DVR72.  If bit 15 of PARM1 is set, DVR72 will accept characters and pass them to the Control entry point of the logical driver (this provides compatibility with "Auto Speed Detect"). The logical driver determines when the request is completed.
2	SEND	Transmit data. DVR72 sets "Data Terminal Ready" (CD) and "Request to Send" (CA), thus making it possible for the interface to transmit data. The request is completed when "Data Set Ready" (CC) is detected by DVR72.

Note: The use of option 1 (RECEIVE) over option 2 (SEND), or vice versa, merely serves to save turnaround time for the first Read or Write request. There is nothing wrong with issuing a Write request after a "Line Open (RECEIVE)" I/O Control request.

## 5-1. EQT EXTENSION

An EQT extension is a continuation of the DOS-III Equipment Table (EQT). There is one extension for every EQT entry which pertains to a device being controlled by a physical/logical driver combination.

The EQT extension is linked to the appropriate EQT entry by the logical initialization routine associated with the particular logical driver being used.

The EQT extension required by DVR72 differs from those used by other Hewlett-Packard physical drivers in the following respects:

- The number of stop bits (1 or 2) is selected by a strap on the HP 12587 interface. Bit 7 of EQT19, which is used for this purpose by some HP physical drivers, is ignored by DVR72.
- The Sync Character field in EQT20 is ignored by DVR72.
- The baud rate selection is made by way of a hood on the HP 12587 Interface. The Input Baud Rate and Output Baud Rate fields in EQT21 have no effect.

- The status reported in EQT25 is for the HP 12587 interface.
- Echo must **not** be requested when using Bell System Type 202 (or equivalent) Data Sets in the half duplex mode.

Specifically, the EQT extension for DVR72 has the format illustrated in Figure 5-1.

## 6-1. LINE INTERFACE CONVENTIONS

This section describes the actions performed by DVR72 in response to the various requests which can be issued by the user's program.

### 6-2. LINE OPEN [RING]

In response to a "Line Open (RING)" I/O Control request, DVR72 does the following:

- Clears "Data Terminal Ready" (CD).
- Recognizes "Ringing" (CE) interrupts.

Word

Contents

18	Length of the EQT Extension (n - 17)						
19	Line Plex	Sec Ch			Echo	Parity	Char Size
20	(Reserved)						
21							
22	Logical Driver's "READ" Entry Address						
23	Logical Driver's "WRITE" Entry Address						
24	Logical Driver's "CONTROL" Entry Address						
25	Current HP 12587 Board Status						
26	Timer Block						
27	for the						
28	Physical						
29	Driver						
30	Timer Block						
31	for the						
32	Logical						
33	Driver						
34	Storage						
35	Area						
36	for the						
37	Physical						
38	Driver						
39	Storage Area						
.	for the						
.	Logical Driver						
n							



Bit 15

0

Figure 5-1. DVR72 EQT Extension

Word 19	Bits 15	Line Plex: 0 = Half Duplex; 1 = Full Duplex	Word 20	Bits 7-0	(Not used by DVR72).
	Bit 14	Sec Ch: 0 = No Secondary Channel 1 = Secondary Channel			
	Bits 13-7	(Not used by DVR72).	Word 21		(Not used by DVR72).
	Bit 6	Echoplex: 0 = Echo Off; 1 = Echo On			
	Bits 5-4	Parity: 0 = Parity Off; 1 = Odd Parity; 2 = Even Parity			
	Bits 3-0	Char Size: Number of Bits in Each Character			



### 6-3. LINE OPEN [RECEIVE]

In response to a "Line Open (RECEIVE)" I/O Control request, DVR72 does the following:

- Sets "Data Terminal Ready" (CD).
- Clears "Request to Send" (CA).
- Sets "Secondary Send" (SA).
- Sets the parity and echo features as indicated in the EQT extension.
- Monitors "Data Set Ready" (CC) at 200 millisecond intervals until the signal is set for 2 seconds.

Note: If bit-15 of the control word (**conwd**) is set, DVR72 will accept characters and pass control to the Control entry point of the logical driver. This provides compatibility with "Auto Speed Detect."

### 6-4. LINE OPEN [SEND]

In response to a "Line Open (SEND)" I/O Control request, DVR72 does the following:

- Sets "Data Terminal Ready"(CD).
- Sets "Request to Send" (CA).
- Clears "Secondary Send" (SA).
- Sets the parity and echo features as indicated in the EQT extension.
- Monitors "Data Set Ready" (CC) at 200 millisecond intervals until the signal is set for 2 seconds.

### 6-5. LINE CLOSE

In response to a "Line Close" I/O Control request, DVR72 does the following:

- Clears "Data Terminal Ready" (CD).
- Monitors "Data Set Ready" (CC) at 200 millisecond intervals until either the signal is clear or 10 seconds has elapsed.

### 6-6. READ

In response to a Read request, DVR72 does the following:

- Sets Data Terminal Ready" (CD).
- Clears "Request to Send" (CA).
- Sets "Secondary Send" (SA).
- Sets the parity and echo features as indicated in the EQT extension.

If both of the following signals are set, DVR72 will interpret them as being correct line status:

- "Data Set Ready" (CC).
- "Carrier Detect" (CF).

If the line status is not correct, DVR72 will indicate a "line error" to the logical driver. If the HP 12587 reports a parity error or a lost character, DVR72 will indicate a "data error" to the logical driver.

When performing a line turnaround, DRV72 does the following:

- Sets "Data Terminal Ready" (CD).
- Clears "Request to Send" (CA).
- Sets "Secondary Send" (SA).
- Sets the parity and echo features as indicated in the EQT extension.
- Disables the interrupts for 300 milliseconds.

### 6-7. WRITE

In response to Write requests, DVR72 does the following:

- Sets "Data Terminal Ready" (CD).
- Sets "Request to Send" (CA).
- Clears "Secondary Send" (SA).
- Sets the parity and echo features as indicated in the EQT extension.

If "Data Set Ready"(CC) is set, DVR72 will interpret it as being correct line status.

If the line status is not correct, DVR72 will indicate a "line error" to the logical driver. If "Secondary Receive" (SBB) is not set, DVR72 will indicate a "break" to the logical driver.

When performing a line turnaround, DVR72 does the following:

- Sets "Data Terminal Ready" (CD).
- Sets "Request to Send" (CA).
- Clears "Secondary Send" (SA).
- Sets the parity and echo features as specified in the EQT extension.
- Disables the interrupts.
- Delays for 300 milliseconds and tests for correct status at 100 millisecond intervals (minimum = 200 milliseconds; maximum = 1 second) prior to transmitting.

