2601A INSTALLATION AND REFERENCE MANUAL

Manual No. 02601—90902
Microfiche No. 02601—90802

HEWLETT PACKARD

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Publication History

Changes in text to document updates subsequent to the initial release are supplied in manual update notices and/or complete revisions to the manual. The history of any changes to this edition of the manual is given below. The last update itemized reflects the machine configuration documented in the manual.

Any changed pages supplied in an update package are identified by an update number adjacent to the page number. Changed information is specifically identified by a vertical line (revision bar) on the outer margin of the page.

First Edition ..... JAN 82

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SECTION I.
GENERAL INFORMATION

1-1. INTRODUCTION

This manual provides the necessary information for configuring and programming the HP 2601A Daisywheel Printer. It also contains information on print wheel and language selection, controls and indicators, the RS-232C Interface, and diagnostics. An appendix contains special HP 3000 information and tables detailing print wheel spoke data.

1-2. RELATED INFORMATION

Additional information pertaining to the HP 2601A Daisywheel Printer can be obtained from the following related manuals.

- *2601A Operators Manual* (Part No. 02601-90901)
- *2601A Maintenance Manual* (Part No. 02601-90904)

1-3. GENERAL DESCRIPTION

The HP 2601A is a 40 character/second (with plastic print wheels or 32 character/second with metal print wheels) printer that produces print equal in quality to that of electric typewriters. It has the ability to use a wide variety of plastic and metal print wheels interchangeably. Standard print features include autounderlining, auto-bidirectional print, multiple print pitches, addressable horizontal and vertical tabs, and margin controls. In addition, the HP 2601A can highlight words using either bold or shadow print.

Word processing enhancements to the HP 2601A include automatic centering, proportional spacing, and right justification of text. These capabilities are provided via escape sequences and are executed automatically by the printer.

The daisywheel printer is supported for the HP 3000, HP 1000, HP 250, and HP 125 systems, and also the HP 2645, HP 2642, HP 2647, HP 2648, HP 2624, and HP 2626 terminals.(In addition, the HP 2601A can be used with the HP 80 Series Systems. Contact the HP Corvallis Division for application information). Interfacing is accomplished with an RS-232C serial interface. These configurations are detailed in section III.

NOTE

The basic paper handling mechanism of the HP 2601A is a friction feed platen. Bidirectional forms tractors are available as an accessory.

SECTION II.
CONTROLS AND INDICATORS

2-1. INTRODUCTION

This section provides information about the controls and indicators on the operator control panel. Switch settings and fault indications are included to enable the operator to better understand the operation of the HP 2601A.

2-2. MODE SWITCHES

The mode switches, located under the printer's access cover (see figure 2-1), include two rotary switches and two eight-switch dip modules. These switches are set by the operator to select certain functions as described in the following paragraphs.

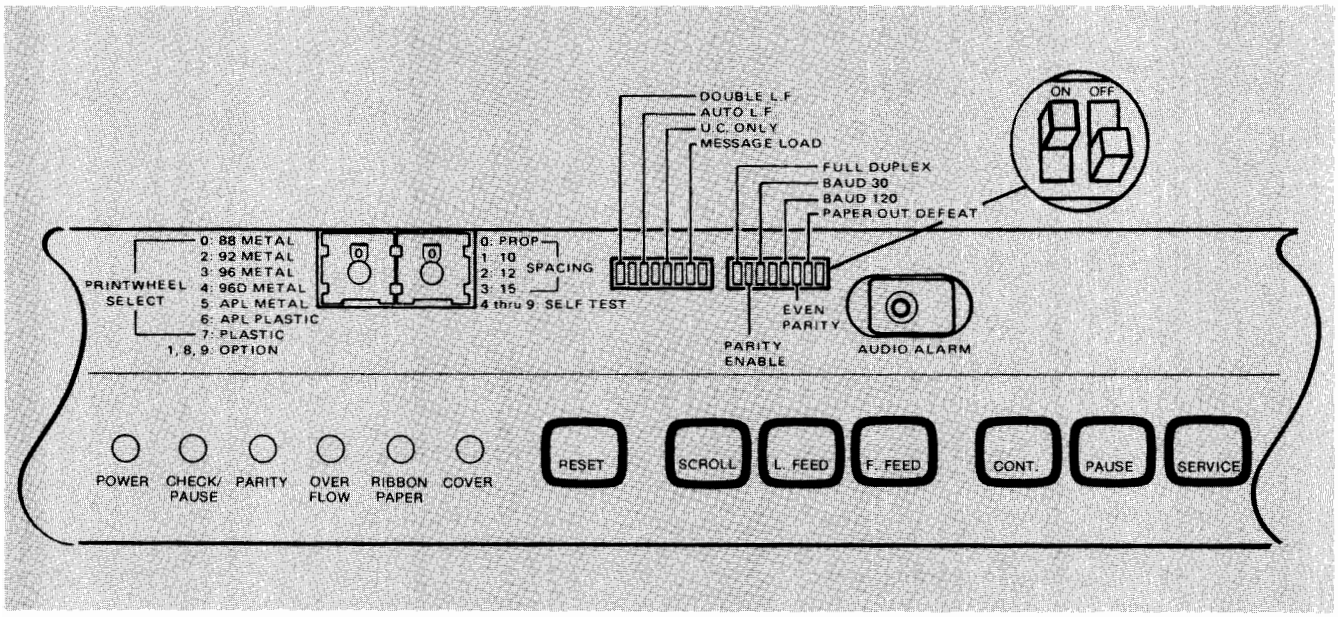


Figure 2-1. Operator Control Panel

2-3. Print Wheel Select Switch

This switch is set for the type of print wheel being used.

Position	
0	88-character metal wheels
2	92-character metal wheels
3	96-character metal wheels (unused)
4	96D-character metal wheels-normal setting for 96 character metal wheels
5	*APL metal wheels
6	*APL plastic wheels
7	96-character plastic wheels
1,8,9	(Selection defaults to 88 character metal wheel)

* APL (A Programming Language) wheels have different characters and character locations, thus they require a special print wheel selection.

NOTE

The print wheel select switch must be set to match the particular type of print wheel being used. This helps prevents possible print wheel damage, excessive wear, or incorrect printing.

2-4. Spacing Select Switch

This switch selects horizontal character spacing and also the printer self-test mode.

Position	
0	Proportional space (used with PS print wheels)
1	10 pitch character spacing
2	12 pitch character spacing
3	15 pitch character spacing
4-9	Self-test—printer enters internal diagnostic mode if this setting is selected at power-up

2-5. Left DIP Switch Module

This switch is set to determine how the printer responds to a line feed (LF) command.

Switch 1	Double LF (double line feed) On—Printer executes double line feed for every line feed command, and for every carriage return if switch 3 (auto line feed) is on. Off—Printer executes single line feed for every line feed command, and for every carriage return if switch 3 (auto line feed) is on.
Switch 2	(unused)

Switch 3 — Auto LF (auto line feed)
On—Printer executes line feed (single or double) for every carriage return

Off—No line feed executed with each carriage return. Line feed occurs only with separate line feed commands.

Switch 4 — (unused)

Switch 5 — (unused)

Switch 6 — (unused)

Switch 7 — Message Load (unused)

Switch 8 — (unused)

2-6. Right DIP Switch Module

This switch is set to determine duplexing, parity enable, baud rate, and paper-out sensing.

Switch 1 — Full Duplex
On—Full duplex ASCII mode (normal operating position)

Off—Half duplex ASCII mode (local copy)

Switch 2 — Parity Enable
On—Enables parity checking and parity transmission

Switch 3 — Baud Rate Selection

Switch		
30	120	Baud Rate Selected
On	On	110
On	Off	300
Off	On	1200
Off	Off	Optional baud rate as per switches 3, 4, and 5 on the HPR05 PCA

Switch 4 — (unused)

Switch 5 — U.C. Only (unused)

Switch 6 — Even Parity
This switch is used in conjunction with the parity enable switch.
On—Selects even parity check and transmission

Off—Selects odd parity check and transmission

Switch 7 Paper Out Defeat
On—Paper-out sensing disabled

Off—Paper-out sensing enabled

2-7. OPERATING SWITCHES

These seven switches are located in the right area of the Operator Control Panel. The following paragraphs explain the function of these membrane switches.

a. RESET

The RESET switch restores the HP 2601A to normal operating status following a printer check or an error condition, and clears all error indicators. The RESET switch is also used to restore normal operation after the PAUSE switch has been activated. This is not the same as a remote reset.

b. SCROLL

The SCROLL switch advances the paper a short distance to give the operator a clear view of the last printed line. The paper is automatically returned to the last printing position when the switch is released.

c. LINE FEED

The LINE FEED switch initiates a single or a double line feed operation as selected by the DOUBLE LF mode switch. This action is repeated if the switch is activated longer than 600 ms. This switch does not cause a line feed code to be transmitted.

d. FORM FEED

The FORM FEED switch initiates a form feed to the next top-of-form position. A form feed code is not transmitted.

e. CONTINUE

The CONTINUE switch causes a "Continue" message of up to 31 characters to be transmitted over the communications link.

f. PAUSE

The PAUSE switch enables the HP 2601A to pause without data loss. This switch should be activated prior to opening the sound cover. Pressing the RESET switch restores normal operation.

g. SERVICE

This switch is normally used only by a qualified service person to run internal diagnostics. If touched during normal operation, it may cause a break (250 ms space) to be transmitted over the communications link. This switch should not be activated during normal operation.

2-8. CONTROL PANEL INDICATORS

The control panel indicators are located on the left side of the Operator Control Panel and indicate various printer conditions as follows:

a. POWER

The POWER indicator illuminates when AC power is applied to the HP 2601A.

b. CHECK/PAUSE

When flashing, the CHECK/PAUSE LED (Light Emitting Diode) indicates that the printer is in the PAUSE state. When illuminated steadily, it indicates that a print operation has been requested while the printer is in a CHECK condition. A CHECK condition occurs when a print wheel or carriage command received by the printer cannot be successfully completed due to a malfunction (possibly caused by a paper jam or bent print wheel). The CHECK condition disables the printer until the problem is corrected and the RESET switch is depressed. If the problem causing the CHECK condition is not corrected, the CHECK indicator will illuminate as soon as printing is attempted.

c. PARITY

The PARITY LED indicates detection of any of the following types of errors:

- Incorrect parity sensed on a received character
- A framing error (no stop bit) detected on a received non-break character
- A serial data character detected with an excess number of bits

When a parity error is detected, a DEL character (⌐) is substituted for the erroneous character.

This indicator functions only if the PARITY ENABLE switch (under the access cover) is on.

d. OVERFLOW

The OVERFLOW LED indicates that the print input buffer has overflowed, causing some loss of data.

e. RIBBON/PAPER

The RIBBON/PAPER LED indicates that printing has been attempted after either the end of the ribbon has been reached or after the printer is out of paper.

f. COVER

The COVER LED indicates that printing was attempted with the sound cover open.

g. AUDIO ALARM

The audio alarm sounds briefly to indicate the occurrence of errors or various operating conditions. Pressing the RESET switch causes the alarm to sound briefly and clears the error indicator.

SECTION III.
INSTALLATION AND CONFIGURATION

3-1. INTRODUCTION

This section provides general information pertaining to some of the supported HP 2601A configurations and specific information concerning each configuration. Each configuration description contains detailed data concerning cabling, baud rate switch settings, restrictions and interfaces required for the HP 2601A. A matrix detailing configuration requirements is provided in table 3-1. In addition, this section provides information concerning the RS-232 interface.

NOTE

This section is intended for reference only. The configurations should be set by the customer engineer.

3-2. HPR05 PCA STANDARD CONFIGURATION

Baud rate, language selection, and type of protocol used are normally selected using ESC sequences. However, these can also be selected by setting switches on the HPR05 PCA (see section IV). The standard configuration for the HPR05 PCA switch module (A66) establishes the following conditions: ETX/ACK enabled, DC1/DC3 enabled, typewriter paired, and 9600 baud rate. This configuration is set by the following switch positions:

- S1 thru S6 = on
- S7 and S8 = off

3-3. DATA FLOW CONTROL (HANDSHAKING)

The HP 1000, HP 1000 L-Series, and the HP 264X do not utilize handshaking when configured with the HP 2601A. When handshaking is not being used, data loss can occur if the HP 2601A is unable to keep up with the data transfer rate. This inability to keep up with the data transfer rate can be the result of the execution of multiple line feeds, paper out, ribbon out or error conditions. This situation may also occur in text containing mostly shadow print, bold print, or underlined characters. In each of these cases, the HP 2601A must strike each character position at least twice, thus slowing the effective print rate of the printer. However, since the 300 baud data transmission rate is less than the printer's average print rate and the HP 2601A is equipped with a 2.7 Kbyte data buffer, no data loss occurs in most printing applications.

The following system configurations are supported for the HP 2601A:

- HP 3000/III
- HP 3000/30,33,40,44,64
- HP 1000
- HP 1000 L-Series
- HP 250
- HP 125
- HP 264X (2642A, 2645A, 2647A, 2648A)
- HP 2624A, HP 2626A

Table 3-1 summarizes the configuration requirements of the HP 2601A.

TABLE 3-1. HP 2601A CONFIGURATION MATRIX

	INTERFACE RS-232C	DRIVER	MODEM CABLE	SPECIAL REQUIREMENTS	PROTOCOL	BAUD RATE
HP 3000/ III	Modem Capable *30032B (ATC) STD.	IOTERMØ	~ 2601A Modem Cable	2028 or Later Version MPE	X-ON/ X-OFF	1200
HP 3000/ 30/33/44	*30018A/ 30019A (ADCC) STD.	HIOTERMØ	~ 2601A Modem Cable	2028 or Later Version MPE	X-ON/ X-OFF	1200
HP 125	45500A System Console (Interface Included)	N/A	~~13242G Cable	N/A	X-ON/ X-OFF	1200
HP 250	***45120A	TIO DROM 2601 DROM	~2601A Modem Cable	B.04.00 Release	X-ON/ X-OFF	9600
HP 1000	**12792A	DVM.00 DDV.12	~ 2601A Modem Cable	RTE IV-B	No Hand-Shaking	300
HP 1000 L-SERIES	**12005A	DD.00 ID.00	** 12005-60003	RTE L	No Hand-Shaking	300
HP 264X	~~13250B	N/A	~~13232G	~~~Device Support ROM	No Hand-Shaking	300
HP 2624A, HP 2626A	~~262X STD.	N/A	~~13242G Cable	N/A	X-ON/ X-OFF	1200

* Available from CSyD if no ports available on ATC or ADCC
** Available from DSD
*** Available from GSD

~ Included with 2601A Printer
~~ available from DTD
~~~ Device support ROM not needed if customer has casette tape drive.
~~~

3-4. HP 3000/III/HP 2601A CONFIGURATION

The HP 3000/III/HP 2601A configuration (see figure 3-1) utilizes X-on/X-off protocol at speeds up to 1200 baud. Serial interfacing is achieved using an RS-232C interface and an HP 2601A modem cable (320355-02-DIA), both included with the printer. In addition, the HP 3000/III system must have a modem-equipped ATC (Asynchronous Terminal Controller). The system baud rate must be set to 1200.

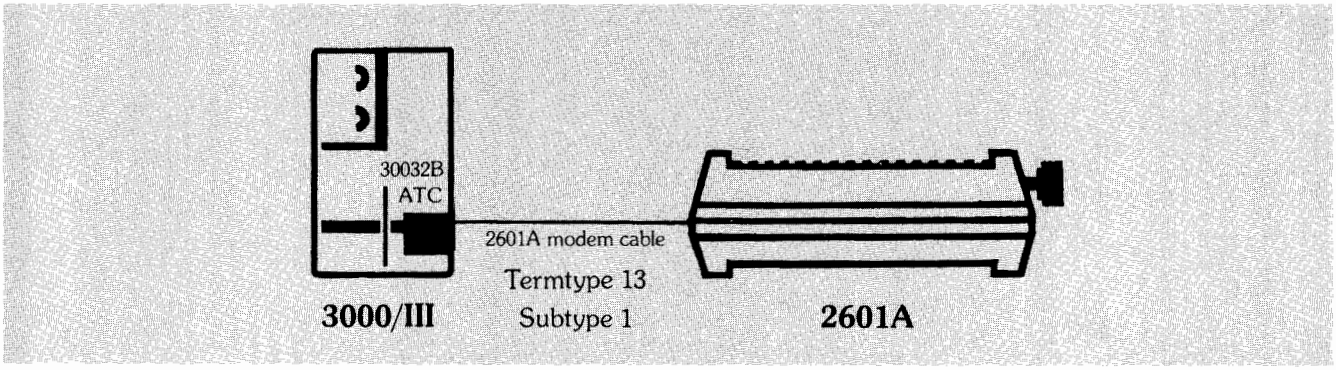


Figure 3-1. HP 3000/III/HP 2601A Configuration

3-5. HP 3000/30,33,40,44,64/HP 2601A CONFIGURATION

The HP3000/30,33,40,44,64/HP 2601A configuration (see figure 3-2) uses X-on/X-off protocol at speeds up to 1200 baud. Included with the HP 2601A are the RS-232C interface and the HP 2601A modem cable (320355-02-DIA). The system baud rate must be set to 1200.

NOTE

The HP 2601A Parity Select switch must be set in the even position. An overflow will result if it is set in the odd position.

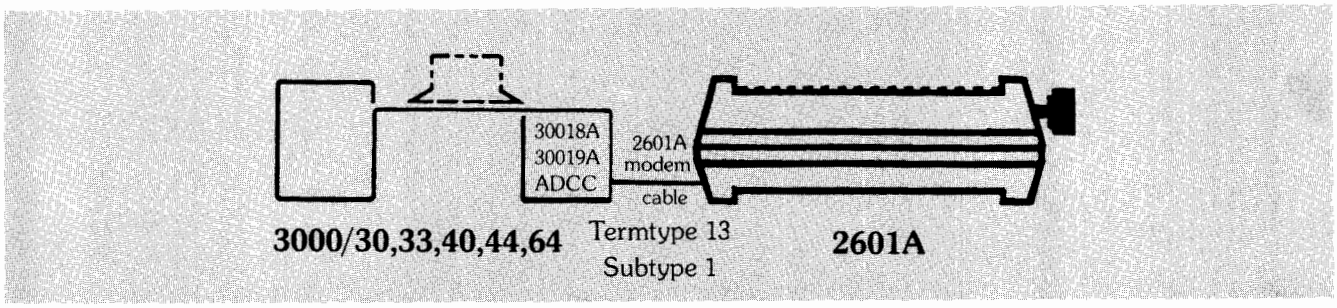


Figure 3-2. HP 3000/30,33,40,44,64/HP 2601A Configuration

3-6. HP 250/HP 2601A CONFIGURATION

The HP 250/HP 2601A configuration (see figure 3-3) employs X-on/X-off protocol at speeds up to 9600 baud. An RS-232C interface and an HP 2601A modem cable (320355-02-DIA) are included with this configuration. The HP 250/HP 2601A configuration requires setting certain baud rate switches and connector board jumpers as explained in the following paragraphs.

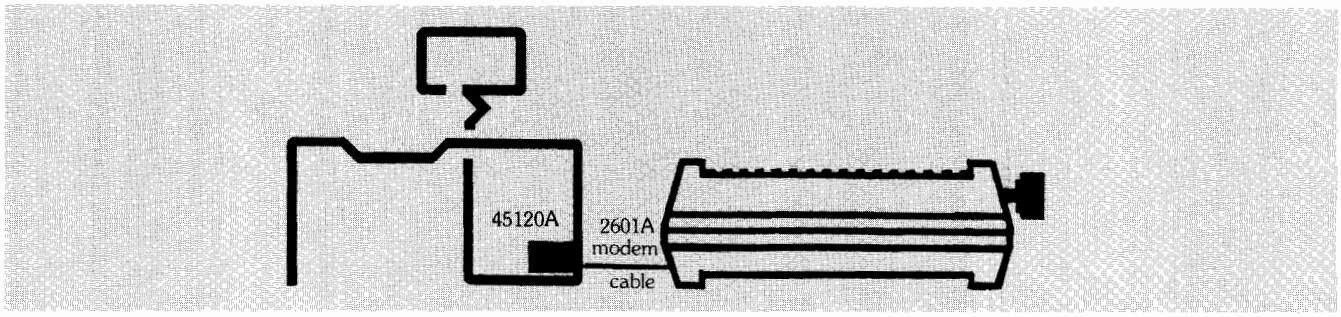


Figure 3-3. HP 250/HP 2601A Configuration

a. HP 250 Baud Rate Switch Settings

Baud rate switches for the HP 250 are located on the Asynchronous Data Communications PCA as shown in figure 3-4. Each baud rate switch must be set to match the baud rate of the device connected to the corresponding port. As the HP 2601A requires a 9600 baud rate, the port switch is set to 8.

NOTE

To set the optional baud rate of 9600, both baud rate select switches on the right DIP switch module of the operator control panel must be off.

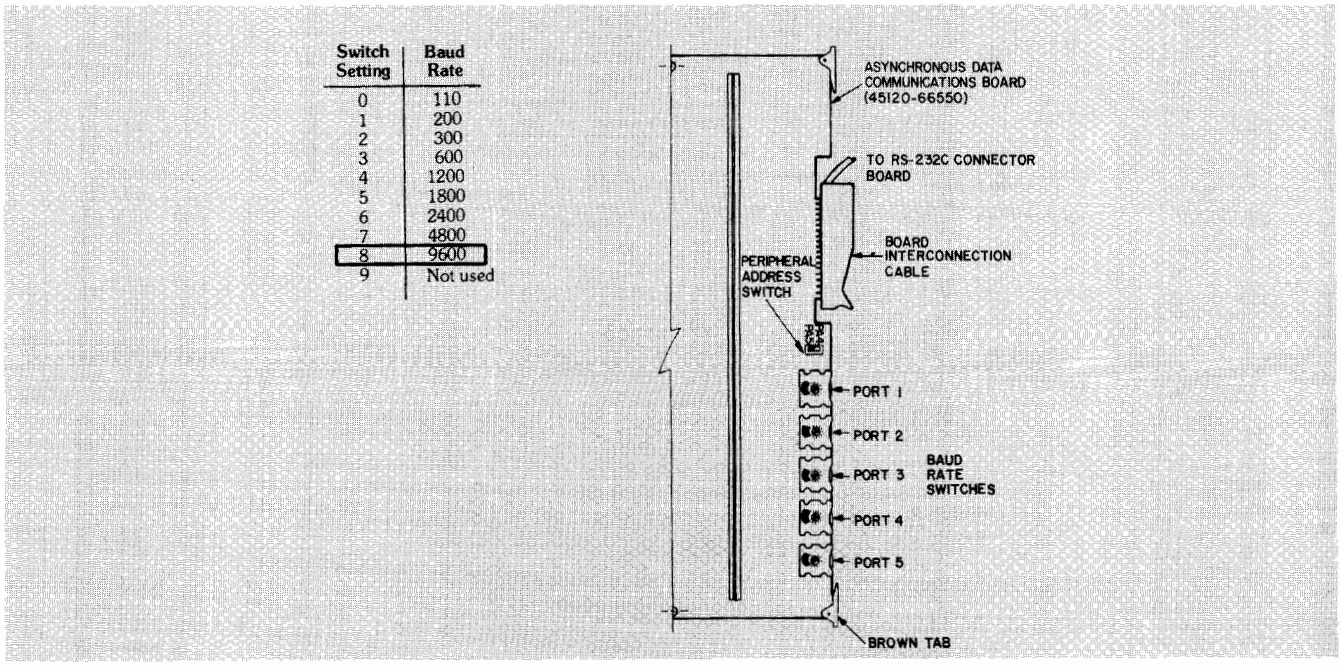


Figure 3-4. HP 250 Baud Rate Switch Settings Diagram

b. Connector Board Jumpers

For proper operation of the HP 2601A with the HP 250, the RS-232C Connector Board Assembly must be jumpered to accommodate each port assignment (see figure 3-5). Switch all the jumpers associated with the HP 2601A port to the A position.

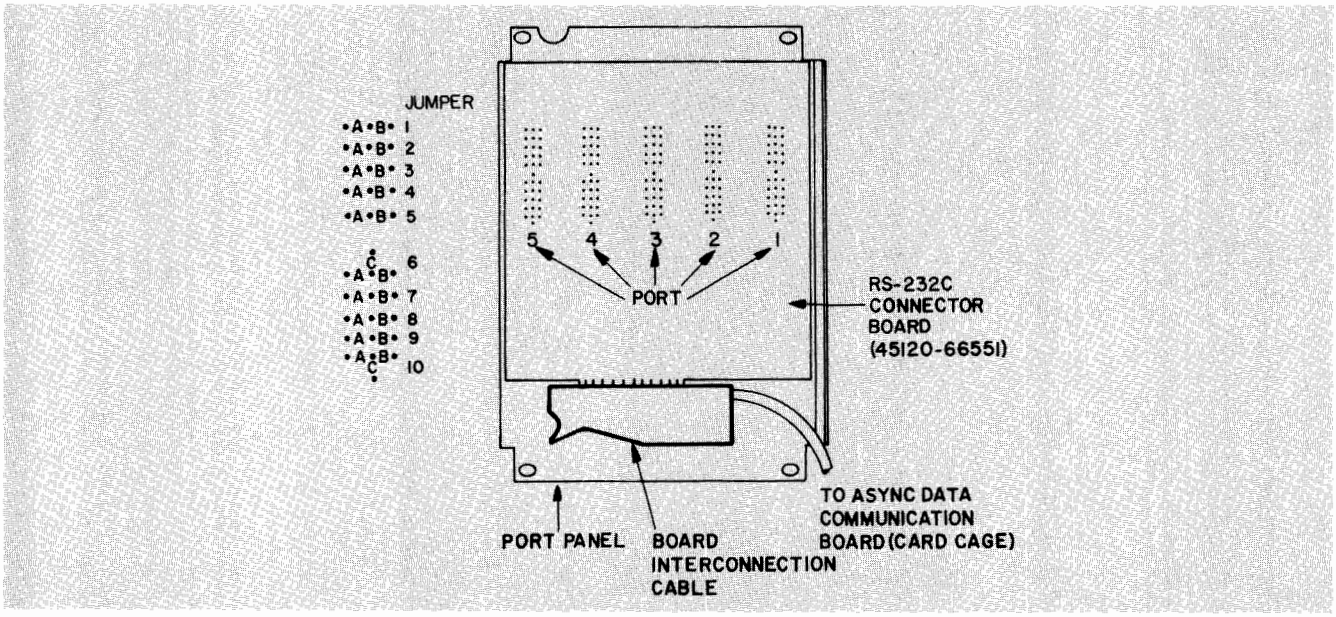


Figure 3-5. RS-232C Connector Board Assembly (rear view)

3-7. HP 125/HP 2601A CONFIGURATION

The HP 125/HP 2601A configuration communicates at speeds up to 1200 baud using X-on/X-off protocol (see figure 3-6). An RS-232C interface and a 13242G printer cable are required for proper communication. In addition, the HP 125 has a configuration menu which is set as in table 3-2 for operation with the HP 2601A.

TABLE 3-2. HP 125 MENU CONFIGURATION

Baud rate: 1200	Parity: NONE (0)
Straps: xz	Handshaking: etX
SRRXmit: OFF	SRRInvert: OFF
Prtr nulls: 0	
X-on/X-off: Recv	

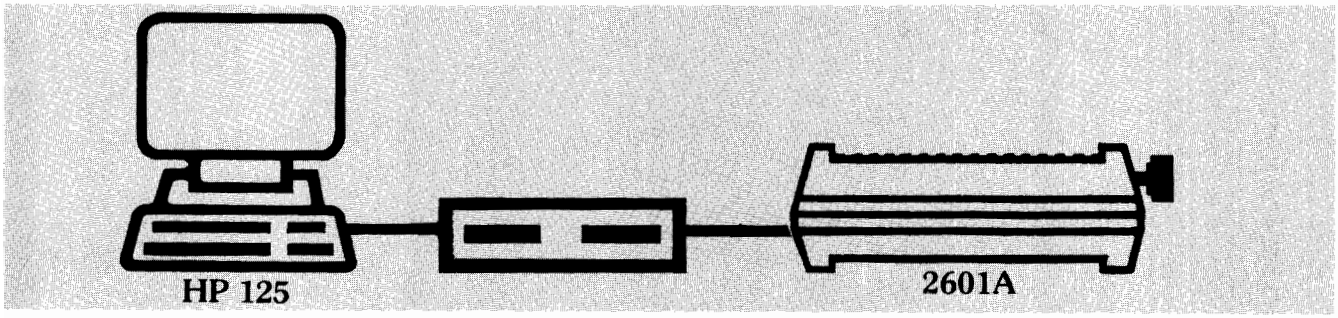


Figure 3-6. HP 125/HP 2601A Configuration

3-8. HP 1000/HP 2601A CONFIGURATION

The HP 1000/HP 2601A configuration (see figure 3-7) does not use handshaking protocol. Communication is accomplished (at a 300 baud rate) using an RS-232C interface and an HP 2601A modem cable (320355-02-DIA).

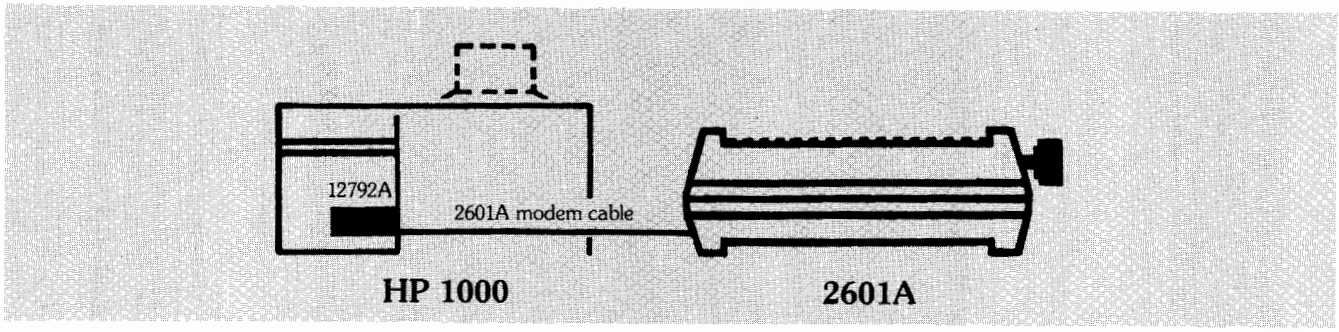


Figure 3-7. HP 1000/HP 2601A Configuration

3-9. HP 1000 L-SERIES/HP 2601A CONFIGURATION

The HP 1000 L-Series/HP 2601A configuration (see figure 3-8) communicates at 300 baud using no handshaking. An RS-232C interface and a modem cable (12005-60003) are required for proper interfacing.

NOTE

The 12005-60003 modem cable is included with the system interface (12005A) if it is ordered with option 002.

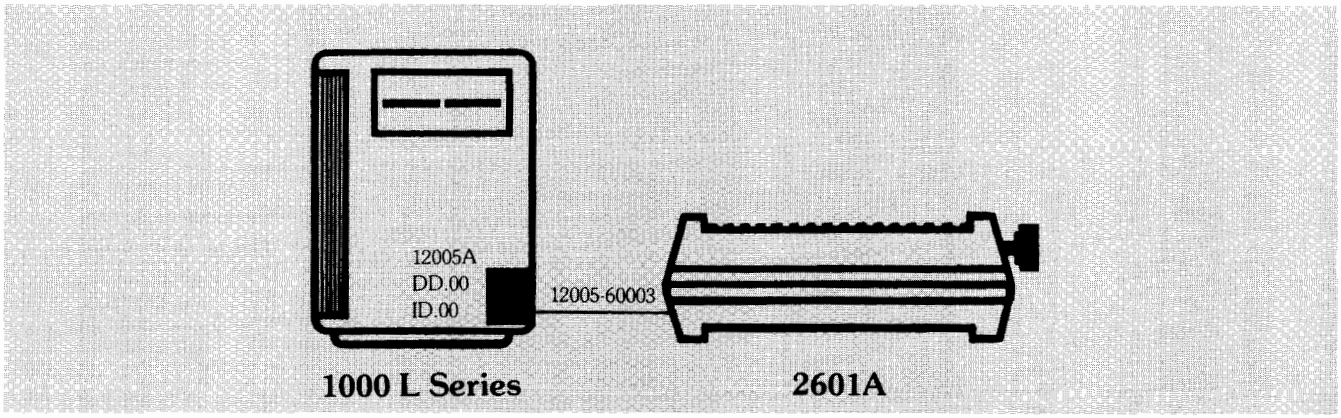


Figure 3-8. HP1000 L-Series/HP 2601A Configuration

3-10. HP 264X/HP 2601A CONFIGURATION

The HP 264X terminals/HP 2601A configuration communicates at 300 baud with no handshaking protocol (see figure 3-9). An RS-232C interface and a 13232G modem cable are required for proper communication. The 264X terminals must have a device support ROM (13261A) installed on the Memory Control PCA. The GP Asynchronous Data Communications PCA (in the terminal) must be configured for operation as described in the following steps.

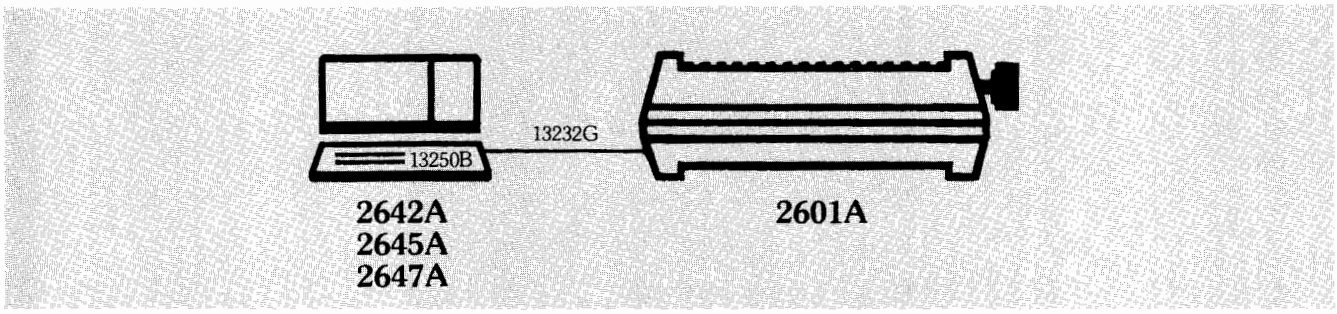


Figure 3-9. HP 264X/HP 2601A Configuration

a. Disconnect the primary AC power source from the terminal and open the terminal per the instructions in the appropriate installation and service manual.

b. Configure the GP Asynchronous Data Communications PCA to the desired baud rate using tables 3-2 and 3-3.

c. Install the GP Asynchronous Data Communications PCA in the card slot adjacent to the farthest left existing PCA.

NOTE

To ensure proper terminal operation, the GP Asynchronous Data Communications PCA must be installed in the backplane connector card slot. There should be no vacant connectors between PCAs except in terminals which contain the two cartridge tape PCAs.

d. Perform the terminal self test as described in the appropriate installation and service manual to ensure proper terminal operation.

e. Close the terminal.

TABLE 3-3. HP 264X SWITCH SETTINGS

SWITCH	GROUP	FUNCTION PERFORMED
S1FC7 S1FC6 S1FC5	closed closed closed	Selects one null character
S1FC4	open	Selects parity C4 open=No parity
S1FC3	open closed	Even Parity Odd Parity
S1FC2 S1FC1 S1FC0	closed open open	Set for 300 baud
S4A4 S4A11 S4A10 S4A9	open closed open closed	Address 10
S41AT	open	Not used for printer applications
S42SB S4THE	open open	Selects number of stop bits. Disables Transmit handshaking capability
S4RHE S2XXX S3XXX	open open open	Disables receive handshake capability Not used for printer applications Not used for printer applications

TABLE 3-4. BAUD RATE SWITCH SETTINGS

Baud Rate	FC2	FC1	FC0
External	Closed	Closed	Closed
110	Closed	Closed	Open
150	Closed	Open	Closed
300	Closed	Open	Open
1200	Open	Closed	Closed
2400	Open	Closed	Open
4800	Open	Open	Closed
9600	Open	Open	Open

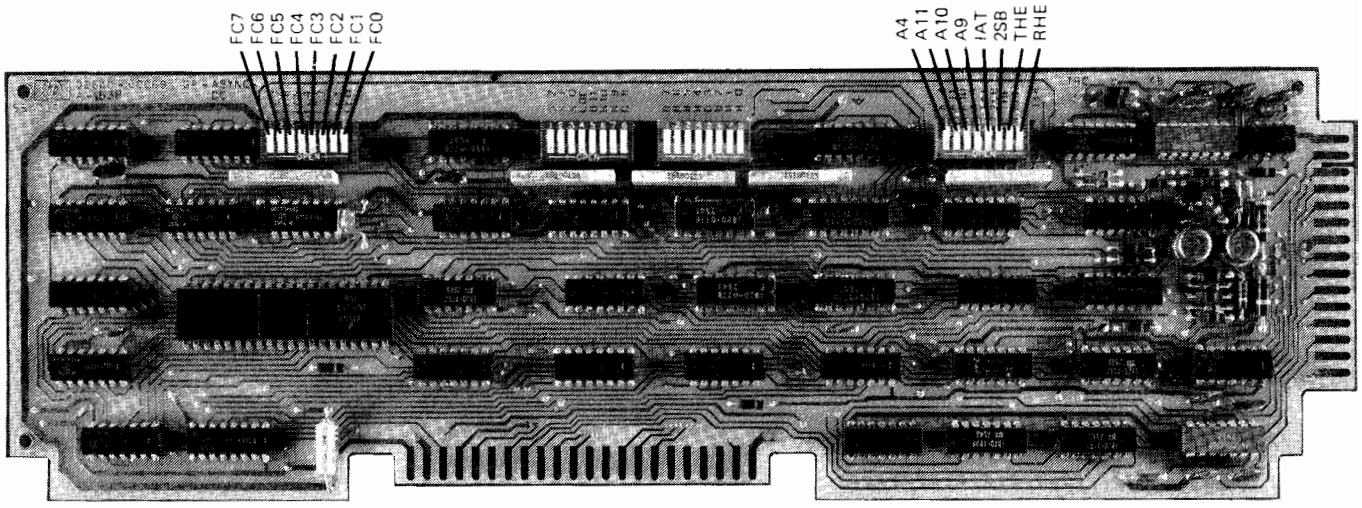


Figure 3-10. GP Asynchronous Data Communication PCA (02640-60089) Switch Location

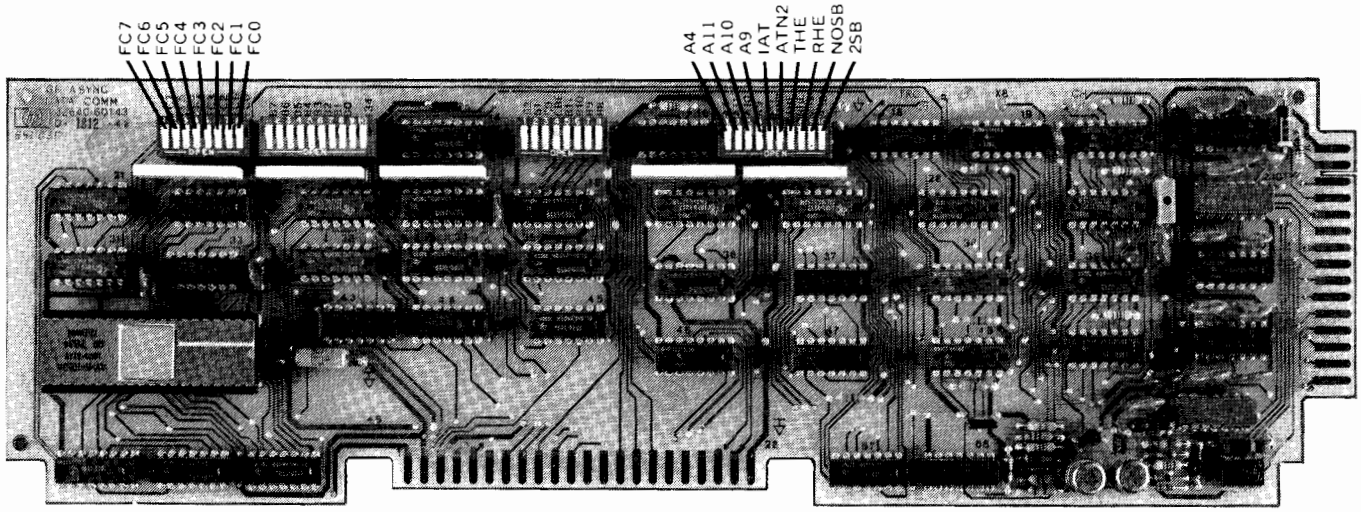


Figure 3-11. GP Asynchronous Data Communication PCA (02640-60143) Switch Settings

3-11. HP 2624A, HP 2626A/HP 2601A CONFIGURATION

The HP 2624A, HP 2626A/HP 2601A configuration (see figure 3-12) interfaces with the HP 2601A at speeds up to 1200 baud using X-on/X-off protocol. An RS-232C interface and a 13242G modem cable (13242-60010) are

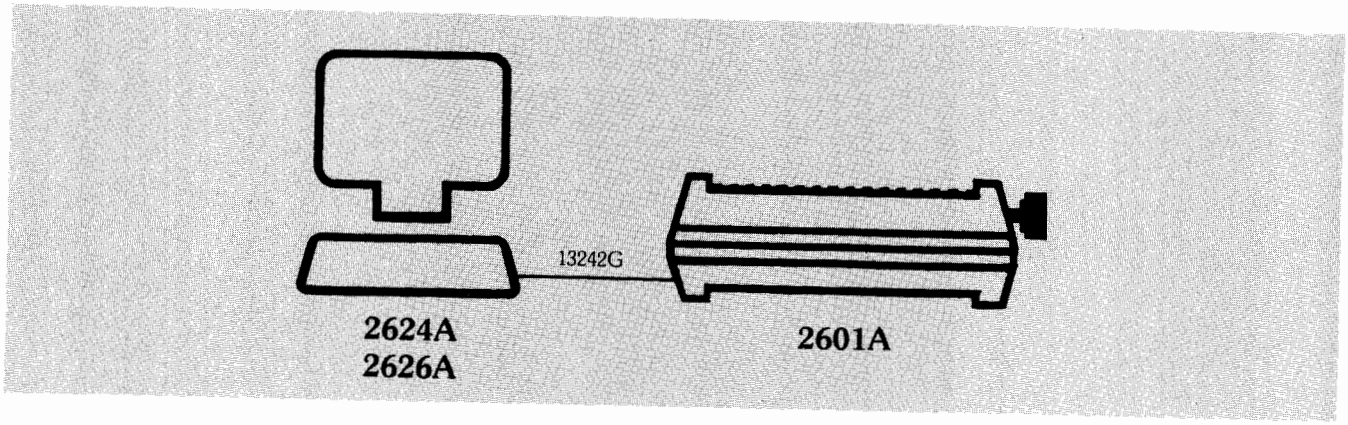


Figure 3-12. HP 2624A, HP 2626A/HP 2601A Configuration

TABLE 3-5. HP 2624A, 2626A MENU CONFIGURATION

DATACOM 1			
RecvPace must be set to X-on/X-off.			
DATACOM 2			
Baud rate: 1200 (max)	Parity: 0's	Databits: 7	**BufSize: 128
Asterisk: OFF		StopBits: 1	EnqAck: NO
TR (CD): HI	Chk. Parity: NO	*SR(CH): LO	StripNulDel: YES
*Recv Pace: None	Clk:INT	*SRRXmit: NO	*RR(CF)Recv: NO
Xmit Pace: X-on/X-off		*SRRInvert: NO	CS(CB)Xmit: NO

* Don't care
** Dependant on terminal's internal configuration

3-12. RS-232C INTERFACE

All HP 2601A printers are shipped with an EIA (Electronic Industries Association) RS-232C interface and a compatible shielded interface cable. Figure 3-13 illustrates the pin configuration of the interface cable connectors. The RS-232C interface signals are listed in table 3-5 and are defined in the following paragraphs.

The RS-232C cable included in the HP 2601A has all the pins connected for interfacing with the HP 2601A. If the user desires to hard-wire an HP 2601A to a CPU, only three wires need to be used. One wire should be connected to pin 2 (Transmitted Data), one to pin 3 (Received Data), and one to pin 7 (Signal Ground). However, it is also necessary to connect pins 4, 5, and 6 together at the printer end of the cable to ensure proper operation.

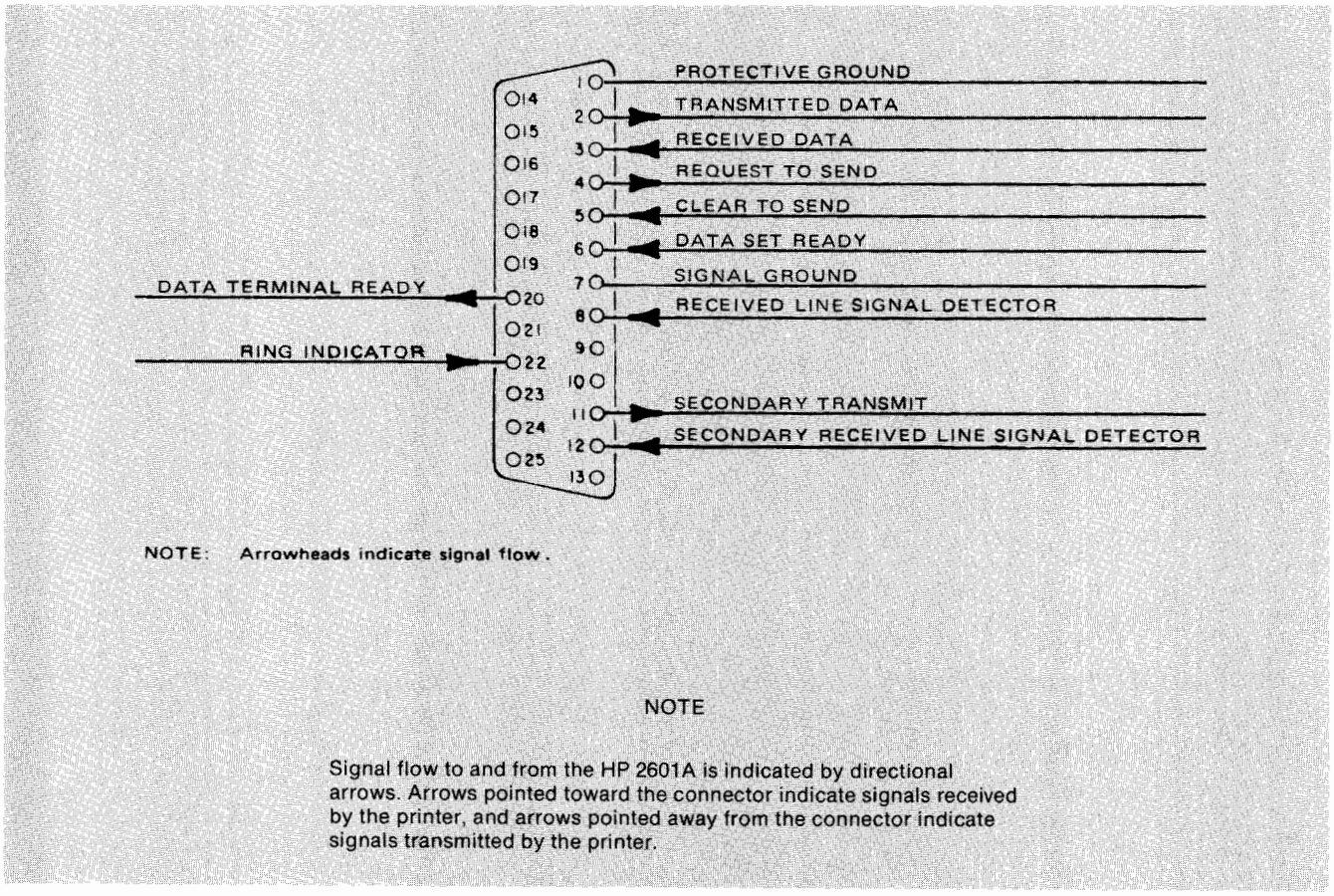


Figure 3-13. Serial Interface Cable Pin Assignments

TABLE 3-6. SERIAL INTERFACE CABLE PIN ASSIGNMENTS

Pin	RS-232C Nomenclature	HPR05 Signal	CCITT	TelCo
1	Protective Ground	Ground		
2	Transmitted Data	-XMIT DATA	101	AA
3	Received Data	-DATA RECEIVED	103	BA
4	Request to Send	+REQUEST TO SEND	104	BB
5	Clear to Send	+CLEAR TO SEND	105	CA
6	Data Set Ready	+DATA SET READY	106	CB
7	Signal Ground	XMIT SINK	107	CC
8	Received Line Signal Detector	+CARRIER DETECT	102 109	AB CF
9	(unused)			
10	(unused)			
11	*(unassigned)	+PRINTER READY		
12	Secondary Received Line Signal Detector	+OPTION 2 (unused)	122	SCF
13	(unused)			
14	(unused)			
15	(unused)			
16	(unused)			
17	(unused)			
18	(unused)			
19	(unused)			
20	Data Terminal Ready	+DATA TERM READY	108	CD
21	(unused)			
22	Ring Indicator	+OPTION 3 (unused)	125	CE
23	(unused)			
24	(unused)			
25	(unused)			

* +PRINT READY signal (same as pin 11) can be tied to pin 20 by installing jumper plug in position A60, pins 5 and 6, on HPR05 PCA. The +PRINT READY signal can be used as a hardwired handshake (ON = OK to send; OFF = Do not send).

NOTE

To avoid future service problems, the customer engineer should label the HPR05 PCA with an indication that this jumper (A60, pins 5 and 6) has been installed.

3-13. RS-232C INTERFACE SIGNALS

The signal voltages on the RS-232C interface lines are nominally +12 and −12 volts. Data signal states are referred to as "mark" and "space", where a mark denotes a logic 1 (−12 volts) and a space denotes a logic 0 (+12 volts). The other signals (control signals) are referred to as either ON (+12 volts) or OFF (−12 volts).

Each of the RS-232C signals listed in table 3-6 are briefly defined in table 3-7.

TABLE 3-7. RS-232C SIGNALS

SIGNAL	DESCRIPTION
Protective Ground	The protective ground is connected to chassis ground within the HP 2601A.
Transmitted Data	The Transmitted Data refers to the serial ASCII-coded digital data transmitted by the HP 2601A.
Received Data	The Received Data refers to the ASCII-coded digital data being received by the HP 2601A.
Request to Send	Request to Send indicates the HP 2601A is ready to receive data.
Clear to Send	The Clear to Send signal must be ON (Hl) for data transmission.
Data Set Ready	The Data Set Ready signal must be ON (Hl) for operation in remote mode.
Signal Ground	Signal Ground is the ground reference for all other interface signals.
Received Line Signal Detector	The Received Line Signal Detector indicates the HP 2601A is receiving an acceptable data signal.
Secondary Transmit	Presently unused
Secondary Received Line Signal Detector	Presently unused
Data Terminal Ready	Signal indicates the HP 2601A power is on.
Ring Indicator	Presently unused

SECTION IV.
HPR05 PCA CONTROL FUNCTIONS

4-1. INTRODUCTION

This section describes the functions that can be changed by setting the jumpers or switches on the HPR05 PCA.

NOTE

This section is intended for reference only. The HPR05 PCA configurations should be set by the customer engineer.

The HPR05 PCA has a jumper strip (J2), a jumper block (A60), and a switch module (A66), each of which can be set for varying functions. Figure 4-1 shows the locations of the switch and jumpers on the HPR05 PCA. The functions of the switch and jumpers are described in the following paragraphs.

4-2. OPTION JUMPER FUNCTIONS

The option jumpers consist of small "jumper plugs" installed on a connector strip at location A60 on the HPR05 PCA. A jumper may also be installed between pins 9 and 10 of jumper strip J2. The presence or absence of each jumper enables or disables certain operating features of the HP 2601A. The functions of the option jumpers are outlined in table 4-1.

TABLE 4-1. HPR05 PCA OPTION JUMPERS

Jumper Location	Jumper	Function
J2-pins 9 & 10	In *Out	Enables no retries on PW seek error Enables 8 normal retries on PW seek error
A60-1 & 2	In	Enables individual test selection in self-test mode
*A60-3 & 4	In	Enables programming the "Continue" message
**A60-5 & 6	In	Enables signal on the DATA TERMINAL READY interface line to switch the same as the PRINTER READY interface signal

* Indicates standard configuration

** If the jumper is installed in this position, label the PCA to that effect to avoid future service problems.

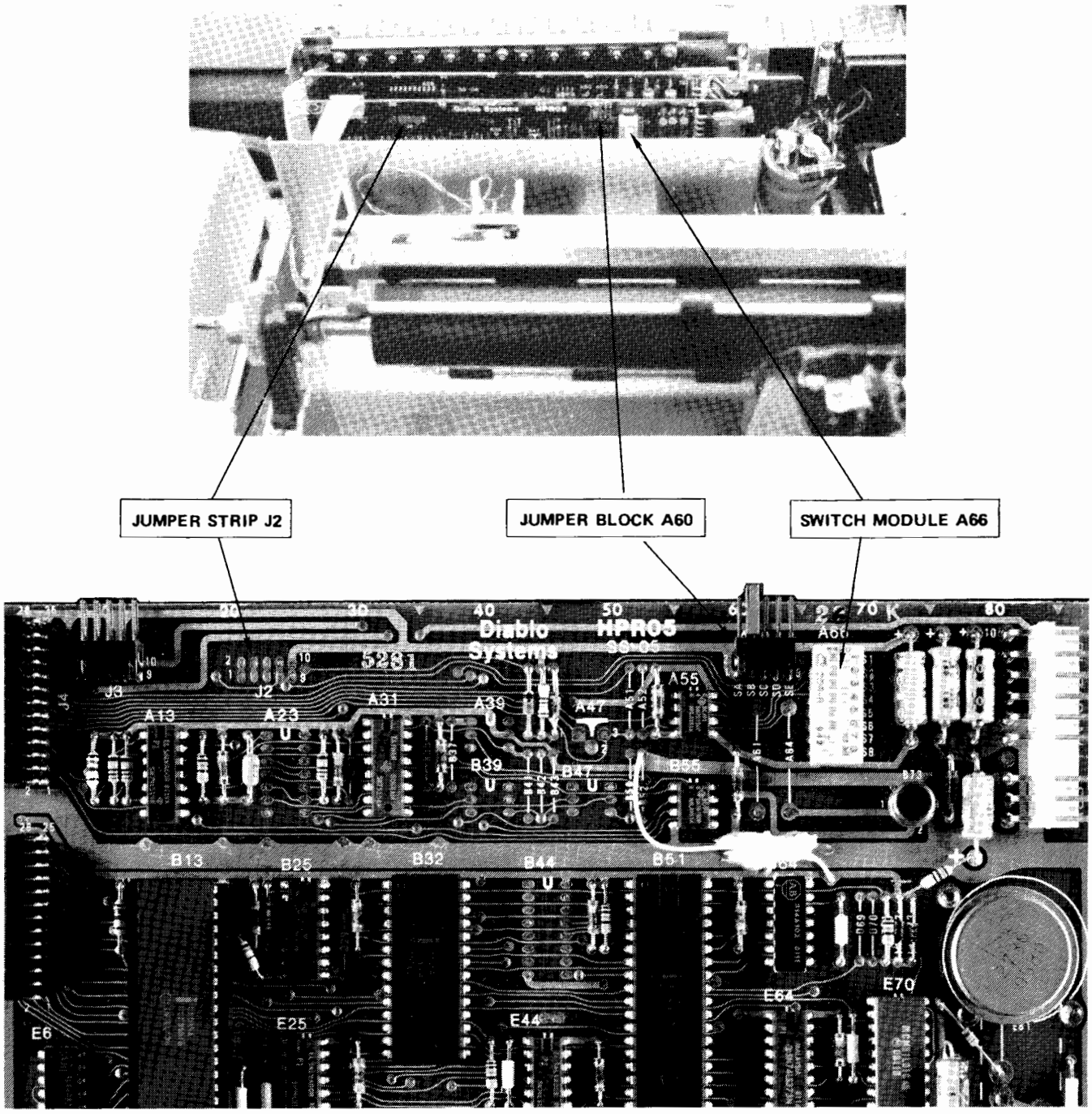


Figure 4-1. HPR05 PCA Option Jumpers and Operating Control Switches

4-3. CONTROL SWITCH FUNCTIONS

The switch module (A66) on the HPR05 PCA allows the selection of ETX/ACK enable, DC1/DC3 (X-on/X-off) enable, optional baud rate, and different language print wheels. Figure 4-2 details the functions selected by these switches and the following paragraphs further explain these functions.

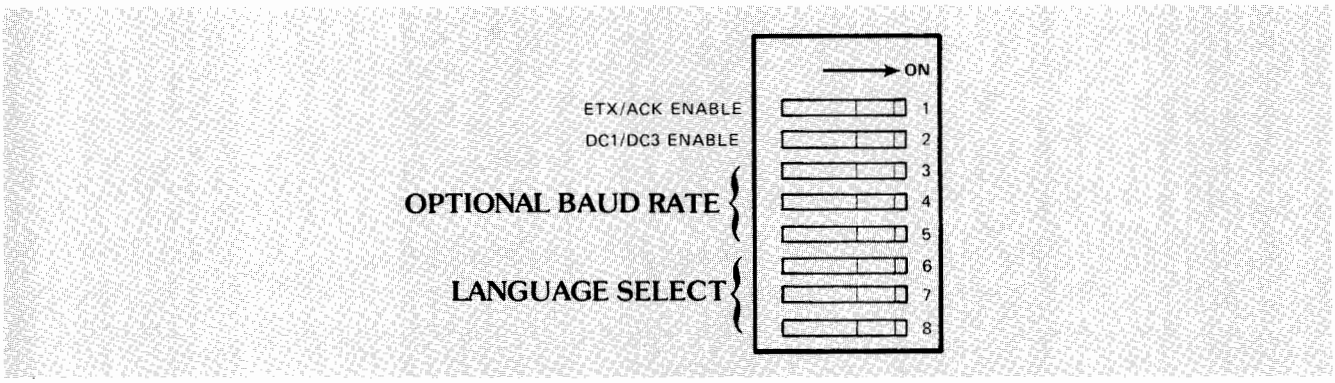


Figure 4-2. HPR05 Control Switch Functions

TABLE 4-2. OPTIONAL BAUD RATE SELECT

SWITCH			
3	4	5	BAUD
OFF	OFF	OFF	150
ON	OFF	OFF	600
OFF	ON	OFF	1800
ON	ON	OFF	2000
OFF	OFF	ON	2400
ON	OFF	ON	4800
OFF	ON	ON	7200
ON	ON	ON	9600

TABLE 4-3. LANGUAGE SELECT

	SWITCH			
	6	7	8	PRINT WHEEL SELECT
	OFF	OFF	OFF	DEFAULT TWP
*	ON	OFF	OFF	TWP
	OFF	ON	OFF	LOGICAL BIT PAIRED
	ON	ON	OFF	APL
	OFF	OFF	ON	FRENCH AZERTY
	ON	OFF	ON	GERMAN
	OFF	ON	ON	SCANDINAVIAN
	ON	ON	ON	NORSK

TWP=Typewriter Paired
APL=A Programming Language

*Factory Configuration

4-4. Switch 1—ETX/ACK Enable

This switch enables an ACK character to be transmitted whenever an ETX character is encountered in the print buffer. ETX characters are not printed. When the switch is OFF, the ETX characters are disregarded.

4-5. Switch 2—DC1/DC3 (X-on/X-off) Enable

This switch enables a DC3 code to be transmitted through the interface if printing is attempted whenever any of the following conditions are present:

a. Buffer nearly full (within 64 characters)

b. COVER OPEN

c. PAPER OUT

d. END OF RIBBON

e. Printer in CHECK/PAUSE condition

Once a DC3 code is transmitted, a DC1 code will be transmitted when the buffer has been emptied to within 64 characters and/or the alarm conditions (b. through e. above) have been corrected and a RESET routine initiated.

4-6. Switches 3, 4, and 5—Optional Baud Rate

These three switches set the optional baud rate as shown in table 4-2. When the two BAUD switches on the operator control panel are set to OFF, the optional baud rate is selected as the data communication speed. The standard configuration is 9600 baud.

4-7. Switches 6, 7, and 8—Language Selection

These switches enable the HP 2601A to recognize a particular language font for data being received through the communications (RS-232C) interface (see table 4-3). The escape sequence ESC SYN (n) (see table 4-2 to determine values of n) overrides the language selection switch (this ESC sequence is explained in more detail in paragraph 5-4).

4-8. HPR05 PCA STANDARD CONFIGURATION

The HPR05 PCA is configured at the factory as follows:

- Jumper strip J2—no jumpers between pins 9 and 10
- Jumper block A60—one jumper between pins 3 and 4
- Switch module A66—S1 through S6 = on
  S7 and S8 = off

SECTION V.
ESCAPE SEQUENCES

5-1. INTRODUCTION

This section contains a list (table 5-1) of the HP 2601A escape code command sequences. It also provides examples of some of the escape sequences, and briefly explains each command.

5-2. GENERAL INFORMATION

The escape (**ESC**) mode is initiated by momentarily depressing the **ESC** key, or by receiving the **ESC** control code over the communications interface. This code is always received as the first character of a 2- or 3-character "escape sequence". The escape code allows the HP 2601A to receive the next one or two characters as commands and not print data (if uninterrupted by a carriage return (except **ESC CR P**)). Following the last character in the **ESC** code sequence, the HP 2601A executes the command and then returns back to its normal operating mode.

NOTE

Use the display function mode when entering **ESC** sequences with terminals.

TABLE 5-1. HP 2601A ESCAPE CODE COMMAND SEQUENCES

CHARACTERS (1)	(2)	(3)	DESCRIPTION OF COMMAND
ESC	1		Set horizontal tab stop at current carriage (print) position
ESC	2		Clear all horizontal and vertical tabs
ESC	3		Graphics mode ON (clear with CR)
ESC	4		Graphics mode OFF
ESC	5		Forward print mode ON
ESC	6		Backward print mode ON (clear with CR)
ESC	7		Print suppression ON (clear with CR)
ESC	8		Clear individual horizontal tab stop at current carriage (print) position
ESC	9		Set left margin
ESC	0		Set right margin
ESC	HT	(n)*	Initiate absolute horizontal tab to print position (n)
ESC	LF		Perform negative line feed
ESC	VT	(n)*	Initiate absolute vertical tab to line (n)
ESC	FF	(n)*	Set lines per page to (n)
ESC	—		Set vertical tab stop at current paper position
ESC	CR	P	Initiate remote RESET
ESC	RS	(n)*	Set Vertical Motion Index (VMI); n = VMI + 2
ESC	US	(n)*	Set Horizontal Motion Index (HMI); n = HMI + 2
ESC	A		Print in secondary color (red)
ESC	B		Print in primary color (black)
ESC	C		Clear top and bottom margins
ESC	D		Perform negative half line feed
ESC	U		Perform half line feed
ESC	L		Set lower page margin at current paper position
ESC	T		Set top page margin at current paper position
ESC	Y		Print the print wheel character under ASCII code 20 (HEX)
ESC	Z		Print the print wheel character under ASCII code 7F (HEX)
ESC	/		Enable auto backward printing
ESC	\		Disable auto backward printing
ESC	S		Set HMI to value defined by setting of SPACING switch
ESC	SYN	(n)	Select language (see table 5-3 for values of n)
ESC	>		Normal printing mode
ESC	<		Reverse printing mode
ESC	(		Enter program "Continue" mode
ESC	)		Exit program "Continue" mode
ESC	P		Proportional space ON (cleared by ESC S)
ESC	Q		Proportional space OFF
ESC	DC1	(n)*	Offset selection (cleared by CR). See paragraph 5-24
ESC	E		Auto underscore ON
ESC	R		Auto underscore OFF
ESC	O		Bold print ON (cleared by CR)
ESC	W		Shadow print ON (cleared by CR)
ESC	&		Bold/Shadow print OFF
ESC	%		Increase carriage settling time to 20 ms (cleared by ESC N)
ESC	BS		Backspace 1/120"
ESC	SO	M	Program mode ON
ESC	X		Cancel all WP modes except proportional space
ESC	=		Auto center ON (cleared by CR)
ESC	M		Auto justify ON

*See table 5-2 for n, the ASCII character representing the particular decimal value desired.

TABLE 5-2. ASCII CHARACTERS FOR DECIMAL VALUES

DECIMAL VALUE	ASCII CHARACTER	DECIMAL VALUE	ASCII CHARACTER	DECIMAL VALUE	ASCII CHARACTER	DECIMAL VALUE	ASCII CHARACTER	DECIMAL VALUE	ASCII CHAR.
	CTRL A		CTRL Z						
1	(SOH)	26	(SUB)	51	3	76	L	101	e
	CTRL B		CTRL [						
2	(STX)	27	(ESC)	52	4	77	M	102	f
	CTRL C		CTRL \						
3	(ETX)	28	(FS)	53	5	78	N	103	g
	CTRL D		CTRL]						
4	(EOT)	29	(GS)	54	6	79	O	104	h
	CTRL E		CTRL ^						
5	(ENQ)	30	*(RS)	55	7	80	P	105	i
	CTRL F		CTRL						
6	(ACK)	31	*(US)	56	8	81	Q	106	j
	CTRL G								
7	(BEL)	32	SPACE	57	9	82	R	107	k
	CTRL H								
8	*(BS)	33	!	58	:	83	S	108	l
	CTRL I								
9	*(HT)	34	"	59	;	84	T	109	m
	CTRL J								
10	*(LF)	35	#	60	<	85	U	110	n
	CTRL K								
11	*(VT)	36	$	61	=	86	V	111	o
	CTRL L								
12	*(FF)	37	%	62	>	87	W	112	p
	CTRL M								
13	*(CR)	38	&	63	?	88	X	113	q
	CTRL N								
14	*(SO)	39	'	64	@	89	Y	114	r
	CTRL O								
15	(SI)	40	(	65	A	90	Z	115	s
	CTRL P								
16	(DLE)	41	)	66	B	91	[	116	t
	CTRL Q								
17	*(DC1)	42	*	67	C	92	\	117	u
	CTRL R								
18	(DC2)	43	+	68	D	93	]	118	v
	CTRL S								
19	(DC3)	44	,	69	E	94	^	119	w
	CTRL T								
20	(DC4)	45	-	70	F	95	_	120	x
	CTRL U								
21	(NAK)	46	.	71	G	96	`	121	y
	CTRL V								
22	*(SYN)	47	/	72	H	97	a	122	z
	CTRL W								
23	(ETB)	48	0	73	I	98	b	123	{
	CTRL X								
24	(CAN)	49	1	74	J	99	c	124	|
	CTRL Y								
25	(EM)	50	2	75	K	100	d	125	}
								126	~

*The CTRL sequence must be used for these ASCII characters (there are no individual keys for these functions).

ACK — ACKNOWLEDGE
BEL — BELL
BS — BACKSPACE
CAN — CANCEL
CR — CARRIAGE RETURN
DC1 — DEVICE CONTROL 1
DC2 — DEVICE CONTROL 2
DC3 — DEVICE CONTROL 3
DC4 — DEVICE CONTROL 4
DEL — DELETE
DLE — DATA LINK ESCAPE
EM — END OF MEDIUM
ENQ — ENQUIRY
EOT — END OF TRANSMISSION
ESC — ESCAPE
ETB — END OF BLOCK
ETX — END OF TEXT
FF — FORM FEED
FS — FILE SEPARATOR
GS — GROUP SEPARATOR
HT — HORIZONTAL TABULATION
LF — LINE FEED
NAK — NEGATIVE ACKNOWLEDGE
NUL — NULL
RS — RECORD SEPARATOR
SI — SHIFT IN
SO — SHIFT OUT
SP — SPACE
SOH — START OF HEADING
STX — START OF TEXT
SUB — SUBSTITUTE
SYN — SYNCHRONOUS IDLE
US — UNIT SEPARATOR
VT — VERTICAL TABULATION

NOTE

The HP 2601A utilizes several escape sequences that use a binary quantity as the third parameter (such as the sequence **ESC HT (n)**). This results in an absolute horizontal tab to column "n". Since column "n" is interpreted by the HP 2601A as a binary quantity rather than as an ASCII character, any character from SOH to ~ is interpreted as a bit pattern forming a binary number. For example, the ASCII character # is interpreted as a decimal 35 (see table 5-2). Thus, the HP 2601A decodes **ESC HT#** as an absolute tab to column 35. This method works well except when data is passed from a host computer through a 26XX terminal and the terminal interprets the parameter character as a handshaking character. For example, when ENQ/ACK protocol (HP standard) is used, the sequence **ESC HT ENQ** (absolute tab to column 5) is not passed correctly to the HP 2601A. This is due to the fact that the ENQ character is decoded as a handshaking character. ENQ is the only character that causes this problem when operating in ENQ/ACK protocol. Other characters present similar situations when operating in multipoint mode (MTS 3000).

There are three ways to avoid misinterpretation of characters. The above examples are applicable when the information being transmitted is in an ASCII mode. No escape sequences are restricted if the file is defined as binary data and passed as a binary file. Another way to avoid misinterpretation of characters is to tab to the column before the desired one and space over one column (or to tab to one column ahead of the desired column and backspace one column). Thus, for the example demonstrating an absolute tab to column 5 using ENQ/ACK protocol, the sequences **ESC HT EOT SP** or **ESC HT ACK BS** are effective. An alternate approach is to set a tab stop at the desired column using **ESC 1**, then tabbing to that position prior to printing.

The following example clarifies the method of using escape sequences:

To perform an absolute horizontal tab to position 35, the escape sequences read as follows:

DATA DATA **ESC HT#** DATA DATA DATA DATA DATA

Data printed before tab to column 35

Column 35

The escape sequence in this example was determined by consulting table 5-1.

ESC HT (n)	Initiate absolute horizontal tab to print position (n)*

* See table 5-2 for "n", the ASCII character representing the particular decimal value desired.

Table 5-2 lists the ASCII character # for a desired value of 35. Therefore, **ESC HT #** is interpreted as a tab command to absolute horizontal position 35.

NOTE

Since many ASCII characters (such as DC1) are not represented by an individual key, the equivalent CTRL code must be entered for that ASCII character. For example, the CTRL code for DC1 is CTRL Q (as listed in table 5-2).

5-3. ESCAPE SEQUENCE DESCRIPTIONS

A brief explanation of each escape sequence is contained in the following paragraphs.

5-4. Language Selection

TABLE 5-3. LANGUAGE SELECTION (BYTE n)

6	5	4	3	2	1	0	Language Selection
X	X	X	X	0	0	0	Default (Typewriter Paired)
X	X	X	X	0	0	1	* Typewriter Paired
X	X	X	X	0	1	0	Logical Bit Paired
X	X	X	X	0	1	1	APL
X	X	X	X	1	0	0	French Azerty
X	X	X	X	1	0	1	German
X	X	X	X	1	1	0	Scandinavian
X	X	X	X	1	1	1	Norsk

NOTES: Bits 0 - 2 of Byte (n) perform Language Selection
Bits 3 - 5 of Byte (n) perform Print Wheel Selection
X = Don't Care
0 = OFF
1 = ON

* Indicates standard configuration

Bits $b_3b_2b_1b_0$	COLUMN → / ROW ↓	0 (000)	1 (001)	2 (010)	3 (011)	4 (100)	5 (101)	6 (110)	7 (111)
0000	0	NUL	DLE	SP	0	@	P	`	p
0001	1	SOH	DC1	!	1	A	Q	a	q
0010	2	STX	DC2	"	2	B	R	b	r
0011	3	ETX	DC3	#	3	C	S	c	s
0100	4	EOT	DC4	$	4	D	T	d	t
0101	5	ENQ	NAK	%	5	E	U	e	u
0110	6	ACK	SYN	&	6	F	V	f	v
0111	7	BEL	ETB	'	7	G	W	g	w
1000	8	BS	CAN	(	8	H	X	h	x
1001	9	HT	EM	)	9	I	Y	i	y
1010	10	LF	SUB	*	:	J	Z	j	z
1011	11	VT	ESC	+	;	K	[	k	{
1100	12	FF	FS	,	<	L	\	l	|
1101	13	CR	GS	-	=	M	]	m	}
1110	14	SO	RS	.	>	N	^	n	~
1111	15	SI	US	/	?	O	_	o	DEL

Initially, language font selection is accomplished by setting switches 6, 7, and 8 of the HPR05 PCA. After the initial setting, all subsequent settings must be done remotely by executing the sequence **ESC SYN (n)**. See table 5-1 for the values of byte "n".

NOTE

The initial language font selection is stored in non-volatile RAM. Any changes must be made remotely using **ESC SYN (n)**; a remote RESET or power off-on sequence will not result in a default to the HPR05 switch settings.

5-5. Printing Format

Horizontal character spacing, vertical line spacing, and the number of lines per page define the printing format. Each of these factors can be independently controlled. An index is used to define the specific motion desired for both horizontal and vertical character spacing. Any given point on a page can be defined in terms of a horizontal position and a vertical position.

Figure 5-1 illustrates the page layout and printing format. The terms used for setting the printing format are defined in the following paragraphs.

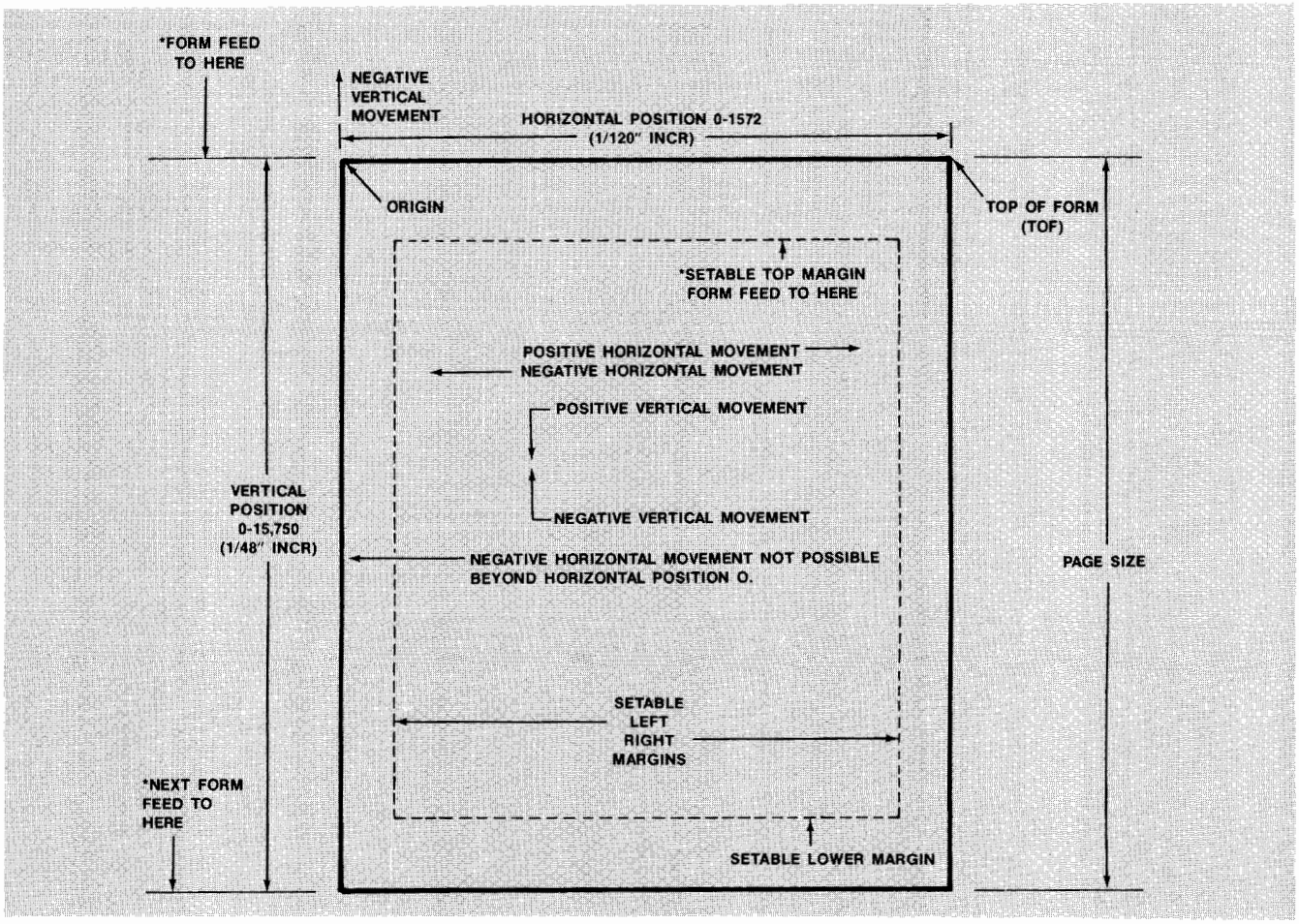


Figure 5-1. Page Layout and Printing Format

5-6. DEFINITIONS OF PRINTING FORMAT TERMS

The printing format terms used in this manual are defined in the following paragraphs.

a. Origin

The origin refers to the position of the print head after a form feed. This position is determined with no top margin set and an absolute tab to print position 1 (horizontal position 0) set.

b. Horizontal Motion Index

The horizontal motion index (HMI) is defined as the distance the carriage moves after printing a character or when spacing. This distance is measured in multiples of 1/120inch. The minimum HMI is 0 and the maximum is 125.

c. Vertical Motion Index

The vertical motion index (VMI) is defined as the distance the paper (platen) moves for each line feed or negative line feed. The distance is measured in multiples of 1/48-inch. The minimum VMI is 0, the maximum is 125; when VMI is 0, no paper movement occurs.

d. Absolute Horizontal Position

The absolute horizontal position is defined as the horizontal distance, in 1/120-inch increments, between the print head position and the origin. The minimum absolute horizontal position is 0, the maximum is 1572 (13.1" by 120).

e. Absolute Vertical Position

The absolute vertical position is defined as the vertical distance, in 1/48-inch increments, between the current print line and the first line on the page (the origin). The minimum absolute vertical position is 0, the maximum is 15,750 (125 by 126 lines/page).

f. Print Position

Print position is defined as the horizontal space occupied by a single printed character. This is similar to a print "column" on a line printer, except that it is variable as the number of print positions per line is dependent on the HMI. The minimum number of print positions per line is 13 when the HMI equals 125; the maximum is 1573 when the HMI equals 1. Position 1 is defined as the left-most print position. The print position may be calculated as follows:

$$\text{Print Position} = \frac{\text{Absolute Horizontal Position}}{\text{HMI}} + 1$$

g. Line

Line is defined as the vertical distance capable of being occupied by a row of printed characters. The height of the line is equal to the VMI. Calculate the line number as follows:

$$\text{Line Number} = \frac{\text{Absolute Vertical Position}}{\text{VMI}} + 1$$

h. Lines per Page

Lines per page is defined as the actual number of print lines per page of paper. The number of lines per page can be set from 1 through 126.

5-7. Standard Formats

Any of three standard printing formats can be selected via the SPACING switch on the Operator Control Panel. These formats are summarized in table 5-4 below.

TABLE 5-4. STANDARD PRINTING FORMATS

	Horizontal Spacing			Vertical Spacing		
SPACING Switch	Char/in.	Char/line	HMI	Lines/in.	Lines/page	VMI
10	10	132	12	6	66	8
12	12	158	10	6	66	8
15	15	199	8	6	66	8

Additional formats can be obtained by changing the HMI, VMI, or lines per page. Such variable indexing overrides the SPACING switch function. Performing the escape sequence **ESC S** restores control to the SPACING switch.

5-8. Optional Formats (Variable Indexing)

Any of the three format factors (HMI, VMI, and lines per page) can be altered to produce an optional format by using escape (**ESC**) sequences. Any optional format selected can be cancelled by using the **ESC CR P** (remote RESET) sequence (or **ESC S**), which returns the HP 2601A to the format selected by the SPACING switch.

Execution of any of these format sequences does not immediately alter horizontal or vertical position. It does, however, change subsequent operations by redefining the variable format factors. It is recommended that a form feed (FF) and an absolute tab to horizontal position 0 be performed prior to changing any format factors.

5-9. VARIABLE HMI

The standard HMI can be altered by executing the three-character **ESC US** (n=ASCII character) sequence. In this escape sequence, the decimal value of the selected ASCII character is two greater than the number of 1/120-inch increments the carriage moves after printing a character or when spacing.

For example, to set the HMI to 15, execute the sequence **ESC US DC1**.

This sequence was obtained by consulting table 5-1 which states:

ESC US (n)* Set horizontal motion index (HMI); n = HMI + 2

* See table 5-2 for "n" values, the ASCII character representing the particular value desired.

Since the desired HMI is 15, 15 is inserted for HMI in the equation n = HMI + 2, resulting in n = 17. Using 17 for the value of "n", table 5-2 lists DC1 as the ASCII equivalent, which is the third parameter of the **ESC US DC1** sequence.

The minimum value of HMI is 0 increments and the maximum is 125 increments. An **ESC S** sequence returns the control of HMI to the SPACING switch.

5-10. VARIABLE VMI

The standard VMI can be altered by executing the three-character sequence **ESC RS** (n=ASCII character). To do so, the decimal value of the selected ASCII character must be two greater than the number of 1/48-inch increments the paper is to move for each line feed or negative line feed. For example, to change from 6 lines/inch to 8 lines/inch, the VMI must be changed from 8 to 6. The sequence **ESC RS BS** changes the VMI to 6. This escape sequence was determined by consulting table 5-1, which contains the following.

ESC RS (n)* Set variable motion index (VMI); n = VMI + 2

* See table 5-2 for "n", the ASCII character representing the particular value desired.

The ASCII character for "n" is found by solving for n = VMI + 2, resulting in n = 8. Consulting table 5-2 for the ASCII character for 8, BS is found. Thus, the **ESC RS BS** sequence changes the VMI to 6 (8 lines/inch).

NOTE

When using the auto justify or auto center modes, alter the VMI at the beginning or end of a line of text. Altering the VMI within the line of text causes incorrect justification or centering of the text.

5-11. LINES PER PAGE

The number of lines per page can be changed by executing the three-character sequence **ESC FF** (n=ASCII character), where the decimal value of the ASCII character is equal to the number of lines per page desired. The minimum number of lines per page is 1, the maximum is 126.

The following two formulas can be used to compute the desired number of lines per page:

$$\text{Number of lines per inch} = \frac{48}{\text{VMI}}$$

Lines per page = Number of lines/inch x page size in inches

After the desired number of lines per page is known, use table 5-2 to determine the appropriate ASCII character for the **ESC** sequence.

5-12. Forward/Backward Printing

The HP 2601A prints forward or backward and is capable of both automatic and programmed backward printing. It can also operate in an inverted horizontal motion mode.

Auto backward printing is enabled by the sequence **ESC /**. It is disabled by the sequence **ESC **. When the HP 2601A is operating in the auto backward printing mode, a line of text will be printed in the reverse direction only if all four of the following conditions exist:

a. Auto backward printing is enabled.

b. Printing is at least one line behind print-queued data.

c. The line to be printed contains less than 256 characters following the first printable character.

d. The carriage is closer to the right end of the next line than to the left.

When the HP 2601A is in the auto backward printing mode, programmed backward printing overrides it for a single line.

5-14. PROGRAMMED BACKWARD PRINTING

Programmed backward printing causes incremental carriage movement to the left, directly opposite to carriage motion during forward printing. The space and backspace codes are also reversed in the backward printing mode, however tabulation operations, carriage return, and all paper movement functions are unaffected.

The programmed backward printing mode is accessed by entering the sequence **ESC 6**. An **ESC 5** sequence or a carriage return (CR) will re-establish the forward printing mode.

5-15. INVERTED HORIZONTAL MOTION (REVERSE PRINTING)

For foreign languages and any other applications requiring reversal of the entire page format, the **ESC <** sequence will establish the inverted horizontal motion mode. In this mode, all horizontal motion is inverted including tabulation. The origin is redefined as the rightmost carriage position, and the starting point for each line is considered to be the right margin. Since the HP 2601A is equipped with non-volatile RAM, the inverted horizontal motion mode is preserved at power-down and restored at power-up.

Backward printing can also be performed when operating in the inverted horizontal motion mode. In this case, backward printing is defined as printing from left to right.

To resume normal left to right printing (forward printing), perform the escape sequence **ESC >**.

5-16. Print Suppression

In the print suppression mode, the HP 2601A replaces all printable characters with spaces. Escape sequences and control characters are not affected. The print suppression mode is initiated by the **ESC 7** sequence, and cancelled by a carriage return (CR) command.

5-17. Margin Control

5-18. HORIZONTAL MARGINS

The left and right margins are adjusted by positioning the carriage to the desired print position (by entering the required number of space characters), then entering an **ESC 9** or **ESC 0** sequence. Altering the left margin causes

the carriage to return to the new margin position following a carriage return (CR) command. Altering the right margin causes the audible alarm to sound for one-half second when printing continues beyond the new margin setting.

The carriage can be moved to the left beyond the left margin by using either the absolute horizontal tab or backspacing when the margin is set at some print position other than 1.

A remote RESET operation clears adjusted print margins to print positions 0 and 1572.

5-19. VERTICAL MARGINS

The top and bottom vertical margins are adjusted by first placing the paper in the top-of-form position, then moving the paper up with a series of LINE FEED operations to reach the desired top margin position. The top margin is then set at this position by executing an **ESC T** sequence. After positioning the paper at the desired bottom margin position by using LINE FEED operations, execute an **ESC L** sequence to set the bottom margin. The bottom margin must always be set below the upper margin, and both must be within the page size boundaries.

Whenever a lower margin is crossed with a line feed, auto line feed, or half line feed, the paper is moved automatically so that the print head is at the top margin of the next page. This action eliminates the need for a form feed character. The spaces between the lower margin of one page and the top margin of the next page are accessed by vertical tabs (absolute and normal) and negative line feeds.

Top and bottom margins are reset to the top-of-form and bottom-of-page locations whenever page size is altered or a remote RESET is received. These margins are reset (initialized) upon receipt of an **ESC C** command.

5-20. Tabulation

Two methods of tabulation are available for both horizontal and vertical motion. The normal tab method is similar to the traditional system used on typewriters in that tab stops are set at predetermined positions. The carriage or paper then moves to these positions sequentially on command. The absolute tab method does not require prior setting of tab stops. The carriage is positioned directly at any one of 126 possible positions either horizontally or vertically from any other position.

NOTE

In the case of absolute vertical tabulation, the paper should be moved forward only, unless the printer is equipped with optional bidirectional tractors.

Both methods of tabulation provide horizontal and vertical positioning to standard print positions or lines. This makes it possible, by using variable indexing, to print data out in any format desired without prior editing. For example, data that was originally formatted for 10 characters/inch, 6 lines/inch, can be printed at 12 characters/inch, 4 lines/inch (or any other format), with all tabular material remaining in the same relative position.

The method of tabulation to be used is specified by the character sequence used. The horizontal tab (HT) character or vertical tab (VT) character alone executes a normal tab operation. An **ESC HT** or **ESC VT** sequence, plus an ASCII character, executes an absolute tab.

5-21. NORMAL HORIZONTAL TAB

Horizontal tab stops can be set at any print position up to position 160 by positioning the carriage to the desired print position and executing an **ESC 1** sequence. Tab stops can only be set at the first 160 print positions. The formula for determining a tab position is:

$$\text{Horizontal Tab} = \frac{\text{Horizontal Position}}{\text{HMI}} + 1$$

A tab command (HT or VT) automatically causes the carriage to move to the next sequential tab stop. If a tab move is commanded with no tab stop having been set to the right of the present carriage position, the carriage does not move and the alarm sounds. Individual horizontal tab stops are cleared by first positioning the carriage to that print position and then executing an **ESC 8** sequence. All tab stops, both horizontal and vertical, can be cleared simultaneously by executing an **ESC 2** sequence.

5-22. ABSOLUTE HORIZONTAL TAB

In this mode, the carriage can be positioned directly to any of the first 126 print positions without prior setting of tab stops. Since absolute tab stops are not retained in memory, each tab stop must be commanded each time it is to be used. The command sequence for an absolute horizontal tab is **ESC HT** (n = ASCII character), where the value of the ASCII character indicates the print position desired. See table 5-2 for the appropriate ASCII character for the escape sequence.

The leftmost print position is considered to be location 1. Any ASCII character other than NUL and DEL can be used, enabling direct tabulation to any of the first 126 positions. Note that this method of tabulation also permits leftward tabs. The horizontal position at completion of an absolute tab is computed as follows:

$$\text{Horizontal position} = (\text{Print position desired}) \times \text{HMI}$$

5-23. NORMAL VERTICAL TAB

Vertical tabs are referenced to the top-of-form position. This position, the first print line on the page, is reached by a FORM FEED command, followed by a manual adjustment of the paper location vertically to locate the paper in the proper position. After referencing the succeeding vertical tabs with a FORM FEED command and manual top-of-form alignment (if needed), vertical tab stops may be set at any line on the page by first moving the paper to the desired line by means of a series of LINE FEED commands. Next, execute an **ESC** -- sequence to lock in the vertical tab. Repeat the LINE FEED commands and the **ESC** sequence for each tab stop desired. The location of the vertical tab stop is defined as follows:

$$\text{Vertical tab position} = \frac{\text{Vertical Position}}{\text{VMI}}$$

Once vertical tab stops are set, subsequent vertical tab (VT) commands cause the paper to be indexed upward to the next sequential vertical tab stop. If there are no more stops set between the present print line and the end of the form, the paper does not move and the audible alarm sounds. Individual vertical tab stops cannot be cleared as can the horizontal tab stops. All tab stops, horizontal and vertical, are cleared simultaneously by executing the **ESC 2** sequence.

5-24. ABSOLUTE VERTICAL TAB

In this mode, the paper can be moved to any of the 126 possible lines on the page. Absolute vertical tab is initiated by executing the **ESC VT** (n = ASCII character) sequence. The value of the ASCII character chosen determines the number of the line desired (see table 5-2 to determine the appropriate ASCII character for the **ESC** sequence). The top print line on the page is assigned the value of 1, with each succeeding line assigned the next highest number.

It is impossible to tab beyond the end of the page even if the number of lines per page is less than the maximum (126). The actual amount of paper movement is determined by the following:

a. The paper position before VT execution

b. The ASCII character used

c. The vertical motion index (VMI)

The ultimate position reached is determined as follows:

Vertical position = (Line number desired) x VMI

5-25. Line Feed

LINE FEED (LF) commands cause the form (paper) to be moved up one line (one VMI). An **ESC LF** sequence acts as a negative line feed, causing the paper to be moved down one line. Line feeds are also performed automatically as a result of a carriage return operation when the AUTO LF is ON.

NOTE

For HP terminals, a line feed is tagged on to each CR command issued by the keyboard. If AUTO LF is on in this case, a double line feed will follow each carriage return.

5-26. Half Line Feed

The half line feed command (**ESC U**) causes the paper to move one-half line (one-half of the VMI). A negative half line feed (**ESC D**) moves the paper down one-half line. These two commands are unchanged in the graphics mode. If the VMI is set to an odd number, the total paper movement will be one increment (1/48 inch) less than one-half line.

5-27. Form Feed

The form feed (FF) command causes the paper to be moved to the first line of the next page, or to the top margin line if one has been set.

5-28. Graphics Mode

The graphics mode is accessed by entering an **ESC 3** sequence. A carriage return command or an **ESC 4** sequence will return the HP 2601A to normal operation. While in the graphics mode, carriage movement is completely divorced from printing; that is, printing a character does not automatically move the carriage. Carriage movement occurs in

1/60-inch increments for space and backspace commands, and in response to tab commands. Also, in the graphics mode, paper feed movement in response to line feed commands is in 1/48-inch increments. The vertical tab, form feed, top of form, and margin commands remain unchanged. Half-line (**ESC U**) and negative line feed (**ESC D**) commands are the same in graphics mode as they are in the normal mode.

5-29. Two-Color Printing

Two color ribbon control is standard in the HP 2601A, and requires that a two-color ribbon be installed. The HP 2601A normally prints in the primary color. To print in the alternate color, execute an **ESC A** sequence. To return to the primary color, execute an **ESC B** sequence or a RESET.

5-30. Power-Up and Remote Reset Parameter Storage

The HP 2601A has a number of parameters which are initialized at power-up or upon execution of a remote reset (**ESC CR P**). Some of these parameters are stored in non-volatile RAM when the HP 2601A is powered down or remotely reset. Tables 5-6 and 5-7 list the parameters which are stored in non-volatile RAM in each condition. Parameters which are not stored in non-volatile RAM default as listed in table 5-5 (after power-up or a remote reset).

TABLE 5-5. DEFAULT PARAMETERS

* Normal Print Mode
* Forward Print Mode
* Left-to-Right Forward Print Direction (Print Position 0 at leftmost carriage position)
* Carriage moved to Horizontal Position 0
* Print suppression off
* Send and print buffers cleared
* "Continue" programming enabled
* ETX/ACK ON per HPR05 dip switch
* DC1/DC3 ON per HPR05 dip switch
** Vertical position cleared to 0 (paper does not move)
** VMI set to 8 (6 lines per inch)
** Lines/page set to 66
** Print in black
** Left margin set to position 0
** Right margin set to position 1572
** Top margin set to position 0 (line 1)
** Bottom margin set to position 528 (line 66)
** All horizontal and vertical tab stops cleared
$ Auto backward printing enabled jumper strip)
$ Language select via HPR05 dip switches
Automatic PW seek retries (8) enabled (unless disabled by
Option baud rate per HPR05 dip switches (unless baud switch on control panel is ON)

$ These commands must be programmatically changed; power-up or remote reset do not cause these parameters to default.
* Default parameters at power-up
** Default parameters following remote reset

NOTE

Do not issue a remote RESET during a data transmission. The remote RESET command clears the 2.7K data buffer, causing any data that is in the buffer at that time to be lost.

5-31. NON-VOLATILE PARAMETER MEMORY

Power-Down. At power-down, the current status of each of the operating parameters listed in table 5-6 is saved in the nonvolatile RAM and restored at power-up. The remaining parameters default as listed in table 5-5.

TABLE 5-6. NON-VOLATILE PARAMETER MEMORY FOR POWER-DOWN

Auto carriage return flag	Right margin
Auto line feed flag	Left margin
Remote margin flag	Horizontal tabulation increment
Program mode flag	Horizontal spacing increment
Proportional space flag	Vertical tabulation increment
Inverted horizontal motion flag	Vertical spacing increment
Auto backward print enable flag	Carriage home position
Page size	Print wheel and language selection
Top margin	Red/black ribbon flag
Bottom margin	Remote HMI flag

Remote Reset (ESC CR P). Remote reset restores the following parameters (table 5-7) from non-volatile RAM; the remaining parameters default as listed in table 5-5.

TABLE 5-7. NON-VOLATILE PARAMETER MEMORY FOR REMOTE RESET

Auto carriage return flag
Auto line feed flag
Inverted horizontal motion flag
Carriage home position
Language selection
Auto backward print enable flag

5-32. "CONTINUE"

The nonvolatile RAM feature allows a "continue" message of between 1 and 31 characters to be stored. When an ENQ character is received, or when the control panel switch CONTINUE is pressed, the HP 2601A will transmit this message to the host system. The "continue" mode may be entered by the sequence **ESC (** and terminated by **ESC)**.

5-33. Word Processing Enhancements

The HP 2601A has the following word processing enhancements:

- Proportional space printing
- Offset selection
- Auto underscoring
- Bold overprint
- Shadow print
- Carriage settling time control
- Half unit backspace
- Program mode—spoke position and hammer/ribbon data
- Auto center
- Auto justify

Most of the word processing enhancements are performed on a character by character basis and are described in more detail in the following paragraphs. The auto line center and auto justify modes require memory storage while being performed.

5-34. PROPORTIONAL SPACE PRINTING

The proportional space mode facilitates use of proportional space (PS) print wheels on the HP 2601A. A table of PS unit values is retained in the HP 2601A memory. These PS unit values represent one-half the width required by each proportionally spaced character. The letter "V", for example, has a PS value of 6, which is one-half of the 12/120-inch spacing a "V" requires. Carriage movement is calculated by adding the PS unit value of the character just printed to the PS unit value of the character about to be printed. Thus, if the character "i" is to follow a "V", the carriage must move 9/120-inch before printing the i. This is the sum of the PS unit values of the i (3) and V (6). This feature is designed to give optimum proportional spacing when the printer is equipped with one of the more commonly used PS print wheels.

The proportional spacing mode is selected by the SPACING switch on the operator control panel. If, however, the terminal is in the remote HMI mode, the SPACING switch is ignored. When proportional spacing is selected by the SPACING switch, the HMI automatically goes to 12 pitch.

The proportional spacing mode may also be selected by the sequence **ESC P**, and turned off by the sequence **ESC Q**. Once either one of these sequences has been received, the SPACING switch is ignored until the sequence **ESC S** is received, which returns control to the spacing switch.

In the proportional spacing mode, the HMI affects only tabulation and word space size (space and backspace). Entering and exiting the proportional spacing mode via the escape sequence does not change the HMI as happens when proportional spacing selection is made by means of the SPACING switch.

Certain data may require non-proportional spacing even though a PS print wheel is being used in the HP 2601A. For example, when the display from a video terminal is to be printed to illustrate a document; if it is printed proportionally spaced, the columnar alignment of the information is lost. To avoid this, issue the **ESC Q** sequence to exit the proportional spacing mode, then issue an **ESC US DLE** sequence to set the HMI to 15 (which is adequate to print

all characters on the PS print wheel without any characters touching). When the non-proportionally spaced printing has been completed, revert to normal HMI by executing the **ESC S** sequence, and return to the proportional spacing mode by executing an **ESC P** sequence.

All numeric characters have a PS value of 5. This allows numeric data to be aligned in columnar form without having to turn off proportional space printing. The starting position of the columns can be established by setting a tab at that position, and performing a tab operation, or by using the absolute horizontal tab to move to the starting position. When altering the value of HMI during the printing of each line, the operator should verify that the HMI has the same value before moving the carriage to the next line. This ensures that the starting position does not change.

5-35. OFFSET SELECTION

Normally, to change character spacing, the HMI is adjusted. However, for proportionally spaced printing, the HMI is ignored and table values (stored in memory) are used. Thus, to add or subtract a constant offset value to each table size, the sequence **ESC DC1** (n=ASCII character) is used, where the ASCII character represents the number of 1/120-inch increments desired as the offset. For example, to set an offset of 3, the sequence **ESC DC1 ETX** is executed (the ASCII character for 3 is ETX). If the sign of the offset is negative, the number 40 is added to the number of 1/120-inch increments desired. For example, to set an offset of -3, the sequence **ESC DC1** + is executed (the ASCII character for 43 (3 plus 40 for the negative sign) is +). The specified number of 1/120-inch increments (offset) is added to each table size value (or to the HMI if the HMI is the controlling size), including spaces. This process continues until another **ESC DC1** (ASCII character) sequence is received, or until offset is cleared by a carriage return (CR) or the sequence **ESC X**.

NOTE

If the resulting character size after setting the offset is zero or less, no carriage movement occurs. Note also that because NUL and DEL will be ignored by the serial receiver, positive offset values range from 1 through 63, and negative values range from 0 through 62.

Offset selection and auto justify modes cannot be active at the same time.

5-36. AUTO UNDERSCORING

Automatic underscoring is initiated by escape sequence **ESC E** and is halted by the **ESC R** sequence. For example, to underline the word "underscore" in the sentence, "Please underscore all emphasized words.", the following sequence is entered:

Please **ESCE**underscore**ESCR** all emphasized words.

NOTE

The **ESC E** sequence also clears the 264X or 262X display screen (if displaying the data to the terminal) if the terminal is not in the "display functions" mode.

Underscoring will not occur if the area between the start and end locations is not positive (if **ESC R** precedes **ESC E**), or if the sequence **ESC X** is received. The **ESC X** sequence cancels all word processing enhancements except proportional spacing.

5-37. BOLD OVERPRINT

Bold overprint is initiated by the sequence **ESC O**. Subsequent characters are struck twice with no intervening carriage motion and with the normal ribbon advance occurring between character strikes. A carriage return (CR) or the **ESC &** or **ESC X** sequences cause the HP 2601A to exit the bold overprint mode.

NOTE

Bold overprint and shadow print may not be active at the same time.

The bold and shadow print modes automatically invoke increased carriage settling time.

5-38. SHADOW PRINT

Shadow print is initiated by the sequence **ESC W**. Subsequent printable characters are struck twice with 1/120-inch of carriage movement and normal ribbon advance between character strikes. This does not change the HMI or table size value for that character. A carriage return (CR) or either of the sequences **ESC &** or **ESC X** causes the HP 2601A to exit the shadow print mode.

5-39. CARRIAGE SETTLING TIME CONTROL

The carriage settling time can be increased to 20 msec by issuing the sequence **ESC %**. This provides more time for mechanical vibrations to dampen before printing, which improves print quality at a small sacrifice in print speed. The sequence **ESC N** restores the normal carriage settling time.

5-40. HALF UNIT BACKSPACE

The sequence **ESC BS** produces a 1/120-inch backspace movement of the carriage.

5-41. PROGRAM MODE

The program mode provides the user control of spoke position, hammer energy, and ribbon advance. This allows the use of special print wheels without modifications to the HP 2601A.

The program mode is initiated by the sequence **ESC SO M**. It is exited by using either the CTRL SI or the **ESC X** sequence.

NOTE

If the sequence for auto justify or auto center is received, the HP 2601A exits the program mode and enters the requested mode.

Space is controlled by the HMI plus the offset. If the HP 2601A is in the proportional space mode, spacing is controlled by the ribbon advance (RA) (move RA, print, move RA) plus the offset.

In the program mode, two characters are sent for each character to be printed. The first character selects the desired print wheel spoke position (as described in the following steps a. through c.); the second character establishes the hammer energy and ribbon advance (as described in the following steps d. through f.).

The complete sequence required to print one character in the control mode appears as follows:

Perform the following steps to obtain the correct escape sequence for the character to be printed:

a. Determine the electrical spoke position for the desired character by consulting table 5-8 or the print wheel tables in appendix C.

b. Add 32 to the electrical spoke position number to calculate the value for "n" in the following formula:

   Electrical spoke position + 32 = (n)

c. Find the ASCII character for (n) by consulting table 5-2. This is the value used for the first character of the program mode escape sequence.

d. Determine the hammer energy needed to print the desired character (see table 5-9). As a guide, consult the hammer energy tables in the appendix, using the hammer energy values used for characters similar to the one to be printed. This hammer energy level represents the first part of the byte used to determine the second character of the sequence.

SORT COMPARISON CHART
Plastic – 96 Character

Print Wheel Title, HP Part No.		Ribbon Advance Data	ASCII HEX Address	Electrical Spoke Position
PICA 10	92152A	8 6 7 7 6 5 5 5 5 5 5 5 5 5 7 5 8 4 7 5 8 5 6 6 5 6 5 5 5 5 6 6 6 6 5 5 5 5 6 6 5 5 6 5	77 7A 79 6B 71 75 70 66 73 68 74 69 61 65 6E 72 6F 63 62 6C 64 78 67 76 6A 6D 22 26 21 7D 2F 3F 5E 5C 40 2A 28 7C 29 3C 60 5F	0 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55
BRITISH PICA 10	92152R			
* GERMAN PICA 10A	92152P			
SPANISH PICA 10	92152S			
FRENCH PICA 10	92152Q			
SCANDIA PICA 10	92152M			
PICA NORSK 10	92152N			
ELITE 12	92152H			
PRESTIGE ELITE LEGAL 12A	92152J			
COURIER 10	92152B			
COURIER LEGAL 10A	92152G			
COURIER 72	92152K			
MANIFOLD 10	92152C			
OCR-A 10	92152E			
OCR-B 10	92152F			
APL-10	92152D			
GENERAL SCIENTIFIC	92152L			
KANA GOTHIC ELITE 12	92152T			

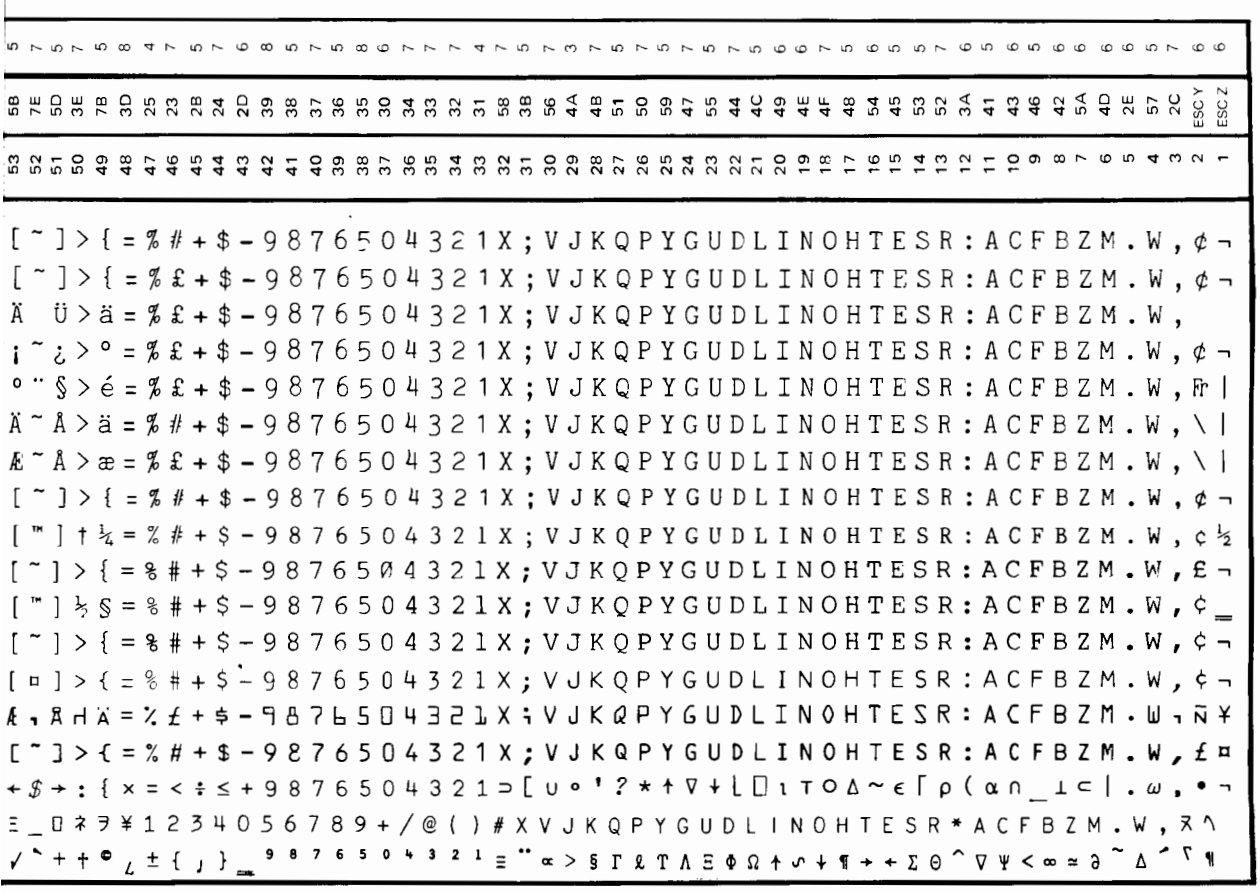
*See Appendix C (German Plastic 96-Character Wheel) for information concerning the ß, β, ~, and | characters.

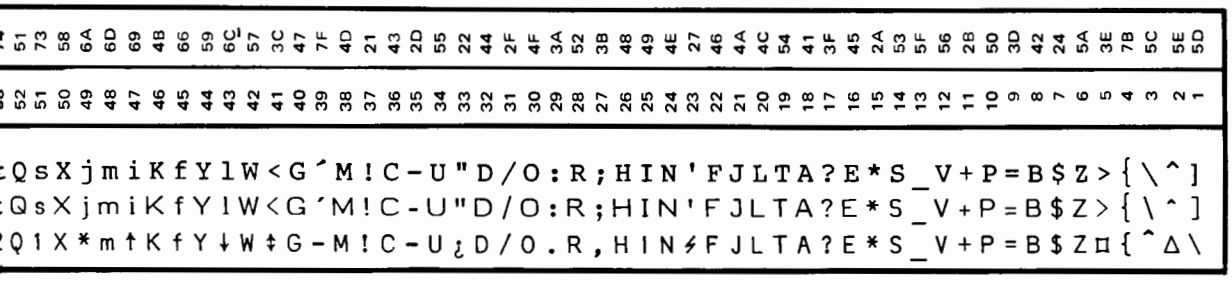
SORT COMPARISON CHART
Metalized – Diablo 96 Character

Print Wheel Title	Part No.	ASCII HEX Address	Electrical Spoke Position
TITAN 10	92153U	20 60 7E 7D 23 39 38 37 36 35 30 34 33 32 31 5B 2E 25 2C 26 28 40 29 7C 71 7A 78 6B 62 70 79 67 76 75 63 68 64 61 65 6E 6F 72 77	0 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54
CUBIC PS	92153W		
FINANCIAL 10	92153V		

SORT COMPARISON CHART
Metalized – 88 Character

Print Wheel Title	Part No.	ASCII HEX Address	Electrical Spoke Position
PICA 10	92153B	23 39 38 37 36 35 30 34 33 32 31 3C 7B 25 60 26 28 40 29 3E 71 7A 78 6B 62 70 79 67 76 75 63 68 64 61 65 6E 6F 72 77	0 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54
TITAN 10	92153A		
ELITE 12	92153C		
LETTER GOTHIC 12	92153D		
BOLD PS	92153E		





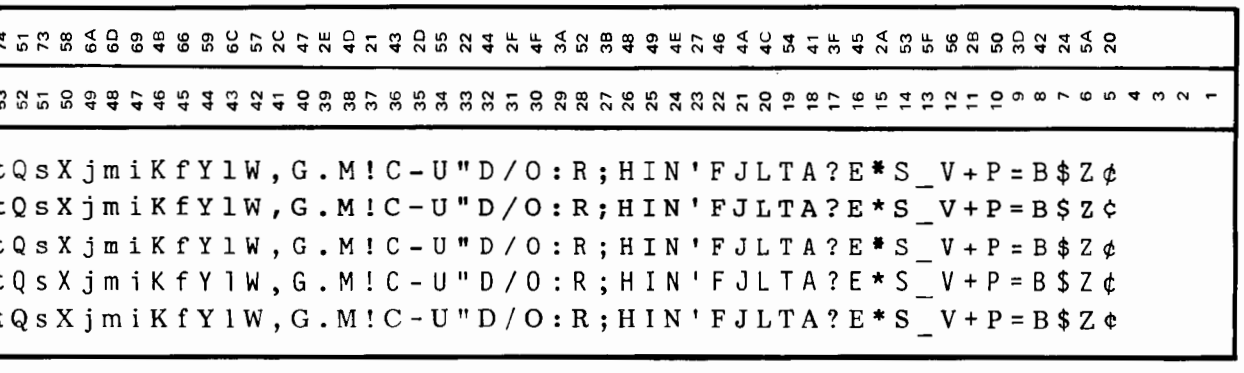


TABLE 5-9. HAMMER ENERGY VALUES

Level 0 - Select spoke 0, do not fire hammer
Level 1 - Lowest hammer energy
Level 2 - Low hammer energy
Level 3 - High hammer energy
Level 4 - Highest recommended hammer energy
Level 5 - Maximum hammer energy (above level 4)
Level 6 - Hammer energy between levels 1 and 2
Level 7 - Hammer energy between levels 3 and 4

CAUTION

Discretion should be exercised when using level 5, as higher than normal print wheel wear will occur.

e. Determine the value of ribbon advance needed when printing the desired character, using table 5-8 as a reference. The ribbon advance values range from 0 to 15, with 15 being the largest distance advanced. This number represents the second part of the byte used to determine the second character of the sequence.

NOTE

The ribbon advance values in table 5-8 were derived using the Titan 10, 96-character, 10-pitch metal print wheel because it was determined to be the widest 10-pitch typeface. These ribbon advance values are provided as a reference which is appropriate for most applications.

f. Find the ASCII value for the second character of the escape sequence using table 5-10 and the values determined in steps d. and e.

TABLE 5-10. CHARACTERS FOR HAMMER ENERGY AND RIBBON ADVANCE VALUES

HAMMER ENERGY	RIBBON ADVANCE 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	Q	R	S	T	U	V	W	X	Y	Z	[	/	]	^	_
6	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	q	r	s	t	u	v	w	x	y	z	{	¦	}	~	DEL

5-42. AUTO CENTER

Auto line centering is initiated by the sequence **ESC** =. Subsequent data is stored in a memory buffer until a carriage return (CR) or a line feed (LF) command is received. The data is then printed centered between the margins and the HP 2601A exits the auto center mode. The auto center mode allows the line to extend beyond the left and right margins. The **ESC X** clears the auto center mode without performing any printing.

If auto justify is enabled when auto centering has been entered, auto centering will have precedence for that line only.

NOTE

The command sequence to alter the VMI (**ESC RS (n)**) must not be imbedded in the line to be centered. The correct sequence would be:

ESC RS (n) **ESC** = data to be centered CR **ESC RS (n)** CR LF

5-43. AUTO JUSTIFY

The automatic margin justification mode is initiated by the **ESC M** sequence. Subsequent data is stored in a buffer until a carriage return (CR) or a line feed (LF) command is received. The data is then printed with the text justified between the left and right margins. The auto justification mode remains enabled until the sequence **ESC X** is received or a break is transmitted or received; the HP 2601A then exits the mode without performing any printing.

The auto justification mode functions in the fixed pitch or the proportional spacing mode. A maximum of 2688 characters may be included in a line; additional characters cause the OVERFLOW lamp to illuminate, and the overflowed data is destroyed. During auto justification, all communication protocols function normally.

The HP 2601A begins justification calculations from the position of the first printable character after the carriage return (CR), line feed (LF), or horizontal tab (HT) sequence. This allows unjustified leading spaces or tabs and allows partial line justification. The number of 1/120-inch offset units needed to fill out or to condense the line being justified is calculated. The offset units are then applied, first to the spaces between words, and then to the spaces between characters (after the word spaces have reached 150 percent of their normal size). If the offset added to the character spaces exceeds seven units, the line is printed unjustified. Offset units are added from the left to the right on odd lines, and from right to left on even lines.

NOTE

The command sequences to set VMI (**ESC RS (n)**) or HMI (**ESC US (n)**) must not be imbedded in the line to be justified. To avoid this, enter the commands as follows:

ESC RS (n) data to be justified **ESC RS (n)** CR LF

5-44. CANCEL WORD PROCESSING ENHANCEMENTS

The sequence **ESC X** cancels the following word processing modes:

Auto underscore
Shadow print
Offset selection
Auto center
Bold overprint
Program mode
Auto justify

The proportional spacing and increased settling time modes are not cancelled by **ESC X**.

SECTION VI.
REMOTE DIAGNOSTICS

6-1. GENERAL INFORMATION

The HP 2601A has remote diagnostic capabilities which allow interrogation of machine parameters and status through the serial interface.

All diagnostic commands are processed immediately when received and are not queued. This means all status reported will be the status present at the time the command was received. Only the low 7 bits (bits 0 through 6) of a status byte are significant. Their equivalent value may range from 0 to 127. The MSB (bit 7) will be a parity bit as defined by the PARITY ENABLE and PARITY EVEN/ODD switches.

NOTE

In wrap-around mode, the MSB (bit 7) will be that received from the host computer.

All commands that generate a response from the HP 2601A will result in a status byte being sent to the host computer preceded by an STX character. The rules for ETX/ACK and DC1/DC3 protocols are applicable and should be used for sending status requests to the HP 2601A.

Table 6-1 lists the diagnostic commands and each command is explained in the following paragraphs.

TABLE 6-1. DIAGNOSTIC COMMANDS

ESC SUB I	Initialize the printer
ESC SUB R	Remote error reset
ESC SUB 1	Request status byte 1
ESC SUB 2	Request status byte 2
ESC SUB U	Enter user (programmable) test mode
ESC SUB W (n)	Enter wrap-around (echo) test mode
ESC SUB X	Exit test mode
DEL	Error correct backspace (user test mode only)
STX	Print buffer once (user test mode only)
SOH	Print buffer repeatedly (user test mode only)

6-2. DIAGNOSTIC COMMAND DEFINITIONS

ESC SUB I. This command causes the HP 2601A to unconditionally execute an initialize sequence regardless of any error conditions that may exist within the printer. Unlike the corresponding sequence **ESC CR P**, this command is executed immediately when received. The HP 2601A will default to the same conditions that exist at power up. This command should be preceded by a nonprinting character to cause the printer to abort any multiple character sequence in progress.

ESC SUB R. This command causes the HP 2601A to reset any error conditions. If the printer is in check, it will execute a restore. Due to internal program latency, the minimum time necessary to reset all errors is 250 msec. This command is essentially the same as pressing the RESET switch on the control panel.

ESC SUB 1. This command causes the HP 2601A to send STATUS 1 through the interface. The bit definitions for STATUS 1 are as follows:

0	End of ribbon	4	Cover open switch
1	10 Pitch	5	Printer idle (no motion and queue empty)
2	Paper out switch	6	Print in check
3	Auto line feed switch	7	**Parity bit**

ESC SUB 2. This command causes the HP 2601A to send STATUS 2 through the interface. The bit definitions for STATUS 2 are:

0	Reserved/future use	4	Reverse print mode (inverted horizontal motion)
1	Reserved/future use	5	Paper out defeat switch enabled
2	Auto carriage return	6	Full-duplex switch
3	Double line feed switch	7	**Parity bit**

ESC SUB U. This command causes the HP 2601A to enter the user programmable test mode. In this mode the user may enter any command sequence to the HP 2601A within 5 characters from the end of the buffer. The printer may then be commanded to execute the buffer either once or repeatedly. All standard and optional **ESC** sequences are valid except remote diagnostic commands. Any remote diagnostic commands in the buffer will be ignored. Both ETX/ACK and DC1/DC3 protocols will function normally when entering data into the buffer. During buffer execution an ACK will be sent through the serial interface for each ETX encountered in the buffer, if enabled. DC1/DC3 will not function during buffer execution. The user programmable test mode may be exited by issuing either an **ESC SUB X** or **ESC SUB I** sequence. All other incoming commands will be ignored during buffer execution.

ESC SUB W (n). This command will cause the HP 2601A to enter the wrap-around (echo) test mode. In this mode, the printer will send back to the host computer each byte (n) that it receives, using the same protocol as status commands. The echoing starts with the first byte following the **ESC SUB W** sequence. The HP 2601A will automatically exit the wrap-around mode when in the local mode. The wrap-around mode may be exited by issuing either an **ESC SUB X** or **ESC SUB I** sequence. The **ESC SUB X** sequence will be echoed back to the host computer.

ESC SUB X. This command will cause the HP 2601A to exit both the wrap-around and user programmable test modes immediately. When in the user test mode, the printer will finish the execution of the buffer if it is in progress when the **ESC SUB X** was received. The printer will simultaneously accept new data from the interface.

DEL. The DEL or rubout character is used for error correction when entering data into the buffer in the user test mode. The buffer pointer will back up one position, and the previous character will be echoed on the printer for each DEL received. All control characters except space, backspace, carriage return and line feed will be echoed as the uppercase ASCII equivalent preceded by an exclamation mark (!). An **ESC** character will be echoed as a dollar sign ($). The DEL character is ignored during an **ESC** sequence, to prevent invalid **ESC** sequences. If the incoming data is faster than the speed of the print mechanism, the entire rubout and echo sequence will be transparent.

STX. The STX character will cause the content of the print buffer to be executed one time only, when in the user test mode. If the buffer is being executed repeatedly (SOH character), receiving an STX character will cause the HP 2601A to return to the single cycle execution mode at the end of the buffer. The SOH and STX characters may still be used as the third character of a three character sequence in the user test mode. A break in the user test mode will cause the printer to go back to the buffer entry mode which allows entering new test data without exiting the user test mode.

SOH. The SOH character will cause the content of the print buffer to be executed repeatedly. The HP 2601A will continue buffer execution until being returned to single cycle execution mode (STX character), or exiting user test mode (**ESC SUB X** or **ESC SUB I**).

APPENDIX A. USING THE HP 2601A WITH THE HP 3000

The HP 3000 Multi-Programming Executive (MPE) communicates with the HP 2601A as an input/output file for both reading and writing. Thus, a simple file statement is all that is needed for communicating with the daisywheel printer. For example, use the following approach to print a file:

:FILE DAISY;DEV=30	"DEV=30" indicates that 30 is the port number connected to the HP 2601A.
:RUN FCOPY.PUB.SYS >FROM=print file name;TO=*DAISY	This command refers the "DAISY" file statement.

The baud rate and termtype can be altered programatically, allowing a normal configuration to remain set for an HP terminal with a higher baud rate, changing only when an HP 2601A is connected to the port. The following SPL (system programming language) program demonstrates this approach:

```
  This general approach can be used with many of the other general
purpose subsystems such as the EDITOR, etc.

:RUN FC2601X

Enter desired LDEV number
34 (port number)
HP32212A.3.09 FILE COPIER (C) HEWLETT-PACKARD CO., 1979

)FROM=FC2601A;TO=*DAISY
*200*WARNING;FROMFILE RECSIZE IS 80 BYTES, TOFILE RECSIZE IS 134
BYTES.
CONTINUE OPERATION (Y OR N)?
EOF FOUND IN FROMFILE AFTER RECORD 52

53 RECORDS PROCESSED *** 0 ERRORS

)E

END OF PROGRAM
:RUN LISTEQ2

LISTEQ2 B00.00 (C) HEWLETT-PACKARD CO., 1978

***NO TEMP FILES

***FILE EQUATIONS

:FILE DAISY; DEV=34;REC=-132;CCTL (generated file statement with
port number)
```

```
END OF PROGRAM

$CONTROL MAP,MAIN=PORTSET
BEGIN
  BYTE ARRAY PGM(0:15):="FCOPY.PUB.SYS   ";
  INTEGER PIN,
          TERM,
          ERRCD,
          DPARM,
          LNGTH,
          SPEED:=120,
          TERMTYP:=13;

  ARRAY MSG(0:12):="ENTER DESIRED LDEV NUMBER ";
  BYTE ARRAY PRNTR(0:9):= "DAISY     ";
  BYTE ARRAY FSTMT(0:37):="FILE    DAISY;DEV=30;CCTL;REC=-132
  ",%15;

  INTRINSIC CREATE,ACTIVATE,QUIT,FOPEN,FCLOSE,FCONTROL,COMMAND,
  PRINT,READ;

  PRINT(MSG,13,%40);
  IF <> THEN QUIT(1);


  LNGTH:= READ(FSTMT(18),1);
  IF <> THEN QUIT(2);

  COMMAND(FSTMT,ERRCD,DPARM);
  IF <> THEN QUIT(3);

  TERM:= FOPEN(PRNTR,%(16)184,4);
  IF < THEN QUIT(4);

  FCONTROL(TERM,11,SPEED);
  IF < THEN QUIT(SPEED);

  SPEED:= 120;

  FCONTROL(TERM,10,SPEED);
  IF < THEN QUIT(SPEED);

  FCONTROL(TERM,38,TERMTYP);
  IF < THEN QUIT(TERMTYP);

  CREATE(PGM,,PIN,,1);
  IF < THEN QUIT(5);

  ACTIVATE(PIN,2);
  IF <> THEN QUIT(6);

  FCLOSE(TERM,0,0);
  IF <  THEN QUIT(7);
  END.
  KEEP FC2601S
  SPL FC2601S
  PREP $OLDPASS, FC2601X; CAP=PH
  SAVE FC2601X
```

APPENDIX B. HAMMER ENERGY/ PROPORTIONAL SPACE TABLES

HAMMER ENERGY/PROPORTIONAL SPACE TABLES

The hammer energy/proportional space tables serve as a reference for proportional space (PS) units and nonstandard hammer energies that are recommended when certain print wheels are used. The HP 2601A is programmed with a standard set of hammer energies suitable for the most commonly used print wheels (Pica 10, Titan 10, Elite 12, Bold PS, etc.). For other print wheels, some characters are significantly different and require a change in hammer energy to give optimum print quality. The recommended changes in hammer energy can be handled by the host system software, without any hardware changes in the printer.

The hammer energy/proportional space tables are used as follows:

a. Refer to table B-1 to locate the listing for the print wheel in question. The index listing includes the print wheel title and part number, and table-column that gives the appropriate hammer energy and PS values for that print wheel. The table-column designation identifies both the table and column; for example, B2-3 refers to table B-2, column 3.

b. Refer to the appropriate table indicated by table B-1. Column 1 of each table shows the standard set of hammer energies resident in the HP 2601A, and the recommended PS values for the most common print wheels. The subsequent columns list recommended changes in these values when certain print wheels are used. Any print wheel that is referenced to column 1 of its designated table may be used without any change in hammer energies. Where a single number (x) is listed in a column, that number represents hammer energy. Where two numbers (x/y) are listed together in a column, the first number (x) represents hammer energy and the second number (y) represents PS value. PS values are listed only in columns applicable to PS print wheels.

TABLE B-1. PRINT WHEEL REFERENCE TABLE

PLASTIC/96-CHARACTER PRINT WHEELS

Print Wheel	HP Part Number	Refer to Table-Column
Pica 10	92152A	B2-1
British Pica 10	92152R	B2-5
German Pica 10A	92152P	B2-21
Spanish Pica 10	92152S	B2-23
French Pica 10	92152Q	B2-10
Scandia Pica 10	92152M	B2-12
Pica Norsk 10	92152N	B2-17
Elite 12	92152H	B2-1

Prestige Elite Legal 12A	92152J	B2-3
Courier 10	92152B	B2-2
Courier Legal 10A	92152G	B2-4
Courier 72	92152K	B2-1
Manifold 10	92152C	B2-11
OCR-A 10	92152E	B2-15
OCR-B 10	92152F	B2-16
APL-10	92152D	B2-19
General Scientific	92152L	B2-14
Kana Gothic Elite 12	92152T	B2-6

METALIZED/96-CHARACTER PRINT WHEELS

Print Wheel	HP Part Number	Refer to Table-Column
Titan 10	92153U	B4-1
Cubic PS	92153W	B4-1
Financial 10	92153V	B4-2

METALIZED/88-CHARACTER PRINT WHEELS

Print Wheel	HP Part Number	Refer to Table-Column
Pica 10	92153B	B3-1
Titan 10	92153A	B3-1
Elite 12	92153C	B3-1
Letter Gothic 12	92153D	B3-1
Bold PS	92153E	B3-1

TABLE B-2. HAMMER ENERGY - 96 CHARACTER PLASTIC PRINT WHEELS

Spoke	COLUMN 1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9	1-10	1-11	1-12	1-13	1-14	1-15	1-16	1-17	1-18	1-19	1-20	1-21	1-22	1-23	1-24
0	3										4							4	4					4
95	3					2	2																	4
94	4					3	3							2										4
93	3					2	2				4			2				4	4					4
92	4					3	3							2										
91	3										4								4					4
90	4													3				3						
89	3										4			2				4	4					
88	3													2				2						4
87	3					2	2				4								4					
86	2					3	3				3							3	3					4
85	2													1				3						
84	2										3								3					4
83	2										4								4					3
82	3										4			2				4	4					4
81	2										4							4	4					4
80	3					2	2							2										
79	2					3	3				3			3				3	3					3
78	4																							
77	2					3	3				3							3	4					4
76	3										4			2				4	4					4
75	3					2	2				4								4					
74	4													2										
73	2					3	3				4							3	4					4
72	3													1				4						
71	4					3	3							2										
70	2																			3				
69	3					2	2							1				4	2					
68	2													3						3				
67	2		4	3		3	3	3	3	3		3			3		3	4		3	3	3	4	
66	2					3	3																	
65	2																							
64	1		2	2		2	2	2			4				2			2	3	3		4		
63	2								4	4		4		3	4		4	3		4	4	4	4	
62	4					2	2			3				2				3	2	3				
61	3					2	2							1										
60	2													1										
59	2			4				4	3	3		3			4		3	3		3	3	3	3	4
58	2													1										
57	2		4	4				4						3	3					3				
56	1					2	2	2			3								4	3		3		4
55	2																			3				
54	1													3				2	2					
53	2								4			4			4		4			3	4	4		
52	1					2	2			2	3							2	4	3		3		
51	2					3	3		4	4		4			4		4			3	4	4		
50	2		3	4		3	3	4																
49	2		4	4		4	4	4	3	3		3			4		4	4		3	3	3	1	
48	3					4	4							2										
47	3					2	2																	
46	3				4				4	4			4	2	4		4		2	2	4			
45	2																							
44	3													2				4						
43	1					3	3							2					2					
42	3													2										
41	3													2										
40	2																							
39	3													2										
38	3													2										
37	3	4				2	2							2										
36	3					2	2							2										
35	2					4	4																	
34	3					2	2							2										
33	2																							
32	4					3	3							3					3					
31	2					4	4											3						
30	4													2					3					
29	3													2				4	2					
28	4																		1					
27	4													2					2					
26	4													2				3	3					
25	4													3					2					
24	4													3				3						
23	4																		2					
22	4																							
21	4																	3						
20	2																	4	1					
19	4													2					2					
18	3													2										
17	4																	3						
16	3													2					1					
15	4													2					3					
14	3																							
13	4													3										
12	1					2	2												2					
11	3																		2					
10	3																	4						
9	4													2					2					
8	4													3					2					
7	3																							
6	4													3					2					
5	1																							
4	4													3					3					
3	1																							
2	3	4								4		2	4	2	4	4	2	1	2		4			
1	1		4	2				2		2		2	3	4	2	2	2	3		3	2			2

HAMMER ENERGY/ METALIZED PRINT WHEELS

TABLE B-3. 88-CHARACTER

Spoke	COLUMN 2-1	2-2	2-3
0			
95			
94			
93			
92	4/6		
91	3/5		
90	4/5		
89	3/5		
88	3/5		
87	3/5		
86	4/5		
85	3/5		
84	3/5		
83	3/5		
82	2/5	2/3	
81	4/6	3/5	3
80	1/3		
79	4/8		
78	1/3		
77	4/7		
76	2/3		
75	4/8	4/5	
74	2/3		
73	4/6	2/3	2
72	4/5		
71	3/5		
70	3/5		
69	3/5		
68	3/5		
67	4/5		
66	3/5		
65	4/5		
64	3/5		
63	3/5		
62	3/5		
61	3/5		
60	3/5		
59	3/5		
58	3/5		
57	3/5		
56	3/5		
55	2/4		
54	3/7		
53	3/4		
52	4/7		
51	3/4		
50	4/7		
49	3/3		
48	4/8		
47	2/3		
46	4/7		
45	3/4		
44	4/7		
43	2/3		
42	4/8		
41	1/3		
40	4/7		
39	1/3		
38	4/8		
37	2/3		
36	3/7		
35	1/4		
34	4/7		
33	2/4		
32	4/7		
31	2/4		
30	4/7		
29	2/3		
28	4/7		
27	2/3		
26	4/7		
25	3/3		
24	4/7		
23	1/2		
22	4/6		
21	3/5		
20	3/6		
19	3/6		
18	4/7		
17	2/5		
16	4/6		
15	3/5		
14	4/5		
13	1/5		
12	4/6		
11	2/5		
10	4/6		
9	2/5		
8	4/6		
7	4/5		
6	3/6		
5	3/5		
4			
3			
2			
1			

TABLE B-4. 96-CHARACTER

3-1	3-2	3-3	3-4	3-5	3-6	3-7
3/5				4/6	4	4/6
1/5		3		2/5	2	2/5
1/5		4		4/7	4	4/7
2/3				3/5	3	3/5
4/6		2		3/5	3	4/5
3/5						
4/5						
3/5						
3/5						
3/5						
4/5						
3/5						
3/5						
3/5						
2/5						
2/3	3			4/5	4	4/7
1/3						
4/8		2				
1/3						
4/7		2				
2/3	3					
4/8		1		4/7		
2/3	4					
2/3	3	3		3/5	3	1/5
4/5	2					
3/5	4					
3/5						
3/5	4	4				
3/5		4				
4/5	3					
3/5						
4/5	3					
3/5	2					
3/5		4				
3/5						
3/5	4	4				
3/5		4				
3/5		4				
3/5		4				
3/5		4				
3/5	4	4				
2/4	3	4				
3/7		4				
3/4						
4/7		2				
3/4	2	4				
4/7		3				
3/3						
4/8						
2/3		3				
4/7		1				
3/4		4				
4/7		2				
2/3		3				
4/8		3				
2/5				1/5	1	1/5
4/7		3				
1/5		2				
4/8		1				
2/3		1			1	
3/7						
1/4		2				
4/7		2				
2/4						
4/7		2				
2/4						
4/7		3				
2/3	1					
4/7		3				
2/3	1					
4/7		3				
3/3		2				
4/7		3				
1/2	2	2				
4/6		1				
3/5		1				
3/6						
3/6		2				
4/7		3				
2/5						
4/6		3				
3/5						
4/5		2				
1/5			2			
4/6		3				
2/5						
4/6		3				
2/5		3				
4/6		3				
4/5		3				
3/6						
2/5				3/5	3	3/6
2/3				1/5	1	1/5
2/5	1	3		4/7	4	4/7
1/5	3	3		3/5	3	3/5
2/3				2/5		2/5

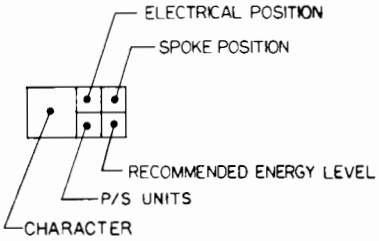
APPENDIX C.
PRINT WHEEL TABLES

The print wheel tables listed in this appendix are included as a reference for obtaining electrical spoke position, ASCII address, and recommended hammer energy data for individual print wheel characters.

TABLE C-1. APL, PLASTIC 96 CHARACTER PRINT WHEEL

ROW	b4	b3	b2	b1	COLUMN 2 (b7=0, b6=1, b5=0)	COLUMN 3 (b7=0, b6=1, b5=1)	COLUMN 4 (b7=1, b6=0, b5=0)	COLUMN 5 (b7=1, b6=0, b5=1)	COLUMN 6 (b7=1, b6=1, b5=0)	COLUMN 7 (b7=1, b6=1, b5=1)
0	0	0	0	0	SP	0	—	✱	◊	P
1	0	0	0	1	··	1	α	?	A	Q
2	0	0	1	0	)	2	⊥	p	B	R
3	0	0	1	1	<	3	∩	Γ	C	S
4	0	1	0	0	≤	4	L	~	D	T
5	0	1	0	1	=	5	∈	↓	E	U
6	0	1	1	0	>	6	_	U	F	V
7	0	1	1	1	⊐	7	∇	ω	G	W
8	1	0	0	0	∨	8	Δ	⊃	H	X
9	1	0	0	1	∧	9	ι	↑	I	Y
A	1	0	1	0	≠	(	∘	⊂	J	Z
B	1	0	1	1	÷	⊏	⌶	←	K	{
C	1	1	0	0	,	;	□	⊢	L	⊣
D	1	1	0	1	+	x	⌷	→	M	}
E	1	1	1	0	.	:	T	≥	N	$
F	1	1	1	1	/	\	○	—	O	DEL

INTERPRETATION:

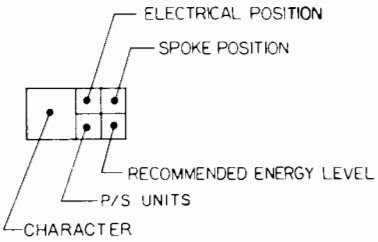


ESCY	.	2	94	ESCZ	¬	1	95

TABLE C-2. FRENCH, PLASTIC 96 CHARACTER PRINT WHEEL

ROW	b4	b3	b2	b1	COLUMN 2 (b5=0, b6=1, b7=0)	3 (b5=1, b6=1, b7=0)	4 (b5=0, b6=0, b7=1)	5 (b5=1, b6=0, b7=1)	6 (b5=0, b6=1, b7=1)	7 (b5=1, b6=1, b7=1)
0	0	0	0	0	SP	0	à	P	\	p
1	0	0	0	1	!	1	A	Q	a	q
2	0	0	1	0	"	2	B	R	b	r
3	0	0	1	1	£	3	C	S	c	s
4	0	1	0	0	$	4	D	T	d	t
5	0	1	0	1	%	5	E	U	e	u
6	0	1	1	0	&	6	F	V	f	v
7	0	1	1	1	'	7	G	W	g	w
8	1	0	0	0	(	8	H	X	h	x
9	1	0	0	1	)	9	I	Y	i	y
A	1	0	1	0	*	:	J	Z	j	z
B	1	0	1	1	+	;	K	□	k	é
C	1	1	0	0	,	<	L	Ç	l	ù
D	1	1	0	1	—	=	M	§	m	è
E	1	1	1	0	.	>	N	^	n	··
F	1	1	1	1	/	?	O	_	o	DEL

INTERPRETATION:

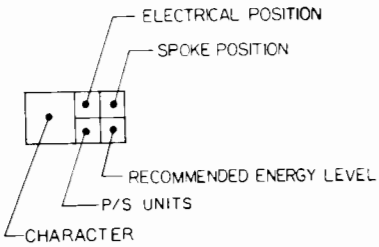


ESCY	Fr	2	94	4	ESCZ	l	1	95	2

TABLE C-3. ENGLISH, PLASTIC 96 CHARACTER PRINT WHEEL

ROW	b4	b3	b2	b1	COLUMN 2 (b5=0, b6=1, b7=0)	3 (b5=1, b6=1, b7=0)	4 (b5=0, b6=0, b7=1)	5 (b5=1, b6=0, b7=1)	6 (b5=0, b6=1, b7=1)	7 (b5=1, b6=1, b7=1)
0	0	0	0	0	SP	0	@	P	\	p
1	0	0	0	1	!	1	A	Q	a	q
2	0	0	1	0	"	2	B	R	b	r
3	0	0	1	1	#	3	C	S	c	s
4	0	1	0	0	$	4	D	T	d	t
5	0	1	0	1	%	5	E	U	e	u
6	0	1	1	0	&	6	F	V	f	v
7	0	1	1	1	'	7	G	W	g	w
8	1	0	0	0	(	8	H	X	h	x
9	1	0	0	1	)	9	I	Y	i	y
A	1	0	1	0	*	:	J	Z	j	z
B	1	0	1	1	+	;	K	[	k	{
C	1	1	0	0	,	<	L	\	l	|
D	1	1	0	1	—	=	M	]	m	}
E	1	1	1	0	.	>	N	^	n	~
F	1	1	1	1	/	?	O	_	o	DEL

INTERPRETATION:

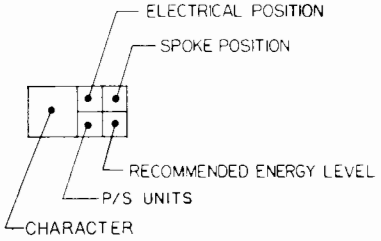


ESCY	¢	2	94	3	ESCZ	¬	1	95	2

TABLE C-4. NORSK, PLASTIC 96 CHARACTER PRINT WHEEL

ROW	b4	b3	b2	b1	COLUMN 2 (b7=0, b6=1, b5=0)	3 (0,1,1)	4 (1,0,0)	5 (1,0,1)	6 (1,1,0)	7 (1,1,1)
0	0	0	0	0	SP	0	@	P	\	p
1	0	0	0	1	!	1	A	Q	a	q
2	0	0	1	0	"	2	B	R	b	r
3	0	0	1	1	£	3	C	S	c	s
4	0	1	0	0	$	4	D	T	d	t
5	0	1	0	1	%	5	E	U	e	u
6	0	1	1	0	&	6	F	V	f	v
7	0	1	1	1	'	7	G	W	g	w
8	1	0	0	0	(	8	H	X	h	x
9	1	0	0	1	)	9	I	Y	i	y
A	1	0	1	0	*	:	J	Z	j	z
B	1	0	1	1	+	;	K	Æ	k	æ
C	1	1	0	0	,	<	L	Ø	l	ø
D	1	1	0	1	—	=	M	Å	m	å
E	1	1	1	0	.	>	N	^	n	~
F	1	1	1	1	/	?	O	_	o	DEL

INTERPRETATION:

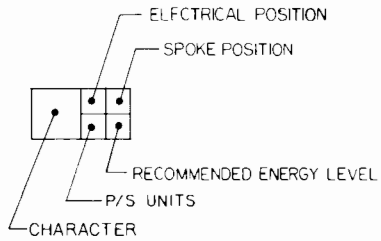


ESCY	\	2	94	2	ESCZ	|	1	95	2

TABLE C-5. GERMAN, PLASTIC 96 CHARACTER PRINT WHEEL

ROW	b4	b3	b2	b1	COLUMN 2 (b7=0, b6=1, b5=0)	3 (0,1,1)	4 (1,0,0)	5 (1,0,1)	6 (1,1,0)	7 (1,1,1)
0	0	0	0	0	SP	0	§	P	\	p
1	0	0	0	1	!	1	A	Q	a	q
2	0	0	1	0	"	2	B	R	b	r
3	0	0	1	1	£	3	C	S	c	s
4	0	1	0	0	$	4	D	T	d	t
5	0	1	0	1	%	5	E	U	e	u
6	0	1	1	0	&	6	F	V	f	v
7	0	1	1	1	'	7	G	W	g	w
8	1	0	0	0	(	8	H	X	h	x
9	1	0	0	1	)	9	I	Y	i	y
A	1	0	1	0	*	:	J	Z	j	z
B	1	0	1	1	+	;	K	Ä	k	ä
C	1	1	0	0	,	<	L	Ö	l	ö
D	1	1	0	1	—	=	M	Ü	m	ü
E	1	1	1	0	.	>	N	^	n	ß
F	1	1	1	1	/	?	O	_	o	DEL

INTERPRETATION:

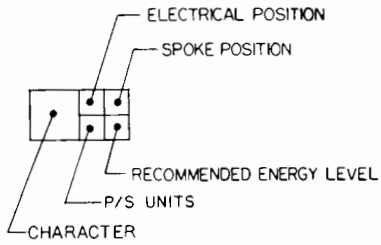


ESCY	~	52	44	1	ESCZ	|	1	95	2

TABLE C-6. SCANDINAVIAN, PLASTIC 96 CHARACTER PRINT WHEEL

ROW	COLUMN 2	3	4	5	6	7
	(MSB) b7	0	0	1	1	1	1
	b6	1	1	0	0	1	1
b4	b3	b2	b1 (LSB) b5	0	1	0	1	0	1
0	0	0	0	SP	0	@	P	`	p
1	0	0	0	1	!	1	A	Q	a	q
2	0	0	1	0	"	2	B	R	b	r
3	0	0	1	1	#	3	C	S	c	s
4	0	1	0	0	$	4	D	T	d	t
5	0	1	0	1	%	5	E	U	e	u
6	0	1	1	0	&	6	F	V	f	v
7	0	1	1	1	'	7	G	W	g	w
8	1	0	0	0	(	8	H	X	h	x
9	1	0	0	1	)	9	I	Y	i	y
A	1	0	1	0	*	:	J	Z	j	z
B	1	0	1	1	+	;	K	Ä	k	ä
C	1	1	0	0	,	<	L	Ö	l	ö
D	1	1	0	1	-	=	M	Å	m	å
E	1	1	1	0	.	>	N	^	n	~
F	1	1	1	1	/	?	O	_	o	DEL

INTERPRETATION:



ESCY	\	2	94	ESCZ	¦	1	95