HEWLETT PACKARD

2608A Line Printer Driver DVB12

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The Printing History below identifies the Edition of this Manual and any Updates that are included. Periodically, Update packages are distributed which contain replacement pages to be merged into the manual, including an updated copy of this Printing History page. Also, the update may contain write-in instructions.

Each reprinting of this manual will incorporate all past Updates, however, no new information will be added. Thus, the reprinted copy will be identical in content to prior printings of the same edition with its user-inserted update information. New editions of this manual will contain new information, as well as all Updates.

To determine what software manual edition and update is compatible with your current software revision code, refer to the appropriate Software Numbering Catalog, Software Product Catalog, or Diagnostic Configurator Manual.

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Chapter 1
PRODUCT DESCRIPTION

This manual provides programming and configuration instructions for HP 2608A Printer Driver DVB12. The Relocatable Part Number is 92062-16004. Driver Size is approximately 900 words. Driver DVB12 provides the software interface between the RTE-IV, RTE-IVB, RTE-6/VM and RTE-M operating systems and the 2608A graphics printer. Refer to the 2608A Technical Reference Manual, 02608-90903.

The 2608A graphics printer is a microprocessor controlled, medium-speed device that provides both alphanumeric and graphics hard-copy output.

The graphics capability of the 2608A enables it to transmit a dot-per-bit binary pattern. On any given transmission the user is able to place a dot or dots in any or all of the 924 dot positions. The true value of the dot-per-bit capability is especially apparent when a software graphics application package is used. The 92840A and 92841A Graphics Plotting Software provide such a facility and are available for HP 1000 systems.

Refer to Chapter 4 for details on system generation guidelines if the 92840A software is to be included in your system generation.

Chapter 2
FUNCTIONAL FEATURES

The 2608A must interface on an HP 1000 type computer through the 26099A interface card and its associated cable.

The following capabilities of the 2608A are supported by DVB12:

1. Print from primary and secondary character set on same line.
2. Select print and transparency modes.
3. User selection of primary or secondary character sets.
4. Programmatic definition of vertical forms control at 6 or 8 lines per inch (LPI).
5. Programmatic reset of vertical forms to standard HP 6 or 8 LPI definitions.
6. Read-back of character set dot row information.
7. Programmable Status Read Request.
8. Device Clear Request.
9. Dynamic Status Request.
10. VFC Control Request.
11. Device Self-Test Request.
12. Ping/Pong Read Request.
13. Definition of First Print Column.
14. Processing Honesty Mode.

WRITE REQUEST

The EXEC Write Request (Appendix A) directs the contents of a user buffer to the 2608A and initiates the print from the currently specified primary and/or secondary character set in the currently selected print mode. The user must supply the address of the first buffer word and the number of words or ASCII characters to be transferred.

Paper movement may be controlled in one of three ways:

1. Use of first data character for forms control. The second character of the buffer is printed in the first print position.

2. Use of a paper motion control request either to slew a specified number of lines from current position or to select a predetermined position on the paper with a VFC command.

3. Use of Honesty Mode with control characters embedded in the data.

The user must ensure the data stream does not exceed the printing capabilities of the 2608A. DVB12 will not detect excessive length in the user's data buffer. Extra characters will be lost following receipt of the 132nd printable character.

The appearance of the output is a direct function of the selected print mode. The write request itself neither modifies nor checks to see what is the current print mode.

SELECT PRINT MODE CONTROL REQUEST

The EXEC Control Request (Appendix A) allows the user to define the print mode and transparency mode for subsequent write requests to the driver. In addition to the standard alphanumeric print, the 2608A is able to convert the user's data buffer into either double-size print or graphics data. On receipt of this control request, the driver commands the 2608A into the requested mode and the 2608A will remain in this mode until either a new mode is requested or a device-clear control request is received.

If a power-fail occurs on the 2608A or the operator presses the RESET key on the front panel, the driver will restore the print mode that existed prior to the power-fail or reset.

Transparency mode ON prevents the 2608A from responding to the control characters SI (SHIFT IN), SO (SHIFT OUT), and BS (BACKSPACE). Consequently, SI, SO, and BS are printed. But transparency mode OFF, the default condition, enables the 2608A to respond to, rather than print, SI, SO, and BS. Transparency mode does not affect graphics.

Double Size Print Mode

Selection of the double size print mode will cause subsequent write requests to be printed at twice the normal print size up to a maximum of 66 characters per line. Paper motion following the print selects VFC channel 3 or slew 1 line, depending on the state of the "auto page eject" flag in the driver. Control requests for paper motion, when in double size print, are available. Line slew requests will cause twice the normal paper motion (i.e., 3 or 4 lines per inch compared to the 6 or 8 lines per inch in normal print mode). VFC channel requests will cause motion to the selected channel independent of the current double size print mode.

Graphics Print Mode

Selection of the graphics print mode will cause subsequent write requests to be interpreted as dot data not to exceed 924 dot positions. Additional data will be lost. 924 dots per line is a function of 132 print columns with 7 addressable dots per column (132X7=924). Note that dot data is packed 8 bits per byte or 16 bits per word so that the maximum logical user's buffer length is 924 divided by 8 (for bytes) for 115.5 bytes which should be rounded up to 116 bytes. The driver will pass all 116 bytes to the 2608A but the 2608A will only interpret the top 4 bits of the 116th byte. For words the maximum buffer length is 57.75 rounded to 58 words.

Line control following the print when in graphics mode will always be slew 1 dot row without auto page eject.

CHARACTER SET CHANGE CONTROL REQUEST

This control request changes the primary/secondary character set definitions of the 2608A to those requested in the IPRAM parameter. The available character sets are described in Table 2-1. Any user request with a code of 05 or 06 will default to ASCII as will any request for a language not installed in the 2608A.

Table 2-1. Standard and Optional Language Identity Codes

LANGUAGE	OCTAL CODE	BINARY CODE
Standard Language		
ASCII	00	0000
Optional Language (-001)		
ARABIC	01	0001
CYRILLIC	02	0010
KATAKANA	03	0011
DRAW	04	0100
Reserved Language Codes	05	0101
(Defaults to ASCII)	06	0110
Optional Language (-002)		
(ISO Substitution Set)		
APL	07	0111
FRENCH	10	1000
GERMAN	11	1001
SWEDISH/FINNISH	12	1010
DANISH/NORWEGIAN	13	1011
SPANISH	14	1100
BRITISH	15	1101
JAPANESE ASCII	16	1110
ROMAN EXTENSIONS SET	17	1111

PROGRAMMATIC DEFINITION OF VERTICAL FORMAT INFORMATION

The user may request to programmatically redefine the vertical forms definitions of the 2608A. This write request requires a user buffer containing vertical format channel information for each line of the form. The IBUFL parameter defines 6 or 8 lines per inch and the number of lines to be included in one page. The maximum forms length is 127 lines. The driver will reject any request with a forms length equal to zero.

The IBUFA parameter contains the address of a user buffer defining the forms channels. The buffer should contain X words, where $1<X<127$ is the number of lines in the form. Word 1 of the buffer defines the 16 VFC channels for line 1 for the form, word 2 defines the 16 channels for line 2, etc. Refer to Appendix A for more details on the data format.

In all cases of programmatically defining the VFC, the forms position at the time of the request is defined as the new TOF.

Should either a power-fail or a RESET occur on the 2608A, all aspects of the programmable VFC are lost. The driver is not able to recover such information.

PROGRAMMATIC RESET OF VERTICAL FORMS

The user may reset the vertical forms to a predefined 2608A standard VFC. Specifications of 6 or 8 LPI is via the IPRAM parameter.

NOTE

If a standard VFC is installed when this command is received then the current forms position is NOT redefined as a new TOF. Rather, the line counts will be transposed from 6 to 8 or 8 to 6 LPI as the case may be. In any other possible combination the current forms position will be redefined as the new TOF.

CHARACTER SET READ BACK REQUEST

The character set dot patterns used within the 2608A to form any of its character sets may be read back to the computer by means of the EXEC Read Request (Appendix A). This feature is of interest to a program wanting to reproduce the 2608A character set in graphics mode. The user must supply DVB12 with:

a. The character set identification code.
b. The first desired character.
c. A destination buffer address.
d. The number of bytes of dot data requested.

The number of bytes of dot data requested can be supplied as a positive number to have the dot data returned in unpacked format (one byte per word) or as a negative number for packed format. In either case, the lower four bits of the first word of the returned data is the language identity code (see Table 2-1); therefore, the requested count must be a negative two bytes or a positive one word greater than the actual desired number of bytes of dot data.

There are nine bytes of dot data per character; therefore, a full 2608A character set (128 characters) consists of 1152 bytes of dot data. To read back a character set in packed format, a user must request -1154 bytes and to read the same set in unpacked format he must request 1153 words. More details about character-dot data reads are in Appendix A.

The user can request a subset of the entire set of dot patterns by providing a value in IPRAM equivalent to the first desired character. The data returned will start at this point and continue until either the number of bytes requested is reached or all possible bytes the 2608A can transmit are exhausted.

Because the 2608A, when spooled, rejects all character set read back requests, the driver has a special subchannel designation capability to prevent such rejection. If at system generation time a special LU is attached to the DVB12 EQT along with a subchannel designation of 3, the user is able to access the 2608A back. (The environment of the device is totally unchanged by this request.) This special subchannel designation allows only this request and the programmable status read request. All other requests on subchannel 3 will be rejected.

Of course, if the 2608A is not spooled, this request as well as any other read request may be successfully accomplished on any subchannel except 2.

PROGRAMMABLE STATUS READ REQUEST

The 2608A has internal status indictors. They are listed in Table 2-2. Maximum buffer length allowed for this request is 127 words. Any request longer than 127 is truncated. A buffer length of zero is converted to 1. The data is returned unpacked in the user buffer. The top 8 bits of every word is clear. Therefore, the buffer length MUST be supplied as a positive word count or the request is rejected.

The 2608A design is such that the requested status information is NOT returned until any operation in progress is complete, thereby ensuring that the returned status information is accurate. This request should be used with caution since the request effectively disables the buffering capabilities of the 2608A.

CAUTION

The location and description of the bits returned in word 1 by this status read request do not correspond in location to the description of status contained in Table 3-2, EQT 5 status. This request brings the status information directly and unmodified from the 2608A into the user buffer. Status obtained any other way (dynamic status request, at end of successful transfer, etc.) will conform to the description in Table 3-2.

Table 2-2. Internal Status Byte Definitions

WORD NUMBER	BIT DEFINITIONS (If applicable)							
	7	6	5	4	3	2	1	0
1	Off/On Line	Ready /NRDY	VFC 9 BOF	VFC12 TOF	VFC Inited	6/8 LPI	Resvd	Power-Fail
2	Off/On Line	P MEC Error	S TST Fail	Paper Out	Resvd	6/8 LPI	Platn Ribbn	Resvd
3	Reserved			TPRTY	Print Mode Number			
4	Secondary Language				Primary Language			
5	PS/FL	Number of Self-test Subtest Which Failed						
6	6 LPI dot row count							
7	6 LPI current line count (forms position)							
8	6 LPI page size in number of lines							
9	8 LPI dot row count							
10	8 LPI current line count (forms position)							
11	8 LPI page size in number of lines							
12	Firmware identification number							
13	Number of "blanked" columns - Range=0 to 17B - Default=0							
14	(No significant information for user)							
15	(No significant information for user)							
16	POWER UP SEC LANGUAGE				POWER UP PRIM LANGUAGE			
17 thru 127	words 17 thru 127 are available but meaningless to the user.							

Any bit definition in this table that uses the slash (/) to separate the description, refers to a 0/1 setting of the bit. The other descriptions apply when the bit is set to 1.

As in the character set read back read request, special consideration is again given for the user who may wish to receive the programmable status information while the device is spooled for output by accessing the 2608A via a subchannel designation of 3. It should be pointed out that the programmable status information is probably of little value to a user program since the information is pertinent to the currently spooled operation and is subject to change. The intent of this feature is to allow something like an on-line diagnostic to slip in and sample the printers status or to perhaps accumulate statistics on printer operation. Of course, a status request does not alter the state of the device.

PING/PONG READ REQUEST

The Ping/Pong Read Request is made available exclusively for ON LINE diagnostic testing of the 2608A subsystem. The intent of the request is to verify proper operation of the entire 2608A subsystem except for the electromechanical operations in the 2608A that convert the internal buffer to a printed pattern. The following sequence of events will occur on receipt of a Ping/Pong read request:

1. The driver will send a Ping command to the 2608A followed by 256 decimal bytes of data. The data pattern begins with 0 and increases by 1 until 256 bytes have been transmitted.

2. The driver immediately follows the Ping with a Pong command and goes into an input mode to read back the 256 bytes just transmitted. Each returned byte is examined for accuracy and a count is maintained for the number (if any) of errors encountered.

The user has two options available for return of the results of the Ping/Pong. If the buffer length is 1 then only a "pass/fail and number of errors" code is returned to the first location of the user's buffer. If the buffer length is exactly 257 decimal then the pass/fail code is returned. Also, the exact results of the Pong are returned unpacked, right justified, in buffer locations 2 thru 257. Any buffer length other than 1 or 257 causes the request to be rejected.

SELF-TEST CONTROL REQUEST

The Self-Test Control Request causes the 2608A to execute its internal microprocessor-controlled self-test function. The status word associated with self-test will be updated and is available to the user via the Programmable Status Read Request described in Appendix A. A printing and a non-printing version of self-test are both available. The printing version of self-test executes in approximately 17 seconds and results in a full page of output. The non-printing version executes in less than 3 seconds.

All conditions that existed prior to execution of this request are restored on completion of self-test unless self-test fails.

DEVICE CLEAR REQUEST

The Device Clear Request causes a TOF command to be sent to the printer followed by a Master Clear command. The TOF command is issued to ensure there is no data in the 2608A buffer and that the form is properly positioned on completion of the Master Clear.

This command should be considered at the start of all applications since it will always reset the 2608A to a known power-up state.

DYNAMIC STATUS REQUEST

The Dynamic Status Request causes a return of the I/O status (LIA on the select code) of the 2608A. EQT 5 is updated and the status is returned to the calling program in the A-Register. See Table 3-2 for a bit by bit definition of the device status. The driver does not return the status until all 2608A internal activity has ceased thereby ensuring the integrity of the status.

PAPER MOTION CONTROL REQUEST

The paper motion capabilities of the 2608A may be exercised with the Paper Motion Control Request. Motion requests include:

a. Slew from 1-55 lines (print lines - not dot rows).
b. VFC channels 1 thru 16.
c. Auto page eject mode ON or OFF.
d. Suppress paper motion following data transfer. This allows the overprint mode.

Appendix A contains a detailed explanation of the parameter required for each transfer.

DEFINITION OF FIRST PRINT COLUMN

Under program control the user can define dynamically which of the first 16 columns is logically to be column 1. The value supplied in IPRAM by this control request is used to logically blank out the number of columns specified in the least significant 4 bits of IPRAM. For example, a value of seven will cause all subsequent printing to begin in column 8. A value of zero will cause an effective reset back to the power up state of printing, starting in column 1. If the current print task has printable characters in any of the last 16 columns (columns 117 thru 132) then the use of this request will cause the loss of as many characters on the right margin as are specified by IPRAM for this control request.

The driver does not monitor the state of this feature. Should a power-fail or RESET occur, column 1 is defined as the value last supplied by this control request. Once column 1 has been logically defined, the operator will not be able to reset to physical column 1 via local operation, that is, by pressing RESET on the front panel. This feature, once enabled, can be turned off by a repeat of the control request with IPRAM = 0, a master clear control request or a reboot of the system.

If the current print mode is double size, the shift in column 1 position is proportional. If the mode is graphics then the shift is calculated by (IPRAM X 8) which determines the number of leading dot columns which are skipped. Programmable status word 13 (Table 2-2) defines the current value of the position of column 1.

SUBCHANNEL DESIGNATIONS

The ability of the 2608A to respond to user requests that modify the default or power up state of the device implies that for some applications it is vital to know if any of the programmable features have suddenly been reset to the default state, as will happen in a power-fail on the device, or when the operator presses RESET. For example, if a power-fail occurs when the paper is not at the appropriate position for top of form, then when the device executes its power-fail recovery procedure, the current paper position is defined as the new top of form. For some print tasks it is undesirable to continue the print operation without operator intervention to put the device back into the proper state.

On all entries into the Initiator section the driver will check for, among other things, the presence of the power-fail bit in the devices status. If it is not set, then normal processing occurs. If it is set, then the following three events occur regardless of the subchannel:

1. The device is commanded back ON LINE by the driver (power-fail will always come back OFF LINE).

2. A MASTER CLEAR is sent which clears the power-fail bit and automatically installs the power-on default values which are:

    a. Standard print mode.

    b. Primary and Secondary languages in accordance with the settings of the switches under the access cover.

    c. Standard 6 or 8 LPI Vertical Forms Control in accordance with the setting of the 6/8 LPI default switch under the access cover.

    d. Internal print buffer clear and logical column 1 set equal to physical column 1.

3. The driver then reinstalls as much of the printer's environment as is possible:

   a. The print and transparency mode as defined prior to the power-fail or RESET are re-established.

   b. If a programmable definition of column 1 was active, then the offset is re-established.

   c. The driver then checks to see whether a programmable definition of Primary/Secondary (P/S) language was active:

      1. If not, then the state of P/S as defined by the front panel is not modified.

      2. If a P/S control request modification was active then the driver reads back status from the 2608A to discover the current value of the P/S defaults on the front panel (word 16 of Table 2-2). If this value does not equal the value obtained when the request to modify P/S was executed, then the driver allows the new value to become the current definition of P/S language.

         If the values are identical, then it is most probable that a power-fail instead of a RESET caused this action and therefore the driver installs the definition last supplied by the control request to modify P/S.

A check is then made to see whether the subchannel designator is 1. If not 1, the processing of the request continues as if the power-fail had not occurred. All device features except the position of the paper relative to the top of form and 6/8 LPI are in the pre-power-fail state. If a subchannel designator of 1 is detected, the driver commands the device OFF LINE and then makes an immediate return from the Initiator with A=3 to indicate a device malfunction which is reported on the console as a NOT READY condition. At this time the operator either aborts the task or overrides the power-fail by returning the 2608A to ON LINE or by the UP,LU operator command.

Refer to the sections on Character Set Read Back and Programmable Status Read Request in Appendix A for additional descriptions of subchannel capabilities.

AUTOMATIC UP OF THE DEVICE

The 2608A will generate an interrupt when the device is put ON LINE by the operator. The driver will detect such a spurious interrupt and call $UPIO to allow the system to initiate any pending calls. It is, therefore, not necessary for the operator to respond to the NOT READY message with the UP command but rather to satisfy all conditions required to allow the device to go ON LINE and then to simply press the ON LINE switch on the front panel of the 2608A.

DEVICE TIME-OUT

By inserting a time-out value directly into EQT 15, the driver always overrides either the time-out value supplied at generation time or the TO operator command. The worst examples of time-out are 17 seconds for the self-test control request and 4 seconds for a maximum paper slew in double size print. The driver supplies a time-out value in EQT 15 appropriate to the request. The driver does not attempt to handle a time-out, should it occur, but rather lets the system process the time-out in normal fashion.

2608A INTERNAL BUFFERING

Power failure or a manual RESET causes loss of one or two lines of output, loss of all buffered data, and termination of any print in progress. But, nevertheless, the system signals the completion of the previous record before it detects the power-fail or RESET, and flags the completion of the last request. It does so because the internal buffering scheme of the 2608A accepts and signals completion to the system before any mechanical print action has started, and because it accepts all data in the next print request while it is only beginning to print the previous request.

HONESTY MODE

The driver will process three control characters in honesty mode. These are carriage return (CR), line feed (LF), and form feed (FF). The driver, detecting a CR, throws it out and replaces it with a Print and Zero Slew command. Because the 2608A can merge internal buffers, the user can overprint two lines on top of each other. But only two lines may be overprinted. If more than two lines are output with a CR, only the first and last lines will be overprinted. A null line is not counted as the first line by the driver (i.e., XXXXX (cr) (lf) (cr)XXXXXXX). The LF character is replaced with a Print and Slew One Line or, if auto page eject mode is on, Print and Slew to VFC Channel 3. DVB12 pads the next line with blanks to make it appear that only a LF was executed and continue printing from that point below the LF.

If a LF is the last character sent in honesty mode and the next operation is non-honesty mode print, the line is not padded with blanks. The FF character is replaced with a Print and Slew to VFC channel 1. A CR is implied. Honesty mode is invoked by setting the X bit in the control word in a write request call. Honesty mode is enabled only for each write request. The X bit overrides the V bit and is ignored if the 2608A is in graphics mode.

CONFIGURATION CHECK (IO07 Error)

This driver requires that an equipment table extension be specified at system generation time. The driver verifies that sufficient EQT extension is available on first entry. If there is not enough EQT extension, the driver rejects all I/O requests, resulting in abnormal program termination with IO07 errors. The system must be regenerated with adequate EQT extension in order to correct for this error. Refer to Chapter 4 for generation procedures.

Chapter 3
SYSTEM INTERFACE SPECIFICATIONS

DVB12 is a non-privileged RTE driver, operating without DMA (DCPC). DVB12 is passed control and data information from the user in EQT entries (Table 3-1) in the base page communication area in standard RTE driver format. DVB12 contains an initiation section, IB12, and a continuation/completion section, CB12. IB12 initiates requests unique to the 2608A for various print modes and control functions. IB12 is exited in all cases in a maximum of 3 milliseconds from entry time. The continuation/completion section CB12 is entered to complete those user requests requiring more than 3 ms. Upon exit of IB12, the A-Register indicates the request status as:

A=0	Operation initiated	A=3	Device not ready or device malfunction
A=1	Illegal request code		
A=2	Illegal control function	A=4	Immediate completion

Upon the successful completion of a request, the A-Register contains the device status as defined by Table 3-2. The B-Register contains the number of words or characters transferred.

Table 3-1. DVB12 EQT Entries

EQT 1	Device suspend list pointer
EQT 2	Driver initiation section address
EQT 3	Driver completion section address
EQT 4	[Driver Flags] [Unit #] [Channel]
EQT 5	[AV] [EQ type code] [Status]
EQT 6	CONWD (Current I/O request)
For write or read requests	
EQT 7	Buffer address
For control requests	
EQT 7	Optional parameter
EQT 8	Buffer length
For write requests	
EQT 9	Optional VFC/Slew control request
For read request (character set read back)	
EQT 9	ASCII equivalent of first character requested
EQT 10	Temp. storage for DVB12
EQT 11	Temp. storage for DVB12
EQT 12	EQT Extension size (XX words)
EQT 13	EQT Extension starting address
EQT 14	Device time-out reset value
EQT 15	Device time-out clock

Table 3-2. EQT 5 Status

```
Bit 7 = Power failed
Bit 6 = TOF executed on last paper motion request
Bit 5 = Clear is 6 LPI    Set is 8 LPI
Bit 4 = VFC initialized with standard 6 or 8
        LPI definition
Bit 3 = On line
Bit 2 = Not ready
Bit 1 = VFC channel 9 indicator
Bit 0 = VFC channel 12 indicator
```

Table 3-3. EQT 11 Definitions

```
Bit  15 = Continuation return
Bit  12 = Transparency on/off flag
Bits 11 = Current print mode where:
thru 8     0000 = Standard print
           0001 = Double size print
           0010 = Graphics print
           0011 = Reserved
           thru
           1111
Bit 7   = Suppress space on next operation
Bit 2   = Character set read back continuation
Bit 1   = Auto page eject mode
Bit 0   = Control word output

Bits 14,13,6,5,4,3 are reserved
```

Chapter 4
CONFIGURATION GUIDELINES

This chapter provides configuration guidelines for integration of DVB12 into an RTE operating system. It is intended to augment the information provided in the system generation instructions for your system software.

GENERATION PROCEDURE

Load the relocatable binary code of DVB12 into the RTE system during system generation. During system generation, take the following steps to configure the driver into the system.

Program Input Phase

The relocatable binary code for DVB12 must be provided along with all other system modules during this phase.

Table Generation Phase

In this phase, make the following entries:

1. Provide an Equipment Table (EQT) entry for each 2608A intended for the system.

   ```
   * EQUIPMENT TABLE ENTRY
   ```

   Where the prompt is in the format: EQT XX?

   The response for DVB12 is: SC,DVB12,B,X=5

   Where XX in the prompt is the current EQT entry number. SC is the select code of the I/O controller. The B specifies the buffering option. The X option for extended EQT is required and results in driver malfunction if not specified. A five word extension is required. The T for Time-Out option is meaningless since the driver controls its own time-outs. DMA is not used by this driver.

2. Provide a Device Reference Table (DRT) entry to relate the desired Logical Unit (LU) number for each printer to the EQT entry.

```
    * DEVICE REFERENCE TABLE
```

Where the prompt is in the format: LU = EQT#?

The response is in the format: EQT#,subchannel

The response is to provide the EQT number to relate to the LU specified in the prompt. This is the point when the subchannel designation is supplied to specify the power-fail recovery read back options.

Power-Fail Operation

At this point, the desired subchannel designations are supplied to determine whether or not to proceed with the user's request should the power fail on the printer. If a subchannel is specified (response is EQT#,1) then requests to the driver will not proceed and a not ready response is returned to the system. If subchannel is not specified (response is only EQT# or EQT#,0), then the driver will do an automatic recovery as specified in Chapter 2 of this manual. Of course these generation assignments are temporarily modifiable by the LU operator command.

Read Back Operation

Specification of a subchannel response of EQT#,3 at this point will create the special situation of allowing character set read backs and status read backs from the 2608A while it is a spooled output device.

3. Provide an Interrupt Table entry to establish the links that tie the Select Codes back to the EQT entries.

```
    * INTERRUPT TABLE
```

Where the response is in the format: SC,EQT,N

SC is the Select Code. EQT,N specifies that control should be directed to EQT entry N when the device in SC interrupts.

OPERATION OF DVB12 WITH 92840A GRAPHICS SOFTWARE

To enable character set read back for graphics character generation with the 92840A software, a Device Reference Table entry must be specified for the 2608A using subchannel 3 in addition to the entry for the standard printer subchannel. The relocatable binary module %DVZ12 must also be installed in the system. For the installation of %DVZ12 into RTE-IV or RTE-IVB refer to Appendix D of the 92840A manual (part number 92840-90001).

Appendix A
CALLING SEQUENCES

STANDARD WRITE REQUEST

Assembly call:

```
EXT EXEC
JSB EXEC
DEF *+5
DEF ICODE
DEF ICNWD
DEF IBUFA
DEF IBUFL
```

FORTRAN call:

```
CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL)
```

Where:

ICODE = 2 = Request code

ICNWD = Control Word Defined as:

Bits 0 thru 5 = Device Logical Unit Number

Bit 6 = Not used

Bit 7 = Print mode bit (V-bit)

= 1 Print contents of print buffer using Standard or Double size print followed by VFC channel 3 (Auto page eject on) or slew 1 line (Auto page eject off).

= 0 First character of buffer is used for line control. The second character of the buffer is printed in column 1 of the printer. The control meanings of characters in column 1 are:

Blank= single space--data is printed followed by either VFC ch. 3 or slew 1 line for auto page eject on or off.

0 = double space--VFC ch. 3 or slew 1 line precedes the data followed by the same VFC ch. 3 or slew 1 line. In both cases the choice is a function of auto page eject on or off.

1 = Eject current page with VFC ch. 1 then transfer data followed by VFC ch. 3 or slew 1 line depending on auto page eject on or off.

* = No paper motion either before or after the data transfer--overprint.

Any other = Same as definition for blank character.

Bit 8 = Not used - Set to zero.

Bit 9 = VFC define bit where if:

= 0 Then user's buffer contains data - it is not a VFC define request. Interpretation of a standard write continues.

= 1 The user is requesting a programmatic modification of the current VFC definition. The request is interpreted as described in the next section.

Bits 10 thru 15 = Not used--set to zero

Note

The Honesty bit overrides the V bit and will not be used with graphics print request. The V bit will not be implemented when printing in graphics mode. In graphics all paper movement other than the default of slew 1 dot row must be controlled by a specific control request.

In summary, line movement following the print may be controlled by:

1. The V bit
2. First character of the buffer
3. Specific control requests to specify paper motion
4. Current print mode of the 2608A

IBUFA = Address of first word of user data buffer.

IBUFL = Length of data buffer. If positive length is given in words, if negative, length is in characters. A buffer length of zero will cause a VFC ch. 3 if auto page eject is set. Otherwise it will cause a slew of 1 line.

VFC DEFINE WRITE REQUEST

This section is a continuation of the above described write request and explains the parameter definitions when Bit 9 of ICNWD is set.

IBUFA = Address of first word of buffer containing data for all 16 VFC channels. Buffer must be set up with the same number of words as specified by Bits 0 thru 6 of IBUFL.

Buffer format: Each bit of each word defines a specific VFC channel. For example:

```
First word of buffer
  Bit 15 = VFC channel 16
  Bit 14 = VFC channel 15
  Bit 13 = VFC channel 14
      etc.
  Bit  0 = VFC channel 1
Second word of buffer
      etc.
```

Consecutive words of the buffer define consecutive VFC channel assignments through the length of the buffer.

IBUFL = Length of VFC define buffer and whether 6 or 8 LPI.

Bit 7 = 0 or 1 for 6 or 8 LPI.

Bit 0 thru 6 = Length of the form for the VFC define. This is the number of lines from top of form to the top of the next form. Maximum forms length is 127 lines. Standard forms size for 6 LPI is 66 lines and for 8 LPI is 88 lines. A buffer length of zero will cause a command reject.

The IFORM parameter is not required for this operation.

CONTROL REQUESTS

Assembly call:

```
EXT EXEC
JSB EXEC
DEF *+3(or 4)
DEF ICODE
DEF ICNWD
DEF IPRAM (Optional)
```

FORTRAN call:

```
CALL EXEC(ICODE,ICNWD,IPRAM)
```

Where:

ICODE = 3 = Request code

ICNWD = Control word

Bits 0 thru 5 = Device Logical Unit Number

Bits 6 thru 10 = Control Information - All values are shown in octal.

0B = Clear Control

The following sequence of events occur:

- Top of Form is issued to position the paper.
- Master Clear is issued to reinstall default conditions:

  a. Print mode is set to standard and transparency is set to "off".

  b. Page eject mode is set "on".

  c. Primary/Secondary language and 6/8 LPI are selected as per switch labeled POWER ON CONDITIONS on the front panel under the access cover.

  d. A standard 6 or 8 LPI VFC is selected in accordance with the switch mentioned above.

  e. The internal print buffer is cleared and logical column 1 is set equal to physical column 1.

  f. Selection of Primary/Secondary languages via SI/SO defaults to SI.

6B = Dynamic status request

This request will return the 2608A I/O status to the user in the A-Register and update the drivers status in EQT 5.

11B= Paper motion request (requires IPRAM)

IPRAM = Parameter to indicate one of the following:

IPRAM (decimal)	VFC Channel	Description
<0	1	Page eject (Top of form)
0		Suppress space on next operation
1 thru 55		Slew 1 thru 55 lines as specified
56	3	Skip to next single space line
57	4	Skip to next double line
58	5	Skip to next triple line
59	6	Skip to next half page
60	7	Skip to next quarter page
61	8	Skip to next tenth line
62	2	Skip to bottom of form
63	1	Skip to top of form
64		Set auto page eject mode (Default)
65		Clear auto page eject mode
66	9	Skip to bottom of form with status
67	10	Skip to line before bottom of form
68	11	Skip to line before top of form
69	12	Skip to top of form with status
70	13	Skip to next seventh line
71	14	Skip to next sixth line
72	15	Skip to next fifth line
73	16	Skip to next fourth line
>73		Not defined so ignore the request

15B= Change character set(s) (requires IPRAM)

IPRAM contains the codes for primary and secondary character set assignment. See Table 2-1 for code assignments. The current definition of primary and secondary languages is available by doing a status read request and examining word 4 (See Table 2-2).

Bits 0 thru 3 = Octal code for new primary set
Bits 4 thru 7 = Octal code for new secondary set

16B= VFC reset (requires IPRAM)

IPRAM = 0 or 1 to select either the standard 6 or standard 8 lines per inch VFC definition.

20B= Self-Test (requires IPRAM)

Requests either the printing or non-printing version of the internal microprocessor controlled self-test function of the 2608A.

IPRAM = 0 = Do the printing version of self-test
= 1 = Do the non-printing version of self-test

21B= Definition of First Column (requires IPRAM)

IPRAM defines which of the first 16 physical print columns is to be logical column 1. Refer to Chapter 2 for complete details.

Bits 0 thru 3 = Column definition where 0000 = Print in column 1
0001 = Print in column 2
etc.
1111 = Print in column 16

Bits 4 thru 15 = Not used

30B= Select Print Mode (requires IPRAM)

IPRAM contains the code for the requested print mode and whether or not it is selected in the transparent mode. Refer to Chapter 2 for greater detail on modes and transparency.

Bits 0 thru 3 = Mode code where 0000 Standard print(default)
0001 Double size print
0010 Graphics print
0011 |
thru | --reserved--
1111 |

Selection of a reserved mode defaults to standard print

Bit 4 = 0 = Transparency OFF (default)
= 1 = Transparency ON

Transparency ON or OFF can only be selected in conjunction with a print mode select. The appropriate value for the print mode must be supplied in bits 0 thru 3. This bit is meaningless when in graphics mode.

Bit 5 thru 15 = Not used

bits 11 thru 15 (ICNWD) = Not used so set to zero

CHARACTER DOT DATA READ

Refer to Chapter 2 for further details on character set read back.

Assembly call:

```
EXT EXEC
JSB EXEC
DEF *+6
DEF ICODE
DEF ICNWD
DEF IBUFA
DEF IBUFL
DEF IPRAM
```

FORTRAN call:

```
CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL,IPRAM)
```

Where:

ICODE = 1 = Request code

ICNWD = Control word

Bits 0 thru 5 = Device logical unit number

Bit 6 = 0 = Not a Ping/Pong read
= 1 = Do a Ping/Pong read - Contents of Bit 7 not significant. See end of this appendix for description of Ping/Pong read.

Bit 7 = 0 = Character set read
= 1 = Programmable status read. See next section for description when Bit 7 is set.

Bits 8 thru 15 = Not used

UNPACKED READ

The dot data composing the requested character set is returned to the user's buffer right justified padded with leading zeros. Consider the following description of a buffer after a read back. Assume that you are looking at the character M in the buffer.

									*							
Bits	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
IBUFA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
IBUFA+1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0
IBUFA+2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0
IBUFA+3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
IBUFA+4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
IBUFA+5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
IBUFA+6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
IBUFA+7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IBUFA+8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* The bits marked with an asterisk are used internally by the 2608A to identify characters which require special processing. They never are to be considered as part of the character dot representation.

PACKED READ

In this case the dot data is returned to the user's buffer packed into both the top and bottom bytes of the word. Note in the following example of a read back of the characters KL that all of the K is in the top half of the 9 consecutive words as is all of the L in the bottom half.

	*								*							
Bits	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
IBUFA	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
IBUFA+1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0
IBUFA+2	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0
IBUFA+3	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
IBUFA+4	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0
IBUFA+5	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0
IBUFA+6	0	0	1	0	0	0	1	0	0	0	1	1	1	1	1	0
IBUFA+7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IBUFA+8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

IBUFA = Buffer address in user's area into which the dot data is returned.

IBUFL = Number of bytes of dot data requested for return to IBUFA. A positive count returns data in unpacked format (one byte per word). A negative count returns data in packed format. In packed format, the driver returns data in character cell pairs, requiring 18 bytes per pair, and truncates any trailing bytes from an incomplete pair. The count requested must include one word for the language identity code, which is the first word returned. A count of zero will be

converted to 1 and will return the language identity code. The actual number of words or bytes read will be returned in the B-Register following the EXEC call.

IPRAM Bits 0 thru 6 = First ASCII character requested

ASCII equivalent of the first character whose dot data is requested. If zero is supplied, then transfer will begin with the first possible data. Only Bits 6 thru 0 of IPRAM will be considered thereby restricting the range to 0 thru 177 octal - the range of all possible ASCII characters.

Bits 12 thru 15 = Language identity code of the requested language. See Table 2-1 for codes.

The transmission log returned in the B-Register will always be a positive number to indicate the actual number of bytes, including the Language Identity Code, returned to the user's buffer.

PROGRAMMABLE STATUS READ

Assembly call:

```
EXT EXEC
JSB EXEC
DEF *+5
DEF ICODE
DEF ICNWD
DEF IBUFA
DEF IBUFL
```

FORTRAN call:

```
CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL)
```

Where:

ICODE = 1 = Request code

ICNWD = Control word

Bits 0 thru 5 = Device logical unit number

Bit 7 = 1 To identify as status read. See the next section for character set read back when bit 7 = 0.

IBUFA = Buffer address in user's area into which the status is returned.

IBUFL = Number of words of status, starting with the first word as defined in Table 2-2. Maximum allowed value is 127.

PING/PONG READ

Assembly call:

```
EXT EXEC
JSB EXEC
DEF *+5
DEF ICODE
DEF ICNWD
DEF IBUFA
DEF IBUFL
```

FORTRAN call:

```
CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL)
```

Where:

ICODE = 1 = Request code

ICNWD = Control word

Bits 0 thru 5 = Device logical unit number.

Bit 6 = 0 = Interrogate Bit 7 - Look for status or character set read request.
= 1 = Do a Ping/Pong read. Bit 7 not significant.

Bits 7 thru 15 = Not signififcant.

IBUFA = Buffer address into which the data is returned.

IBUFL = Buffer length

= 1 = Return only the "pass/fail and number of errors" code into the first location of user's buffer.
=257= Same as above plus all 256 bytes of Pong data are returned in locations 2 thru 257.
= Anything else, the request is rejected.

Pass/Fail code Bit 15 = 0 = Passed Ping/Pong
= 1 = Failed with the Number of failures in Bits 0 thru 7.

Pong data pattern: Starts with 0 and increases by 1 up to 256 (0 thru 377B). Analysis of the pattern in event of failure may be used as diagnostic tool. For example, a bit stuck high.

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Driver DVB12

92062-90004 **December 1983**

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Tel: 0047/2/17 11 80
Telex: 16621 hpnas n
A,CH,CM,CS,E,M,P

OMAN
Khimjil Ramdas
P.O. Box 19
MUSCAT
Tel: 722225, 745601
Telex: 3289 BROKER MB MUSCAT
P

Suhail & Saud Bahwan
P.O.Box 169
MUSCAT
Tel: 734 201-3
Telex: 3274 BAHWAN MB

PAKISTAN
Mushko & Company Ltd.
1-B, Street 43
Sector F-8/1
ISLAMABAD
Tel: 51071
Cable: FEMUS Rawalpindi
A,E,M

Mushko & Company Ltd.
Oosman Chambers
Abdullah Haroon Road
***KARACHI** 0302*
Tel: 524131, 524132
Telex: 2894 MUSKO PK
Cable: COOPERATOR Karachi
*A,E,M,P**

PANAMA
Electrónico Balboa, S.A.
Calle Samuel Lewis, Ed. Alfa
Apartado 4929
PANAMA 5
Tel: 63-6613, 63-6748
Telex: 3483 ELECTRON PG
A,CM,E,M,P

PERU
Cía Electro Médica S.A.
Los Flamencos 145, San Isidro
Casilla 1030
***LIMA** 1*
Tel: 41-4325, 41-3703
Telex: Pub. Booth 25306
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PHILIPPINES
The Online Advanced Systems Corporation
Rico House, Amorsolo Cor. Herrera Street
Legaspi Village, Makati
P.O. Box 1510
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Tel: 85-35-81, 85-34-91, 85-32-21
Telex: 3274 ONLINE
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Electronic Specialists and Proponents Inc.
690-B Epifanio de los Santos Avenue
Cubao, ***QUEZON CITY***
P.O. Box 2649 Manila
Tel: 98-96-81, 98-96-82, 98-96-83
Telex: 40018, 42000 ITT GLOBE MACKAY BOOTH
P

PORTUGAL
Mundinter
Intercambio Mundial de Comércio S.A.R.L.
P.O. Box 2761
Av. Antonio Augusto de Aguiar 138
P-LISBON
Tel: (19) 53-21-31, 53-21-37
Telex: 16691 munter p
M

Soquimica
Av. da Liberdade, 220-2
1298 ***LISBOA** Codex*
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Telex: 13316 SABASA
P

Telectra-Empresa Técnica de Equipmentos Eléctricos S.A.R.L.
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QATAR
Computearbia
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Eastern Technical Services
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DOHA
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Nasser Trading & Contracting
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Hewlett-Packard Division
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CM

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Pinelands
CAPE PROVINCE 7405
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TUNIS
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E,P

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Telex: 12319 CABAM TN
M

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Teknim Company Ltd.
Iran Caddesi No. 7
*Kavaklidere, **ANKARA***
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Telex: 42155 TKNM TR
E

E.M.A.
Medina Eldem Sokak No.41/6
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