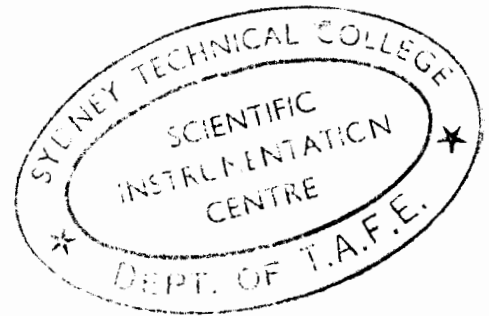


2608A Line Printer Driver DVB12



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PRODUCT DESCRIPTION	SECTION ONE
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1-1. PRODUCT DESCRIPTION

Product Name: HP 2608A Printer Driver

Driver Name: DVB12

Relocatable Part Number: 92062-16004

Driver size: Approximately 800 words



1-2. PRODUCT USE

The driver DVB12 provides the software interface between the RTE-II, RTE-III, RTE-IV and RTE-M operating systems and the 2608A graphics printer.

The 2608A graphics printer is a medium speed hard copy system list and plot device. It is microprocessor controlled and capable of alphanumeric output in both programmably selectable languages and print fonts or in a graphics mode which is a dot per bit translation.

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 Graphics Plotting Software provides such a facility and is available on System 1000. Note however, that the graphics capabilities discussed in this manual and in the 92840A Programming and Reference Manual (92840-90001) apply ONLY to those System 1000's using the RTE-IV software.

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

2-1. INTERFACE REQUIREMENTS

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

2-2. FUNCTIONAL FEATURES

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

1. Print from primary and/or secondary character set on the same line.
2. Select print and transparency modes
3. User selection of primary/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

FUNCTIONAL FEATURES

2-3. WRITE REQUEST

The write request 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 DVB12 with 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 two ways:

1. Use of first data character for forms control. The second character of the buffer is printed in the first print position.
2. The use of a paper motion control request to either slew a specified number of lines from current position or to select a predetermined position on the paper with a VFC command.

The user must insure 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 currently selected print mode. The write request itself neither modifies nor checks to see what is the current print mode. The user is able to control the print mode via the control request defined in Section 2-4.

2-4. SELECT PRINT MODE CONTROL REQUEST

This request 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 a "double size" print or into graphics data. On receipt of this control request, the driver will command the 2608A into the requested mode and it 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 depresses 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" is defined as disabling the 2608A's ability to selectively respond to the SHIFT IN (SI), SHIFT OUT (SO), and BACKSPACE (BS) control characters. The result is that the SI, SO and BS control characters are printed rather than causing their unique actions. Transparency mode "OFF", which is the default condition, enables the 2608A to respond to, rather than print the SI, SO and BS. Transparency is meaningless when the 2608A is in graphics mode.

2-4.1. 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 is either to select 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.

2-4.2. Graphics Print Mode

Selection of the graphics print mode will cause subsequent write requests to be interpreted as "dot" data rather than as printable characters. The user's buffer will be interpreted to contain dot row information 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 ($132 \times 7 = 924$). 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.

2-5. 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 HP supported character sets are described in Table 2-1.

FUNCTIONAL FEATURES

TABLE 2-1. STANDARD AND OPTIONAL LANGUAGES AND THEIR 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 EXTENSION SET	17	1111

Any user request with a code of 05 or 06 will default to to ASCII as will any request for a language not installed in the 2608A.

2-6. PROGRAMMATIC DEFINITION OF VERTICAL FORMAT INFORMATION

The user may request to programmatically redefine the vertical forms definitions of the 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 whose forms length is equal to zero. The IBUFA parameter contains the first word 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. See Appendix A-3 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 VFU are lost. The driver is not able to recover such information.

2-7. PROGRAMMATIC RESET OF VERTICAL FORMS

The user may reset the vertical forms to a predefined 2608A standard VFC. Specification 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.



2-8. CHARACTER SET READ BACK REQUEST

The character set dot patterns used within the 2608A to form any of it's character sets (there are 128 characters in each set) may be read back to the computer with a read request. This feature is of interest to a program wanting to reproduce the 2608A character set in graphics mode. The user must supply DVB12 with:

- The character set identification code (See Table 2-1)
- The first desired character
- A destination buffer address
- The number of bytes of dot data requested

The user must carefully choose whether or not to provide the number of bytes requested as a positive or negative number. The driver will return the character dot data to the user's buffer in either unpacked or packed format depending entirely on whether the byte count is positive (unpacked) or negative (packed). See Appendix A-4 for details on packed/unpacked format. To read back an entire 2608A character set in unpacked format, the user would supply a byte count of +1153 (See next paragraph for explanation of what seems to be an extra count). A packed read of the same set would require a byte count of -1153.

In all cases of read back, the character set identification code of the language received is returned in the least significant 4 bits of the first word in the user's buffer. The user must therefore supply a count equal to the requested length plus 1. The dot data will thus begin, whether packed or unpacked, in the second word of the buffer.

The user is able to 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.

FUNCTIONAL FEATURES

Special consideration must be given at system generation if the user wants to guarantee the ability to do a character set read back when the 2608A is a spooled output device. There never will be a problem if the device is not spooled. If, however, the device is spooled then all read requests are rejected! To solve the problem a special subchannel designation capability has been added to the driver. If at system generation time a special LU is attached to DVB12's EQT along with a subchannel designation of 3, the user will be able to access the 2608A while it is spooled and effectively accomplish a character set read back. (The environment of the device is totally unchanged by this request.) This special subchannel designation will allow only this request and the programmable status read request. Any and 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.

2-9. PROGRAMMABLE STATUS READ REQUEST

The 2608A has internal status indicators that may be of interest to the user. This information, as indicated in Table 2-2, is made available by this read request. An address and word count is supplied by the user and then, starting with the first word, as many of these status words as requested are returned to the user. Maximum buffer length allowed for this request is 127 words. Any request longer than 127 will be truncated. A buffer length of zero will be converted to 1. The data will be returned unpacked in the user's buffer. The top 8 bits of every word will be clear. Therefore, the buffer length MUST be supplied as a positive word count or the request will be rejected.

The 2608A's design is such that the requested status information is NOT returned until any operation in progress is complete thereby insuring 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's buffer. Status obtained any other *
* way (dynamic status request, at end of successful transfer, etc.) *
* will conform to the description in Table 3-2. *
*****
```

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's 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.

TABLE 2-2. 2608A INTERNAL STATUS BYTE DEFINITIONS

WORD	BIT DEFINITIONS (IF APPLICABLE)							
NUMBER	7	6	5	4	3	2	1	0
1	OFF/ON	READY	VFC 9	VFC12	VFC	6/8	Fesvd	POWER
	LINE	/NRDY	BOF	TOF	INITED	LPI		FAIL
2	OFF/ON	P MEC	S TST	PAPER	Resvd	6/8	PLATN	Resvd
	LINE	ERROR	FAIL	CUT		LPI	RIPEN	
3	----- Reserved---			TPRTY	PRINT MODE NUMBER			
4	SECONDARY LANGUAGE				PRIMARY LANGUAGE			
5	PS/FL	NUMBER OF SELFTEST 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 17F Default=0							
14	(No significant information for user)							
15	(No significant information for user)							
16	POWER UP SEC LANGUAGE				POWER UP PFIM LANGUAGE			
17	(Words 17 thru 127 are available but meaningless to							
thru	the user)							
127								
Any bit definition in this table that uses the backslash ("/") to separate the description refers to a 0/1 setting of the bit. Any other description refers to the given definition when that bit is set = 1.								

FUNCTIONAL FEATURES

2-10. PING/PONG READ REQUEST

This 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:

- 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.
- Immediately the driver 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 2 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 not only the pass/fail code is returned but 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 will cause the request to be rejected.

2-11. SELF TEST CONTROL REQUEST

This request will cause the 2608A to execute it's 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 Section 2-9. Both a printing and non-printing version of self test are available. The printing version of self test takes approximately 17 seconds to execute and results in a full page of output. The nonprinting 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.

2-12. DEVICE CLEAR REQUEST

This request will cause a TOF command to be sent to the printer followed by a Master Clear command. The TOF command is issued to insure there is no data in the 2608A's 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.

2-13. DYNAMIC STATUS REQUEST

This 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 insuring the integrity of the status.

2-14. PAPER MOTION CONTROL REQUEST

The paper motion capabilities of the 2608A may be exercised with this control request. Motion requests include:

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

Appendix A-3 contains a detailed explanation of the parameter required for each request.

2-15. DEFINITION OF FIRST PRINT COLUMN

Under program control the user is able to dynamically define which of the first 16 columns is to logically 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 character on the right margin as are specified by IPRAM for this control request.

The driver does monitor the state of this feature. Should a power fail of RESET occur, column 1 is defined as per 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, is turned off by:

1. Repeat of control request with IPRAM = 0.
2. Master clear control request.
3. Re-boot the system.

FUNCTIONAL FEATURES

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 defines the current value of the position of column 1.

2-16. 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 if 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 it's power fail recovery procedure, the current paper position is defined as the new top of form. For some print tasks it would be 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 device's status. If it is not set then normal processing occurs. If it is set then the following 3 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 CLFAR 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 are assigned as per the switches on the front panel under the access cover
 - c. Standard 6 or 8 LPI Vertical Forms Control as per the 6/8 LPI default switch under the access cover
 - d. Clears the internal print buffer and logical column 1 is set equal to physical column 1.
3. The driver will then reinstall as much of the printers enviroment 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 if 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 will read 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 will allow 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 will install the definition last supplied by the control request to modify P/S.

A check is then made to see if the subchannel designator is 1. If not 1, the processing of the request continues as if the power fail did not occur. 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 will command the device OFF LINE and then make 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 is at liberty to either abort the task or to override the power fail by returning the 2608A to ON LINE or by the UP,LU operator command.

See Section 2-8, Character Set Read Pack, and Section 2-9, Programmable Status Read Request, for additional descriptions of subchannel capabilities.

2-17. AUTOMATIC "UP"ing 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 then 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.

FUNCTIONAL FEATURES

2-18. DEVICE TIMEOUT

The driver will always override either the timeout value supplied at generation time or the TO operator command by inserting a timeout value directly into EQT 15. The worst possible case is the timeout associated with the Self Test control request which is about 17 seconds. Next is about 4 seconds for a maximum paper slew in double size print. The driver will supply a timeout value in EQT 15 appropriate to the request. The driver will not attempt to handle a timeout should it occur but rather let the system process the timeout in normal fashion.

2-19. 2608A INTERNAL BUFFERING

Due to the design of the RTE system and the design of the 2608A there is a situation whereby from 1 to 2 lines of output may be irrecoverably lost because of the power fail recovery process in the 2608A. The internal buffering scheme of the 2608A is such that a complete output record will be accepted and signaled complete to the system prior to any actual mechanical print action. Furthermore, it will be willing to accept all of the data in the next print request while it is just beginning to print the previous request. Should either a power fail or a manual RESET occur at this time, it is certain that all the buffered data in the 2608A will be lost and any print in progress will be abruptly terminated. But as far as the system is concerned, the previous record was signaled complete prior to the detection of the power fail or RESET, and the interrupt caused by the power fail or RESET will flag the last request complete.

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

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

Upon the successful completion of a user request, the A register will contain the device status as defined by Table 3-2. The F register will contain the number of words or characters transferred.

TABLE 3-1. DVB12 EQT USAGE



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

SYSTEM INTERFACE SPECIFICATIONS

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

This section provides configuration guidelines for integration of DVB12 into System 1000. It is intended to augment the information provided in the Real-Time Executive Software System Programming and Operators Guide.

4-1. GENERATION PROCEDURE

Load the relocatable binary code of DVB12 into the RTE system during system generation as described in the above mentioned manual. During the system generation, take the following steps to configure the driver into the system.

4-1.1. Program Input Phase

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

4-1.2. Table Generation Phase

In this phase, make the following entries:

- a. 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 should be:

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 will result 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.

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

CONFIGURATION GUIDELINES

* 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 either the power fail recovery technique or the special character set read back/status read back while spooled option.

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 Section 2-16 of this manual. Of course these generation assignments are temporarily modifiable by the LU operator command.

Character set read back/Status 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.

- c. 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.

4-2. Operation of DVB12 with 92840A Graphics Software

To enable character set readback 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 PTE IV refer to Appendix D of the 92840A Manual (Part number 92840-90001).

SUMMARY OF CALLING SEQUENCES	APPENDIX A
------------------------------	------------

A-1. CALLING SEQUENCE FOR STANDARD WRITE REQUEST

Assembly call:

Fortran call:

```

EXT EXEC          CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL)
JSB EXEC
DEF *+5
DEF ICODE
DEF ICNWD
DEF IBUFA
DEF IBUFL

```

Where:

ICODE = 2 = Request code

ICNWD = Control Word Defined as:

Bits 0 = Device Logical Unit Number
thru 5

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 preceeds 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.



SUMMARY OF CALLING SEQUENCES

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.
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 per section A-2.

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

Notes:

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.

A-2. CALLING SEQUENCE FOR 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 -- a VFC define operation.

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 thru 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 = Length of the form for the VFC define. This is the thru 6 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.

SUMMARY OF CALLING SEQUENCES

A-3. CALLING SEQUENCE FOR 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,IPFAM)
```

Where:

ICODE = 3 = Request code

ICNWD = Control word

Bits 0 = Device Logical Unit Number
thru 5

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

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 as per 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.

SUMMARY OF CALLING SEQUENCES

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 IPFAM)

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 = Octal code for new primary set
thru 3

Bits 4 = Octal code for new secondary set
thru 7

16B= VFC reset (requires IPRAM)

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

SUMMARY OF CALLING SEQUENCES

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. See section 2-15 for complete details.

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

Bits 4 = Not used
thru 15

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. See Section 2-4 for greater detail on modes and transparency.

Bits 0 = Mode code where 0000 Standard print(default)
thru 3 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 = Not used
thru 15

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

A-4. CALLING SEQUENCE FOR CHARACTER DOT DATA READ

See Section 2-8 for further details on character set readback.

Assembly call:	Fortran call:
EXT EXEC	CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL,IPRAM)
JSP EXEC	
DEF **6	
DEF ICODE	
DEF ICNWD	
DEF IBUFA	
DEF IBUFL	
DEF IPRAM	

WHERE:

ICODE = 1 = Request code

ICNWD = Control word

Bits 0 = Device logical unit number
thru 5

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

Bit 7 = 0 = Character set read
 = 1 = Programmable status read. See section A-5
 for description when Bit 7 is set.

Bits 8 = Not used
thru 15

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.

SUMMARY OF CALLING SEQUENCES

	Bits 1514131211109876543210															
	*															
IBUFA	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	1	1	0	1	1	0	
IBUFA+2	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	1	0	0	0	1	0	
IBUFA+4	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	1	0	0	0	1	0	
IBUFA+6	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	
IBUFA+8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

* The bits marked with an asterick 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 1514131211109876543210															
	*															
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 = The number of bytes of dot data requested for return to the user's buffer. If the byte count is supplied as a positive number then the dot data will be returned unpacked. If the byte count is negative, data is returned in a packed format. Exactly one extra count must be supplied because the language identity code of the actual language received is placed into the low 4 bits of the first word of the user's buffer. A buffer length of zero will be converted to a length of 1 and will return only the language identity code.

SUMMARY OF CALLING SEQUENCES

IPRAM Bits 0 = First ASCII character requested
thru 6

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 user to the allowed range of 0 thru 177 octal - the range of all possible ASCII characters.

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

* The bits marked with an asterick 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.

The transmission log returned in the B register will always be a positive number to indicate the actual number of bytes, including the character set code, returned to the user's buffer.

A-5. CALLING SEQUENCE FOR PROGRAMMABLE STATUS READ

Assembly call:

Fortran call:

EXT EXEC	CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL)
JSB EXEC	
DEF *+5	
DEF ICODE	
DEF ICNWD	
DEF IBUFA	
DEF IBUFL	

Where:

ICODE = 1 = Request code

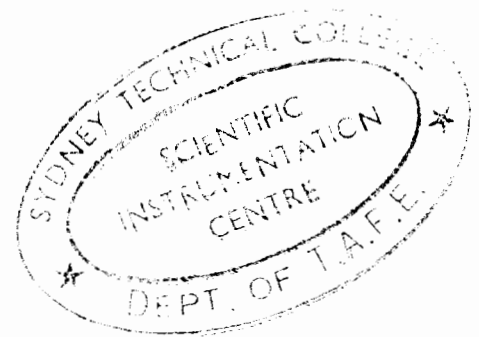
ICNWD = Control word

Bits 0 = Device logical unit number
thru 5

Bit 7 = 1 To identify as status read. See A-4 for
character set readback 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.



SUMMARY OF CALLING SEQUENCES

A-6. CALLING SEQUENCE FOR PING/PONG READ

Assembly call:	Fortran call:
EXT EXEC	CALL EXEC(ICODE,ICNWD,IBUFA,IBUFL)
JSE FEXEC	
DEF *+5	
DEF ICODE	
DEF ICNWD	
DEF IBUFA	
DEF IBUFL	

Where:

ICODE = 1 = Request code

ICNWD = Control word

Bits 0 = Device logical unit number
thru 5

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

Bits 7 = Not significant
thru 15

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

IBUFL = Buffer length

= 1 = Return only the "pass/fail and number of errors"
code into the 1st 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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DVB12

92062-90004

April 1980

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P
International Engineering Associates
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Arranged alphabetically by country

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Intercambio Mundial de Comércio S.a.r.l.
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