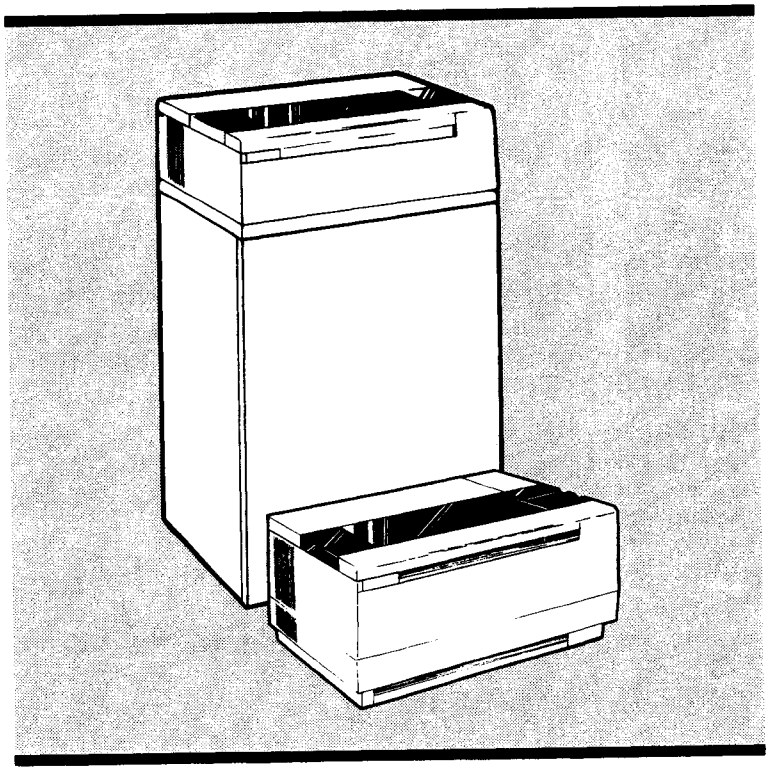
HEWLETT PACKARD

2562C 2563A/B/C Service Manual

Manual P/N 02563-90971



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The following conventions are used throughtout this manual:

NOTE

Notes contain important information that is set off from the text.

CAUTION

Caution messages appear before procedures which, if not observed, could result in damage to equipement.

WARNING

Warning messages indicate when a specific procedure or practice is not followed correctly, personal injury could occur.

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Chapter 1

Product Information
2562C 2563A/B/C

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1-1. INTRODUCTION

This manual provides installation and servicing information for the HP 2562C, 2563A/B/C printer. A functional theory of operation provides a general overview of the electrical operation of the unit. The following information is included in this manual:

Chapter 1.	Product Information
Chapter 2.	Installation
Chapter 3.	Theory of Operation
Chapter 4.	Configuration & Diagnostics
Chapter 5.	Adjustments
Chapter 6.	Removal and Replacement
Chapter 7.	Parts & Diagrams

1-2. PRODUCT DESCRIPTIONS

The HP 2562C and 2563C are impact line printers at the low end of Hewlett-Packard's 256X impact printer family. The PCL printer language ensures common feature access, software development protection and a smooth upgrade path. Both printers provide up to 420 LPM (Lines Per Minute) print speed.

The HP 2562C is a desktop model and the HP 2563C printer is a cabinet-mounted (free-standing) model.

The HP 2563A and 2563B printers are no longer manufactured. The HP2563A was a desktop model, and the HP 2563B was cabinet-mounted (2563B option 114 was a desktop version).

1-3. IDENTIFICATION

Each printer has an identification plate which lists the model and the serial number and is attached to the rear panel next to the power switch. The model number is an alphanumeric (such as 2563C). The serial number consists of a four digit prefix, a letter, and a five digit suffix (0000(A/Y)00000). The prefix is used to indicate design changes. The letter in the fifth location designates the country in which the printer was manufactured ("A" = United States and "Y" = Mexico). The suffix is a sequential number which increments with each printer.

The identification plate also lists the factory installed options. The option numbers are three-digit numbers (such as 015) which, in combination with the model number, indicate the configuration of the unit.

Printed circuit assemblies (PCA's) are identified by a part number and an alphanumeric code consisting of a letter, series code, and a division code stamped or etched on the assembly (for example A-1940-46). The letter identifies the version of the etched trace pattern on the unloaded printed circuit board. The four digit series code pertains to the electrical characteristics of the loaded PCA. The division code identifies the division that manufactured the PCA.

1-4. OPTIONS

The standard HP 2562C, 2563A/B/C are a 300 line per minute (420 LPM using Sparse Character Set), 132 column printer configured for 120 Vac operation. Unless ordered differently, the unit is provided with a power cord for use in the United States, a Roman-8 character set (standard and high speed), a double-high, double-wide (5cpi) character set, and a 16-channel programmable Vertical Format Control (VFC). The standard HP 2562C also includes 13.3 cpi ROMAN8, high density ROMAN8, bar codes, and large block and line draw characters.

Table 1-1. HP 2562C 2563A/B/C OPTIONS

OPTION			
Character Sets (HD=High Density, ND=Normal Density)			
001	*	ND	Line Draw, Math and Block Character Sets
002	#	ND	KATAKANA8 Character Set (2562C use opt 047)
003	#	HD	OCR A and OCR B Character Sets
004	*	HD	ROMAN8 Character Set
005		HD	Italic ROMAN8
006		HD	KATAKANA8 Character Set
007		HD	Bar Codes (2563A ONLY - replaced by 008)
008	*	HD	Bar Codes (3 of 9, 2 of 5, UPC A/E, EAN 8/13)
009	#	ND	12 and 13.3 cpi ROMAN8
010	#	ND	12 and 15 cpi ROMAN8
013	#	ND	13.3 and 15 cpi ROMAN8
026	#	ND	Cyrillic (ECMA 113/86)
027	#	HD	Cyrillic (ECMA 113/86)
028	#	ND	Cyrillic (ECMA 113/88)
029	#	HD	Cyrillic (ECMA 113/88)
030	#	ND	Line Draw and ARABIC8
031	#	HD	ARABIC8
032	#	ND	ASCII, Line Draw and TURKISH8
033		HD	ASCII and TURKISH8
034	#	ND	ASCII, Line Draw and GREEK8
035		HD	ASCII and GREEK8
036	#	ND	ASCII, Line Draw and HEBREW8
037		HD	ASCII and HEBREW8
038	#	ND	ASCII, Line Draw and HEBREW7
039		HD	HEBREW7
043	#	ND	East European (ECMA 94/Latin2)
044	#	HD	East European (ECMA 94/Latin2)
047	@	ND	KATAKANA8 and ROMAN8 (also HD KATAKANA8)
060	@	ND	16.67 cpi compressed (replaces 13.3 cpi)

Table 1-1. HP 2562C 2563A/B/C OPTIONS

OPTION			DESCRIPTION
* 2563B/C models ONLY (standard on 2562C) # Not available on 2562C @ Available on 2562C ONLY			
POWER SUPPLIES			
015	220 VAC, 50/60 Hz.		
016	100 VAC, 50/60 Hz.		
017	100 VAC, 50/60 Hz.		
INTERFACE SUBSYSTEMS			
046			HP-IB Interface (standard)
049			RS-232C Interface
050			RS-422A Interface
052	*		Dataproducts Short Line Interface
053		#	Centronics Parallel Interface
054	*		Dataproducts Long Line Interface
055		#	HP 3000 Multipoint Interface
100		#	HP 1000 interface, parallel/differential
200		#	Series 200 Basic/Pascal HP-IB Interface
210	*	#	HP 1000 M, E, F HP-IB Interface
214	*	#	HP 1000 A-Series HP-IB Interface
230	*	#	HP 3065 HP-IB Interface
250		#	HP 250/260 HP-IB Interface
264		#	HP 64000 HP-IB Interface
290		#	HP Series 300/500 HP-IB Interface/Series 840
300	&	#	HP 3000 Series III Parallel (HP 2608A-compatible)
333	&	#	HP 3000 Series 30, 33 HP-IB Interface
337	*	#	HP 3000 Series 37 HP-IB Interface
340	*	#	HP 3000 Series 39/40/42 HP-IB Interface
344	*	#	HP 3000 Series 44/48/58 HP-IB Interface
364	*	#	HP 3000 Series 64/68 HP-IB Interface
393	*	#	HP 3000 Series 930 HP-IB Interface
850	*	#	HP Shared Resource Manager HP-IB Interface
1AX	@		Multiple I/O: RS232-Centronics-TCP/IP expandable

Table 1-1. HP 2562C 2563A/B/C OPTIONS

OPTION			DESCRIPTION
ALZ	@		Multiple I/O: RS422-Centronics-TCP/IP expandable
ALY	@	**	TCP/IP for HPUX, adaptor box
@ 2562C/2563C only ** To order Lan Adaptor Box you must also order either option 1AX or ALZ (Multiple I/O with Lan Connector), as well as one of the supported TCP/IP LAN PCA's: - C2071S, twisted pair connection - C2071T, coax connection			
CONVENIENCE OPTIONS			
022	*		128 kB version vector graphics board
023	*		512 kB version vector graphics board
024			HP Label Card
065	*		HP 3000 Printer Graphics Support Software
068			Three-pack ribbon starter kit (92162A)
110	&		Sound reduction attachment
112	&		Enclosed printer cabinet with paper shelf
114	*		Desktop printer (deletes printer cabinet)
115	&		Passive paper stacker (for use with cabinet)
400	@		HP Label Card II
500	&		Options #001, #004, #005, #068, #110, and #112
510	*		Options #004, #005, #008, #068
715			Service Documentation
&=2563A ONLY *=2563B ONLY #=Not on 2562C			

1-5. SUPPLIES

RIBBON CARTRIDGES

P/N 92162A Box of three standard cartridges

P/N 92162M Box of three carbon impregnated cartridges for barcode and OCR printing applications.

PAPER

The HP 2562C, 2563A/B/C printers use continuous fan-fold perforated paper varying in width from 3.0 to 16.75 inches. Although the printer accepts paper as wide as 16.75 inches, the farthest right it can print is 14.75 inches. The printer handles paper weights ranging from 15 to 100 pounds. All papers should be tested before large purchases are made. Customer assumes all responsibility for the quality and performance of the media.

Multi-part forms up to six-parts may be used (carbonless multi-part forms up to four parts), with a maximum pack thickness of.024 inches (.61 mm). Forms should be tried at high and low humidity to determine if static buildup must be eliminated for proper stacking.

The following paper types are recommended for use in the HP 2562C, 2563A/B/C printer:

92157A	One-part, white, 8.5 x 11 in. 18 pound bond	2400 sheets/box
92157B	One-part, white, 8.5 x 11 in. 3-hole punched, 15 pound bond	3200 sheets/box
92157C	One-part, white, 8.5 x 11 in. 20 pound #1 bond	2400 sheets/box
9280-0218	One-part, green bar, 9.9 x 11 in. 80-column, 15 pound bond	3200 sheets/box
9280-0705	One-part, white, 8.5 x 11 in. 72-column, 15 pound bond	3200 sheets/box

9320-1515	One-part, blue bar, 14.9 x 11 in. 132 column, 18 pound bond	2400 sheets/box

Refer to the printer Operator's Manual for complete paper specifications.

1-6. RELATED MANUALS

The following manuals provide additional information on the HP 2562C, 2563A/B/C printer:

HP 2562C Operator's Manual	P/N 02562-90901
HP 2563C/64C Operator's Manual	P/N 02564-90988
HP 256X Family Technical Reference Manual	P/N 02564-90905
HP-IB Interface Manual	P/N 26067-90901
Multipoint Interface Manual	P/N 26067-90902
RS-232/422 Serial Interface Manual	P/N 26067-90921
Parallel-Differential Interface Manual	P/N 26067-90905
Centronics Parallel Interface Manual	P/N 26067-90906
Dataproducts Parallel Interface Manual	P/N 26067-90907
Super Centronics I/F Manual	P/N 26067-90957
Label Card Manual	P/N 26062-90902
Condensed Operator's Manual	P/N 02564 90922
Stacking Aid Manual	P/N 02564-90987
Multiple I/O	P/N 02563-90976
Label Card II	P/N 02563-90974

1-7. SPECIFICATIONS

PHYSICAL CHARACTERISTICS

	Desktop Models	Cabinetized Models	Cabinetized New-Look
Width:	59.5 cm (23.4 in)	59.5 cm (23.4 in)	59.5 cm (23.4 in)
Depth:	45.0 cm (17.7 in)	81.0 cm (31.9 in)	83.0 cm (32.7 in)
Height:	27.0 cm (10.7 in)	100 cm (39.4 in)	100 cm (39.4 in)
Weight:	34.0 kg (75.0 lb)	2563C=74 kg (165 lb)	105.5 kg (232.5 lb)

ELECTRICAL CHARACTERISTICS

Input Voltages

100,120 Vac (+5%, -10%), 50/60 Hz
220,240 Vac (+5%, -10%), 50/60 Hz

Power Consumption

80 Watts non-printing
260 Watts printing (typical)
600 VA printing (peak)

ENVIRONMENTAL

Temperature

Operating (printer plus ribbon) 10 to 50 degrees C (50 to 122 F)
Storage (printer) -40 to 75 degrees C. (-40 to 167 F)
Survival (power-on) -20 to 60 degrees C. (-4 to 149 F)
Storage (ribbon) 10 to 50 degrees C. (50 to 122 F)

Relative Humidity

Non-Operating - 5% to 95% (non-condensing)
Operating - 30% to 80% (advised)

Audible Noise. (in accordance w/ISO 9296)

PRINTING	IDLING
2562C	
LWAd = 78 dB	LWAd = 60 dB
LpAm = 64 dB	LpAm = 46 dB
2563C	
LWAd = 69 dB	LWAd = 54 dB
LpAm = 52.3 dB	LpAm = 38 dB
NEW-LOOK (sound enclosure)	
LWAd = 65 dB	LWAd = 53 dB
LpAm = 48 dB	LpAm = 37 dB

LWAd = Sound power.
LpAm = Average sound pressure at 4 bystander positions.

1-8. SAFETY COMPLIANCE

The HP 2562C, 2563A/B/C printer are listed by Underwriter's Laboratories, Inc. in the following categories with respective guide designations: Electronic Data Processing Equipment (EMRT), and Office Appliances and Business Equipment(QAOT).

The Canadian Standards Association has certified this printer as data processing equipment. In addition, this printer was designed to meet most European Safety and RFI/EMC standards for Electronic Data Processing Equipment effective December 1, 1981. Any questions concerning regulatory compliance should be directed to the local Hewlett-Packard Sales Office.

1-9. FCC RFI STATEMENT

The Federal Communications Commission (In 47 CFR 15.818) has specified that the following notice be brought to the attention of users of this product.

Warning: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Any changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate this equipment.

NOTE

Use of a shielded cable is required to comply within the Class A limits in Subpart J of Part 15 of FCC rules.

1-10. SERVICE APPROACH

Repair of the printer is based on modular level replacement of printed circuit assemblies and electro-mechanical subassemblies. The self-test feature and diagnostics (explained in Chapter 4) serves as an aid in isolating problem areas of the printer. Once the problem assembly is located, that assembly should be replaced without further attempts to identify component failures within the assembly.

Chapter 2

Installation
2562C 2563A/B/C

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2-1. INTRODUCTION

This section of the manual provides information concerning printer site selection, unpacking, inspection, and installation. The following procedures are discussed in this chapter:

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2-2. SITE REQUIREMENTS

ENVIRONMENTAL

The printer is designed for operation in a clean, traffic free environment, preferably in an area not subject to excessive shocks, vibrations, or a wide range of temperatures. Air conditioning is not required to ensure reliable operation, but the environmental specifications listed in Section 1-7 should not be exceeded.

PHYSICAL

The printer's location must provide adequate operator access to both the front 3 ft. (1 m) and rear 2 ft. (0.7 m) of the printer. Grillwork for the exhaust fan, which permits circulation of air, should be clean and free from obstructions. The area around the printer should be kept clean and dust-free at all times.

2-3. UNPACKING AND INSTALLATION

The steps involved in unpacking and installation differ for the cabinet mounted (2563C) printers versus the desktop models (2562C). Procedures for the cabinet mounted printers begin in the next section. For unpacking and installation of the desktop printer, see Page 2-23.

Prior to unpacking the printer, examine the shipping container for any signs of damage which might indicate damage to the printer (broken pallet, holes in the container, etc.). If the shipping container is damaged, write a notation on the freight bill describing the damage before signing.

NOTE

The printer should not be unpacked unless a qualified service representative is present. Do NOT destroy or discard the shipping container or any packing materials. In case of a damage claim, the shipping container and packing materials will be needed to be inspected by the freight shipper and possible reshipment of the printer to the factory.

UNPACKING: 2563C (CABINET-MOUNTED PRINTERS)

The following unpacking procedure describes the proper way to unpack the cabinet-mounted HP 2563B and 2563C printers. (See page 2-23 for unpacking instructions for the desktop models; HP 2562C, HP 2563A and HP 2563B option 114.)

WARNING

Protective glasses must be worn while cutting the strapping bands around the container. These straps are under tension and when cut may spring back, potentially causing serious eye injury.

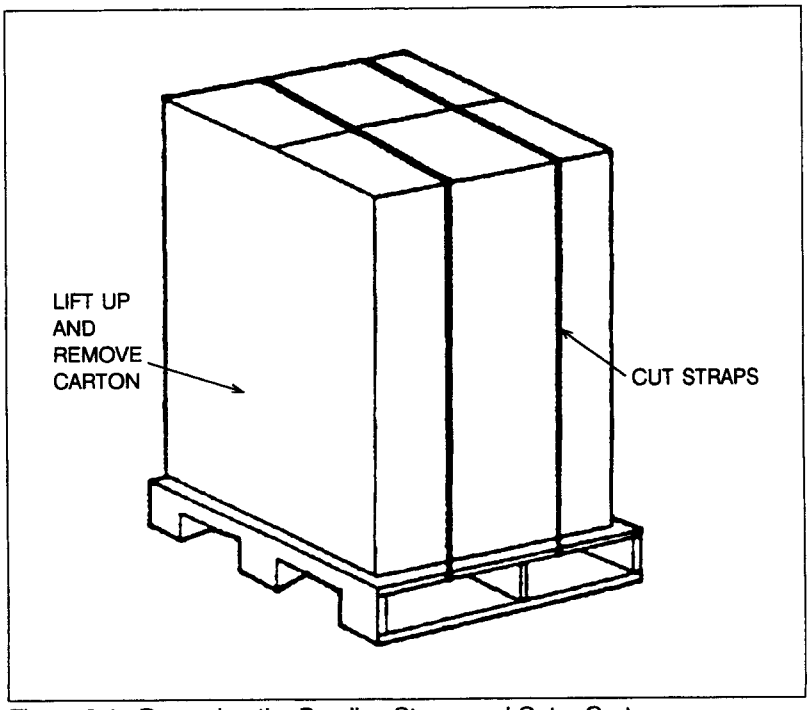


Figure 2-1. Removing the Banding Straps and Outer Carton

a. Wearing protective glasses, stand to one side and cut the banding straps around the outer cardboard carton (see Figure 2-1). Remove the outer carton.

b. Set aside any accessory cartons (these will be used later). Locate one wooden block (1 x 2 x 8 inches). This will be used in step d (see Figure 2-2).

WARNING

The ramp is held in place by the two banding straps and may fall down when the straps are cut.

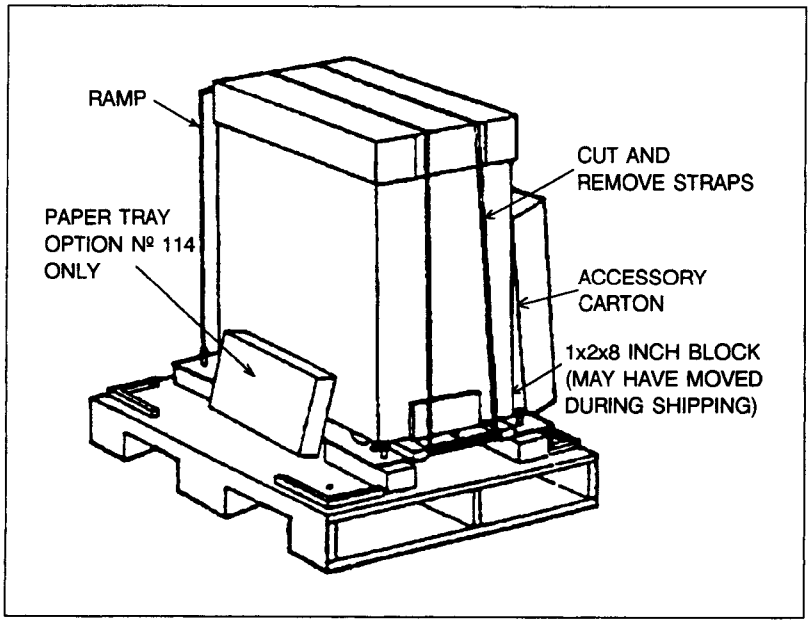


Figure 2-2. Removing the Restraining Straps

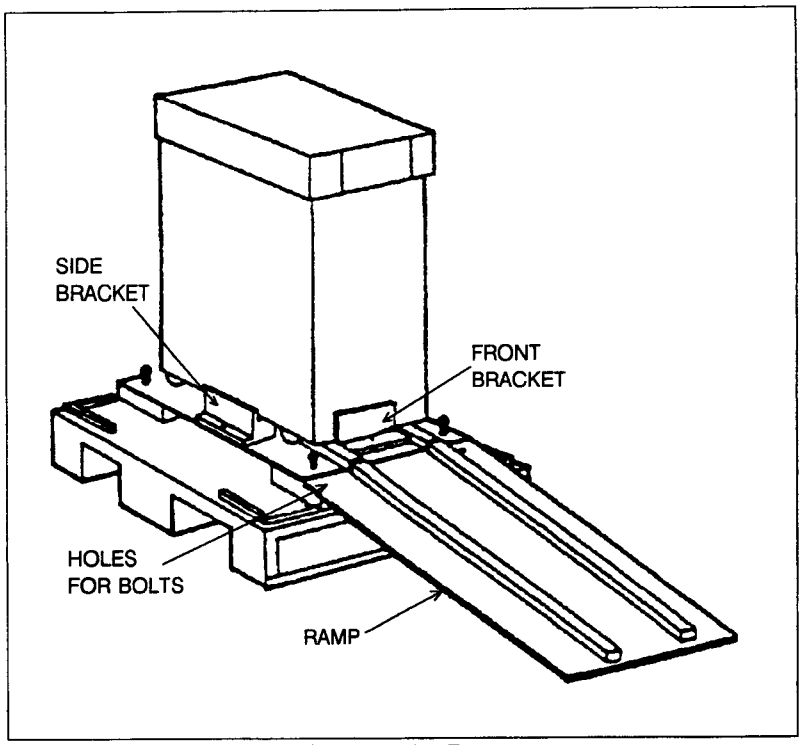


Figure 2-3. Positioning and Securing the Ramp

c. Position the ramp as shown in Figure 2-3. Align the two holes at the top of the ramp with the two holes in the blocks on the pallet. Remove the bolts holding the side brackets and insert these bolts through the holes in the ramp to hold it in place.

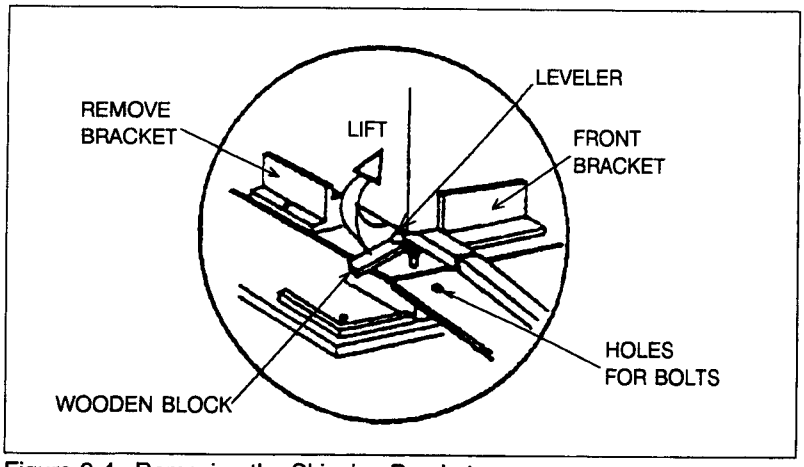


Figure 2-4. Removing the Shipping Brackets

d. Using the wooden block (located in step b) as a lever, lift the printer (as shown) just enough to slide the side bracket out. Then move the block to the other side and repeat the process to remove the other side bracket. After both side brackets have been removed, remove the bolt holding the front bracket. Using the wooden block under the leveler, lift the printer just enough to slide the front bracket out.

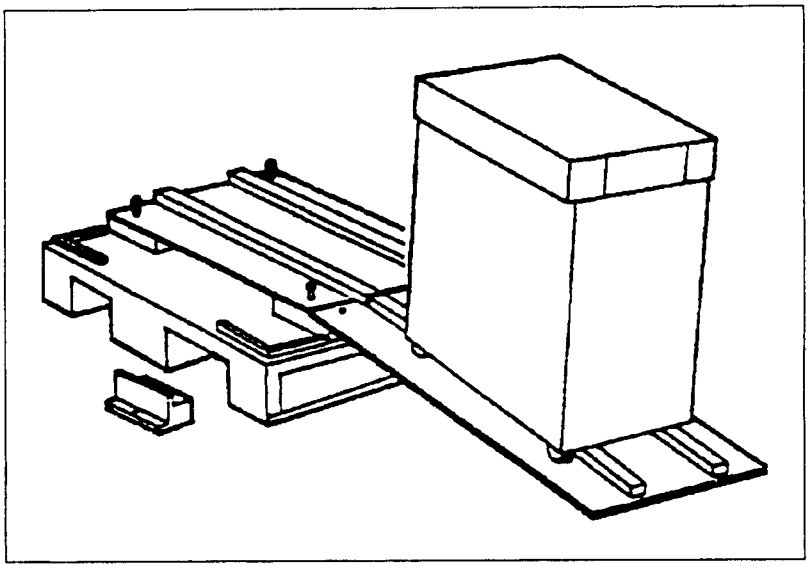


Figure 2-5. Rolling the Printer off the Shipping Pallet

WARNING

Two people are required to perform step "e" to prevent injury or damage to the printer.

The ramp must be placed correctly and secured by two bolts. Failure to do so could result in the ramp sliding out of position while off-loading the printer.

e. Ensure the levelers on the bottom of the printer are in the raised position. Using two people, roll the printer carefully down the ramp (as shown in Figure 2-5). One person should guide the printer from the front while the other person guides and assists from the rear or side of the printer.

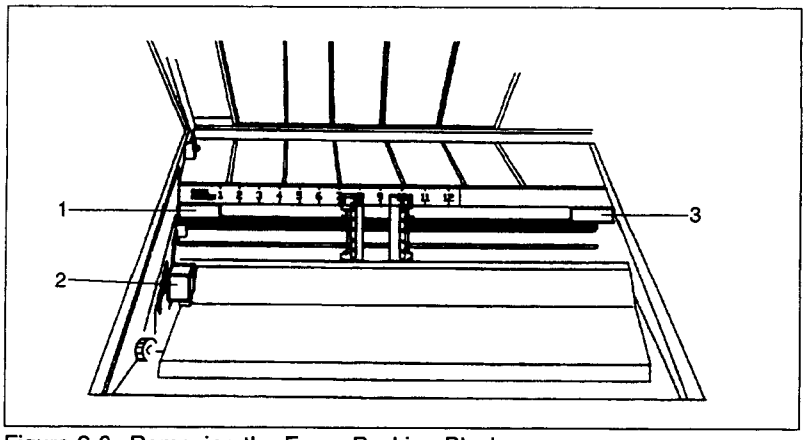


Figure 2-6. Removing the Foam Packing Blocks

f. Open the printer's top access cover. Remove the three foam packing blocks in the order shown in Figure 2-6. Block #1, #2 and #3 are removed by grasping toward the rear and pulling up and out.

UNPACKING: PAPER STACKING AID (2563C PRINTERS)

The paper stacking aid, supplied with a standard HP 2563C printer, is shipped in a separate container. It must be unpacked as follows:

NOTE

These unpacking instructions do not apply to a paper stacking aid upgrade kit (P/N 26770C). Separate installation instructions are supplied when the stacking aid is ordered separately.

a. With the arrow pointing up, open the top of the box.

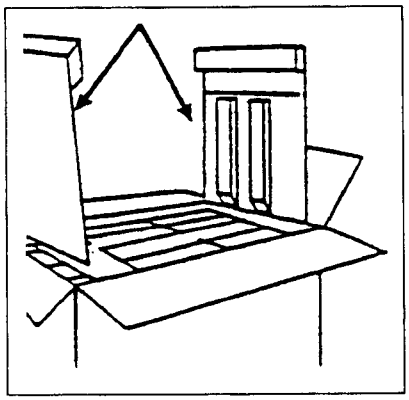


Figure 2-7. Remove Packing Material

b. Remove the two cardboard and foam pieces from each end of the stacking aid (Figure 2-7).

c. Remove the wire paper basket and take off the cardboard sheet, with the screws attached (Figure 2-8).

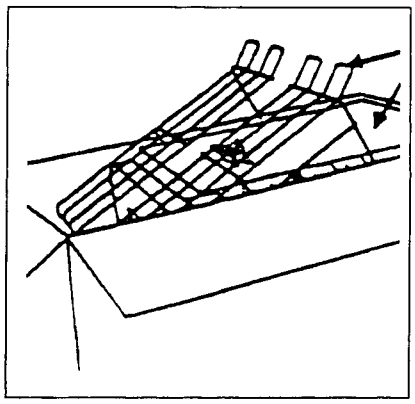


Figure 2-8. Remove Wire Basket

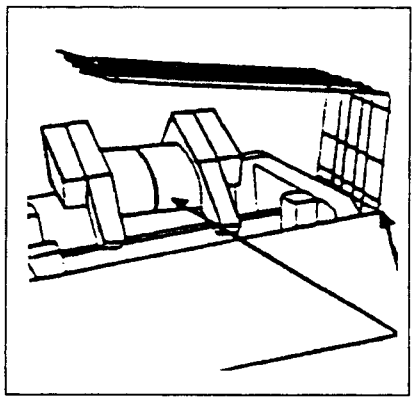


Figure 2-9. Remove Backstop & Forms Break

d. Lift out the backstop and forms break, and remove the two attached foam pieces (Figure 2-9).

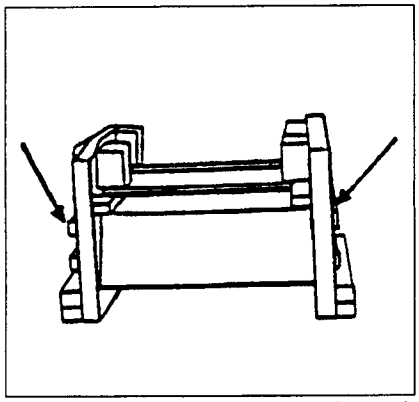


Figure 2-10. Remove Sound Shroud

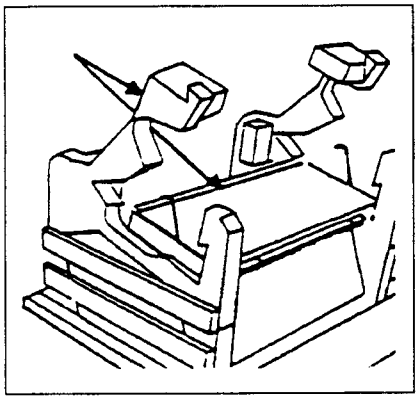


Figure 2-11. Remove Wire Form

e. Grasp the yellow foam end caps and lift to remove the sound shroud and wire form assembly from the box. Place it on a flat surface to disassemble (see Figure 2-10).

In the following step, when removing the wire form, be careful not to catch the plastic tabs on anything, as they may tear.

f. On the top of the sound shroud, pull the foam on either side of the wire form outward and carefully lift out the wire form (Figure 2-11).

g. Remove the two foam end-caps from the shroud, then turn the sound shroud upside down so the cardboard is facing up. Remove the cardboard from the sound shroud.

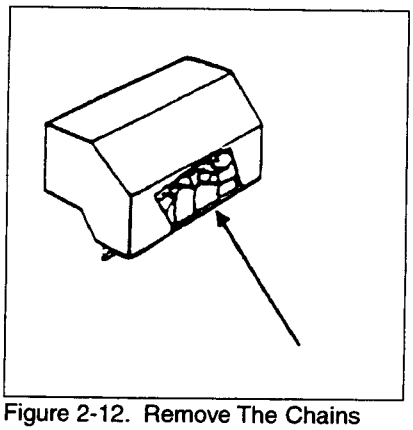


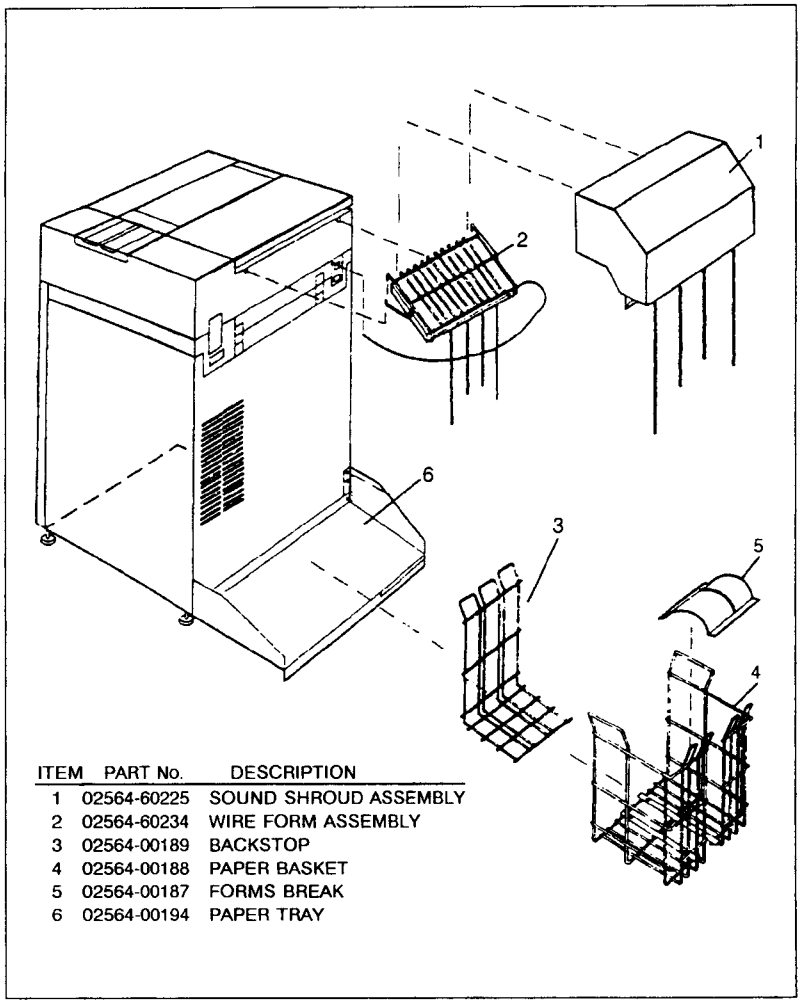
Figure 2-12. Remove The Chains

h. Untape the bag attached to the sound shroud and remove the chains (see Figure 2-12).

i. Lift out the paper tray.

INSPECTION: 2563C (CABINET-MOUNTED PRINTERS)

After unpacking, inspect the printer and stacking aid for signs of physical damage (cracks, broken parts, etc.). Check all shipping documents and the identification plate on the back of the unit to ensure that all parts have been received (see Figure 2-13), and that the printer conforms to purchased specifications. If the printer or cabinet appears to have been damaged save the shipping container for inspection by the carrier in shipment, notify the carrier and the nearest Hewlett-Packard Sales and Service Office immediately.



ITEM	PART No.	DESCRIPTION
1	02564-60225	SOUND SHROUD ASSEMBLY
2	02564-60234	WIRE FORM ASSEMBLY
3	02564-00189	BACKSTOP
4	02564-00188	PAPER BASKET
5	02564-00187	FORMS BREAK
6	02564-00194	PAPER TRAY

Figure 2-13. Paper Stacking Aid Parts

INSTALLATION: PAPER STACKING AID (2563C PRINTERS)

WARNING

Make sure the printer's power is OFF and the power cord is unplugged from the wall before assembling the Paper Stacking Aid. Installing the parts with the power on may cause injury to yourself or damage to the equipment.

The paper tray gives the printer stability. Install it before any other part of your Paper Stacking Aid.

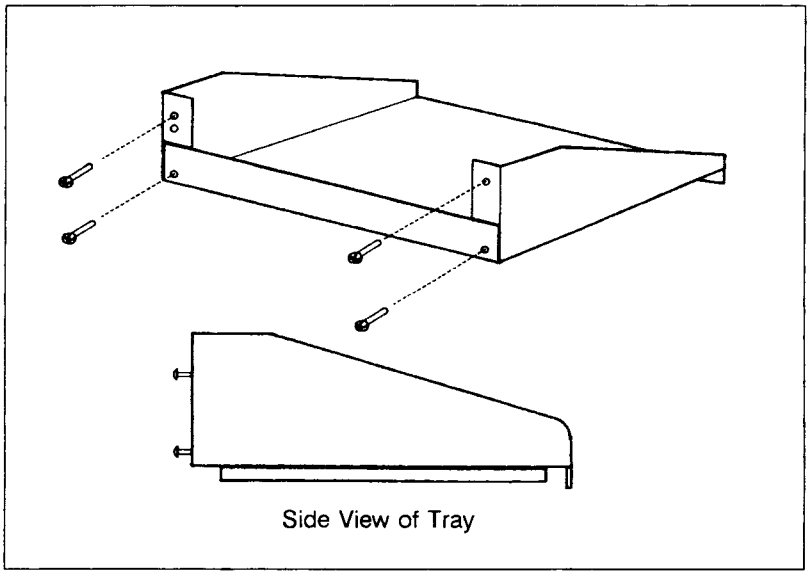


Figure 2-14. Starting the Screws in the Paper Tray

a. Start the screws in the paper tray. Use a #2 Pozidrive screwdriver to start the four screws in the paper tray (Figure 2-14).

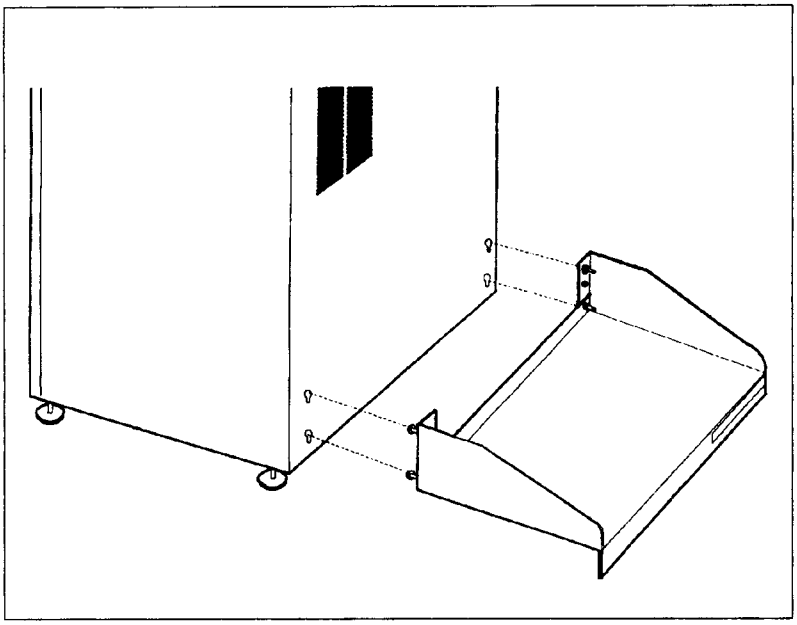


Figure 2-15. Attaching the Paper Tray

b. Insert the screws into the key slots. Align the screws to the holes in the back panel of the printer and insert into the key slots. Drop into place (Figure 2-15).

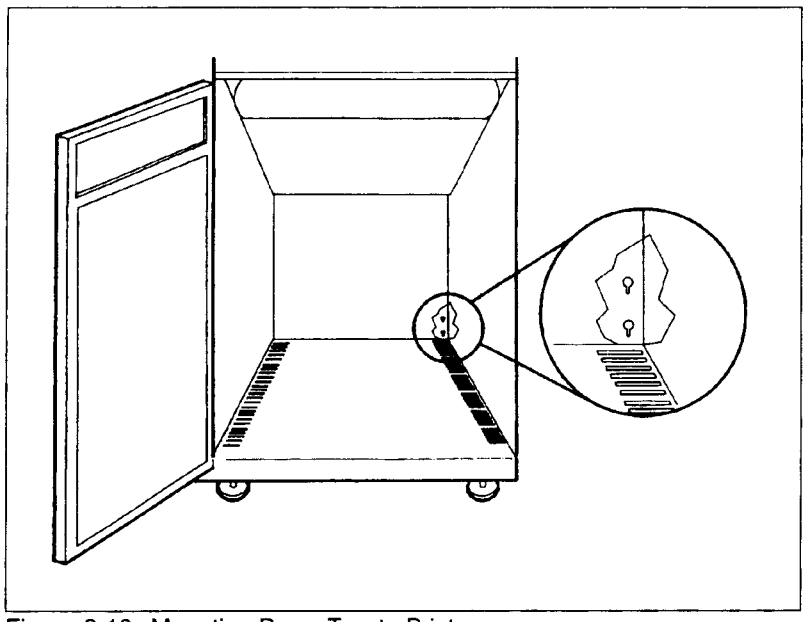


Figure 2-16. Mounting Paper Tray to Printer

c. Attach the paper tray to the printer. Tighten the screws to the back panel from inside the printer stand. You will need to hold back the soundproofing foam in order to reach the screws (Figure 2-16). (Some cabinets may not have foam.)

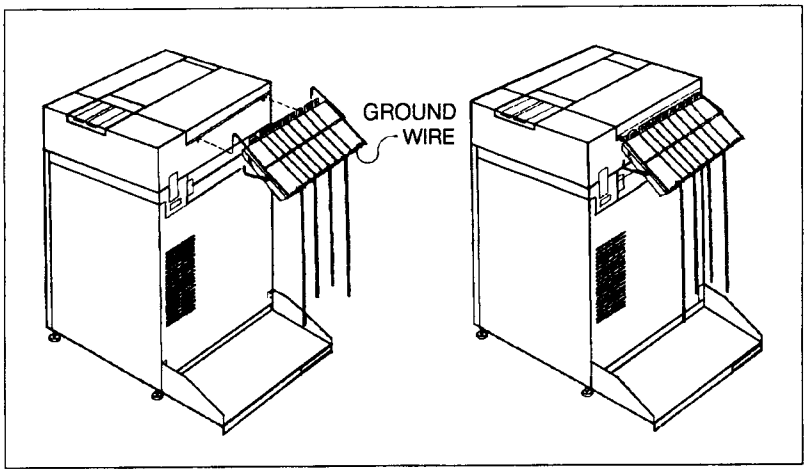


Figure 2-17. Attaching Wire Form

d. Attach the wire form. Hook the wire form into the holes on the top cover (Figure 2-17). Make sure the four chains hang freely.

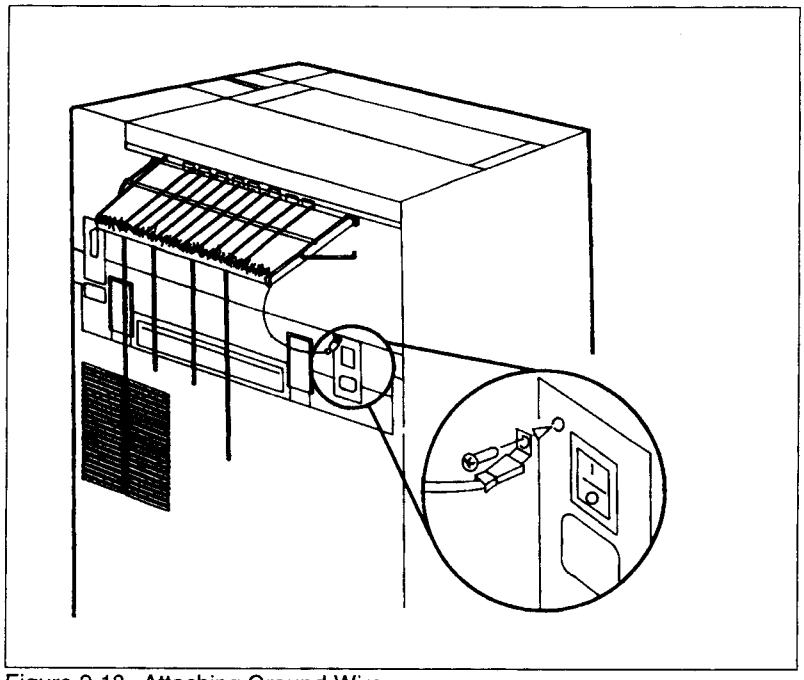


Figure 2-18. Attaching Ground Wire

e. Hook up the ground wire. Locate the small screw next to the power switch on the back panel of the printer. Insert the ground wire onto the spade lug underneath the screw (Figure 2-18). (If you detached the previous ground wire from the printer, you should have pulled the ground wire away from the spade lug, leaving the lug under the screw. If not, remove the screw, put the spade lug and attached ground wire under it, and fasten the screw to the back panel.)

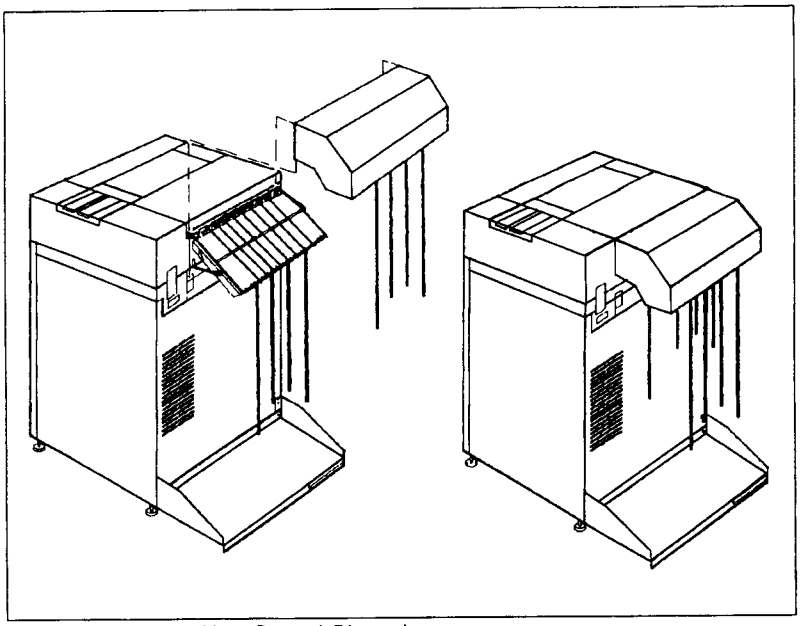


Figure 2-19. Installing Sound Shroud

f. Install the sound shroud. Slide the sound shroud directly over the wire form (Figure 2-19). Push firmly until it snaps into place. Make sure it fits tight against the back of the printer and flush with the top of the printer. The four chains should hang freely.

g. Place the backstop onto the paper tray. Position it one inch from the back panel.

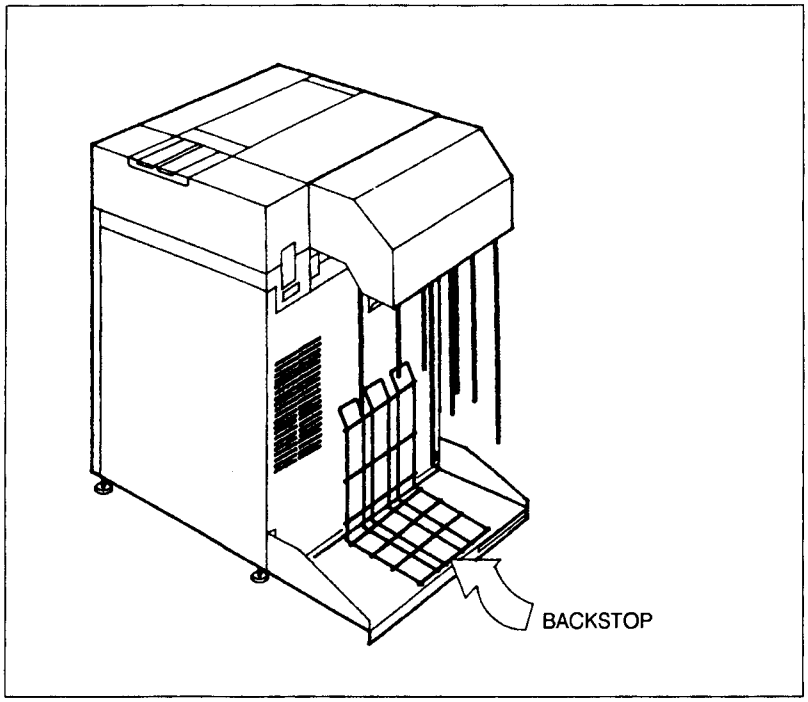


Figure 2-20. Backstop on the Paper Tray

h. Set the paper basket and forms break on the backstop. Put the paper basket on top of backstop with the open end facing the back panel. Place the forms break in the center of the basket (Figure 2-21). Make sure all eight chains hang freely inside the basket.

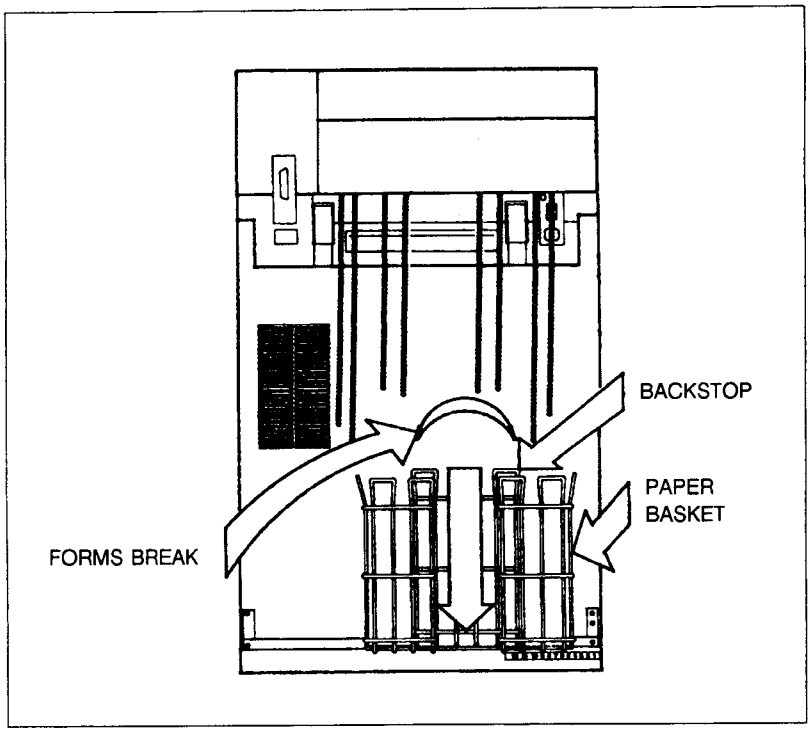


Figure 2-21. Paper Basket and Forms Break over Backstop

UNPACKING: 2562C (DESKTOP PRINTER)

WARNING

The printer, when packaged for shipment, weighs about 75 pounds. Care must be taken when handling to avoid personal injury or printer damage.

To unpack the desktop printer (HP 2562C), perform the following:

a. Move the printer to the desired location. Ensure that the shipping container faces up as labeled.

b. Remove the shipping tape to open either end of the container.

c. Slide the printer out of the end of the container.

d. Lift up and remove the foam packaging material from the top half of the printer. Remove the plastic cover.

e. Open the printer's top access cover.

f. Remove the five foam packing blocks in the order shown in Figure 2-22 Block #1 and #2 are removed by grasping toward the rear and pulling up and out. When block #3, located under the forms loading lever is removed, the last two blocks, located behind the print mechanism will be freed.

g. Carefully lift the printer off the packing pallet. The printer may now be readied for use.

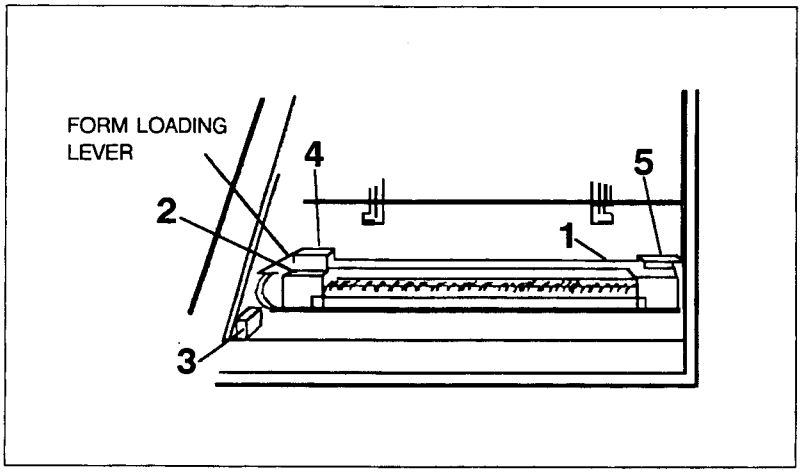


Figure 2-22. Removing the Foam Packing Blocks

INSPECTION: 2562C (DESKTOP PRINTER)

After unpacking, inspect the printer for signs of physical damage (cracks, broken parts, etc). Check all shipping documents and the identification

plate on the back of the unit to ensure the printer conforms to purchase specifications. If the printer appear to have been damaged, notify the carrier and the nearest Hewlett-Packard Sales and Service Office immediately.

COMPLETING THE INSTALLATION (ALL PRINTERS)

a. Ensure that the printer's operating location provides adequate operator access to both the front 3 ft (1 m) and rear 2 ft (0.7) of the printer. Grillwork for the left side exhaust fan, which permits circulation of air, should be clean, free of obstructions, and there should be sufficient clearance to allow free air flow. Section 1-7 (Chapter 1), lists printer dimensions to help in planning the printer location.

b. Check the identification plate to make sure the printer is correctly configured to the input power. Refer to Section 2-4 for power configuration information.

c. Refer to the appropriate Operator's Manual and Interface Manual for step-by-step instructions in completing the printer installation, including ribbon and paper loading and adjustment, printer and I/O configuration, and initial verification self-tests.

2-4. POWER CONFIGURATION

The printer set-up requires that the printer be configured to the local power source. Standard power configuration is for 120 Volt AC, 50/60 Hz operation. Optional power configurations (which are normally configured at the factory), are as follows:

OPTION NO.	DESCRIPTION
015	220 Vac. 50/60 Hz
016	100 Vac. 50/60 Hz
017	240 Vac. 50/60 Hz

Option numbers are listed on the identification plate located at the rear of the printer. If a change in power configuration is required, proceed as follows:

a. Ensure that the printer's ON/OFF switch is set to the OFF (0) position and that the input power cable is disconnected from the printer.

b. Remove the printer's top cover as described in Section 6-3, Chapter 6.

WARNING

HAZARDOUS VOLTAGE

The ac power cord must be unplugged from the printer when making a power configuration change to the printer. With the printer's power switch set to OFF and the ac power cord still plugged in, ac line voltage is still applied to certain areas of the circuitry, such as the FUSE (F1) and FUSE HOLDER.

c. The printer may be configured to operate with either a 100, 120, 220, and 240 Vac source (see Figure 2-23). Configuring the printer input power requires the installation of transformer T1 primary (six pin connector) into either J10 (220/240) or J11 (100/120), and the installation of a fuse in position F1 or F2 (for fuse size see label on board). Verify that the primary of transformer T1 and the fuse are installed in the correct positions corresponding to the input power source.

d. If the printer contains an HP-IB interface, the "Unit Loads" must be set to conform to the overall system. Refer to the 26067A HP-IB Interface Manual (P/N 26067-90901) for calculating the HP-IB load requirements for the printer.

e. Reinstall the printer top cover, following the replacement procedure in Section 6-3, Chapter 6.

f. Install a ribbon and load paper in the printer (see Operator's manual).

g. Connect the power cord to the printer and set the ON/OFF power switch, at the rear of the printer, to the ON (1) position.

h. Perform the printer self-test (see Section 2-5.)

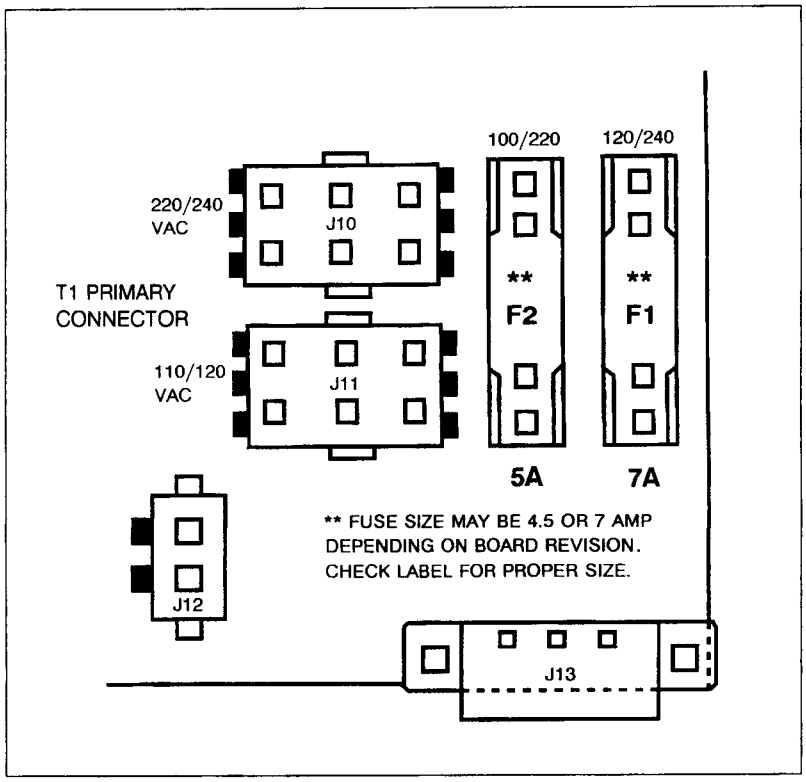


Figure 2-23. Input Power Selection

2-5. SELF-TEST

The TEST key on the Operator's Control Panel starts a routine which verifies the printer's operational status. The Self-test can be run in its entirety, or specific subtests may be performed individually (see Chapter 4).

The printer must be OFFLINE to perform the self-test function. To perform the complete self-test function (excluding the I/O tests), press the TEST key and then press the ENTER key. To run a continuous self-test, press and hold the TEST key for more than five seconds (until the status display changes to a four), and then press ENTER. To exit the self-test mode, press the TEST key momentarily.

When Self-test has completed and no errors are detected, the printer returns to the status mode and front panel displays a "0". If an error occurs during Self-test, an error display flashes on the printer's display. Refer to Chapter 4 of this manual for more information on Self-test.

2-6. PRINTER CONFIGURATION

The HP 2562C, 2563A/B/C are configured entirely from the Operator's Control Panel. Refer to Chapter 4 of this manual for more information on configuring the printer.

2-7. I/O CONFIGURATION

The HP 2562C, 2563A/B/C printers may be configured to several different interfaces. Each interface is configured differently and each interface self-test function is initiated differently. Refer to the following interface manuals for configuring the printer interface:

Parallel-Differential Interface Manual	P/N 26067-90905
Centronics Parallel Interface Manual	P/N 26067-90906
RS-232/422 Interface Manual	P/N 26067-90921
HP-IB Interface Manual	P/N 26067-90901
Multipoint Interface Manual	P/N 26067-90902
Dataproducts Interface Manual	P/N 26067-90907
Multiple I/O Manual	P/N 02563-90976

2-8. UNPACKING AND INSTALLATION

SOUND ENCLOSURE (New-Look)

The sound enclosure supplied with the HP2300 printer is shipped in a separate container. It must be unpacked as follows:

a. Cut straps (2) and remove the outside plastic film. Remove the box as it is shown in Figure 2-24.

b. Push the foam corner protectors to the side and open the doors in the Main Weldment assembly (Figure 2-24).

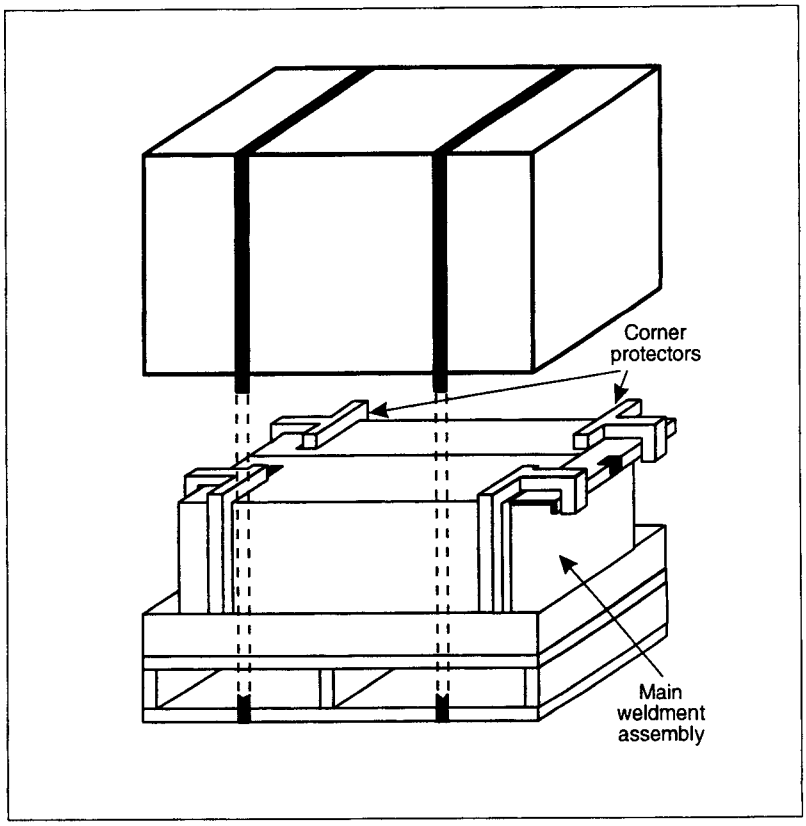


Figure 2-24. Remove Box

c. Lift out the paper tray and remove the two attached foam pieces (Figure 2-25).

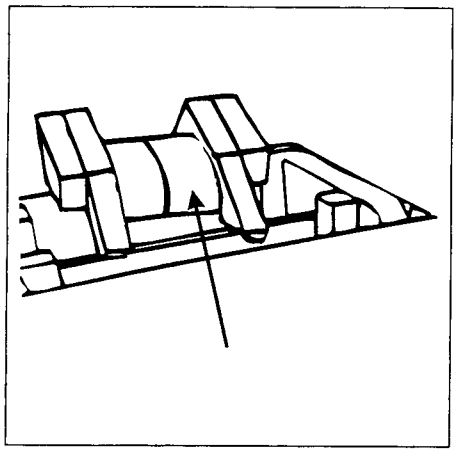


Figure 2-25. Remove Paper Tray. Step c

d. Grasp the foam end caps and lift to remove the shroud and wire form assembly from the box. Place it on a flat surface to disassemble (see Figure 2-26).

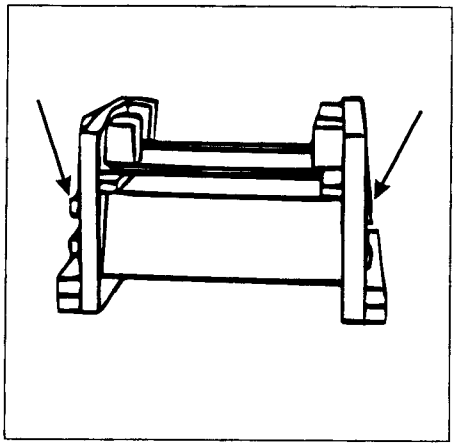


Figure 2-26. Remove Sound Shroud. Step d

CAUTION

In the following step, when removing the wire form, be careful not to catch the plastic tabs on anything, as they may tear.

e. On the top of the sound shroud, pull the foam on either side of the wire form outward and carefully lift out the wire form (Figure 2-27).

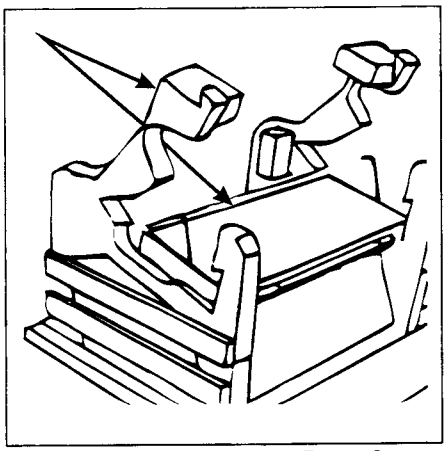


Figure 2-27. Remove Wire Form. Step e

f. Remove the two foam end-caps from the shroud, then turn the sound shroud upside down so the cardboard is facing up. Remove the cardboard from the sound shroud (it fits tightly to the unit and may be hard to remove). Now, continue unpacking the main Weldment assembly, which was emptied in the previous steps (c to e).

g. Remove the foam corner protectors (Figure 2-24). Pull up the corners of the Weldment assembly to ease the remotion of the protectors.

h. Stand up the Weldment by pulling it up by its top brace (figure 2-28).

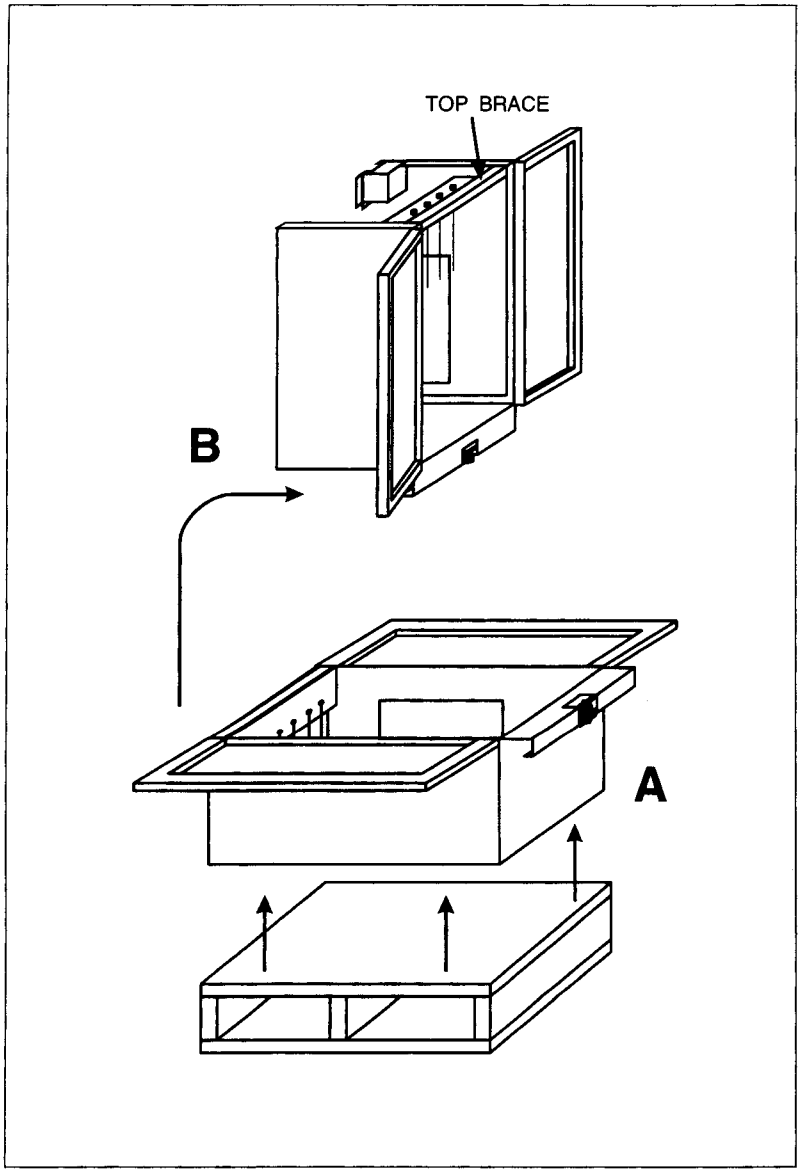
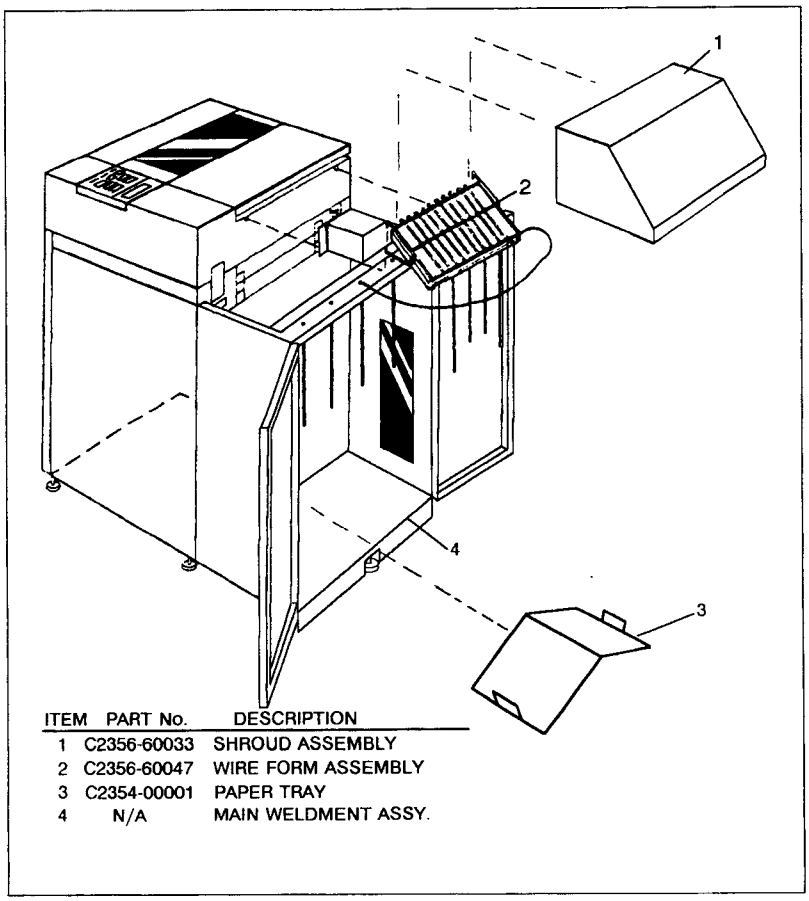


Figure 2-28. Stand up the Main Weldment Assembly. Step f

INSPECTION

After unpacking, inspect the printer and Sound Enclosure for signs of physical damage (cracks, broken parts, etc.). Check all shipping documents and the identification plate on the back of the unit to ensure that all parts have been received (see Figure 2-29), and that the printer conforms to purchased specifications. If the printer or cabinet appear to have been damaged in shipment, notify the carrier and the nearest Hewlett-Packard Sales and Service Office immediately.



ITEM	PART No.	DESCRIPTION
1	C2356-60033	SHROUD ASSEMBLY
2	C2356-60047	WIRE FORM ASSEMBLY
3	C2354-00001	PAPER TRAY
4	N/A	MAIN WELDMENT ASSY.

Figure 2-29. Sound Enclosure

INSTALLATION: SOUND ENCLOSURE

WARNING

Make sure the printer's power is OFF and the power cord is unplugged from the wall before assembling the Sound Enclosure. Installing the parts with the power on may cause injury to yourself or damage to the equipment.

The main weldment assembly gives stability. Install it before any other part of your Sound Enclosure.

a. Start the two screws in the bottom of the main weldment assembly, and the two in the top of the printer stand. Use a #2 Pozidrive screwdriver to start the four screws (Figure 2-30).

b. Route the power cable through the pocket slot and the clips in the Main Weldment assembly. One clip is located in the bottom of the pocket, and the two others are on the Weldment side panel, along the right door. Use the pocket sealing tape to hold the power cable.

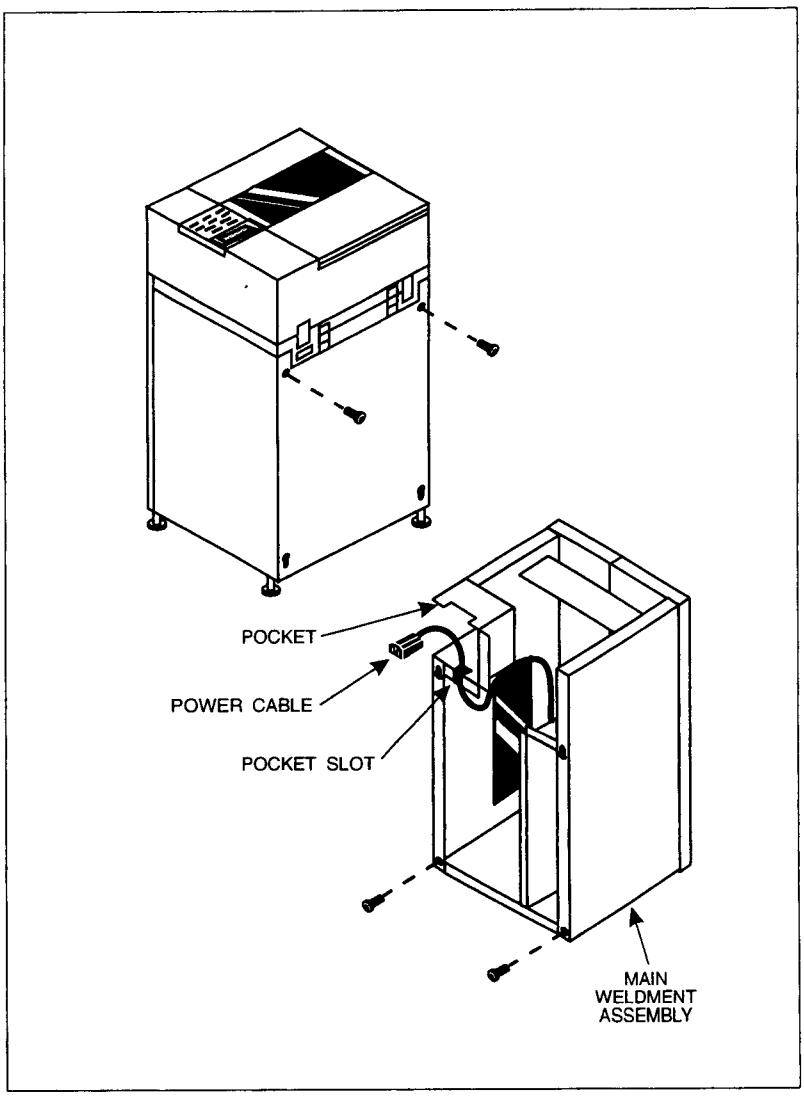


Figure 2-30. Starting the Screws in the Main Weldment Assembly and the Printer

c. Insert the screws into the key slots by holding the main weldment from its top brace with both hands first. Align the bottom screws to the holes in the back panel of the printer stand. Insert lower screws into the key slots. Then while holding the main weldment, repeat the operation with the top screws in the back of the printer. Lower the weldment into place. Ensure the weldment is well seated (Figure 2-31). Do not tighten the screws yet, in order to allow the power and ground cables be routed through the enclosure.

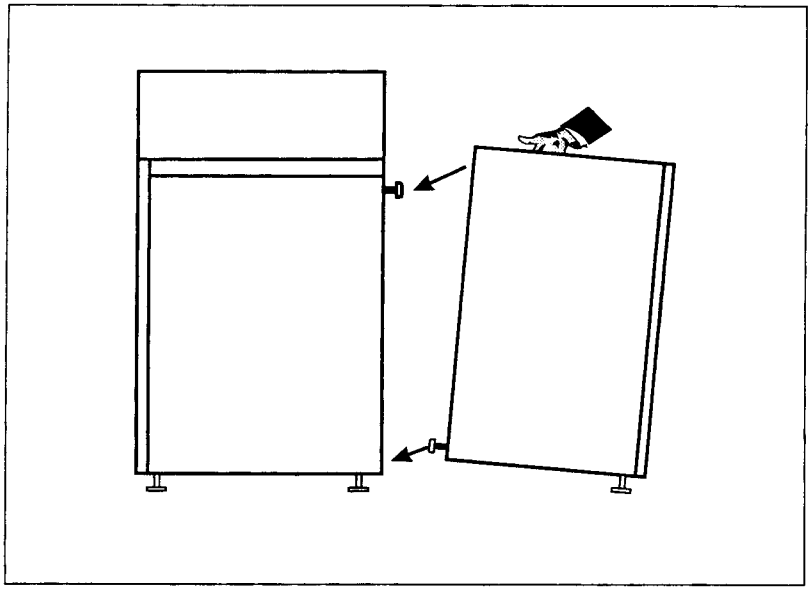


Figure 2-31. Attaching the Main Weldment Assembly

d. Plug the power cable into the power module.

e. Attach the wire form. Hook the wire form into the holes on the top cover (Figure 2-32). Make sure the four chains hang freely.

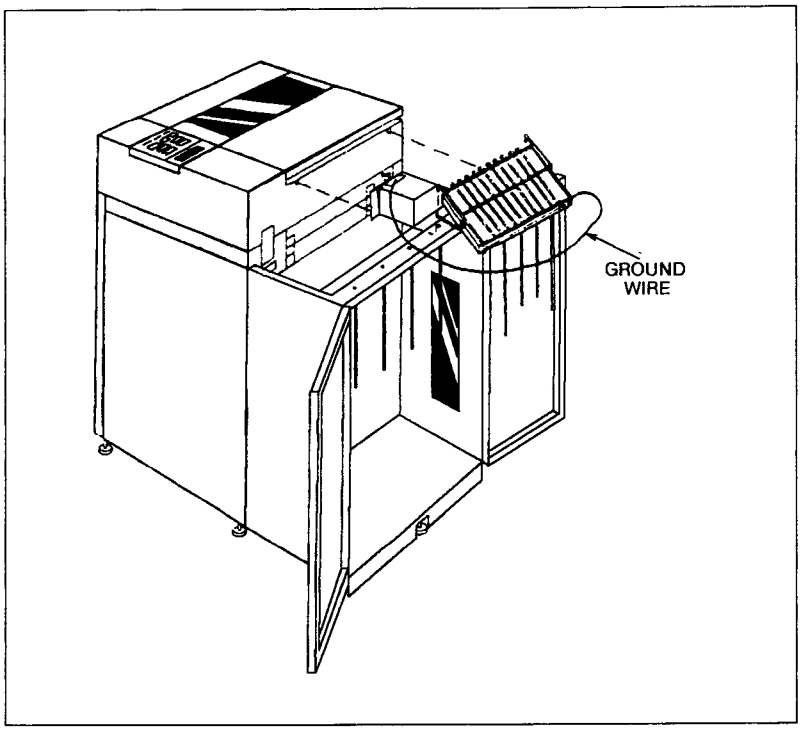


Figure 2-32. Attaching Wire Form

f. Connect the ground wire. Locate the small screw next to the power switch on the back panel of the printer. Insert the ground wire onto the spade lug underneath the screw (figure 2-33).

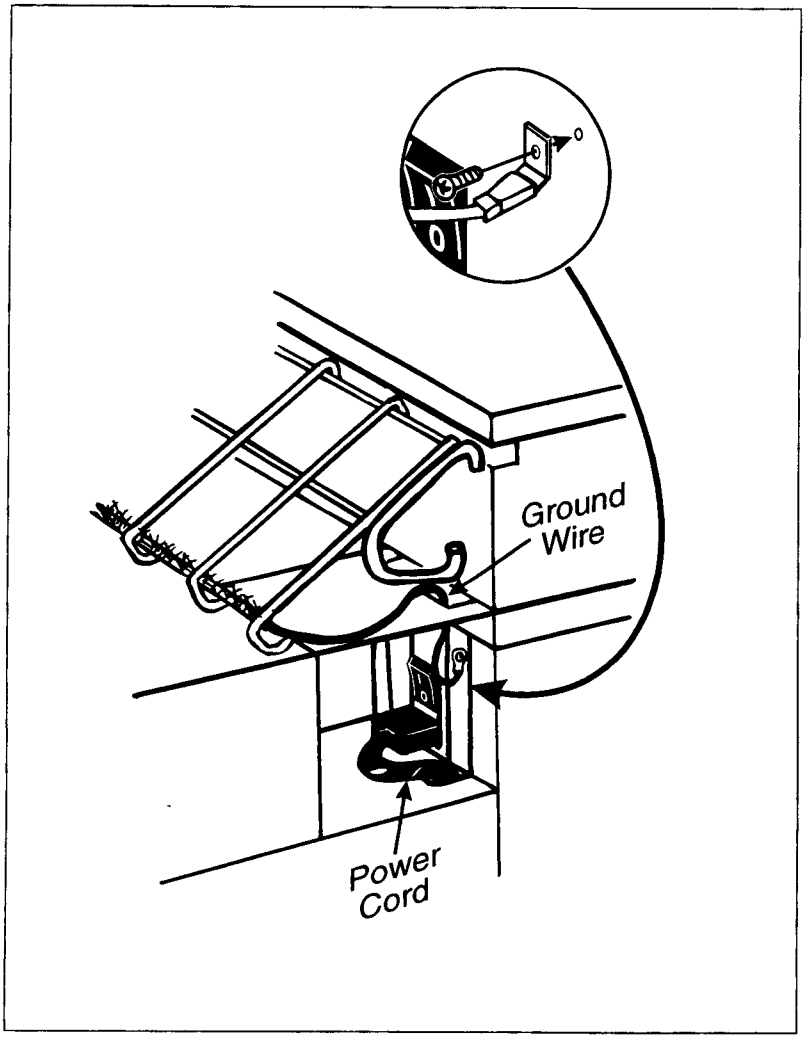


Figure 2-33. Main Weldment Pocket. Route Power Cord and Ground Wire

g. Tighten the two bottom screws to the back panel from inside the printer stand. You will need to hold back the soundproofing foam in order to reach the screws (Figure 2-34).

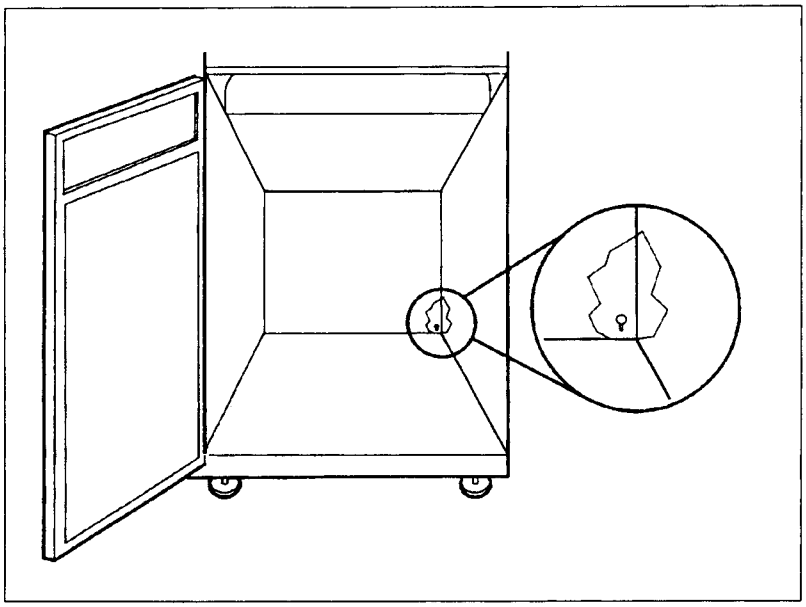


Figure 2-34. Installing Sound Shroud

h. Tighten the two top screws to the back panel from inside of the main weldment assembly. You will need to hold back the soundproofing foam in order to reach the screws (Figure 2-35).

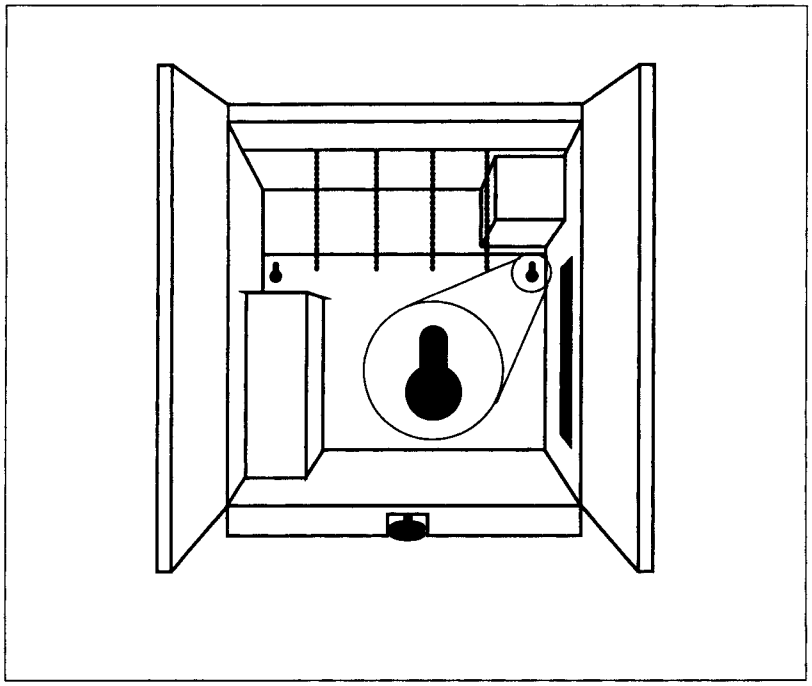


Figure 2-35. Tightening Top Screws from Inside of the Main Weldment Assembly

i. Install the Shroud Assembly. Slide the shroud directly over the wire form (Figure 2-36). Push firmly until it snaps into place. Make sure the shroud pins slide into the main weldment pin holes and the shroud fits tight against the back of the printer and flush with the top of the printer.

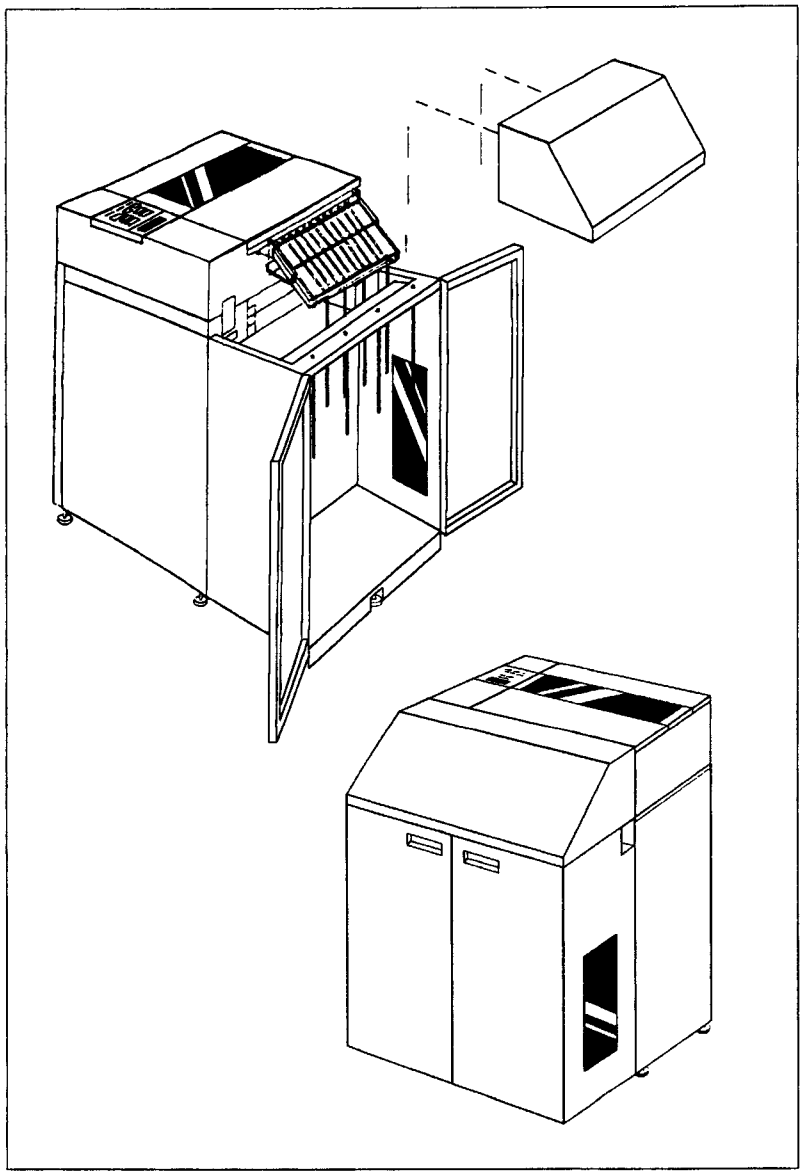


Figure 2-36. Installing the Wire Form and Shroud

j. Open the enclosure doors. Center the paper tray directly against the back of the printer and under the paper (Figure 2-37).

k. Make sure all eight chains hang freely inside the basket (Figure 2-37).

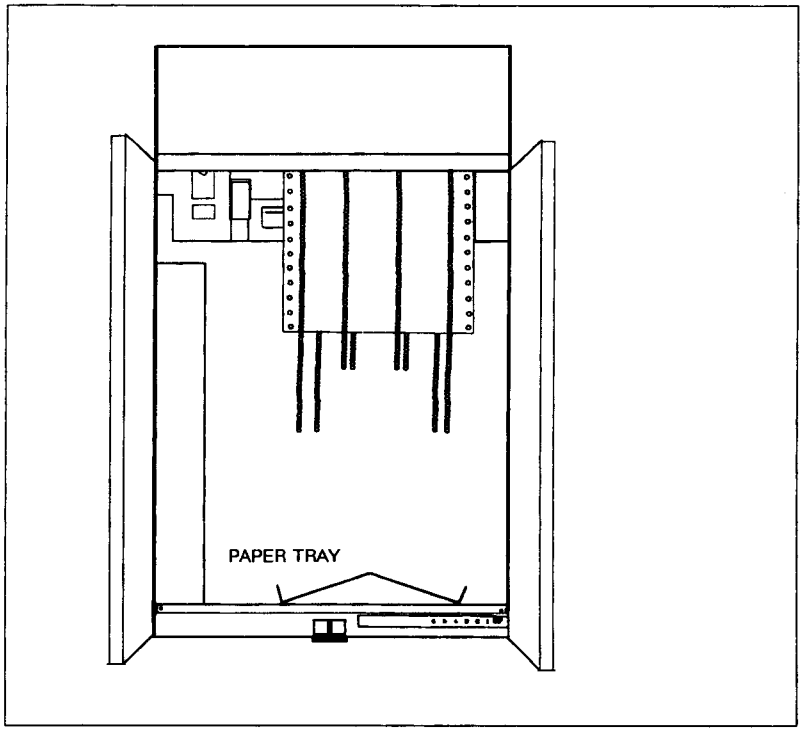


Figure 2-37. Paper Tray and Chains

l. Roll the printer into its operating location, lower its five leveler feet until they contact the floor, applying a light pressure to the floor to help stabilize and level the printer. Use a 9/16" or 15 mm end wrench to turn the leveler jam nuts.

m. At the rear of the printer, set the ON/OFF Switch to OFF position and connect the power cord and system I/O cable. Route the I/O cable and the power cord through the cable clips inside of the sound enclosure.

COMPLETING THE INSTALLATION

a. Ensure the printer's operating location provides adequate operator access to both the front and rear of the printer (1 meter -3 feet- in the front and rear is recommended).

b. Refer to the appropriate Interface and Operator's Manual for step-by-step instructions in completing the printer installation, including ribbon and paper loading and adjustment, printer and I/O configuration, and initial verification self-test.

c. Install the ribbon and load the paper into the printer (see Operator's Manual).

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Chapter 3

Theory of Operation 2562C 2563A/B/C

OperationOperationOperationO

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3-1. INTRODUCTION

This chapter of the manual is intended to provide a generalized functional understanding of the HP 2562C, 2563A/B/C printers. It is designed to provide the service representative with an understanding of the processes occurring during printing. A generalized block diagram of the printer is shown in Figure 3-1. Each component (general block) of Figure 3-1 is further diagrammed and explained in this section of the manual. The following topics are discussed:

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	DOT POSITIONING	3 - 5
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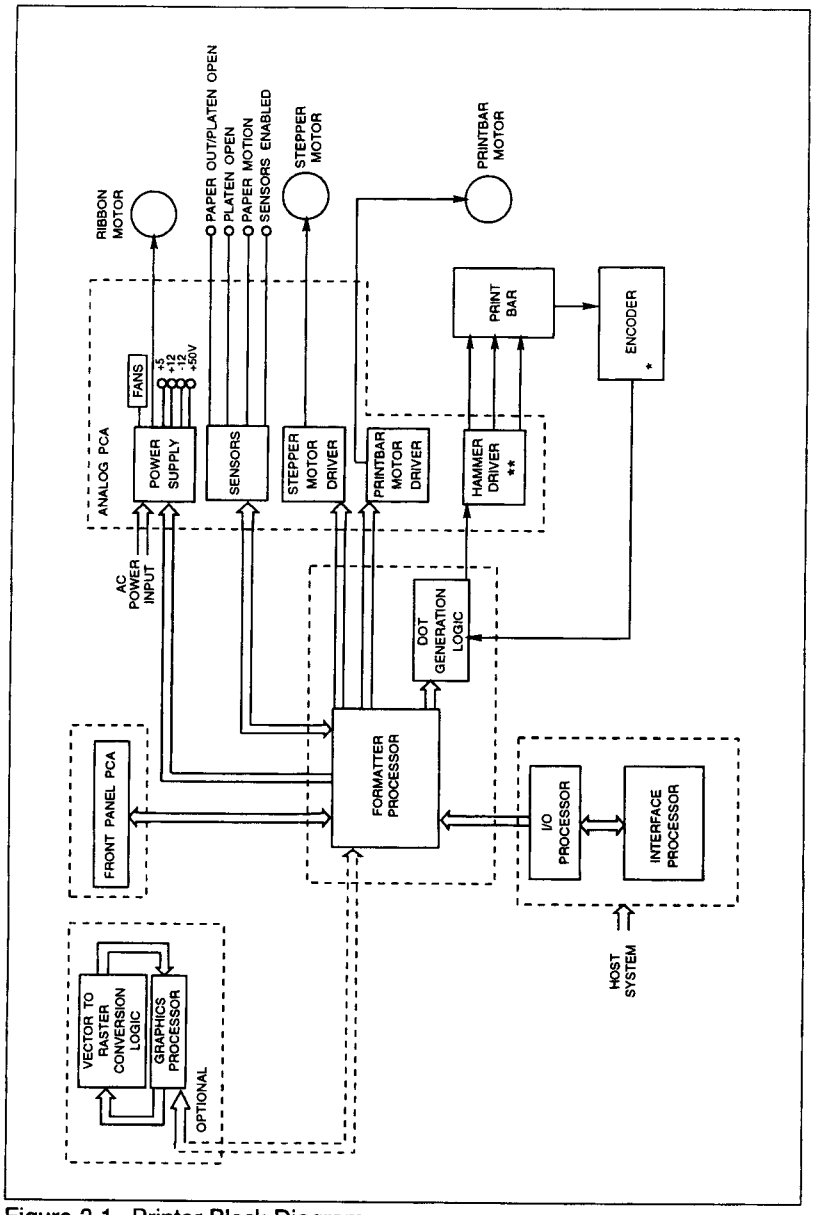

Figure 3-1. Printer Block Diagram

3-2. FUNCTIONAL OPERATION

The HP 2562C, 2563A/B/C printers uses variable dot matrix printing to create printed characters and graphics. The dot matrix print concept is based on the positioning of combinations of dots within a matrix (see Figure 3-2). The basic functions of dot matrix printing are as follows:

ENERGIZING OF THE PRINT BAR HAMMERS

The print bar assembly contains 33 individual hammers (steel tines); Each printbar hammer is responsible for printing across four character positions. When not printing, all hammers are drawn away from the paper by permanent magnets in the print bar assembly. To print a dot, an electro-magnet behind each print bar hammer is energized. The electromagnet provides an opposing magnetic field which overcomes the field of the permanent magnet and releases the hammer allowing it to snap forward. A hardened stylus near the tip of the hammer strikes the ribbon against the paper and platen, printing a dot.

Horizontal Motion of the Print Bar (Mogation)
To generate a horizontal row of dots, the print bar must oscillate back and forth. The lateral motion of the HP 2562C 2563A/B/C printbar is the result of a unique flexible crank arm system. As the DC motor rotates, the counterweights and the print bar are forced to move in opposite directions through the action of an eccentric crank and flexible connection rods, thus balancing the motion of the print mechanism. The print bar and counter-weight are mounted to the printer frame through steel flexures. The print bar/counterweight/flexure system is designed to operate near resonance to decrease the motor current requirements. In the rest position, the print bar is positioned at the center of its travel.

DOT POSITIONING

The dot matrix data is printed one dot row at a time as the print bar moves from left to right or from right to left. After a dot row has been printed, the paper is advanced by the stepper motor and the next dot row is printed as the print bar moves in the opposite direction. Each dot row consists of a segment of all dot matrices associated with the line of print. All dot row data is generated during the print bar turnaround interval by the Formatter PCA's Dot Generation Logic.

HORIZONTAL DOT PLACEMENT

Each character cell has a total of 21 possible dot positions. Since each print bar hammer is responsible for covering four character cells, there are a total of 84 possible dot positions per hammer (four character positions times maximum 21 dots per character cell). Since the print bar is oscillating quite fast, the hammers can physically print in only one of every three positions during a single pass of the print bar. This allows for a maximum of 28 dots over the four character cells, or seven dots per cell.

VERTICAL DOT PLACEMENT

To provide vertical dot columns, the paper must be advanced past the print bar assembly. The HP 2562C, 2563A/B/C use a stepper motor to advance paper. Normal density printing requires that the stepper motor advance the paper a full step (1/72 inch) between dot rows. For high density printing (near letter quality) the paper is advanced one-half step (1/144 inch) between dot rows (see Figure 3-2).

PRINT SPEED

The printer has several different possible print densities which affect the horizontal placement of dots on the page. These include draft, normal and high density print in 10, 12, 13.3, 15 and 16.7 CPI. Other print modes include bar codes and raster graphics. When the printer is directed to run in one of these modes by the selection of a particular character set, the Formatter processor determines the appropriate number of passes in which to clock the dot data out to the hammer driver circuitry. The matrix used for dot placement can range from 70 to 210 dots per inch (or 7 to 21 dots per hammer - see Figure 3-2). Since each print bar hammer is physically capable of printing a maximum of 7 dots per pass of the print bar, characters of higher density than 70 per inch (7 per cell) require multiple passes of the print bar. This has a negative effect on print speed.

Vertical dot placement is also affected by the print mode in a similar manner (see Vertical Dot Placement, above). In addition, the use of all upper case, or a mixture of upper and lower case characters also affects print speed. When printing all upper case characters, the printer addresses only 7 vertical dot rows (14 rows in high-density mode). When printing lower case characters, the character descenders (the portion of a lower case character that is below the base line, such as the lower portions of the letters "y" "g" and "p") require two extra vertical dot rows (four in high density mode). Therefore print speed is slowed when mixing upper and lower case characters. (See "Descender Scan" in Section 3-4 for more information on character descenders.)

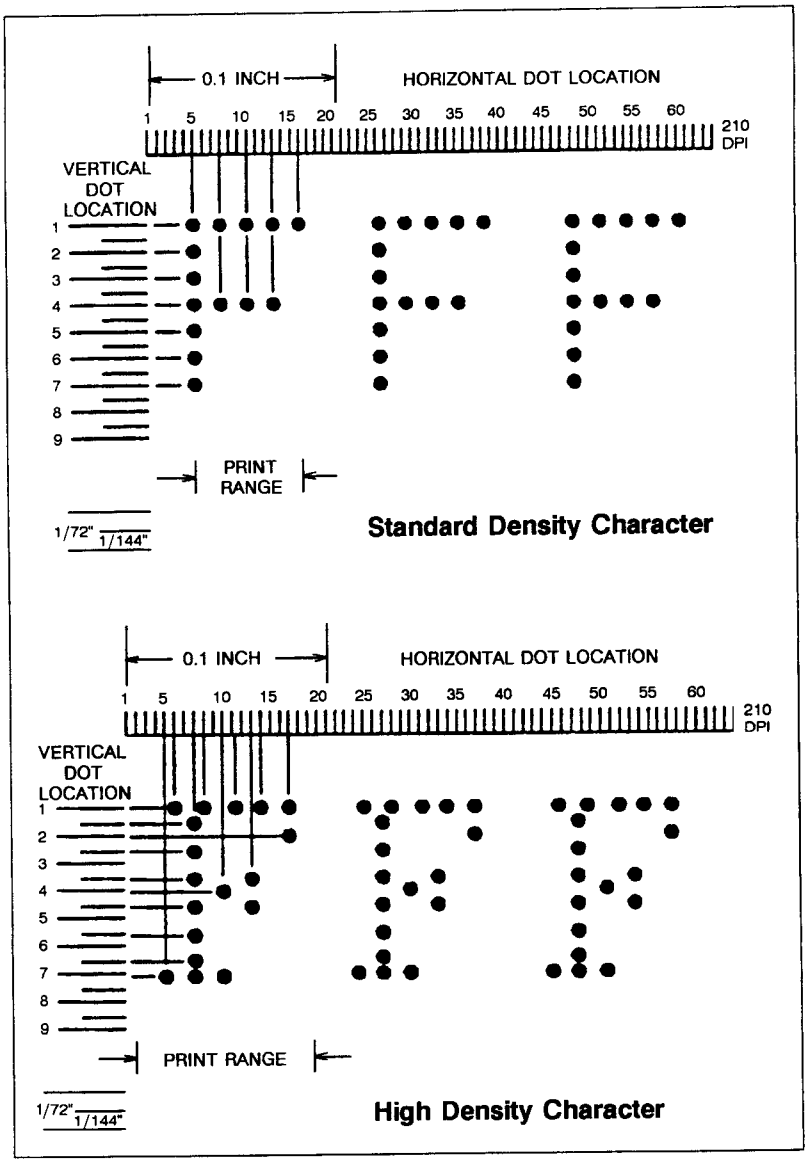

Figure 3-2. Dot Matrix Printing

To print text or graphics on the HP 2562C or 2563A/B/C printer, all basic functions of dot matrix printing (hammers energizing, print bar moving, and paper advancing) must work synchronously. These functions are coordinated by the Formatter PCA's microprocessor.

3-3. FORMATTER PCA

The Formatter PCA consists of two major printer operational blocks: the Processor/Control Circuitry and the Dot Generation Logic. The Z80 microprocessor is used as the printer's main control processor executing the printer functions as defined in the firmware (ROM), and coordinates the activity of the other printer processors and digital subsystems.

The Dot Generation Logic operates as an independent digital subsystem (state machine) to convert print data into dot/image data which can be printed by the HP 2562C, 2563A/B/C's print mechanism.

MEMORY MANAGEMENT

The printer consists of several different processors that are responsible for unique operations (distributed processing). The Formatter PCA's processor communicates with the other processors via shared RAM, and is responsible for all memory management in the printer. This responsibility requires that the Formatter processor communicate with the DGL (Dot Generation Logic), the interface, and (if installed) the Label Card PCA's RAM. Figure 3-3 illustrates the accessible memory of the Formatter PCA's processor.

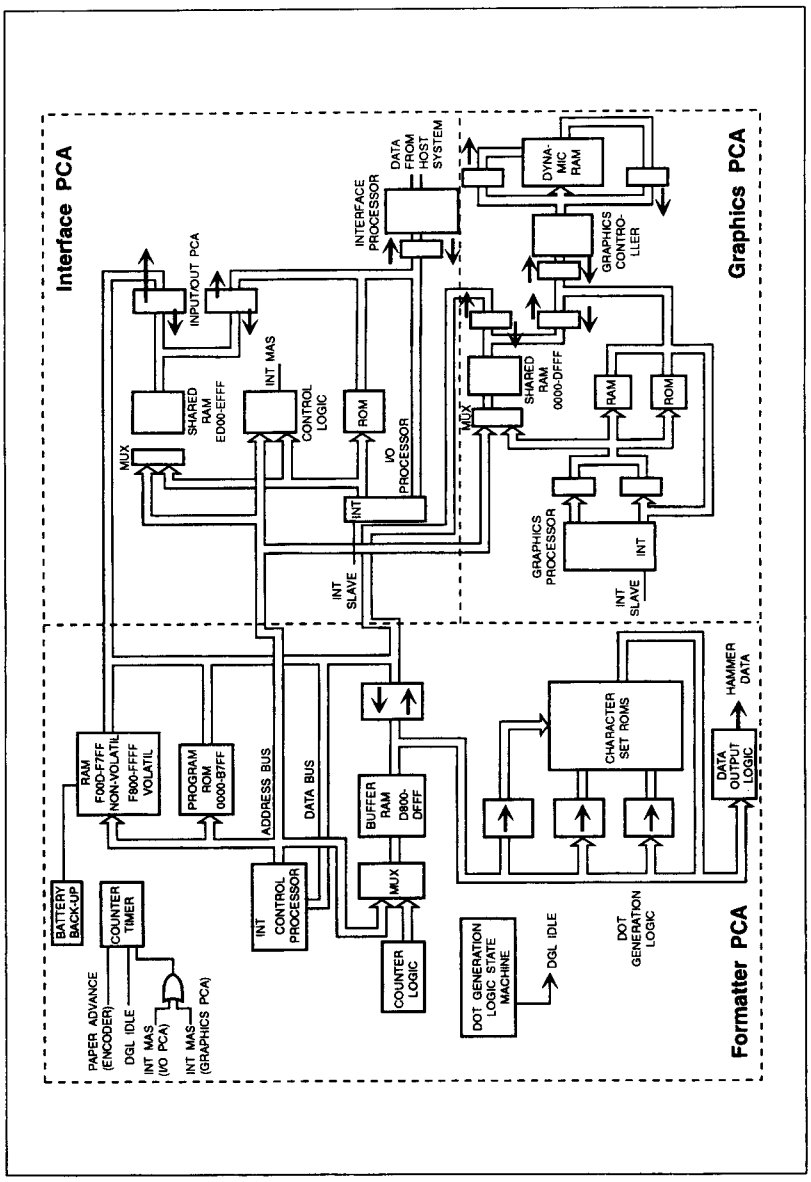

Figure 3-3. Printer Memory Architecture

Table 3-1 summarizes the memory sizes and address ranges of all memory under the management of the Formatter PCA's processor.

Table 3-1. GENERAL MEMORY ASSIGNMENTS

MEMORY ADDRESS RANGE	BYTES	TYPE	MEMORY LOCATION	COMMENTS
0000-BFFF	112K	ROM	Formatter PCA (J100)	Operating Program Instructions
C000-CFFF	4K	RAM	Graphics PCA (J102)	Shared with the Graphics PCA's processor.
D000-D7FF	2K	RAM	Not Used	
D800-DFFF	2K	RAM	Formatter PCA	Shared with DGL RAM
E000-EFFF	4K	RAM	Input/Output PCA (J104)	Shared with the I/O PCA processor.
F000-F7FF	2K	RAM	Formatter PCA (J100)	Control processor's nonvolatile memory
F800-FFFF	2K	RAM	Formatter PCA (J100)	Control processor's volatile memory.

The Formatter processor uses 80K of Read Only Memory (ROM) and 6K of Random Access Memory (RAM). The printer's operational program and internal self-test diagnostics are stored in ROM.

The Formatter processor's 6K of RAM is divided into two distinct address groups: the processor scratch memory and the Dot Generation Logic shared memory. The processor's scratch memory RAM (address F000-FFFF) is used by the processor for temporary storage. The first 2K of the scratch RAM (addresses F000-F7FF) is nonvolatile with standby current provided by a lithium battery. This memory is used for storage of printer configuration (form length, line spacing, margins, etc.).

The remaining 2K of RAM on the Formatter PCA is the Dot Generation Logic shared memory. This memory is used by the Formatter processor for storage of the print data lines. This memory can not be accessed by the Formatter processor when the Dot Generation Logic is active (the IDLE signal is inactive).

PROCESSOR COMMUNICATION

The Formatter processor (Master Processor) functions in conjunction with the other printer processors (Interface, Graphics and Encoder) and the Dot Generation Logic coordinating their independent activities. Each independent subsystem (except the Encoder) has a read/write random access memory (RAM) which it shares with the master processor. The Formatter processor has the capability of accessing any address within the three shared memories.

Communication between the master and the slaves (Interface and Graphics PCA's) is handled through the shared RAMs (see Figure 3-3). Specific locations in the shared memories (except the Dot Generation Logic) are dedicated to the master and slave and are reserved for messages. At periodic intervals or when directed by an interrupt, the master or the slave reads these messages placed in the shared RAMs. The messages direct either the master or slave to a memory packet. The memory packet provides specific instructions directing either the master or slave to perform a specific command.

All communication between the Dot Generation Logic and the Formatter processor is based on the assertion of the IDLE line. The IDLE signal is asserted when the Dot Generation Logic is not processing data; all dot/ image data is calculated during the print bar turnaround interval.

The encoder processor interrupts the master processor by activating paper advance (PAPER ADV). The PAPER ADV signal is asserted prior to the print bar starting turnaround (turnaround being the interval of time which the print bar must slow down, change directions, and accelerate in the opposite direction). The assertion of the PAPER ADV signal provides the formatter processor advance warning to move paper. The data exchanged between the Encoder and the Formatter processors includes the dot density requirements and diagnostic information. This data is exchanged serially over six I/O lines using a data handshake protocol.

All interrupts to the Formatter PCA's processor are channeled through the Counter Timer Chip (CTC). The CTC consists of four individual counting circuits, which can be programmed by the Formatter processor. The four CTC channels are used as either timers, or as an interrupt input to the Formatter processor. The Formatter processor services the CTC interrupt at the completion of its current instruction.

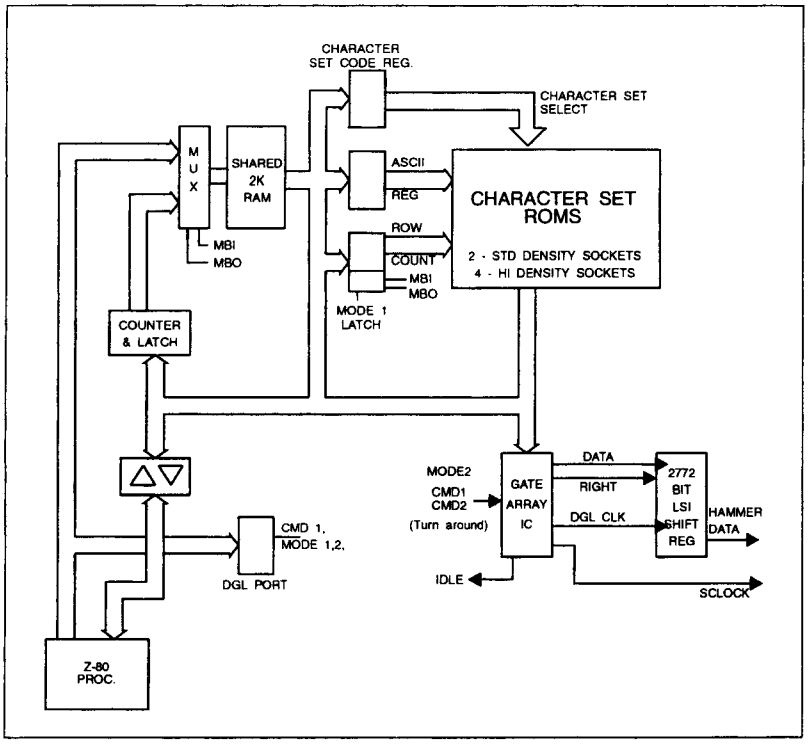

Figure 3-4. Dot Generation Logic Block Diagram

CLOCKING

Processor clocking is derived from a Voltage Control Oscillator (VCO) circuit on the Analog/Backplane PCA. The VCO oscillates (clocks) at approximately 7.33 MHz. This clock is divided by two on the Formatter PCA to provide a 3.66 MHz clock for use by the Formatter processor, the Counter Timer Chip (CTC), and the Dot Generation Logic (DGL). The clock is modulated to minimize the radiated radio frequency interference (RFI).

3-4. DOT GENERATION LOGIC
(Functional Overview)

The Dot Generation Logic (DGL) is responsible for calculating and buffering dot/image data for each dot row of printed data. The dot row consists of a cross-sectional segment of each character of the print line. All dot/image data is processed by the Dot Generation Logic during the print bar turnaround period.

The Formatter processor, using the turnaround period as an indicator, coordinates the flow of data to the Dot Generation Logic for processing. A scenario of the Dot Generation Logic (DGL) and Formatter processor interaction is shown in Figure 3-4.

Recognizing that data is present in the Interface PCA's 4K shared RAM to be processed, the Formatter processor, during DGL idle, moves data from the I/O RAM and loads it into the DGL's 2K shared RAM. The Formatter processor inputs two bytes of data in the DGL's RAM for each character to be printed (see Figure 3-5).

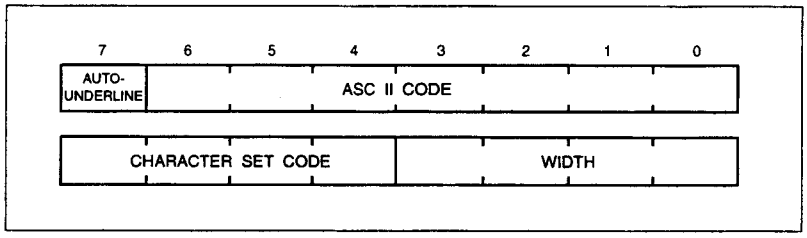

Figure 3-5. Character Identification Bytes (DGL RAM)

The first byte defines the ASCII character to be printed and whether or not the character is to be underlined (AU bit). The second byte determines which character set is to be used (character set code) and the character width. All characters associated with a line of print (maximum of 220) are stored in the RAM; any space remaining after the line data has been loaded is filled with ASCII blanks (20 hex).

As the print bar enters turnaround, the DGL begins generating the next dot row of data. The Formatter processor initiates Dot Generation Logic operation by issuing three bytes to the DGL circuitry: Mode One Byte, Mode Two Byte, and the Command Byte.

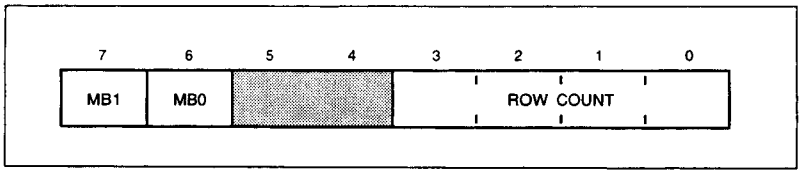

Figure 3-6. Mode One Byte

Mode One Byte, bits zero through three, indicate which horizontal dot row of the dot matrix character cell is being printed. Although a four bit row count allows for up to 16 dot rows vertically, only nine dot row high characters are used, so that the printed output is compatible with existing line spacing formats. Bits six and seven (MB0 and MB1) of the Mode One Byte are used for accessing different blocks of data in the buffered RAM. These bits decode to one of four 512 block of data which are accessible in the DGL 2K shared RAM.

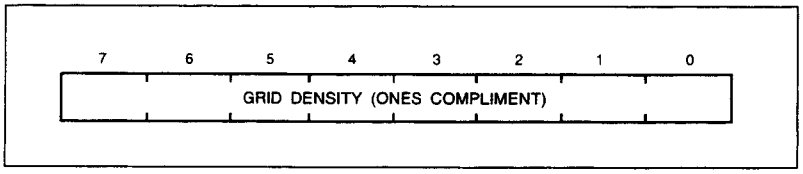

Figure 3-7. Mode Two Byte

The Mode Two Byte defines the horizontal grid density to be used. The Mode Two Byte is input to the DGL as the ones complement of the desired grid pattern. The default grid pattern is 210 dot positions/inch horizontally. It should be understood that although 210 dot positions/inch are available, a maximum of only 70 actual dots/inch are printed due to the physical limitations of the printer's hammers.

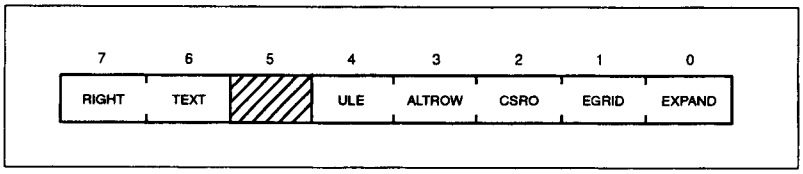

Figure 3-8. Command Mode Byte

The issuing of the Command Mode Byte specifies how the DGL is to process the data in RAM. An explanation of each Command bit follows:

Bit 0 - This bit designates whether the data in the 2K RAM is to be expanded (printed double width/double height).

Bit 1 - Informs the DGL if the variable grid pattern (other than 210 dots/ inch) is to be used. The grid density is specified in Mode Byte Two.

Bit 2 - The setting of the Character Set Read Out (CSRO) bit along with the setting of the RIGHT and the TEXT bits invokes the DGL to access the data in the buffered RAM, and search for character descender information. The Formatter processor uses this information for advancing paper.

Bit 3 - The Alternate Row (Alt Row) bit informs the DGL that half step rows are being printed and to process the data accordingly. Alternate row printing is used in High Density Mode and for printing Bar Codes (high density character set [low resolution bar codes]).

Bit 4 - Under Line Enable (ULE) informs the DGL to underline all characters stored in the buffered 2K RAM whose AU bit is set.

Bit 5 - Not Used

Bit 6 - The TEXT bit specifies if the buffered data is text or graphics.

Bit 7 - The RIGHT/LEFT bit indicates the direction of the print bar motion. When this bit is set (1) the print bar is moving from right to left; when the bit is off (0) the print bar is moving left to right.

Processing begins as the DGL removes the character identification data from the shared RAM. The counter logic (see Figure 3-4), under the control of the DGL's State Machine, addresses the data in the shared RAM. The starting address for reading data in the RAM is at one of two addresses depending upon whether the data is to be printed as the print bar is moving from either left to right, or from right to left. The State Machine's CTCTR signal either increments (if going left) or decrements (if going right) the counter when the next character is to be accessed in the RAM. Most of the DGL is contained in a single chip.

The two bytes of data removed from the shared RAM are latched into the STOR1 (Character Set/Width) and STOR0 (ASCII) registers. These bytes select a specific character set, and a particular ASCII character within the character set. The Mode One Byte, issued by the processor, provides the row count of the dot matrix character to be printed. The combined addressing capability of these three bytes therefore provides dot matrix

character cell data for a specific matrix row, for a specific character and from a specific character set. The character cell dot image data is loaded onto the data bus and latched into the Output Multiplexer.

The Output Multiplexer is a parallel-to-serial device which outputs serial dot/image data to a 2772-bit shift register. The addressing for the multiplexer is provided by a counter which is controlled by the DGL's State Machine. The counter is loaded with the character set width (right nibble of the second Character Identification Byte). Depending upon whether the print bar is moving either right or left, the counter is incremented or decremented to provide for the addressing for the Output Multiplexer. As the counter changes count, a new bit is addressed and outputed from the Multiplexer and clocked to the 2772-bit shift register. These dot/image bits are input to the 2772-bit shift register in an order representative of its appearance in the dot matrix character cell. Each ASCII character pertaining to a line of print (stored in the RAM) is processed in a similar manner.The end result of the DGL's processing is the inputting of a cross-sectional segment of each character in the next line of print into the 2772-bit shift register. This data represents one horizontal dot row which is to be printed by the print bar hammer during a pass of the print bar.

All data must be processed during print bar turnaround. At the completion of DGL processing, the DGL lowers the IDLE line interrupting the Formatter processor. It should be understood that the shared 2K RAM is filled only once for every line of data; however, the DGL processes the data one dot row at a time. The Formatter processor must issue a new Command and Mode One Bytes after each pass of the print bar to update the dot matrix row count.

As mentioned, the processed DGL data is placed into a 2772-bit shift register during print bar turnaround. This register is within a large scale integration (LSI) circuit on the Formatter PCA and contains a dot storage position for every possible dot that could be printed during a single pass of the print bar (maximum 132 characters per line X maximum 21 dots per character). The 2772-bit shift register is designed so that every 21st bit (i.e., 1, 22, 43... 2751) may be tapped and loaded in parallel into a 132-bit bi-directional shift register (Output Register).

It is important to remember the print bar assembly consists of 33 hammers and that each hammer prints across a span of four character positions. The maximum number of dots which an individual hammer could print is 84 (four positions times 21 maximum dots/position). All hammers are fired (released) in parallel. Hammer fire data, designating whether the hammer is to be fired or not, is stored in the hammer driver

circuitry (33-bit shift register). The hammer fire data loaded into the hammer circuitry's 33-bit shift register is input directly from the 132-bit Output Shift register.

The 2772-bit shift register contains a position for every dot which could be printed on the pass of the print bar; every 21st dot position is tapped and loaded, in parallel, into the Output Shift Register.

The 132-bit bi-directional Output Shift Register is a parallel-load serial-output shift register. The direction of the print bar (either right or left) determines at which position (either least significant or most significant position) data is to be shifted from the Output Shift Register.

Data is shifted into the 33-bit Hammer Driver Shift Register by SCLOCK which is at one-fourth the clock rate used to shift data from the 132-bit Output Shift Register. The result is that only every fourth bit from the 132-bit Output Register is loaded into the 33-bit Shift Register. The data is latched out to the Hammer Driver Transistors and the 132-bit Output Shift Register is reloaded with new dot/image data tapped from the 2772-bit register.

To utilize the data in the Output Shift Register, the data must be shifted to the hammer driver shift register in such a manner that only one of every four bits is utilized. To accomplish this, different clocks are used for clocking the data. SCLOCK is used for shifting data into the 33 position hammer driver shift register; SCLOCK is generated from every fourth clock used to shift data from the 132-bit Output Register. Use of these different clocks therefore ignores three of every four bits (i.e., if the print bar were moving from right to left, bits 1, 5, 9..., 129 of the Output Register would be input to the Hammer Driver Register). When 33 bits have been shifted into the Hammer Driver Register, the register is latched by PSTROBE and the hammer driver transistors are fired (if a logic "1" is loaded in one of the hammer driver shift register positions) and the 132-bit Output Register is reloaded with new dot/image data.

After the print bar hammers have fired, the process is repeated. However, this time the data in the 2772-bit register is shifted over one position so that the next dot position is tapped. This results in the selection of the next dot column in the character cell. During this time, the print bar (and thus the hammers) have also moved to the next dot position. The entire process is repeated until all dot/bit data (maximum of 84) for each print bar hammer has been selected. During the next print bar turnaround, the next dot row is loaded into the 2772-bit shift register.

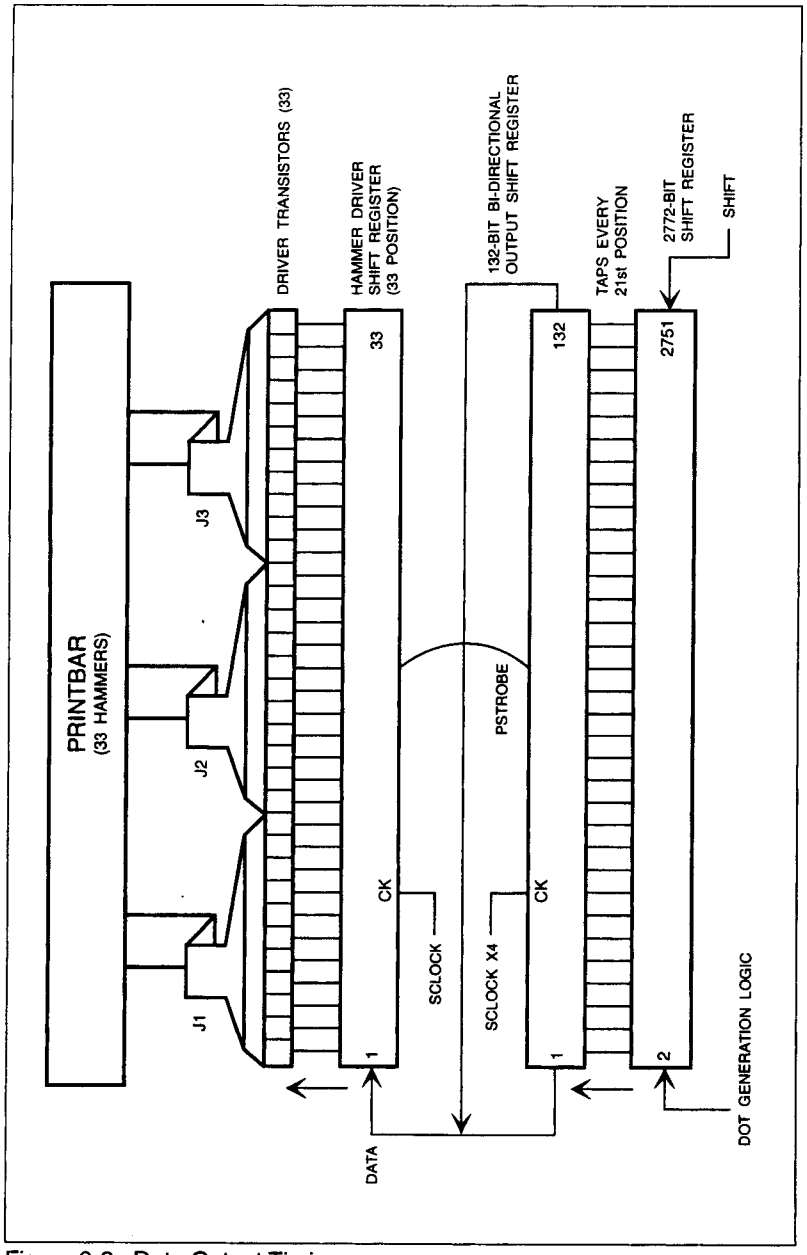

Figure 3-9. Data Output Timing

It should be noted that data clocked from the 132-bit Output Shift Register may be shifted from either the most significant or least significant bit positions. This is necessary so that the correct dot/bit data is input to the hammer for both directions of print bar movement.

CHARACTER SET SELECTION

The HP 2562C, 2563A/B/C may contain up to 16 different character sets: sets zero through seven are normal density and character sets eight through 15 are high density. The character sets are selected by bits four through seven, in byte two of the Character Identification Bytes (see Figure 3-5). These bits are decoded by the Dot Generation Logic to select the correct character set (see Figure 3-10).

All character set dot/image information is stored in six 128K EPROMs (see Figure 3-10). The first two integrated chip positions contain character sets zero through seven which are normal density character sets. The next four integrated chip positions contain the high density character sets, which are the character sets numbered eight through 15. The ALTROW signal (bit 3 of the Command Byte) must be set to a logic "1" for half steps (alternate rows) when selecting the high density character sets.

DESCENDER SCAN

Character descenders are the lower extensions, of the lower case characters, occupying space in the dot matrix character cell below the baseline position (such as the lower portion of the letters g, y, p). In the HP 2562C 2563A/B/C, dot row seven is the baseline position; the descenders occupy dot rows eight and nine.

The Formatter processor determines if any characters from a line of print contain descenders by performing a character descender scan. The descender scan is initiated after the shared buffer RAM memory is filled with data, and bits 2, 6 and 7 of the Command Byte (CSSCAN, TEXT and RIGHT) have been set by the processor. When this occurs the Dot Generation Logic processes the buffered data as though it is processing a print line, however, only the dot rows containing the descender information are accessed. If any descenders are found (dots to be printed in rows eight and nine of any character), the descender latches are set. Once the scan is complete, the Dot Generation Logic lowers the IDLE interrupt. The processor responds by reading bits 0 and 1 of I/O Port 6 (RDST).

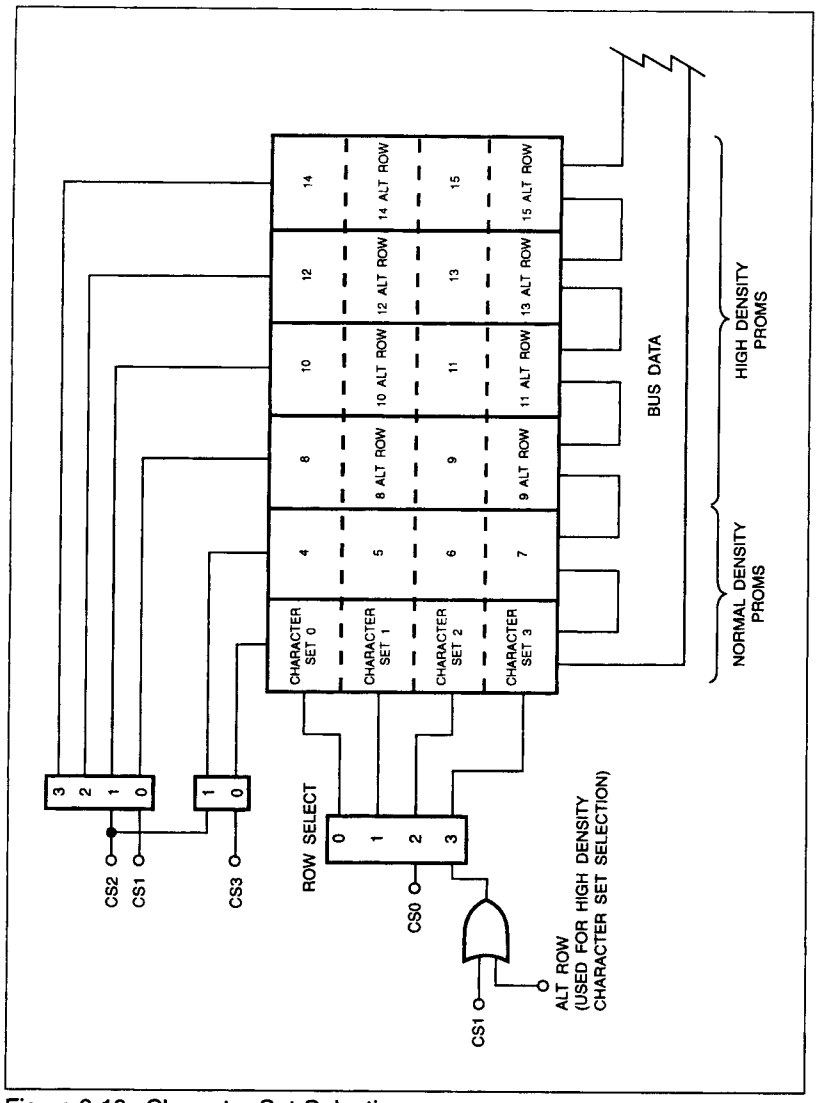

Figure 3-10. Character Set Selection

The purpose of the character descender scan is to increase the print speed of the printer. If no descenders are to be printed on a line of print, the Dot Generation Logic may disregard the processing of rows eight and nine and the microprocessor can slew the paper for the next line of print.

AUTO-UNDERLINING

All ASCII character data which is to be underlined is identified by the setting of bit seven of the first Character Identification Byte (see Figure 3-5). The Dot Generation Logic processes the character cell as normal data until the ninth dot row is ready to be processed. At this time the microprocessor sets bit 4 of the Command Byte (Underline Enable). All characters previously identified to be underlined in their Character Identification Byte are now underlined. This method of underlining transfers most of the burden of underlining from the processor to the Dot Generation Logic. It should be noted that all underling occurs in dot row nine of the ASCII characters.

EXPAND MODE

When double width/double height characters are desired, the Formatter PCA's process sets bit 0 of the Command Byte (EXPAND). As the data stream is sent to the 2772-bit shift register, the EXPAND bit instructs the Dot Generation Logic's state machine to switch the data stream output from its multiplexed output into a shift register. The purpose of the shift register is to duplicate the actual dot/bit image data, and to interleave the duplicated dot/image into the original data stream.

VARIABLE GRID

The variable grid pattern circuitry provides the HP 2562C, 2563A/B/C the capability of printing various horizontal dot densities. The following densities may be printed:

Print Type	Density
Normal (10 characters/inch)	210 dots/inch
High Density (10 characters/inch)	210 dots/inch
Compressed (12 cpi)	180 dots/inch
Compressed (13.3 cpi)	200 dots/inch
Compressed (15 cpi)	180 dots/inch
Compressed (16.7 characters/inch)	200 dots/inch
Bar Codes	110 dots/inch
Graphics	70/140 dots/inch
	60/120 dots/inch*

* (formatter DC >2824, encoder DC >2740)

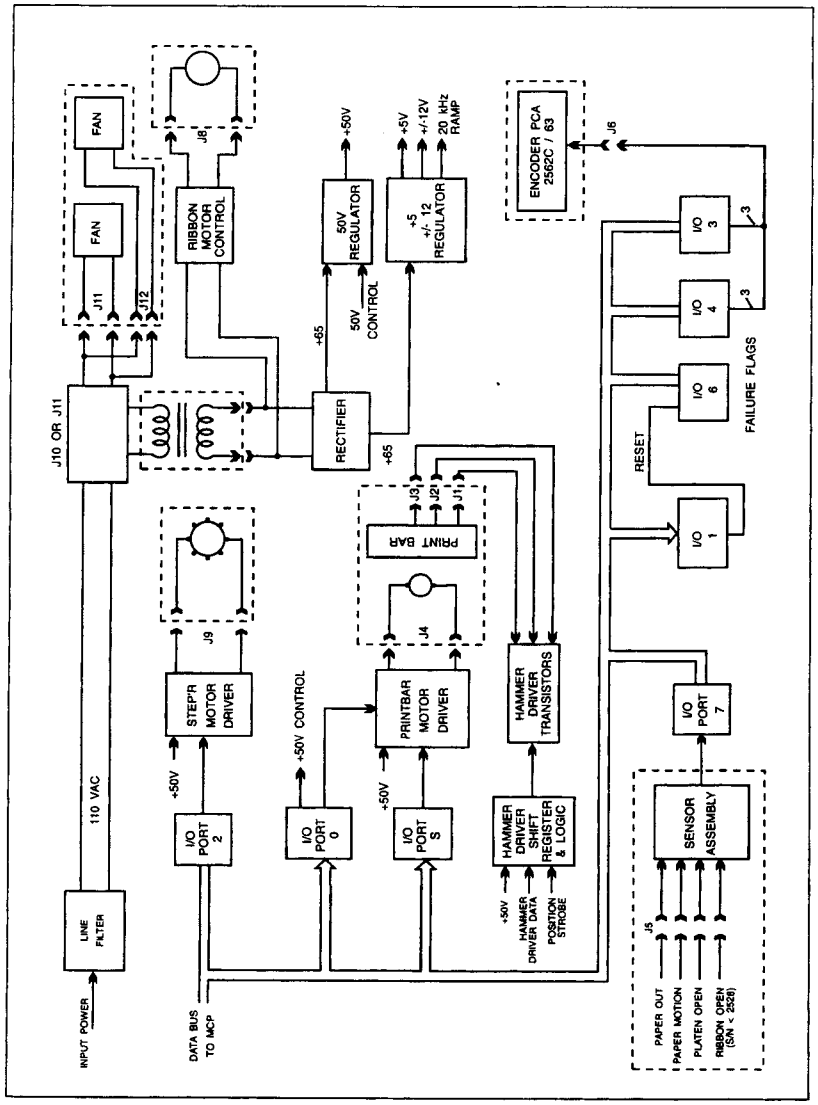

Figure 3-11. Analog Backplane PCA

The Position Strobes (see paragraph 3-10) to print these densities are provided by the Encoder circuitry under the direction of the Formatter processor. The default dot density is 210 dots/inch. If the Formatter

processor desires to print at a density other than the default, bit 1 of the Command Byte (EGRID) is set and the Mode Two Byte is sent to the Dot Generation Logic. The information in the Mode Two Byte is the result of a dot density algorithm. The Mode Two Byte value is loaded into DGL counter circuitry which, under the supervision of the State Machine, ensures that the desired dot density is obtained and that all data is properly aligned in the 2772-bit shift register.

3-5. ANALOG/BACKPLANE PCA

The Analog/Backplane PCA functions as the printer's motherboard and also contains the following functional printer circuits: the Formatter Interface, the Stepper Motor Drive, the Print bar Motor Drive, the Hammer Drivers and the printer Power Supply. Each functional block of this PCA is discussed in the remainder of this section of the manual. Figure 3-11 illustrates functional blocks of the Analog/Backplane PCA.

Table 3-2. ANALOG-BACKPLANE PCA/FORMATTER PROCESSOR INTERFACE

I/O PORT	7	6	5	4	3	2	1	Data Bus 0
0	CB MTR Enable 1=On							+50V Control 1=On
1	FAILURE FLAG RESET							
2			OVDR B 1=On	OVDR A 1=On	Phase B- 1=On	Phase B+ 1=On	Phase A- 1=On	Phase A+ 1=On
3	Data Valid	Data Out	Data ACK		Self Test		Printing 1=On	Ribbon On
4	Data AVL	Data In	Data RCVD			Back EMF 1=Fwd	Self Test	Too Many Dots
5	MSB	Print Bar Motor Speed						LSB
6	Failure Present	+50V Control Status 1=On			Not HMR DR - Fail	Not HMR DR +Fail	Not Paper DR Fail	Not CB Drive Fail
7	Right/ Left 1=Left		Not Hammer Current	+50V Status 1=On	Sensors Enabled	Platen Open Ribbon Out*	Paper Motion	Not Paper/ Platen Open
* Ribbon Out eliminated on 2528Axxxx and later printers.I/O PORT 0 (Output)								

3-6. FORMATTER INTERFACE (Analog PCA)

The Formatter PCA's microprocessor controls and monitors all machine control functions of the HP 2562C 2563A/B/C printer. All tasks are defined in the Formatter PCA's firmware and executed by the microprocessor. All activity is managed on the processor's data bus; input/output port selection is determined by decoding of the processor address bits A0, A1 and A3. All processor/backplane interface functions are summarized in Table 3-2; an explanation of each entry of the table follows.

Bit 0 - The +50V CONTROL bit is used to turn the +50 volt regulator ON/OFF. The 50 volt supply provides power for the print bar motor, the stepper motor and the hammer driver circuits. The supply cannot be turned on if a hardware failure is detected in any of these circuits. The 50 VOLTS STATUS bit (see I/O Port 7) is active when the actual voltage of the supply exceeds +41 volts.

Bits 1-6 Not Used

Bit 7 - The print bar enable (CB MTR EN) bit enables the print bar motor. When the print bar motor drive circuit is enabled, the voltage on the motor is proportional to the level set by the print bar motor speed level (see I/O Port 5). Print bar speed is monitored and adjusted by the Formatter processor. The print bar motor is disabled if the speed is not within range.

I/O Port 1 (Output)

The selection of this port strobes the Failure Latch. The current state of the failure lines (CB MTR DR, PAPER DR, HMR DRV+, and HMR DRV-) may then be accessed by reading I/O port 6. The selection of this port also clears the +50V CONTROL latch which results in the disabling the +50 volt regulated supply.

I/O Port 2 (Output)

Bits 0-5 These bits determine which phases of the stepper motor are to be enabled and whether the overdrive pulses are to be used when changing phases. Phases A+ (B+) and A- (B-) are never enabled simultaneously. A delay of 25 microseconds is provided between the disabling of one phase and the enabling of the other phase. The overdrive bits are enabled to improve

the torque of the stepper motor and are enabled when the respective stepper motor phase is enabled. The overdrive lines remain enabled until a current threshold is reached. At that time overdrive signal is reset without any interaction from the processor firmware. All states are disabled by the RESET signal on printer power-up.

Bits 6-7 Not Used

I/O Port 3 (Output)

Bit 0 - The RIBBON ON bit enables the ribbon drive motor.

Bit 1 - The PRINTING bit is set by the Formatter Processor whenever Hammer Data is to be shifted to the Hammer Driver Shift Register. The Hammer Driver Shift Register is cleared when the PRINTING bit is low.

Bit 2 - Not Used

Bit 3 - The SELF-TEST is set and then read on I/O Port 4 to determine if the backplane/interface circuitry is functioning correctly.

Bit 4 - Not Used

Bits 5-7 These bits constitute a handshake protocol scheme between the Formatter PCA's processor and the Encoder PCA's processor. This arrangement eliminates the requirement for synchronization (clocking) between the two processors for data transfer.

I/O Port 4 (Input)

Bit 0 - The TOO MANY DOTS signal is active when the print bar overheats due to an excessive hammer duty cycle. When this bit is active the Formatter PCA's processor slows the print speed until the print bar cools (approximately a two second printing delay per line).

Bit 1 - The SELF-TEST bit is associated with the SELF-TEST bit of bit three of output port 3 and provides feedback to the processor when Self-test is initiated.

Bit 2 - The BACK EMF bit indicates the direction (rotation) of the print bar motor when the print bar motor is disabled. A logic one indicates the print bar motor is rotating in the forward direction; a logic zero indicates that the motor is rotating in the reverse direction or that the motor is stopped. This signal is used by the microprocessor to initiate a print bar motor starting algorithm which "rocks" the motor to start motion.

Bits 3-4 Not Used

Bits 5-7 These bits constitute a handshake protocol scheme between the Formatter PCA's processor and the Encoder PCA's processor. This arrangement eliminates the requirement for synchronization between the two processors for data transfer.

I/O Port 5 (Output)

Bits 0-7 These eight bits are input to a digital to analog (D/A) converter in the print bar drive motor circuitry to set the drive voltage. This port is reset to zero by a Power-On Reset.

I/O Port 6 (Input)

Bits 0-3 Bits zero through three are cleared when a current failure is sensed in either the print bar drive motor circuitry, the stepper motor drive circuitry, the hammer driver transistors, or the print bar coils. The clearing of any of these bits result in the disabling of the +50 volt supply. These bits are only reset by the Failure Flag Reset bits (I/O Port 1) and are not reset by the Power-On Reset.

Bits 4-5 Not Used

Bit 6 - This bit reflects the logic level of the + 50V Control bit (Port 0, Bit 0).

Bit 7 - The FAILURE bit is cleared any time a failure is detected (bits 0-3 are cleared).

I/O Port 7 (Input)

Bit 0 - This bit is set when either the paper out sensor detects an absence of paper or the platen open switch detects that the platen is open.

Bit 1 - This bit (PAPER MOTION) is used by the Formatter PCA's processor to monitor paper jams and paper out conditions. During normal operation, as the stepper motor advances paper, the bit changes states (logic high to logic low) every 45 steps of the stepper motor. If the processor does not sense this bit toggling, an error is posted and the stepper motor stops.

Bit 2 - The RIBBON OUT*/PLATEN OPEN bit is set whenever either condition is detected. *RIBBON OUT was eliminated on 2528AXXXX and later printers.

Bit 3 - The SENSORS ENABLED bit is low when the sensors are disconnected. This allows the processor's firmware to ignore all sensed indications when the sensor cable is disconnected.

Bit 4 - The +50V STATUS, when active (high) informs the Formatter processor that the +50 volt power supply is greater than +41 volts.

Bit 5 - This bit (HAMMER CURRENT) is used by the diagnostics to verify the operation of each print bar hammer coil (33 total coils). The diagnostics fire each hammer independently checking for hammer current. If no current is detected after the hammer has been fired, an open print bar hammer coil or ribbon cable may be suspect.

Bit 6 - Not Used

Bit 7 - The RIGHT/LEFT bit is generated on the Encoder PCA and indicates the direction of the print bar. This information is essential for the Dot Generation Logic so that the correct bit/dot data may be input to the hammer driver circuitry (a logic one indicates the print bar is moving from the right to the left).

3-7. STEPPER MOTOR CIRCUITRY (ANALOG PCA)

The HP 2562C, 2563A/B/C uses dot matrix print wherein printed characters are formed by a series of dots within a matrix (see Figure 3-2). Printing occurs as the individual hammers of the print bar assembly strike the print ribbon thus creating a .014 diameter sized ink impression (dot) on the paper. All 2562C's and 2563C's with option #025 have a small dot printbar (0.011"), for greater resolution printing barcodes. Vertical dot rows (direction of paper motion within the dot matrices) are created as the paper is advanced by the stepper motor. Each full step from the stepper motor advances the paper 1/72 if an inch (.0139 inches).

The HP 2562C 2563A/B/C stepper motor is a four-phase stepper motor with the phase selection and timing controlled by the Formatter processor. During normal printing, the stepper motor rotates in two degree increments (one step); one step corresponds to a printed dot row (1/72 of inch). During high density printing, the stepper motor advances the paper in ½ step increments (1/144").

A block diagram of the stepper motor circuitry is shown in Figure 3-12. The Formatter processor outputs the following signals to control the stepper motor circuitry:

PHASE A+	PHASE B+
PHASE A-	PHASE B-
OVERDRIVE A	OVERDRIVE B

The stepper motor circuitry is divided into two sections; each section drives one phase of the stepper motor. Paper motion occurs when current is alternately applied to each phase of the stepper motor. The stepper circuitry is arranged so that both phases A+ and A- or (B+ and B-) cannot be energized at the same time. If this were to occur the net result would be the cancellation of phase torque at the stepper motor.

The overdrive signals (OVERDRIVE A and B) applies + 50 volts to the stepper motor windings. The + 50 volts is needed to provide additional current for the stepper motor during paper slewing. When current through either phase reaches a pre-set reference level, the overdrive lines are reset (OA and OB RESET). The 2563 uses the overdrive mode to drive the stepper motor when difficult froms are used (Config 53).

When paper motion is not required, the five volt potential provides current for holding torque.

If current through either phase exceeds the reference level, the PAPER DR FAIL signal is activated. The activation of this signal results in the disabling of the +50 volt supply via the resetting of the +50V CONTROL latch.

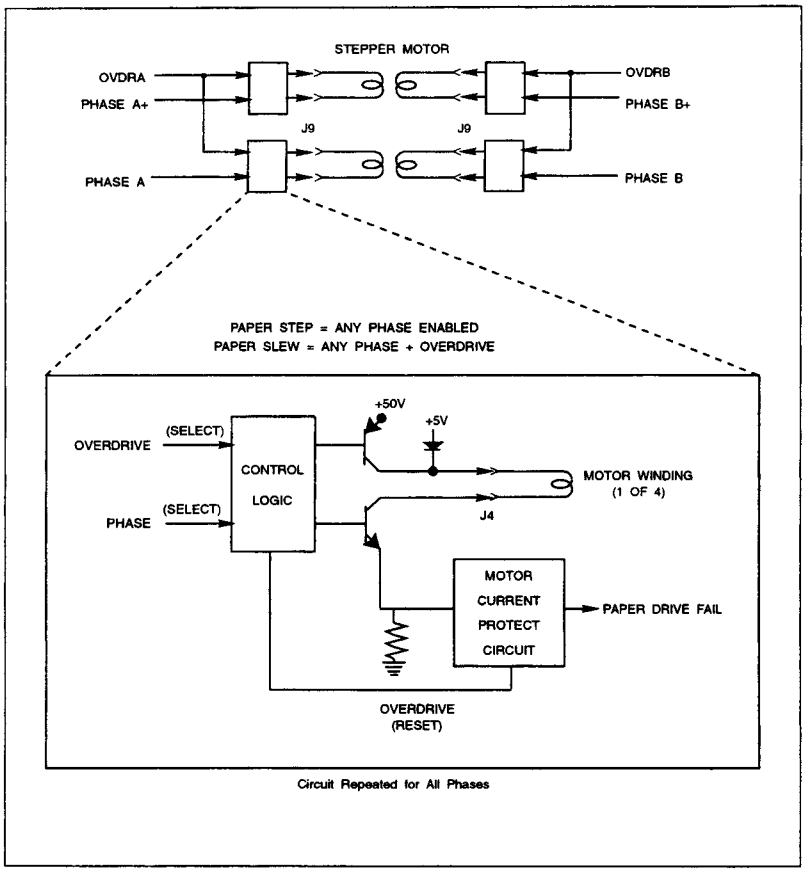

Figure 3-12. Stepper Motor Block Diagram

3-8. PRINT BAR MOTOR DRIVE CIRCUITRY (Analog PCA)

Horizontal dot rows in the character cell matrices are created as the print bar assembly moves from right-to-left and from left-to-right (mogates). The print mechanism is responsible for providing this lateral motion. The HP 2562C, 2563A/B/C print mechanism is unique in that its power (drive) is provided by a DC motor. A crankshaft driven by the motor provides for the print bar's lateral motion. Figure 3-13 illustrates the print mechanism assembly.

The heart of the print mechanism is the print bar assembly. The print bar consists of thirty three individual hammers. Each hammer prints across four character cell positions (total of 84 possible dot positions). At the rest position, the print bar is positioned at the center of it's travel. This centering of the printbar is known as the crank arm phasing adjustment (See section 5-3), and is performed by the engineer whenever the printbar is removed. Print bar motion is closely monitored by the Formatter processor so that the print bar motor speed may be regulated. The print bar motor control system is shown in Figure 3-14.

PRINT BAR MOTOR DRIVE OPERATION

The print bar drive circuitry is responsible for providing current to the print bar drive motor. The drive motor motion, through a mechanical linkage arrangement, provides for the linear motion of the print bar assembly. The print bar motor drive circuitry is shown in Figure 3-15.

NOTE

These parts are shown in this manner for clarity ONLY. Please

the register without disturbing the information stored in the latched section of the register.

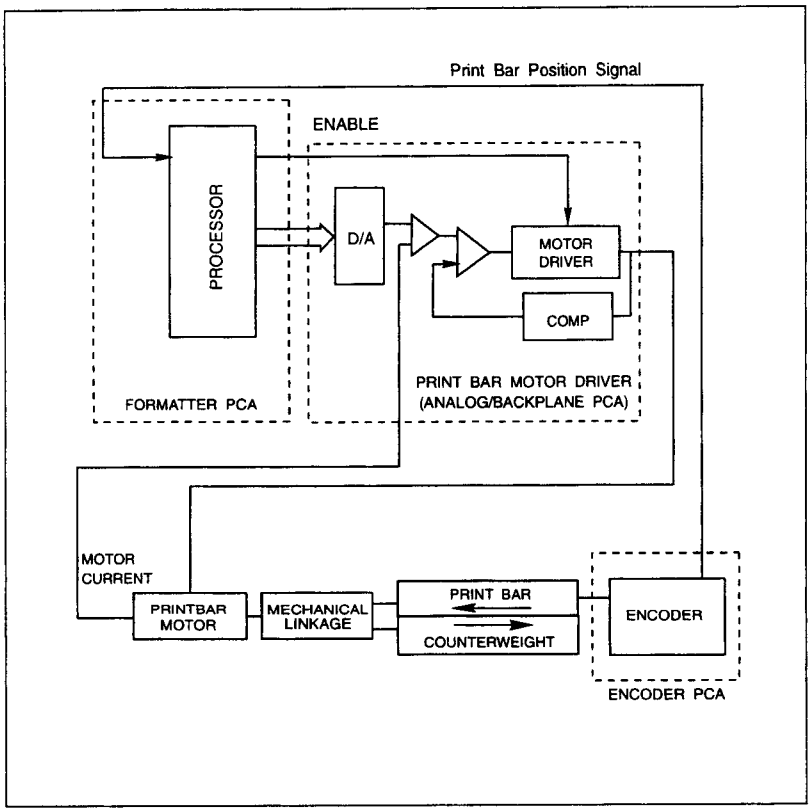

Figure 3-14. Printbar Motor Control System

Data from the 132-bit Output Register is input to the 33-bit Input Register in a manner such that three of every four bits are ignored. This is accomplished by using different clocks. Data is clocked (shifted out) from the 132-bit Output Register with the Dot Generation clock (DGCLK); data is clocked into the 33-bit Input Register with SCLOCK. The SCLOCK signal is generated from every fourth DGCLK. Because of this different clock rate, only every fourth bit from the Output Register is clocked into the Input Register.

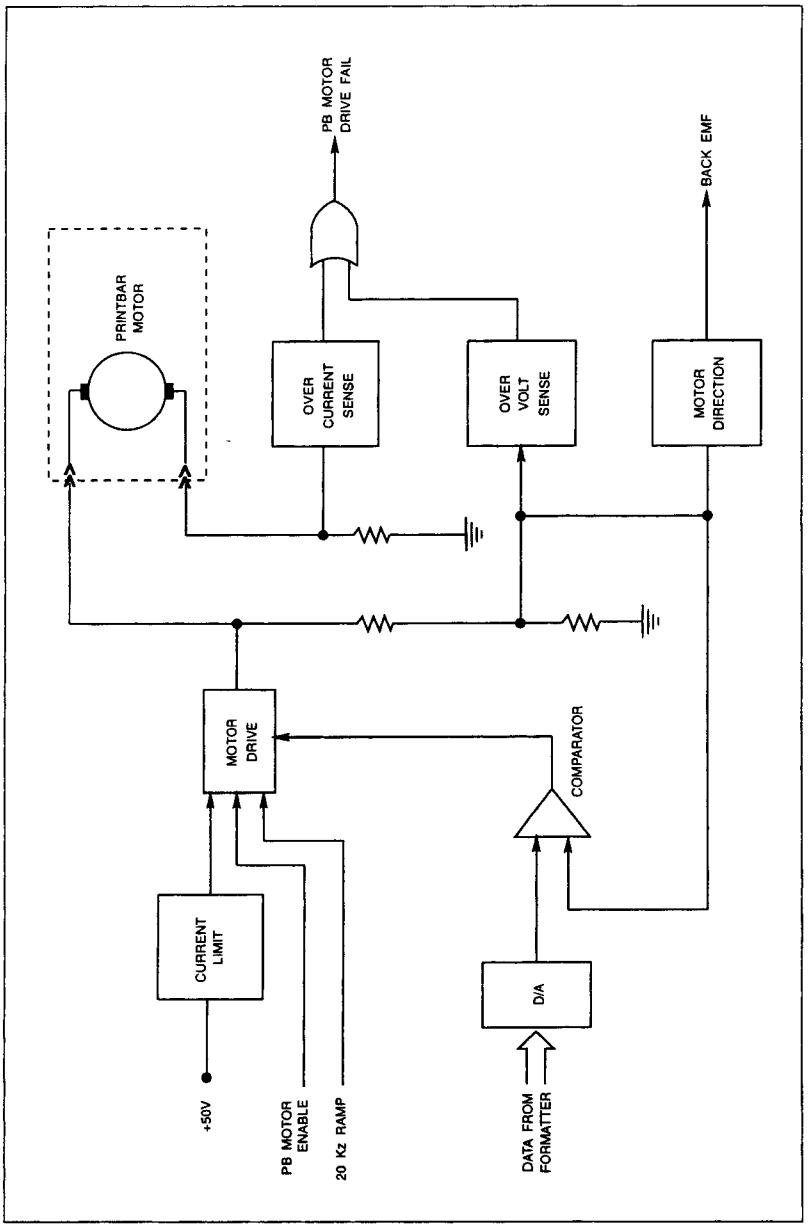

Figure 3-15. Printbar Motor Control System

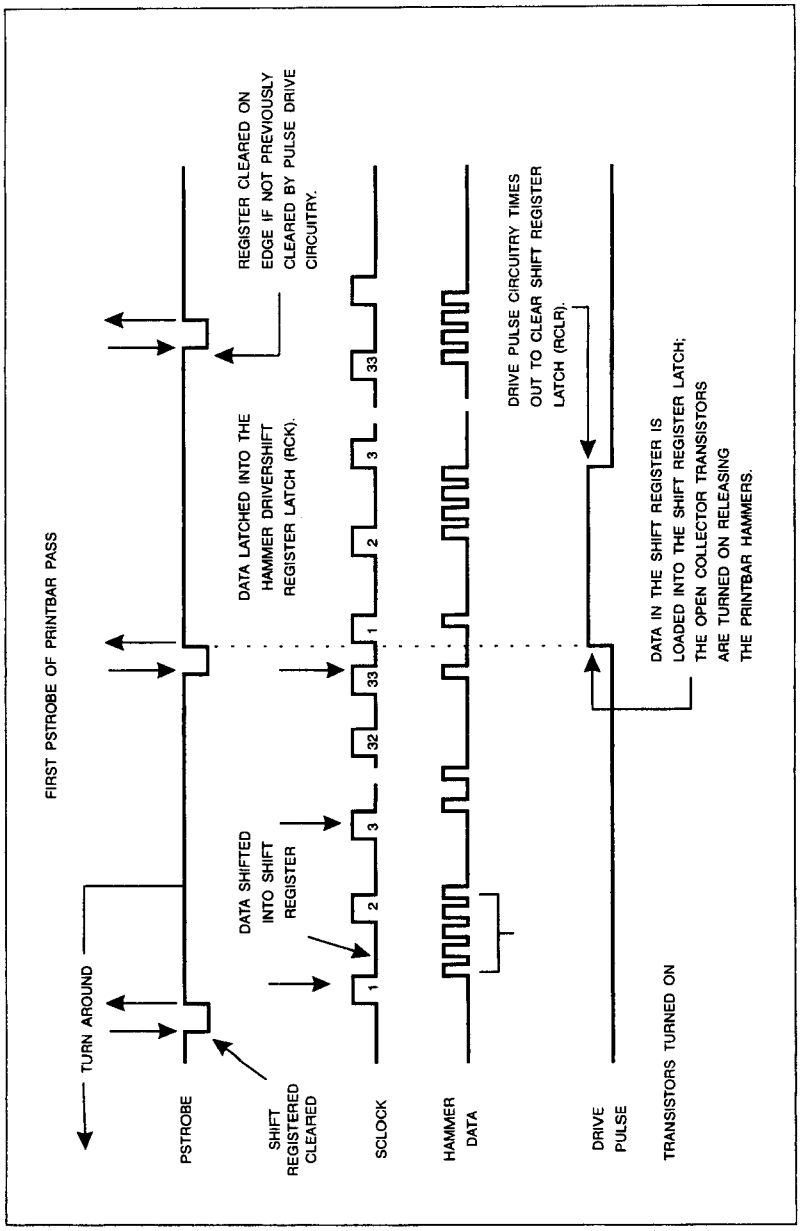

Figure 3-16. Hammer Driver Circuitry Timing

It should be understood that each of the 33 print bar hammers prints across four character positions. The three bits which are ignored during the first loading of the input register represent the first dot positions of the second, third and fourth character positions. These dot positions will eventually be utilized as the contents of the 2772-bit shift register is shifted through the shift register "taps" (total of 84 shifts).

The Position Strobe (PSTROBE) signal is generated by the Encoder Circuitry (see paragraph 3-10) and specifies when the print bar hammers are to be fired. Exactly 33 SCLOCKs occur between PSTROBEs. Hammer Data is clocked into the Input Register on the falling edge of SCLOCK. Data which was shifted into the Input Shift Register is latched into the Input Shift Register Latch on the rising edge of PSTROBE (see Figure 3-16).

When the Input Shift register is latched by the rising edge of PSTROBE, the hammer driver transistors are turned on if a dot is to be printed. The gating of the drive transistors allows current to flow through the individual electromagnetic coils (one for each hammer in the print bar assembly). The current flow through the coils produces a magnetic field which is opposite to that of the permanent magnet and allows the hammer to snap forward, printing a dot. When the coil is de-energized, the permanent magnet recaptures the hammer after the print bar hammers have fired, the process is again repeated; however, this time the data in the 2772-bit shift register is shifted one position over so that new data is tapped (the next dot position for each hammer). Concurrently, the print bar (and thus the hammers) have moved to the next dot position. The entire process is repeated until all dot/bit data (maximum possible 84) for each print bar hammer has been selected. At this time the next dot row is loaded into the 2772-bit shift register.

It should be noted that the data may be output from the 132-bit shift register from either the most significant bit or least significant bit positions. This is done so that the dot-image data from the shift register may be loaded into the hammer driver shift register in the correct orientation with respect to the direction of the print bar (either right to left or left to right).

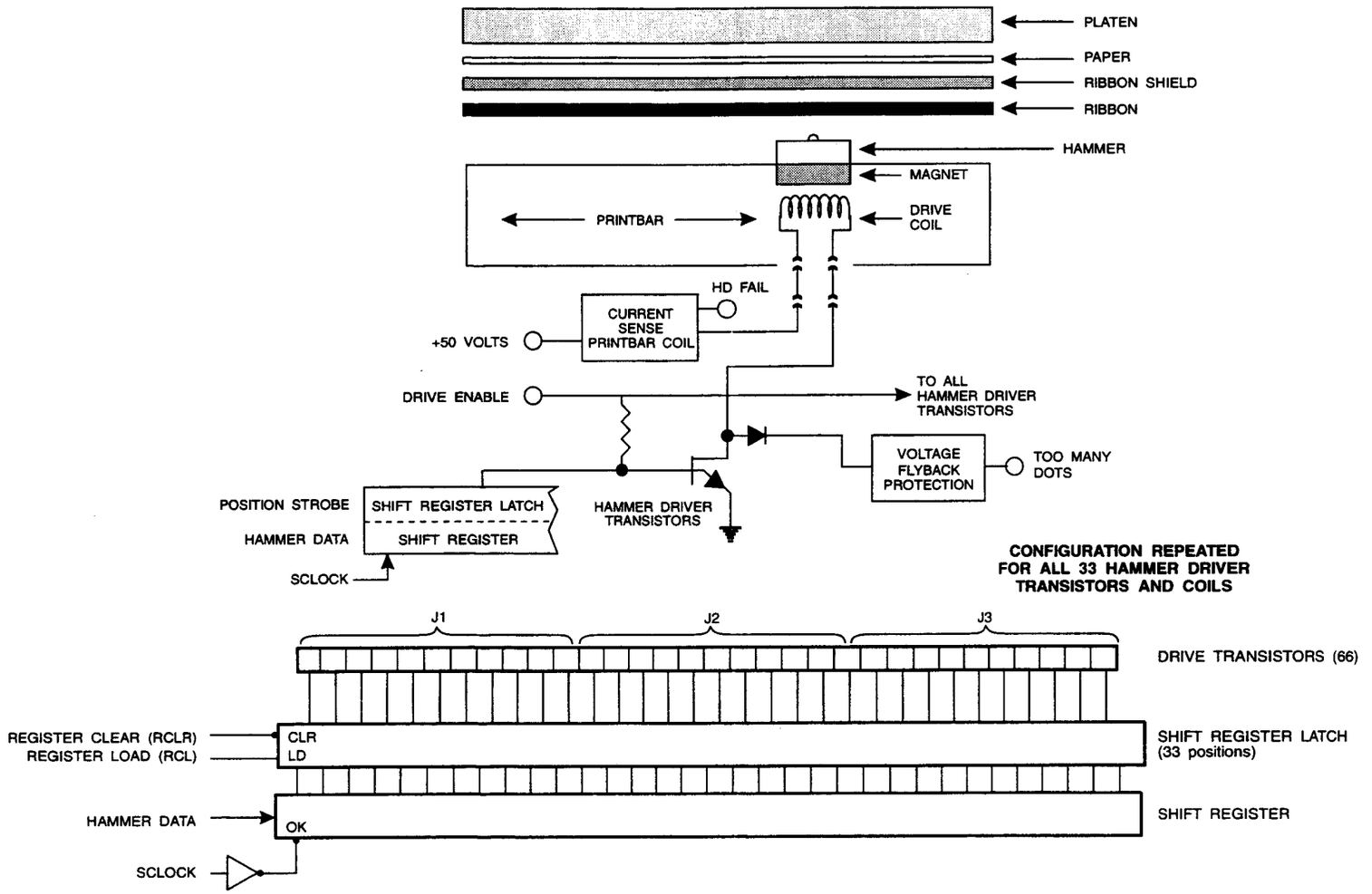

Figure 3-17. Hammer Driver Circuitry

TOO MANY DOTS

Two clamping zener diodes form a voltage flyback protection circuit to drain off the energy stored in the hammer coils when the hammer drive transistors are turned off. Two thermistors, positioned adjacent to the diodes, are used to monitor the zener diode's temperature. The diode's temperature is proportional to that of the print bar assembly. If the diode's temperature is too high (thus the print bar's), the TOO MANY DOTS signal is activated. The Formatter processor uses the TOO MANY DOTS signal as a an indicator to slow the rate at which data is shifted to the hammer driver circuitry and thus the printer print speed. When the temperature of the zener (and thus the print bar) returns to normal, the printer returns to its normal print speed. This too many dots circuitry is activated during sub-test 7 (blackout pattern).

CURRENT SENSING

The HAMMER CURRENT signal is active whenever current is sensed flowing through the hammer driver transistors. The HAMMER CURRENT signal is used while performing the Formatter processor diagnostics which verify the operation of the hammer driver transistors and the print bar coils.

The HMR DRV + FAIL is active whenever current is flowing from the +50 volt line to any of the print bar hammer coils and no printing is occurring (the PRINTING signal is inactive or the HAMMER IDLE is active). The activating of this signal disables the +50 volt switched supply. If HMR DRV + FAIL is active while HMR DRV - FAIL is inactive, one of the hammer driver coils is probably shorted to ground or a zener diode (from the flyback protection circuit) has failed.

HMR DRV - FAIL is active whenever current is flowing through one of the drive transistors and no printing is occurring. The activating of this signal disables the + 50 volt switched supply. This signal indicates to the diagnostics that the hammer driver electronics have probably have failed.

LOGIC SIGNALS

The HAMMER IDLE signal is generated on the Encoder PCA and is active each time the print bar turns around. During print bar turnaround no current should be flowing in either the print bar coils or the drive transistors. Since no current should be flowing while the HAMMER IDLE signal is active, the Formatter processor uses this interval of time to monitor hammer driver electronics and hammer coil failures.

The PRINTING signal is generated by the Formatter processor to indicate to the hammer driver circuitry that dots are to be printed. When the PRINTING signal is inactive (low), the Input Shift Register Latch is cleared; no current should be flowing in either the hammer driver transistors or the hammer coils. The controlling of the PRINTING signal therefore provides a convenient method for the Formatter processor to disable the hammer driver transistors and coils while slewing paper or while performing diagnostics.

3-10. ENCODER PCA

The purpose of the Encoder circuitry is to provide an accurate method of measuring the position of the print bar with respect to the position of the print mechanism casting. This information is essential to the Dot Generation Logic to ensure that all dots are correctly spaced horizontally.

The Encoder circuitry consists of two PCA's: the Encoder PCA which holds the analog and digital circuitry and the Pick-Up PCA. These PCA's are located on the print mechanism casting and the print bar assembly respectively. The Encoder PCA contains all of the encoder circuitry's active electronics. The Pick-Up PCA functions as a device to receive and sum the positioning signals generated by the Encoder PCA and is adjusted to provide a 0.015" gap whenever the printbar is replaced. A block diagram of the Encoder circuitry is shown in Figure 3-18.

The Encoder PCA is divided into the transmitter/receiver circuitry and the state machine/processor logic circuitry.

The signals to the transmitter pattern are generated by an 11 MHz clock which is input to two cascaded four-bit synchronous counters. The outputs from the second counter are used to gate and to clock the shift register. The overall circuit configuration generates a repeating pattern of eight 12 volt square wave pulses on the outputs of the shift register. The eight shift register outputs are tied to the fingers of the transmitter pattern.

The transmitter etched printed circuit pattern consists of five sets of eight fingers on the back of the Encoder PCA. Each finger is spaced on .032 inch centers; each set of eight fingers spans .256 inch. Each finger of a finger set is connected to the other four finger sets (total measurement range equals 5 times .256 inches or 1.28 inches).

The Pick-Up Plate PCA is mounted on the moving print bar assembly and is positioned directly over the etched transmitter fingers. Four etched fingers on the surface of the Pick-Up plate face the fingers of the Encoder PCA. Each Pick-Up plate finger is .128 inches wide and spans four Encoder fingers. The Pick-Up plate fingers capacitively sum the output of the four Encoder fingers under them during print bar movement. The output from alternate groups of four fingers are summed together and capacitively coupled back to the Encoder PCA. The two signals coupled back to the Encoder PCA are similar in magnitude but 180 degrees out of phase. On the Encoder PCA the signals from the pick-up plate are amplified and filtered. The amplified output is a sine wave whose phase is linearly proportional to the position of the print bar with respect to the print mechanism casting.

The principle behind the encoder is that the phase of the pick-up plate's output changes linearly with position of the pick-up plate over the Encoder PCA's transmitter fingers. One complete phase shift (one cycle) represents 0.256 inch print bar movement. After the output signal from the pick-up plate has been amplified, filtered, and synchronized with the 11 Mhz clock, the signal (now a TTL level) is used to latch the state of the first two bits from the counter into a pair of flip-flops. The latched value represents the phase of the output signal at that instant of time and thus the position of the print bar. Output values from the flip-flops represent print bar movement in .001 inch and .002 inch increments.

The flip-flop outputs are input to a "debounce" state machine which makes the digital circuitry less susceptible to the noise of the analog circuitry. The state machine generates a direction bit (RIGHT/LEFT), a change of direction strobe, and a .001 inch strobe. The direction bit indicates the current direction of the print bar (one equals left-right movement and zero equals right-left movement as from the front of the printer). The .001 strobe indicates that the print bar has moved .001 inch in either direction. The change of direction signal interrupts the Encoder Processor and indicates the print bar has changed direction.

ENCODER PROCESSOR

The Encoder Processor is an eight-bit microprocessor and is located in the formatter PCA. The processor has a 128-byte internal RAM and uses a 2K EPROM for storage of its instructions. (If an 8049 is used, the ROM is also internal to the processor.) The processor has one input port (P1) and one output port (P2). These ports are used for communications with the Formatter PCA's processor and the other sections of the printer hardware.

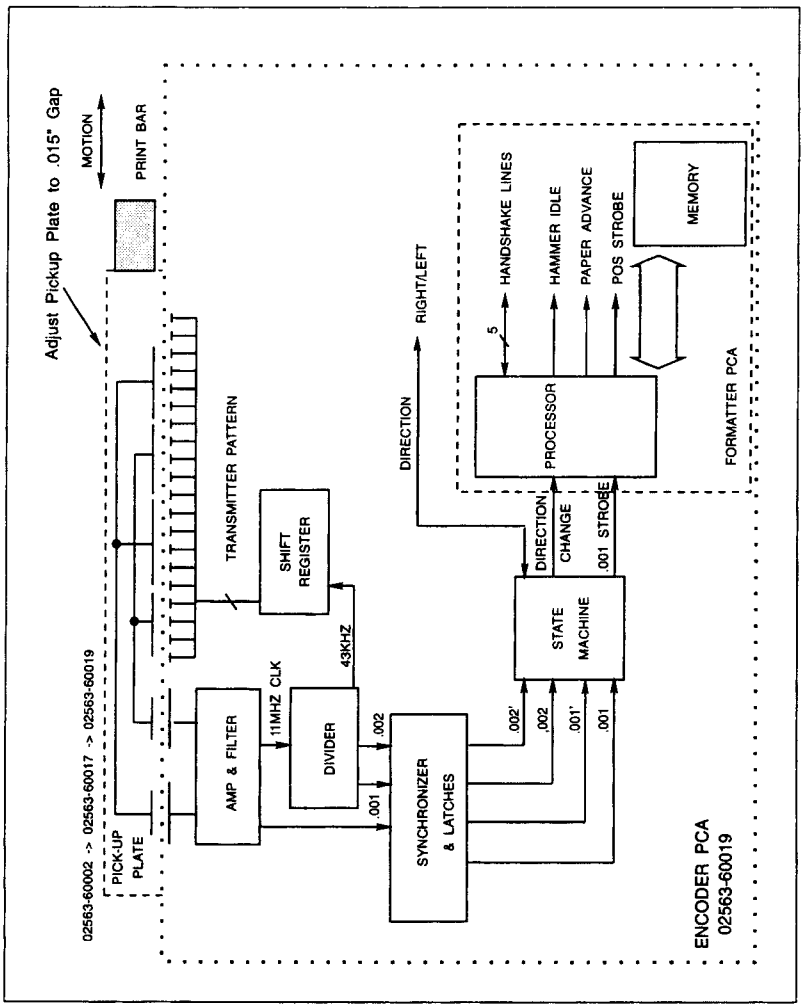

Figure 3-18. Encoder Block Diagram

To aid in printing data the Encoder processor generates the POSITION STROBE, PAPER ADVANCE and HAMMER IDLE signals. The POSITION STROBE signal is used for firing the print bar hammers, thus printing dots. A maximum possible 84 position strobes may be generated by the Encoder Processor (at a dot density of 210 dots/inch) during a single pass of the print bar. To calculate POSITION STROBE, the Encoder processor must take into consideration the sinusoidal nature of the print bar's motion

and the dot density requirements of the Formatter PCA's processor. The sinusoidal nature of the print bar is a result of the unique cam drive arrangement used for moving the print bar. The drive arrangement results in a print bar velocity which is greater at the center of its travel than before and after print bar turnaround. Since the hammers are fired (thus dots are printed) on POSITION STROBEs, the Encoder processor must compensate for the varying print bar velocity to ensure that all printed dots are evenly spaced.

In addition to compensating for varying print bar velocity, the Encoder processor must provide POSITION STROBEs for different dot density as requested by the Formatter PCA's processor. The following dot density strobes are provided by the Encoder processor:

Print Type	**Density**
Normal (10 characters/inch)	210 dots/inch
High Density (10 characters/inch)	210 dots/inch (Half step)
Compressed (16.7/13.3) characters/inch)	200 dots/inch
Compressed (15/12 characters/inch)	180 dots/inch
Bar Codes	110 dots/inch
Graphics	70/140 dots/inch
	60/120 dots/inch*

* (formatter DC >2824, encoder DC >2740)

Using the state machine's direction change and .001 strobes as a reference, the Encoder processor calculates POSITION STROBEs based on the dot density requirements. The POSITION STROBE signal is directly input to the hammer driver circuitry and the dot generation logic circuitry. The PAPER ADVANCE signal is generated by the Encoder processor 0.5 milliseconds prior to the last POSITION STROBE. This signal interrupts the Formatter processor alerting the processor that print bar turnaround will soon occur. This provides the Formatter processor sufficient time for readying itself for advancing paper and for preparing the next dot row for printing.

The HAMMER IDLE signal is generated by the Encoder processor approximately 300 microseconds after the last POSITION STROBE; at this time the print bar should be turning around. Since no printing should be occurring during turnaround, the Formatter processor uses the HAMMER IDLE signal as a reference point to perform the hammer driver transistor and print bar coil diagnostics.

A serial data communication scheme with handshake lines exists between the Encoder PCA processor and the Formatter PCA processor. The

handshake protocol eliminates the need for time synchronization between the two processors. Information passed between processors include dot density requirements and self-test diagnostic information.

3-11. 256X FRONT PANEL PCA

The Front Panel PCA provides for operator interface to the HP 2562C 2563A/B/C printer. The Front Panel consists of 12 keys, three seven-segment displays for hexadecimal code, and an ONLINE indicator. Table 3-3 provides a summary of the keyboard functions. The three displays are used for printer configuration, self-test results, and error status. A summary of the display's Status and Error Codes may be found in Chapter 4 of this manual. For more detailed information on the front panel keys, refer to the 2562, 2563 Operator's Manual.

All communications between the Front Panel PCA and the Formatter processor occur over the data bus and four input/output ports (physically the 26-pin ribbon connector between P1 of the Front Panel PCA and J7 of the Formatter PCA). The interface between the two PCA's is summarized in Table 3-4. Input/Output ports A0 through A2 are output ports from the processor; port A3 is an input port from the front panel and indicates which keys have been pressed. It should be noted that only two segments (c and b) from the most significant display of the keyboard are used.

Table 3-3. KEYBOARD FUNCTIONS

KEYBOARD	DESCRIPTION
ON LINE	This key places the printer ON/OFFLINE. All other keys are disabled when the printer is ONLINE.
FORM FEED	Advances the paper to the next Top Of Form position.
LINE FEED	Advances the paper to the next line position.
PRINT 1 LINE	Causes the printer to go ONLINE, print one line, and return OFFLINE. When pressed in Test mode, a special one line test pattern is printed.
FINE ADJ UP/DOWN	Advances the paper in the direction indicated in small increments. This key also advances the display when in Test, Configure, or Error modes.
SET T.O.F.	The pressing of this key along with the ENTER key establishes the Top of Form position (see the Operator's Manual for details).

Table 3-3. KEYBOARD FUNCTIONS

KEYBOARD	DESCRIPTION
TEST	When pressed along with the ENTER key a Self-test is executed. When pressed and held down for five seconds (until the status changes to a four) and the ENTER key is pressed, a continuous Self-test is executed. Pressing the TEST key a second time terminates the continuous Self-test operation.
CONFIG.	The CONFIGURATION key allows the operator to select any configurable printer function.
ENTER	When pushed, the selected parameter in Configure Mode is set, or the selected test in Test Mode is executed. Lines per Inch, Top of Form, and Page Length are also set by using the ENTER key.
L.P.I. ADJ	When pressed the printing lines per inch is displayed.
PAGE L. ADJ.	When pressed the physical page length is displayed.

3-12. SENSORS (Connected To Analog PCA)

The following conditions are sensed in the HP 2562C 2563A/B/C printer:

Platen Open
Paper Out
Paper Motion (Paper Jams)
Sensor Cable Installed

All sensed conditions are monitored by the Formatter processor (see I/O Port 7 in Table 3-2). Figure 3-19 illustrates sensor wiring. The Paper Out and Platen microswitches and the Paper Motion sensor are located on the rear left-hand wall of the print mechanism opposite the platen.

The Paper Motion sensor, a "Hall Effect" device, is used for paper jam detection. The movement of paper through the printer results in the rotation of the Paper Motion sensor. The rotation of the sensor results in the toggling of the Paper Motion bit every 45 steps (approximately .6 inch). If the processor does not detect a change of state within a specified number of paper steps, a Paper Jam error (13) is displayed on the printer.

The Sensors Enabled bit (bit 3 if I/O Port 7) is a logic low when the sensor cable, J5 of the Analog/Backplane PCA, is disconnected. When the sensor cable is disconnected the sensors are disabled. This allows printing to verify the sensor assembly is defective.

CAUTION

The printer will not detect paper out/platen open when the sensor is disconnected allowing the printer to print on the platen.

3-13. POWER SUPPLY (Analog PCA)

The HP 2562C 2563A/B/C Power Supply is located on the Analog/ Backplane PCA and consists of the following circuits:

Input Power and Strapping
Ribbon Motor Control
+50 Volt Controlled Supply
DC Voltage Regulators (+18, +/-12, and +5)
Power-On-Reset
Power-Fail Warning
Crowbar Protection

INPUT POWER AND POWER SELECTION

Line voltage is applied to the printer via connector J13. This is a three pin connector with the center pin tied to chassis ground. A line filter providing for radio frequency interference (RFI) protection is placed between the J13 and switch S1.

The enabling of switch S1 provides ac voltage to the fan assembly through connector J12 and to the transformer assembly through either connector J10 (220/240 voltage source) or J11 (100/120 voltage source). The moving of the six-pin connector on the primary of T1 to either J10 or J11 therefore provides a convenient method for strapping the printer for the input voltage source. Fuse F1, positioned between switch S1 and the transformer, must be installed in either the 120/240 or 100/220 position depending upon the power configuration of the printer. The secondary of transformer T1 provides 65 Vac to the ribbon motor circuitry and to the bridge rectifier.

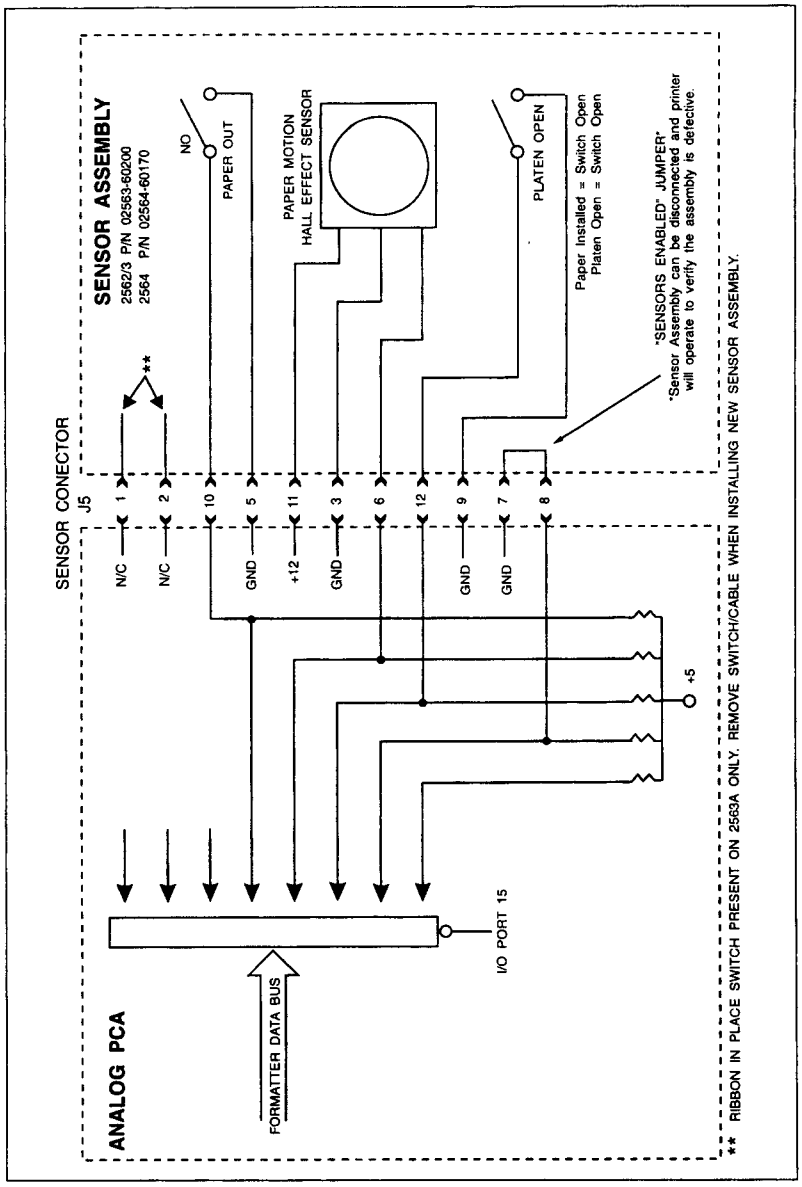

Figure 3-19. Printer Sensors

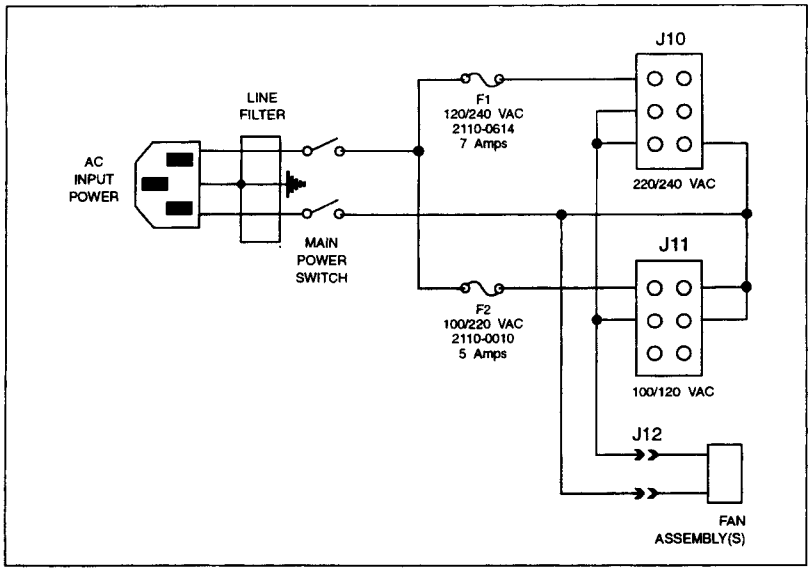

Figure 3-20. Input Power

The bridge rectifier rectifies the voltage from the secondary of transformer T1 to provide +65 volts to the remaining dc regulation circuits and to the +50 volt switched circuit. See Figure 3-21

RIBBON MOTOR CONTROL

The ribbon motor control circuitry consists of a triac switching circuit. The gate of the triac is enabled by RIBBON ON which is generated by the Formatter processor. The gating of the triac provides 65 Vac to the ribbon motor.

+50 VOLT SWITCHED SUPPLY

The +50 volt Switched Supply is the primary voltage source for the hammer driver, print bar motor, and the stepper motor circuitry. This supply is monitored by the Formatter processor (+50V Status) and may be disabled by the processor, via the +50V CONTROL signal, if a overcurrent condition is detected (see Figure 3-21).

The +50 volt Switched Supply is a triac regulated power supply. The output of a comparator is used to gate the triac. The comparator's inputs are sawtooth wave generated off the secondary of the transformer and a

voltage sense line off the triac's output. The less voltage sensed at the triac's output, the sooner the triac is gated on.

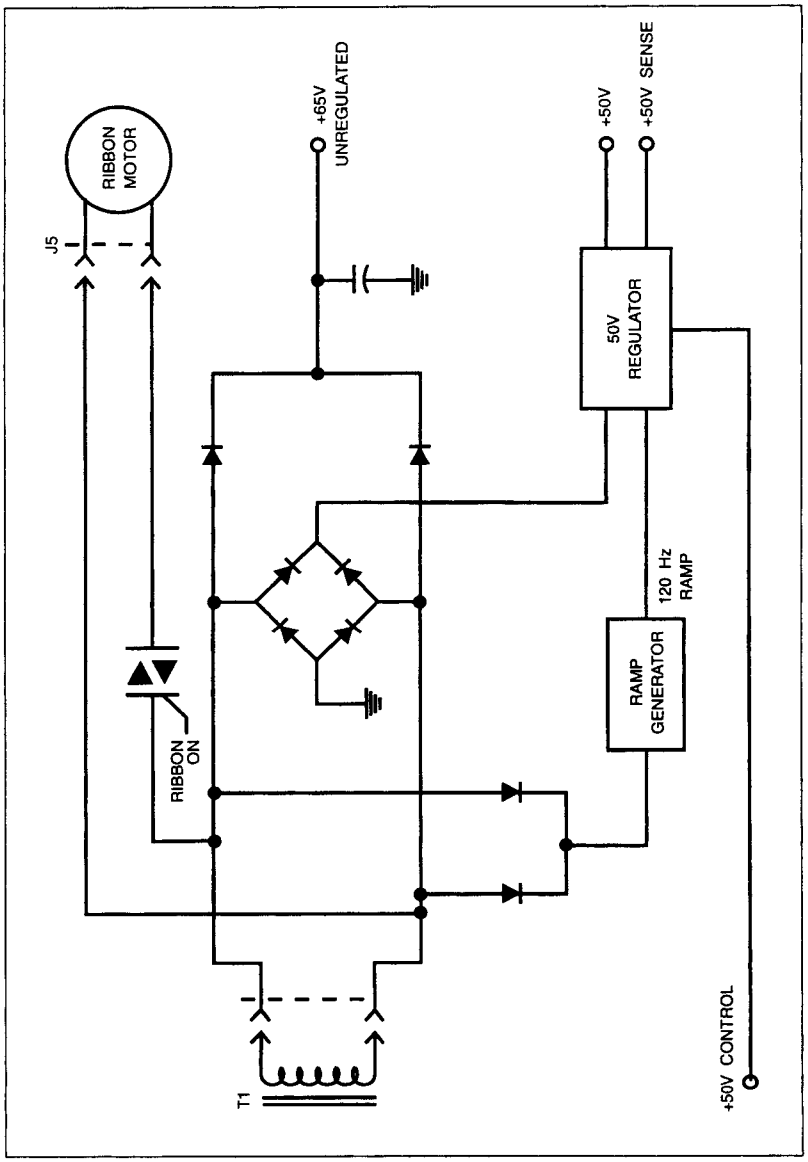

Figure 3-21. +50 Volt Switched Supply

The +50V STATUS signal is used to indicate to the Formatter processor that the +50 volt supply has come up. This signal is active at approximately +42 volts. The +50V CONTROL is normally inactive, thus permitting the +50V supply to be gated on. If an overcurrent situation occurs (see Figure 3-21), this signal becomes active disabling the power supply, but allowing the 12v, 18v and 5v power supplies to remain active, allowing an error code to be displayed on the front panel to be logged in the error log.

DC VOLTAGE REGULATORS

The following dc voltage regulators are used in the printer:

+ 18 VDC
+/- 12 VDC
+ 5 VDC

All DC voltage regulators receive their source from the +65V bridge rectifier source. The +18Vdc consists of a simple linear regulator circuit. The 100 kHz flyback regulator circuit is used to convert 65 volts to +5V and +/-12V. The switching regulator monitors the +5V and varies the frequency to a maximum duty cycle of 50% to maintain +5V to +/- 1%, which also affects the +/-12V. The switching regulator also monitors current draw.

The integrated switching regulator also provides a 20 Khz ramp (REG RAMP) and 20 kHz clock (REG OSC) to be used by the +5 volt regulator and the print bar motor drive circuitry.

POWER-ON RESET

Power-On Reset (RESET) goes to a logic one several hundred milliseconds after the +5 and -12 Vdc supplies are operational. Reset is used throughout the printer to reset (clear) all latches on power-up except the non-volatile RAM.

DRIVE ENABLE is also generated coincident with the setting of RESET. This signal enables the phase select transistors in the stepper motor circuitry and provides a bias voltage for the hammer driver transistors.

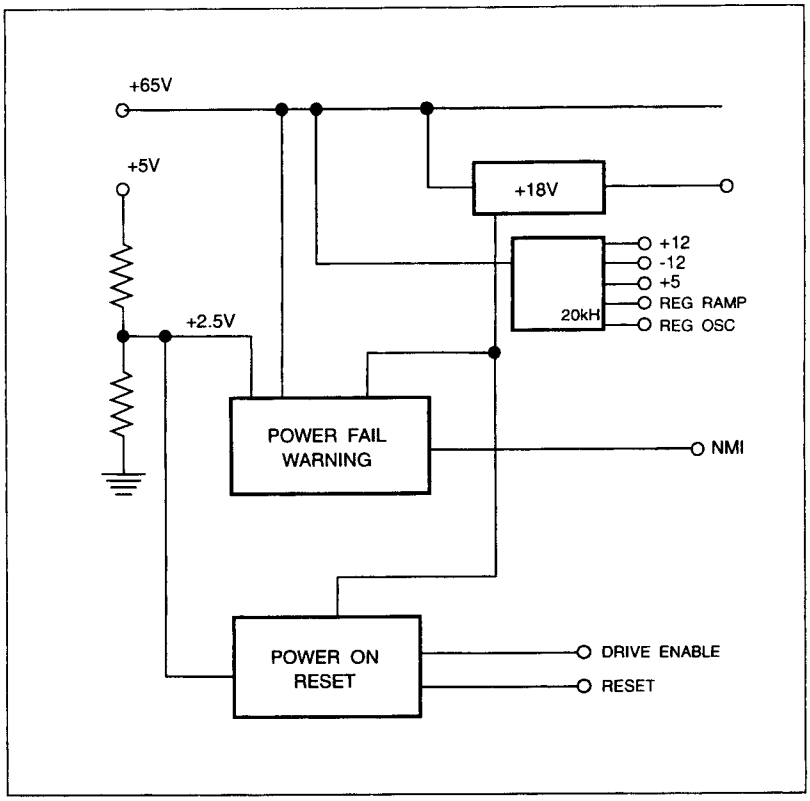

Figure 3-22. DC Voltage Regulators

POWER-FAIL WARNING

The power-fail warning circuitry monitors the +65 volt unregulated supply voltage for line fluctuations. If the supply voltage drops below +28 volts, the NMI (NON MASKABLE INTERRUPT) signal is set. The activating of NMI interrupts the Formatter PCA's microprocessor causing the processor to stop processing and jump error handling routine. The NMI signal becomes inactive when the voltage rises above +32 volts.

CROWBAR PROTECTION

Fused protection for an overvoltage condition is provided as follows: The gate of CR120 is connected to the +50V, +12V and +5.7V regulated supplies through zener diodes. If these supplies exceed +61V, +15.6V, or

+5.7V respectively, CR120 latches on, pulling the 65V unregulated supply to ground, blowing the main fuse.

Chapter 4

Configuration & Diagnostics 2562C 2563A/B/C

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4-1. INTRODUCTION

The HP 2562C 2563A/B/C printer can be configured and problems can be diagnosed largely from the Control Panel. The diagnostics provide the Service Representative a useful tool for detection of printer problems. All error conditions are displayed on the three digit display at the printer's Control Panel.

The following information is explained in this chapter:

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4-2. PRINTER CONFIGURATION AND STATUS INFORMATION

The HP 2562C 2563A/B/C printer is configured entirely from the Control Panel. Once established, the printer's configuration is stored in the Formatter PCA's non-volatile random access memory. The printer configuration should only be altered if a parameter change is necessary to complete a print job (i.e., change in page length) or if the Formatter PCA is replaced. Table 4-1 lists the configurable printer functions and their associated configuration numbers and parameter ranges.

To change a printer configuration, perform the following:

a. While the printer is OFFLINE, press and hold the CONFIG key. The two left decimal points on the printer's display will illuminate indicating the printer is in CONFIGURATION mode.

b. While continuing to press the CONFIG key, press the FINE ADJUST keys (either the UP or DOWN) to increment or decrement the display until the desired configuration is displayed (see table 4-1).

c. Release the CONFIG key. The display now shows the current contents of the configuration number just selected.

d. Using the FINE ADJUST keys, increment or decrement the parameter number until the desired number is displayed. (To exit configuration mode at this point without changing the selected parameter, press either the CONFIG or ONLINE keys and the original value will be retained.)

e. Press the ENTER key. The new parameter will be entered and the printer display will return to the STATUS mode. See Table 4-2

Table 4-1. CONFIGURATION FUNCTIONS FOR 2562C 2563A/B/C

CODE	FUNCTION	FORMATTER DATECODE		DEFAULT VALUE
		<2712	>2712	
01	Select Primary Character Set	0-25	0-95	0
02	Select Secondary Character Set	0-25	0-95	0
03	Select Print Density	0,1	N/A @	0
04	Select Print Pitch	10,16.7	N/A @	10.0
07	Select Page Length	N/A !	0,1	0
20	Configure Interface	00-FF	00-FF	7
21-29	Configure Interface	00-FF	00-FF	0
30	Flight Time Adjust	1-12 *	1-12*	6***
31	Offset Adjust	0-5 *	0-5 *	2***
50	Disconnect Modem	0,1	0,1	0

Table 4-1. CONFIGURATION FUNCTIONS FOR 2562C 2563A/B/C

CODE	FUNCTION	FORMATTER DATECODE		DEFAULT VALUE
		<2712	>2712	
51	Graphics Speed	0,1	0,1	0
52	Horizontal Graphics Density (DPI)	N/A !	60/70 >2749	70
53	Difficult Forms Mode	N/A !	0,1	0
60	Perf Skip Toggle	N/A !	0,1	0
61	Display Functions Toggle	N/A !	0,1	0
62	Line Terminator 0: CR=CR LF=LF FF=FF 1: CR=CR+LF LF=LF FF=FF 2: CR=CR LF=CR+LF FF=CR+FF 3: CR=CR+LF LF=CR+LF FF=CR+FF		0-7 >3305	0
70	Print time (Lst significant hrs)	00-99 *	00-99 *	0
71	Print time (hrs)	00-99 *	00-99 *	0
72	Print time (most significant hrs)	00-99 *	00-99 *	0
73	On time (least significant hrs)	00-99 *	00-99 *	0
74	On time (hrs)	00-99 *	00-99 *	0
75	On time (most significant hrs)	00-99 *	00-99 *	0
80	Enable/Disable label card	0,1	0,1	0<
81	Printronix P Series emulation	0,1	0,1	0<
85/89	Configure label card	0-FF	0-FF	0<
90	Error Log (current error)	**	**	
91	Error Log (last error)	**	**	
92	Error Log (2nd previous error)	**	**	
93/98	Error Log (3rd - 8th prev err)	**	**	
99	Clear Error Log	*	*	

* Configuration functions may only be modified in CE Mode.
** The first half of the display is the error number. To display the fail code (second half of the display) press either the FINE ADJ UP or DOWN key.
*** These values are factory set and vary from printer to printer.
! Applies to formatter firmware at revision 2712 & > (greater) ONLY.
@ Applies to formatter firmware at revision < (less than) 2712.
< Only available when label card is installed.

PRIMARY CHARACTER SET: CONFIGURATION 1

Select the primary character set by accessing function number "1" of the CONFIGURATION mode and selecting the parameter associated with the desired primary character set. The character sets and their associated parameter values are listed on your self-test print out. Figure 4-1 shows an example of the top portion of a self-test printout. The arrows in the figure point out the assigned character set parameter values. Note that the assigned values vary from printer to printer. Check your printer's self-test for the character set values.

SECONDARY CHARACTER SET: CONFIGURATION 2

Select the secondary character set from the printer's self-test. Access function number "2" of the CONFIGURATION mode and enter the parameter associated with that set (Fig. 4-1).

REMOTE CHARACTER SET SELECTION

Character sets in the self-test printout may also be selected remotely if performed under program control. Character set selection commands override the Operator Control Panel configuration setting (except under power-on or reset conditions). When taken "off-line", the printer remains in the character set last commanded. See the HP256X Printer Family Technical Reference Manual, 02564-90905, for information on remote character set selection.

Standard ASCII SHIFT-IN and SHIFT-OUT codes may be used to select primary and secondary character sets. SHIFT-OUT selects the secondary set and SHIFT-IN returns the printer to the primary set. Any number of character sets may be used within one print line if they are the same pitch. Additionally, bar codes and line draw can be printed on the same line as 10 character-per-inch (cpi) character sets. (Compressed character sets and the double-high/double-wide character sets cannot be printed on the same line with each other or with 10 cpi text.)

SELECT PAGE LENGTH REPRESENTATION: CONFIGURATION 7
Not available for datecodes <2712

Page length can be selected in either lines-per-page or in 1/2 inch increments. The default setting of zero (0), sets form length representation at ½ inch increments. A value of one (1) for function 7 sets form length representation in lines-per-page.

Figure 4-1. Standard Self-Test Example, HP Label Card II

DISCONNECT MODEM: CONFIGURATION 50

If a serial interface (or Multipoint interface) is installed in the printer and is connected to a modem, it is possible to disconnect the modem from the printer's Operator Control Panel. Setting function 50 to parameter "1" and then pressing ENTER makes the Data Terminal Ready line go to the "OFF" state for two seconds. If the modem Data Terminal Ready line is connected, this action should disconnect (hang-up) the modem.

GRAPHICS SPEED SELECTION: CONFIGURATION 51

In normal graphics, the printer has two print speeds. The printer prints at 14.5 or 29 inches/minute. Graphics speed is selected by setting function 51 of the CONFIGURATION mode to parameter "0" for the slower print speed and parameter "1" for the higher print speed. The print speed may NOT be set programmatically. The slower print speed provides higher quality print, and therefore is recommended for applications requiring higher-quality graphics.

HORIZONTAL GRAPHICS DENSITY SELECTION: CONFIGURATION 52
Not available for datecodes <2749

Horizontal graphics density (60 or 70 dots-per-inch) is selected via function 52. There is not a parameter of "1" or "0" for this function. Only 60 or 70 shows up in the display window. Programmatically setting the density overrides the operator control panel setting except under power-on or reset conditions. The default value is 70 dots-per-inch (dpi).

DIFFICULT FORMS MODE: CONFIGURATION 53
Not available for datecodes <2712

PERFORATION SKIP MODE: CONFIGURATION 60
Not available for datecodes <2712

When perforation skip mode is enabled (ON), and automatic page eject occurs when the perforation skip region is entered. This is to prevent printing too close to the page perforations. You can turn this automatic page eject "ON" by setting Perforation Skip Mode (function 60) to parameter "1" (ON). The default value is "0" (OFF). VFC control is not affected by perforation skip mode.

DISPLAY FUNCTIONS MODE: CONFIGURATION 61

Turn on the display functions mode by setting function 61 to parameter "1" (ON). In the display functions mode, the printer prints representative character symbols for the control code or escape sequence characters instead of actually executing the commands. For example, if the printer encounters the SHIFT-OUT command (to access the secondary font), the command will not be executed. The symbol SO will be printed instead. Two exceptions to this are the carriage return command and the escape sequence to turn display function mode "OFF" (ESC Z). The carriage return control character will cause a CR symbol to be printed and an actual carriage return and line feed to be performed. Function 80 must be set to parameter "0" if the display function mode is "ON". The default parameter for display functions mode is "0" (OFF).

VERTICAL LINE SPACING

Vertical line spacing (6 or 8 lines per inch) is selected via the LPI ADJ key on the Operator Control Panel or by program control or escape sequences. Programmatically setting the line spacing overrides the Operator Control Panel setting except under power-on or reset conditions.

4-3. OPERATIONAL STATUS CODES

The printer's status code is displayed in either the ONLINE or OFFLINE modes and displays the printer's current status. Table 4-2 summarizes the possible printer status.

Table 4-2. HP 2562C 2563A/B/C STATUS

DISPLAY	DESCRIPTION
0	Printer ready (also modem disconnected for serial & Multipoint interfaces)
1	Printer ready, modem connected (serial & Multipoint interfaces)
2	Silent Run (data recovery for some HP-IB and multipoint I/Os)
3	Reserved
4	Performing a subtest in a continuous mode
5	Standard Selftest/Subtest active
6	Print One Line (I/F buffer empty) activated
7	Print One Line (customer data) activated

4-4. SELF-TEST AND SELECTABLE SUBTESTS

Diagnostic routines are used for troubleshooting the printer. They are performed from the printer's Operator Control Panel (they may also be performed using escape sequences, refer to the HP 256X Printer Family Technical Reference Manual, P/N 02564-90905). Diagnostic self-tests provide the service representative a tool for the detection and isolation of printer malfunctions. The Standard Self-test executes a series of subtests which verify the operation of specific sections of the printer hardware. In addition to the Standard Self-test, subtests can be selected and executed individually.

To perform any diagnostic from the Operator Control Panel, the printer must be off-line. In addition, some of the selectable subtests require that the printer first be placed in CE Mode. If a paper-out or platen open (or paper jam) fault condition exists, none of the printing subtests will execute.

STANDARD SELF-TEST

To perform the standard Self-test (excluding the I/O tests), press the TEST key once to enter the test mode and then press the ENTER key. One copy of the self-test printout should be printed. To perform a continuous Self-test, press and hold the TEST key for five seconds (until the number "4" appears in the display), and then press the ENTER key. Exit the continuous Self-test by pressing the TEST or ON LINE key momentarily. The subtest routines listed in table 4-3 are performed when the standard Self-test is run. It should be noted that the right decimal position LED flashes when any diagnostic test is executed.

Table 4-3. STANDARD SELF-TEST

Power On (CE Mode Only)	This test verifies the +50V regulated supply.
Digital	This test checks the CTC channels. A ROM CRC test is performed on all firmware ROM. A non- destructive read/write test is performed on both volatile and non-volatile RAM. A DGL loopback test is performed to check the DGL logic. A CRC check is performed on all character set ROMS installed.
Static Encoder	This test performs a checksum operation on the Encoder processors ROM and a sequential read/ write operation on the RAM. A square wave is generated by the transmitter circuitry and is input to the divider circuitry generating a 42.9 kHz signal. The transmitter/receiver test verifies that this signal is generated by the transmitter and then received by the receiver.

Printbar Driver (CE Mode Only)	This test initiates print bar motion. Print bar motion (velocity) is measured to determine if the print bar is moving either too fast or slow. Proper communication between the Formatter processor and the print bar drive control logic are verified.
Hammer Driver (CE Mode Only)	This test checks for open hammer coils. All hammers (33 to 1) are fired individually.
I/O Test	See the appropriate I/O manual for test description.
Graphics	This test performs a read/write operation on the Graphic's PCA's dynamic and static RAM. The test performed on the static RAM is non-destructive (the original data is not destroyed). A CRC test is performed on all Graphics ROM. A diagnostic is performed by the Graphics PCA Controller to verify its operation.
Active Encoder	During this test, the print bar motor is activated and the number of .001 strobes which occur during a pass of the print bar is calculated. The Encoder processor also monitors to determine if any Direction Change signals occur outside of print bar turnaround.
THE PRINTED PORTION OF THE SELF-TEST FOLLOWS - REFER TO FIG. 4-2]	
A. Configuration Print Out	A description of the I/O configuration as well as firmware datecodes and print time hours.
B. Character Set Samples	Sample printouts of each character set, with associated selection numbers.
C. Bar Codes	Bar code print samples (if any installed).
D. Raster Graphics	A raster graphic print sample (diagonal lines) is printed.
E. Print Quality	A sample of vertical and horizontal lines are printed; these may be used to evaluate print quality.
F. Double Size Ripple Print	A sample of double size print.
G. Compressed Ripple Print*	A sample of compressed print.
H. High Density Ripple Print*	A sample of high density print. (If high density ROM is installed)
I. Standard Ripple Print	A sample of standard ripple print.
	* = Not on 2562C

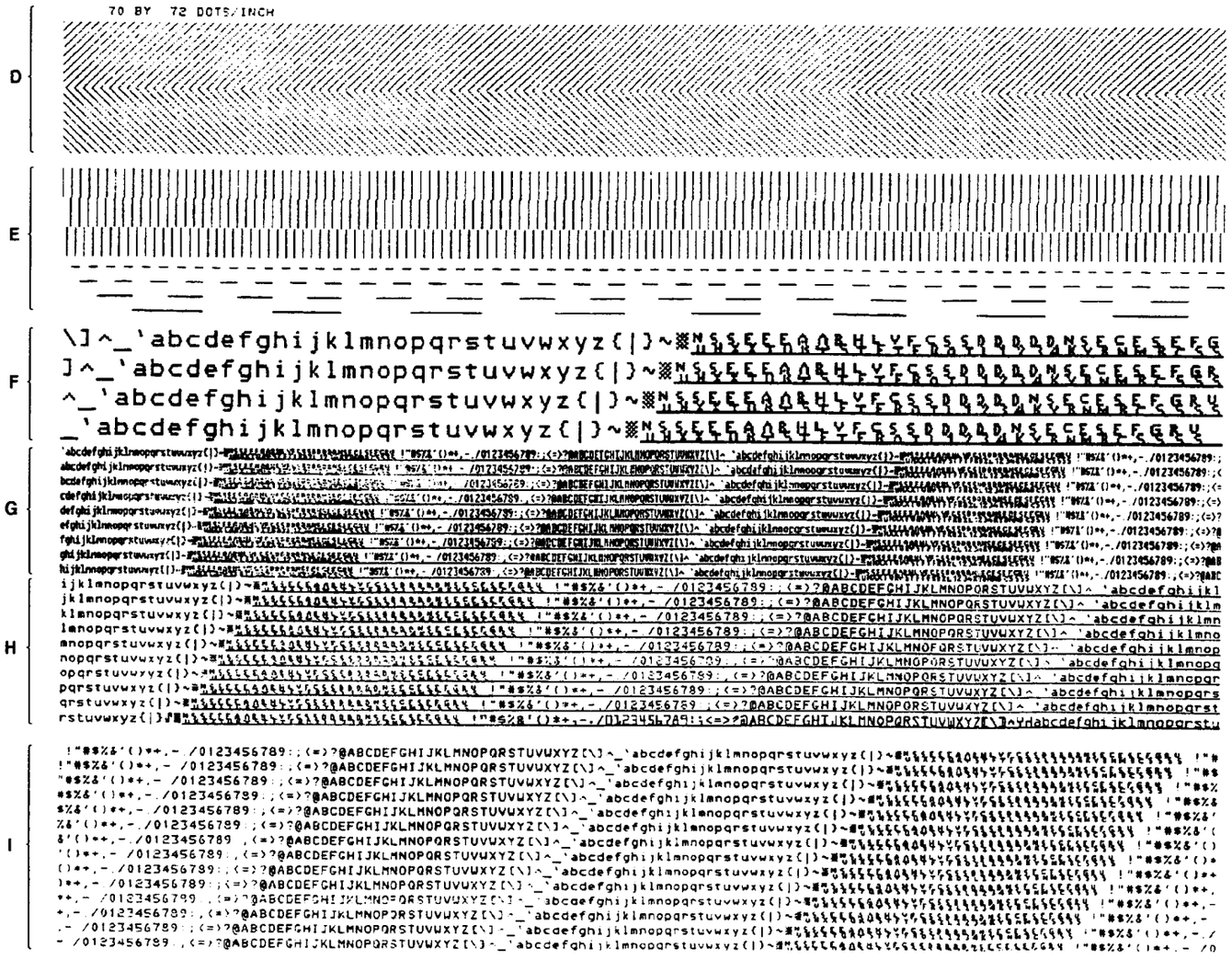

Figure 4-2b. Self-Test Print-Out (see Table 4-3 for explanations)

Figure 4-2. Standard CE-Mode Self-Test with Multiple I/O

SELECTABLE DIAGNOSTIC SUBTESTS

Individual sub-tests may be selected and run from the Control Panel (see Table 4-4). Sub-tests serve to verify the operation of specific functions of the printer's circuitry. To run a sub-test, press the TEST key to enter the TEST mode. Use the FINE ADJUST keys to increment or decrement the printer's display to the desired subtest number. Press the ENTER key to start the subtest. To run a continuous subtest, press and hold the TEST key for five seconds (until the displayed status changes from a five to a four). Use the FINE ADJUST keys to select the desired subtest routine, and then press the ENTER key to execute the routine. Press the TEST key to exit the continuous subtest operation.

Table 4-4. SELECTABLE DIAGNOSTIC TESTS FOR 2562C 2563A/B/C

TEST 2563A	NUMBER 2562C 2563B/C	TEST TITLE
0	0	Standard Self-test
1	1	Standard Ripple Print
2	2	Double Size Ripple Print
3	3	Compressed Ripple Print
4	4	High Density Ripple (if installed)
5	5	Raster Graphics Print (herring bone)
7 *	7 *	Raster Graphics (black out pattern)
	8 #	Configuration Printout
	10	Draft Character Set Ripple Print
11 *	11 *	Digital (Formatter test)
12	12 *	Active Encoder
13	13 *	DGL Character Set ROM CRC
14	14 *	Static Encoder
	16 *	Flight Time Adjust Pattern (double vertical bars at 60 DPI)
20	20 *	Power On
21	21 *	Print Bar Motor
22	22 *	Hammer Driver
30-38	30-38	Interface Tests (I/O dependent, see specific interface Manual)
40-48	40-49	Vector Graphics Option Tests (vector to raster) or HP label card. Check appropriate manual.
	90 **	Graphics Print Quality Test

* CE Mode Only
\# Formatter date code 2712 & >
** 2563B/C 2562C (Formatter date code 2825 & >)

4-5. CE MODE OPERATION

The CE Mode of operation allows the Service Representative to perform several configuration functions, and to perform diagnostic subroutines that are not allowed in the Operator Mode of operation (see Tables 4-1 and 4-3). To place the printer in CE Mode proceed as follows:

a. Set the printer's ON/OFF switch to the OFF (0) position.

b. Remove the printer's top cover as follows:

   1. Open the printer's top cover; loosen the two captive pozidrive screws recessed below the top front edge of the top cover.

   2. Loosen the two pozidrive screws which secure the printer's Control Panel to the top cover. Slide the Control Panel toward the center of the printer approximately one-half inch to the left.

   3. Unlatch the two top cover latches securing the top cover at the rear of the printer.

   4. Carefully lift-up on the top cover to remove from the printer.

c. At the Formatter PCA, install a jumper from the "CE MODE" test point (or hole) and TP1 (GND).

d. Set the printer's ON/OFF switch to the ON (1) position.

4-6. ERRORS

Whenever a diagnostic routine detects an error, an error message is displayed on the Operator Control Panel. This error message is a four digit number. When the error is detected the first (upper) two digits of the error number are displayed, flashing, on the Operator Control Panel. To read the second (lower) two digits press the ENTER key and the second two digits of the error will be displayed.

Descriptions of the error numbers are provided in Appendix A along with possible causes.

In addition to displaying the current error, the printer contains an error log which can store, not only the current error, but the previous eight errors which have occurred. This allows the service representative to identify the

chain of events (errors) which may have occurred as a result of a malfunction (refer to Section 4-7, Printer Error Log).

4-7. PRINTER ERROR LOG

To aid in troubleshooting, the printer is designed to store up to nine error messages. These error messages are written to the printer's error log. The error log (error messages) can be read by the CE to obtain a "history" of the type of errors which have occurred, in order to provide additional insight as to the nature a problem.

Error log errors are read from the printer's Operator Control Panel. These errors are read in a similar manner as a configuration parameter. Two procedures, one for reading the error log and for clearing the error log, are provided below.

Table 4-7. ERROR LOG FUNCTION NUMBER DESCRIPTIONS

FUNCTION NUMBER	DESCRIPTION
90	Read current error
91	Read last error
92	Read 2nd previous error
93	Read 3rd previous error
94	Read 4th previous error
95	Read 5th previous error
96	Read 6th previous error
97	Read 7th previous error
98	Read 8th previous error
99	Clear Error Log

NOTE

Paper-out, Paper jam, and Plater platen open errors are not logged.

READING THE ERROR LOG

a. With the printer OFFLINE, press and hold the CONFIG key. Press either FINE ADJ keys to increment or decrement the printer display until the desired configuration (90 through 98) is displayed, then release the CONFIG key.

b. When the CONFIG key is released, the first half of the error number will be displayed. To obtain the second half of the error number, press either FINE ADJ arrow key.

It is also possible to clear the contents of the error log. Clearing the error log provides the service representative a "fresh start" for recording printer errors.

CLEARING THE ERROR LOG

a. Place the printer in CE MODE, refer to Section 4-5.

b. With the printer OFFLINE, press and hold the CONFIG key and then press either FINE ADJ key to increment or decrement the printer display until function number 99 is displayed, then release the CONFIG key.

c. Use either FINE ADJ key to increment or decrement the printer display until a one (1) is displayed and then press the ENTER key. The error log should now be cleared.

d. Exit CE Mode, refer to Section 4-5.

4-8. INTERFACE CONFIGURATION

All interface functions are programmed from the Operator Control Panel. When the function numbers are entered, write them down in the I/O Configuration parameter column on the Operator Information Label. There may be instances when these numbers need to be re-entered. Each interface has its own set of configuration parameters which are set by accessing functions 20 through 29 of the CONFIGURATION mode. For additional configuration or cabling information, refer to the appropriate Interface manual.

Parallel-Differential Interface Manual	P/N 26067-90905
Centronics Parallel Interface Manual	P/N 26067-90906

RS-232/422 Interface Manual	P/N 26067-90921
HP-IB Interface Manual	P/N 26067-90901
Multipoint Interface Manual	P/N 26067-90902
Dataproducts Interface Manual	P/N 26067-90907

All interface functions (20-29) and their parameters must be entered. If you need to change the configuration or re-enter numbers, follow this procedure:

1. Enter CONFIGURATION mode.

   Make sure the printer is "off-line". Press and hold down the CONFIG. key. At the same time, press either FINE ADJ. key to move to the desired function (20-29). Two decimal points indicate the CONFIGURATION mode.

2. Release the CONFIG. key.

   Find the parameter for the function (20-29) in the appropriate Interface manual.

3. Use the FINE ADJ. keys to move to the desired parameter number.

4. Press ENTER.

   This sets the new parameter and the printer returns to the STATUS mode.

5. Set the next parameter.

   Repeat steps 1 through 4 until all the parameters for functions 20 through 29 are entered, as specified in the appropriate Interface manual.

6. Record the configuration on the Flip Chart located on the Top Cover Assembly.

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Chapter 5

Adjustments
2562C 2563A/B/C

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5-1. INTRODUCTION

This section of the manual provides the adjustment procedures for the HP 2562C 2563A/B/C printer. The following procedures are discussed in this section of the manual:

	Section	Page
5-1.	INTRODUCTION	5 - 3
5-2.	REQUIRED TOOLS	5 - 3
5-3	SEQUENCE OF ADJUSTMENTS	5 - 3
5-4.	CRANK ARM PHASE ADJUSTMENT	5 - 3
5-5.	ENCODER GAP ADJUSTMENT	5 - 6
5-6.	PLATEN GAP ADJUSTMENT	5 - 7
5-7.	ENCODER FRONT PANEL ADJUSTMENTS	5 - 10
	FLIGHT TIME ADJUSTMENT	5 - 11
	OFFSET ADJUSTMENT	5 - 12
5-8.	COLD START	5 - 13

5-2. REQUIRED TOOLS

In addition to the hand tools normally available in service tool kits, the following special tools are required to perform the adjustments on the HP 2562C 2563A/B/C printer.

Feeler Gauge (non-abrasive, two each)	P/N 02563-00081
Phase Adjustment Tool	P/N 02563-00069

5-3. SEQUENCE OF ADJUSTMENTS

Perform the adjustments in the sequence listed in Section 5-1. Always perform the adjustments in correct sequence or erratic print quality may be experienced.

5-4. CRANK ARM PHASE ADJUSTMENT

The Crank Arm Phase Adjustment procedure should be performed whenever the printbar drive motor or printbar is replaced. To phase the crank arms, proceed as follows:

a. Assure the Platen Lever is in the open position.

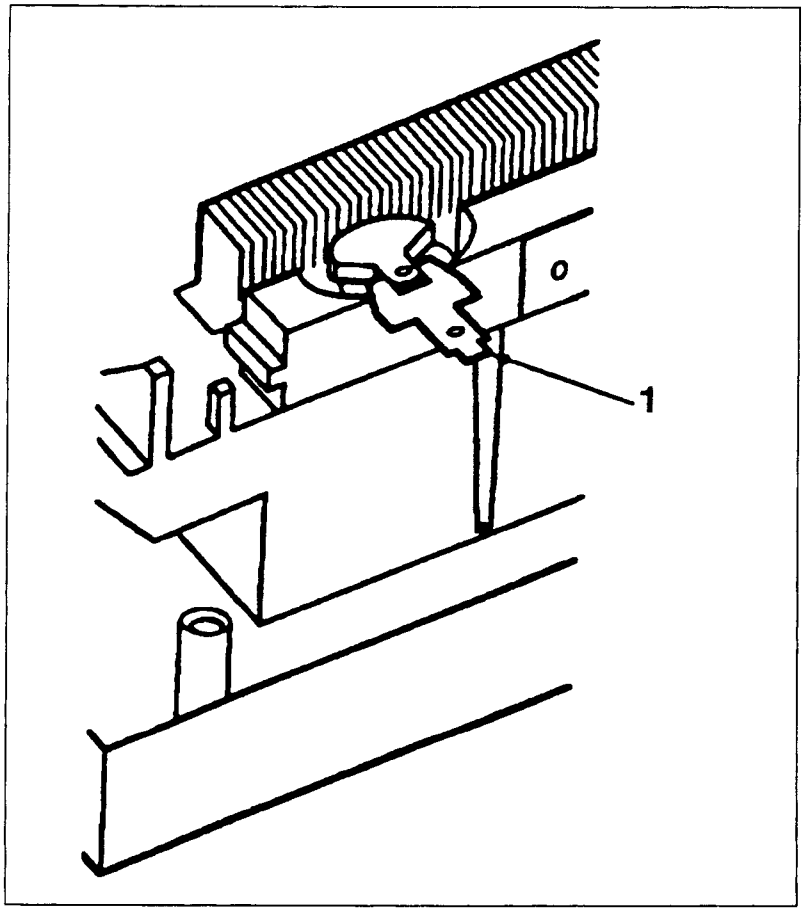

Figure 5-1. Crank Arm Phasing Adjusting Tool

b. Install the phasing tool (P/N 02563-00069) onto the counter-weight (see Figure 5-1).

c. Ensure that the print mechanism flexures are relaxed (nothing is hindering their movement). Place the phasing tool so that the lower lip of the tool is against the edge of the print mechanism. Check the counter balance weights to see if they are equally centered between the inside edges of the tool or the reference on the tool. If the weights are equally centered, no adjustment is needed. It the weights are not equally centered, proceed to step "c" to adjust.

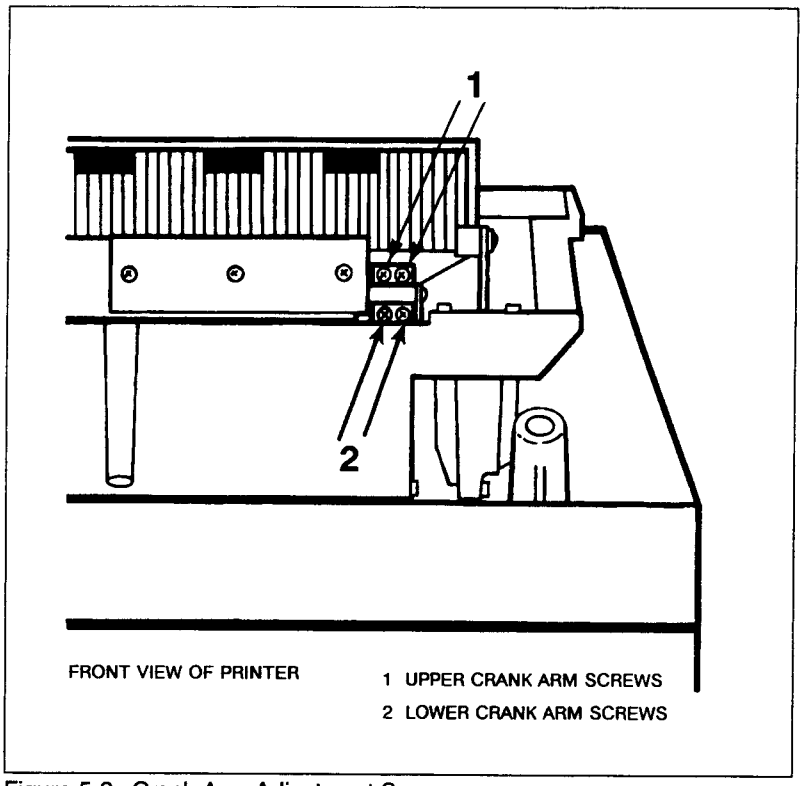

Figure 5-2. Crank Arm Adjustment Screws

d. Loosen all four crank arm screws (see Figure 5-2). Move the adjustment tool until the counter balance weights are equally centered between the inside edges of the tool or the reference on the tool.

e. Snug down first, then tighten the four crank-arm screws in the following sequence: upper left, lower right, upper right, lower left.

f. Verify by slapping the printbar once or twice. It should return to its centered position.

5-5. ENCODER GAP ADJUSTMENT

The encoder gap is the space between the Pick-Up PCA which moves with the print bar assembly, and the Encoder PCA which is mounted on the print mechanism casting. The gap should be .015 +/- .005 inches. The gap should be adjusted each time the print bar assembly, Encoder PCA or the Pick-Up PCA is replaced. The printer weldment must be removed prior to adjusting the encoder gap. This allows access to the 3 pick-up bracket adjustment screws (see Figure 5-3).

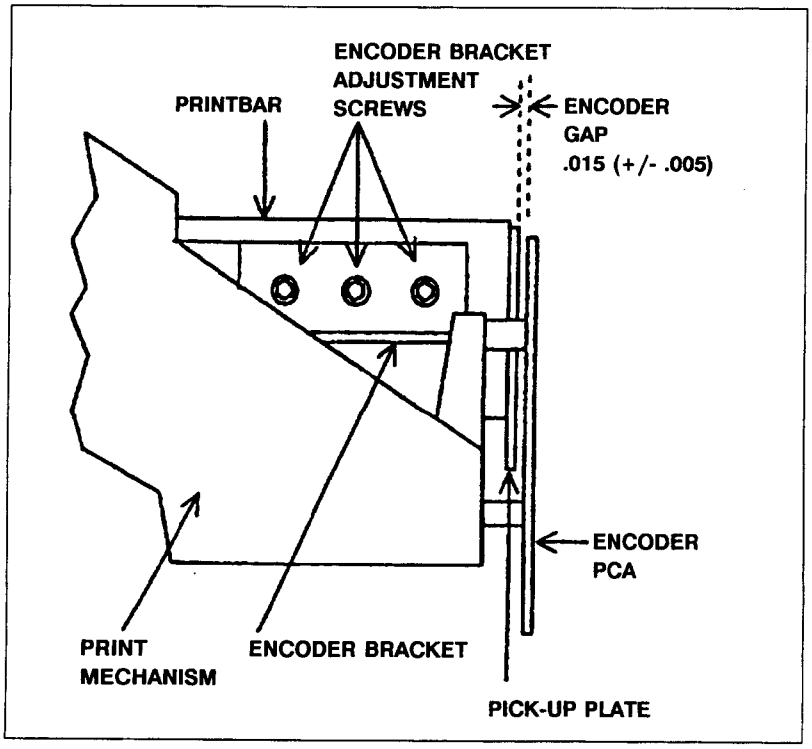

Figure 5-3. Encoder Adjustment

NOTE

If a non-abrasive gauge is not available, two typical HP business cards may be used for setting the Encoder Gap.

CAUTION

When adjusting the encoder gap, it is critical that the gap is parallel from the top to bottom end and that the Encoder PCA and Pickup PCA are not touching.

Adjust the encoder gap as follows:

a. Remove the printer weldment (see Section 6-4).

b. Loosen the three pozidrive screws or 3mm socketed cap screws which support encoder pick-up plate bracket (see Figure 5-3).

c. With a plastic or non-abrasive gauge positioned between the Pick-Up PCA and the Encoder PCA, position the encoder bracket so that a gap of 0.015 +/- .005 inch is obtained. Ensure that the Pick-Up PCA is PARALLEL to the Encoder PCA and tighten the three adjustment screws.

5-6. PLATEN GAP ADJUSTMENT

The Platen Gap is the space between the platen and the print bar hammer tines #1 and #33. This gap should be 0.013 +/- .001 inches with the Platen Adjustment Knob set to "1" or "B". This adjustment should be performed each time the printbar assembly, platen or weldment is replaced or removed.

To adjust the platen gap, perform the following steps:

NOTE

If the printer's top cover is not already off, you only need to remove the top access door only. If the top cover has already been removed, skip step "a", proceed directly to step "b".

a. Remove the screw in the lower end of the gas shock and remove the printer access door from the top cover as shown in Figure 5-4 (see NOTE above).

b. Rotate the Platen Adjustment Knob until it reaches the 1 or B detent.

c. Using a 3mm hex driver, loosen the two screws which secure the platen mounting feet to the print mechanism (see Figure 5-5).

d. Adjust the platen by placing the 0.013 inch feeler gauges (P/N 02564-00081) between the ribbon shield and the platen, one at each end of the platen, one under hammer #1 (first hammer) and one under hammer #33 (last hammer) as shown in Figure 5-5. Grasp the platen and the print bar with one hand, squeezing them firmly together so that the platen is held snug against the gauges. Then tighten the screws.

NOTE

To more easily view the positions of hammers #1 and #33 it may be necessary to push the ribbon shield back and visually observe the hammer positions on the print bar. Assure the gauges are placed between the Platen and the Ribbon Shield.

e. Verify that the Platen Adjustment Knob is still at the 1 or B detent (see step "b" above). Re-check the gap and repeat step "d" if necessary until confident it is set precisely.

NOTE

The platen gap is critical for maintaining good print quality. Re-check after tightening to be certain it is correct.

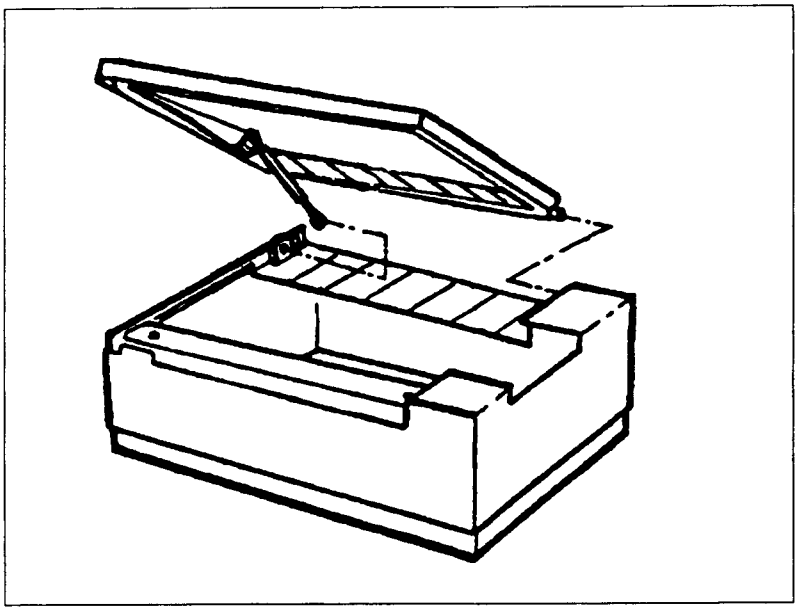

Figure 5-4. Top Cover (front view)

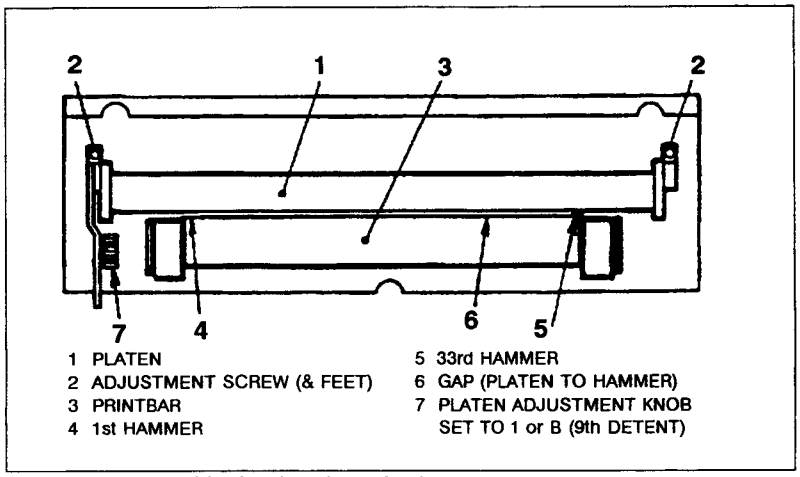

Figure 5-5. Print Mechanism (top view)

5-7. ENCODER FRONT PANEL ADJUSTMENTS

The encoder operational parameters, Hammer Flight Time and Offset Adjust, may be altered via the Operator's Control Panel to improve the print quality.

Hammer Flight Time is the total time it takes for the print bar hammers to strike the paper after they have been fired. This total time is made up of the time which it takes the hammers to physically move the distance (hammer to platen) plus the electronic delay inherent to the hammer driver circuitry.

Offset Adjust is defined as the difference in positions from when the print bar physically changes direction, to when the change of direction signal indicates the print bar has changed direction. This offset is inherent to the printer's circuitry and in actual motion accounts for approximately 0.002 inch of print bar movement.

NOTE

Experience has shown that changes to these adjustments are rarely required. Changing Offset and Flight Time adjustments unnecessarily may introduce new problems.

Before attempting to alter either parameter, ensure that the Encoder PCA is functional, and that the Crank Arm Phase, Encoder Gap and Platen Gap adjustments are set correctly. Refer to the adjustment procedures in this chapter.

To determine whether the Hammer Flight Time or the Offset need adjustment, observe four vertical dot columns (i.e., sub-test 16, or the letter "I", "I", etc.) all of which are printed by the same print bar hammer. If the parameters are adjusted correctly, the dot columns of the letters should be vertical, without any waviness ("dot slalom"). If waviness exists, and is constant across all four columns, the Offset needs adjustment. If the inner two dot columns exhibit more of a problem than the outer two dot columns, then the Hammer Flight Time needs adjustment.

NOTE

Subtest 90 provides additional print patterns that can be used for further fine tuning of these adjustments. Test 90 not available for Datecodes <2712.

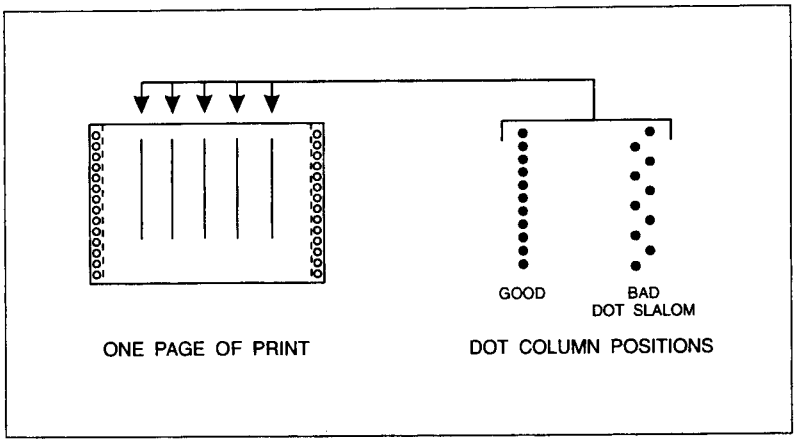

Figure 5-6. Dot Column Positions

FLIGHT TIME ADJUSTMENT

a. Place the printer in the CE Mode of operation. Refer to CE Mode Operation procedure in Chapter 4.

b. Place the printer in Configuration Mode by holding down on the CONFIG key. While holding down on the CONFIG key, use the FINE ADJ keys until the function 30 is displayed. Release the CONFIG key to display the flight time parameter. See Table 5-1 to determine the parameter value. The default value is 6 which corresponds to 343 micro-seconds.

c. Use the FINE ADJ UP/DOWN keys to select the desired parameter value; each increment of the parameter display corresponds to approximately 4.5 micro-seconds. When the desired parameter has been selected, press ENTER to enter the value into non-volatile RAM.

Table 5-1. ENCODER ADJUSTMENT PARAMETER VALUES

Parameter	VALUE	
	Hammer Flight (Function 30)	Offset Adjust (Function 31)
1	370 msec	.001 inch
2	365 msec	.002 inch *
3	359 msec	.003 inch
4	354 msec	.004 inch
5	348 msec	.005 inch
6	343 msec *	
7	337 msec	
8	332 msec	
9	326 msec	
10	321 msec	
11	316 msec	
12	310 msec	
* = Default values		

OFFSET ADJUSTMENT

a. Place the printer in the CE Mode of operation. Refer to CE Mode Operation procedure in Chapter 4.

b. Place the printer into Configuration Mode by holding down on the CONFIG key. While holding down on the CONFIG key, use the FINE ADJ keys until the function 31 is displayed. Release the CONFIG key to display the offset parameter. See Table 5-1 to determine the parameter value. The nominal value should be 2 which corresponds to .002 inches.

c. Use the FINE ADJ UP/DOWN keys to select the desired parameter value. Each increment of the parameter display corresponds to 0.001 inches. When the desired parameter has been selected, press ENTER to enter the value into non-volatile RAM.

After performing these adjustments, execute the printer Self-test and Sub Test 16. Examine the print sample output to determine if the waviness (dot slalom) has been eliminated. If the problem persists, repeat the procedures.

NOTE

Subtest 90 provides additional print patterns that can be used for further fine tuning of these adjustments. Test 90 not available for Datacodes <2712.

5-8. COLD START

The HP 2562C 2563A/B/C printer can be "Cold Started" to initialize all parameters. The cold start procedure functions as a hard reset and is helpful in cases when the printer's self-test will not run or when the Formatter PCA is replaced. To perform the "Cold Start" procedure, proceed as follows:

CAUTION

All configuration values (stored in configuration locations 1-89) will be reset to their default values by a cold start, and the error log (config 90-98) will be cleared. Prior to performing a cold start, read these values and write them down. Following the cold start re-enter these configuration values. Refer to Chapter 4 for more information.

a. Set the printer's ON/OFF switch to the OFF (0) position.

b. Remove the printer's top cover. Refer to the top cover removal procedure in paragraph 6-3 of this manual.

c. At the Formatter PCA, ground the test point labeled "Cold Start" (connect a jumper from testpoint TP1 (GND) to COLD START).

d. Set the printer's ON/OFF switch to the ON (1) position. The Cold Start is performed as the printer is powered-up.

e. Using the record created before the Cold Start (see NOTE above), re-enter the PRINT TIME and ON TIME values, as well as the configuration parameters. (Printer I/O configuration information is also contained in the appropriate interface manuals.)

f. Remove the Cold Start jumper, and replace all printer covers.

Chapter 6

Removal and Replacement 2562C 2563A/B/C

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6-1. INTRODUCTION

This chapter of the manual provides removal and replacement procedures for HP 2562C 2563A/B/C printer. Each procedure should be read thoroughly since some procedures refer to steps from previous procedures and to specific adjustments in other sections of the manual.

	Section	Page
6-1.	INTRODUCTION	6 - 3
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	FRONT PANEL PCA	6 - 7
	BACKPLANE PCAs	6 - 8
	ANALOG/BACKPLANE PCA	6 - 8
6-4.	PRINTER WELDMENT	6 - 10
	STEPPER MOTOR	6 - 13
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6-5.	PRINT MECHANISM	6 - 18
	PRINT BAR	6 - 19
	RIBBON SHIELD	6 - 22
	PRINT BAR DRIVE MOTOR	6 - 23
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	SENSOR SWITCHES	6 - 29
	PLATEN ASSEMBLY	6 - 30
6-6.	LOWER FAN	6 - 33
6-7.	UPPER FAN	6 - 33
6-8.	TRANSFORMER	6 - 36

6-2. TOOLS REQUIRED

The following is a list of tools required to replace the assemblies discussed in this chapter of the manual.

Pozidrive screwdrivers #1 and #2

Small and medium size flat-blade screwdrivers

Metric hexagonal drivers (2.5, 3, 5 and 7 mm)

(Recommended: straight drive handle with extension and replaceable bits. "L" shaped allen wrenches are not recommended for platen and print bar motor replacement procedures.)

Pozidrive screwstarter or Petrowax	P/N 0470-1675
Anti-Static Kit	P/N 9300-1609

6-3. TOP COVER

Removal of the printer top cover provides access to all printer PCAs.

WARNING

The HP 2562C, 2563A/B/C Printers do not contain any operator-serviceable parts. Any operation requiring removal of the printers protective covers must be performed by a trained Hewlett-Packard Service Representative.

Removal of protective covers by untrained personnel may result in serious personal injury.

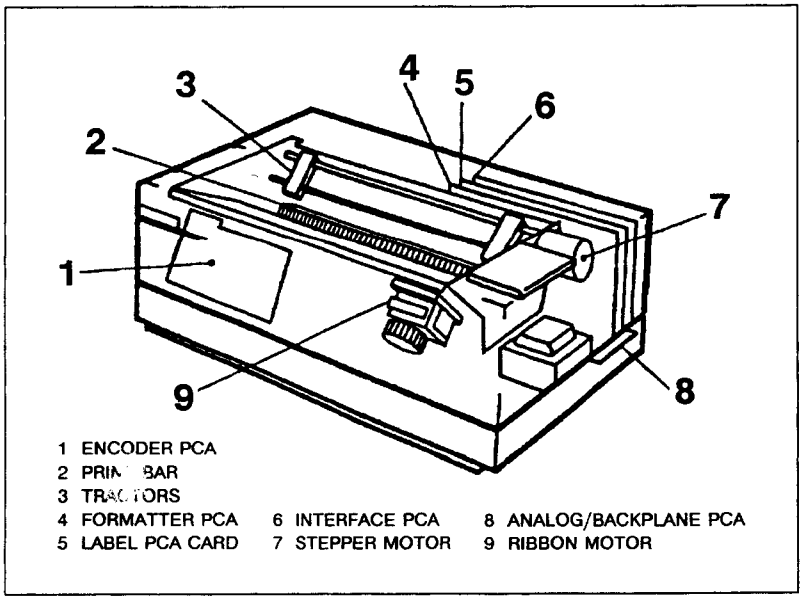


Figure 6-1. Printer Component Locations (desktop models)

Removal:

a. Place the printer OFFLINE and disconnect the interface I/O cable from the I/O PCA at the rear of the printer.

b. Set the printer's ON/OFF switch to the OFF (0) position and disconnect the input power cable.

c. Open the printer's top access door. Using a #2 Pozidrive screwdriver, loosen the two captive screws recessed below the upper front edge of the printer (see Figure 6-2, item 1). These screws are located under the top flap of the user menu.

d. A ribbon cable connects the printer's control panel to the top cover. Remove the control panel from the top cover by loosening the two pozidrive screws securing panel to the cover. Slide the control panel toward the center of the printer approximately one-half inch to separate the control panel from the top cover (see Figure 6-2, item 2).

WARNING

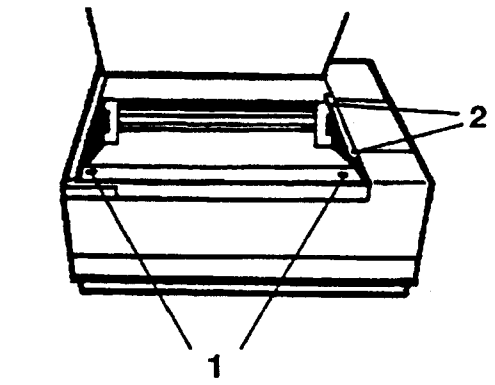
Be careful when using a flat blade screwdriver to pry open the printer's top cover latches. Don't allow the screwdriver to slip and cause injury.

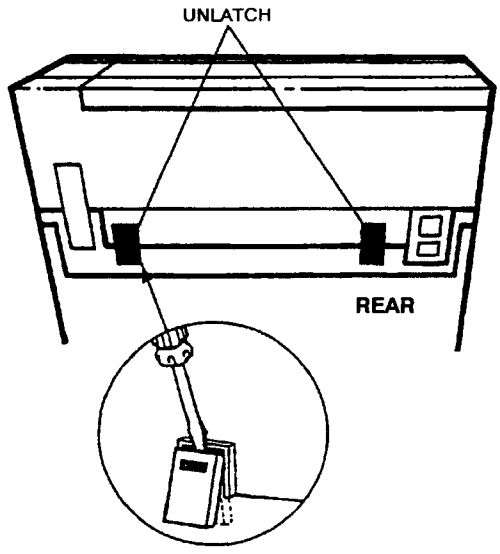
e. Using a flat blade screwdriver, unlatch the two top cover latches securing the top cover at the rear of the printer. On printers with a grey locking tab, push the grey tab up while prying downward and out on the top of the black part of the latch to release (see Figure 6-2).

CAUTION

Do not remove the top cover by grasping the opened top access door. This may damage the access door.

f. From the front of the printer, grasp the right rear and left front corners of the top cover and wiggle the cover while lifting upward to remove.





1 TOP COVER SCREWS (under user menu)
2 OPERATOR CONTROL PANEL SCREWS (loosen and slide inward)

Figure 6-2. HP 2562C 2563A/B/C Top Cover

REPLACEMENT: Top Cover

Reverse the removal procedure to replace the printer's top cover. When replacing, be sure to check the following:

a. Check the ground wire that connects to the lower portion of the I/O PCA to be sure the wire is not pinched by the top cover.

b. Re-seat all backplane PCAs firmly into the backplane.

c. Check the ribbon cable that is routed along the right end of the printer weldment to be sure it is firmly secured by all of the ribbon cable mounting clips and is centered between the clips.

CAUTION

Failure to secure and center the ribbon cable to the end of the weldment may result in damage to the cable due to vibration of the print mechanism.

FRONT PANEL PCA

If replacement of the Front Panel PCA is required, remove the printer top cover (see previous section) and disconnect the ribbon cable from the edge connector on the rear of the PCA. Slide the PCA slightly to the right while lifting to remove. Install the new PCA by reversing the removal instructions.

CAUTION

Static sensitive assemblies. Use adequate static arresting precautions.

BACKPLANE PCAs

The backplane PCAs (Formatter, Graphics, and I/O) may be replaced after the printer top cover has been removed (see Section 6-3). To remove any of the backplane PCAs, unplug any cables (on I/O PCA, remove ground wire) and lift upward to unplug from backplane connectors.

NOTE

If removal of the Formatter PCA is required, the printer must be Coldstarted and reconfigured. Refer to Chapter 4 of this manual.

When re-installing the PCAs, care should be taken not to bend the connector pins on the Analog/Backplane PCA. Ensure that the ground wire on the I/O PCA is properly connected and routed so that it is not pinched by the printer top cover.

CAUTION

Static sensitive assemblies. Use adequate static arresting precautions.

ANALOG/BACKPLANE PCA

The removal of the Analog/Backplane PCA requires that the printer top cover and all backplane PCAs be removed (see preceding paragraphs).

Removal:

a. For desk-top printers only: If desired, the fan assembly can be removed for easier access to the Analog/Backplane PCA as follows:

   1. Disconnect connector J12 (FAN) from the backplane.

   2. Grasp the fan assembly firmly, lifting up to remove from the printer (do not pry up).

b. Unplug the following connectors from the Analog/Backplane PCA (see Figure 6-3):

Hammer Drive Connectors	J1, J2, J3
Print Bar Drive Connector	J4
Sensor Connector	J5
Encoder Connector	J6
Ribbon Motor Connector	J8
Transformer Connector	J7
Stepper Motor Connector	J9
Transformer (Input) Connector	J10 or J11

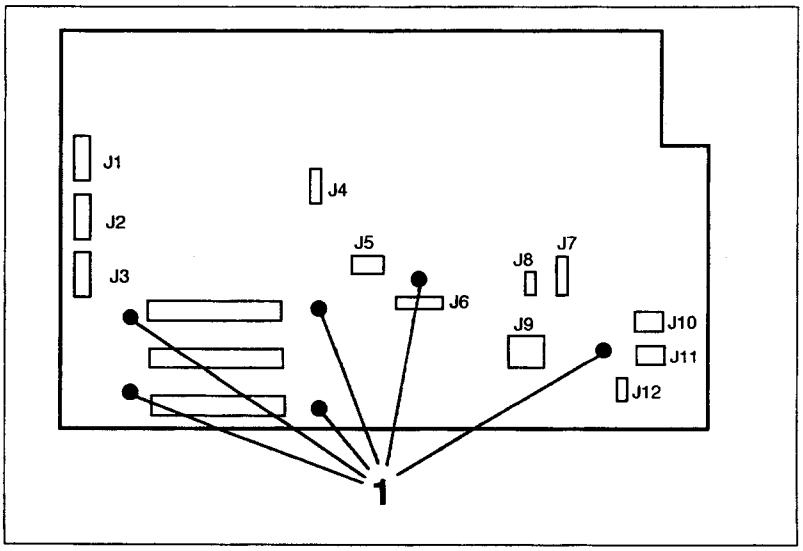


Figure 6-3. Analog/Backplane PCA

c. On 2562C and 2563B (without option #114), use a 7 mm nut driver or box wrench to remove the ground wire connecting the power input plate to the printer base. Remove from the stud on the plate, not from the printer base. (The ground wires for the printer fans are also connected to this stud.)

d. Using needle-nose pliers, pull-up to release the six (6) plastic fasteners on the Backplane PCA (see Figure 6-3, item 1).

e. Position all cables and wires out of the way. From the back of the printer, lift up on the rear of the PCA and slide the PCA from the printer.

CAUTION

Do NOT flex (bend) the Backplane PCA when either removing or installing the PCA in the printer.

REPLACEMENT: Analog/Backplane PCA

Replace the Analog/Backplane PCA by reversing the removal procedure.

6-4. PRINTER WELDMENT

Removal of the printer weldment provides easier access for removal of the printing mechanism. When the printer weldment is removed, the ribbon motor, stepper motor, paper feed tractors, ribbon in place switch, and platen stop are also removed. These assemblies may be removed separately, without removing the printer weldment, if desired (see procedures following the printer weldment removal procedure).

Removal:

a. Verify that the printer is OFFLINE and is disconnected from the power source. Remove the top cover and the Control panel (see Section 6-3).

b. Loosen (do not remove) the two pozidrive screws located inside the printer weldment below the paper feed tractors (see Figure 6-4, item 2).

c. Remove the two pozidrive screws, one at each end of the printer weldment (see Figure 6-5, item 3 & 4).

d. Remove the hammer driver ribbon cable stress relief holder from the right side of the printer (see Figure 6-5, item 2).

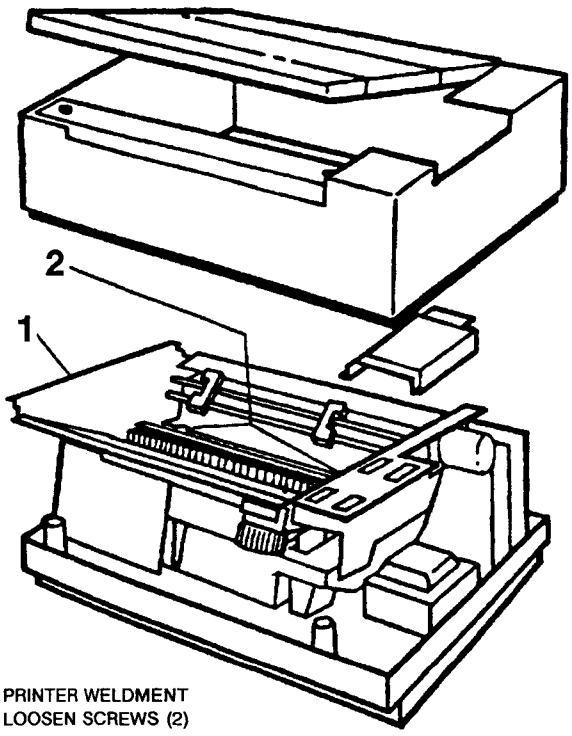


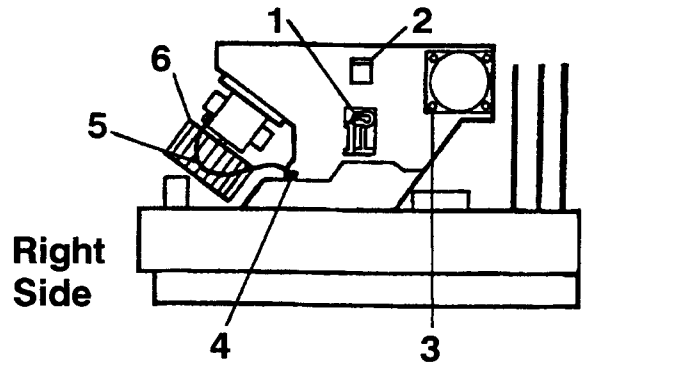
Figure 6-4. Printer Weldment

e. Disconnect connectors J8 (Ribbon Motor) and J9 (Stepper Motor) from the Analog/Backplane PCA (refer to Figure 6-3).

f. From the rear of the printer, unplug the ribbon cable connector from J1 of the Encoder PCA.

g. Slide the weldment toward the rear to clear screws loosened in step b.

h. Carefully lift the printer weldment past the platen release lever and remove the weldment from the printer.



1 TRACTOR GUIDE SHAFT SCREWS
2 CABLE FASTENER
3 RIGHT TRACTOR GUIDE SCREW
4 RIGHT WELDMENT SCREW
5 GROUND WIRE
6 FAN (2563A, 2563B Opt. 114 only)
7 LEFT TRACTOR GUIDE SCREW
8 LEFT WELDMENT SCREW

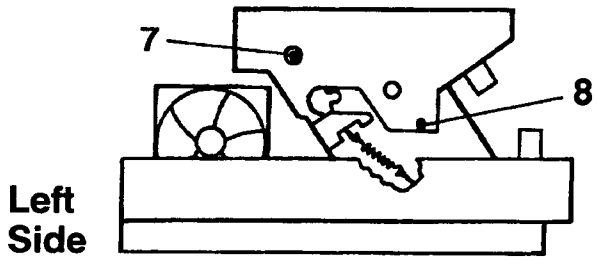


Figure 6-5. Printer Weldment / Side Views

CAUTION

When the printer weldment is removed from the printer, be careful not to allow the platen to slam closed. Damage may result.

REPLACEMENT: Printer Weldment

Reverse the above procedure. Note that the platen must be re-adjusted after printer weldment removal. Refer to the platen gap adjustment procedure, Chapter 5, Section 5-5.

STEPPER MOTOR

The stepper motor may be removed with or without prior removal of the weldment assembly from the printer.

Removal:

a. Verify that the printer is OFFLINE, is disconnected from the power source, and the top cover has been removed from the printer (see Section 6-3).

b. Disconnect connector J9 (Stepper Motor) on the Backplane PCA.

c. Using a 3mm internal hex driver (allen wrench), loosen the set screw on the locking collar slot at the stepper motor tractor drive shaft (see Figure 6-6, item 1).

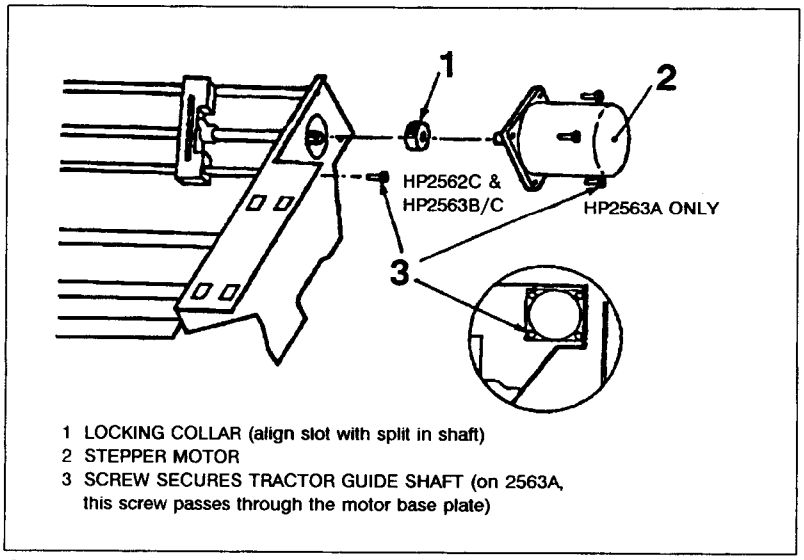


Figure 6-6. Tractor Drive Shaft Collar Alignment

d. Remove the three 3 mm hex head screws on the stepper motor (four pozidrive screws for the 2563A) and carefully slide the stepper motor off the stepper motor drive shaft.

REPLACEMENT: Stepper Motor

a. Slide the stepper motor onto the drive shaft.

b. Install and tighten the three screws into the motor base (four screws on 2563A).

c. Hold the drive shaft as far as possible toward the left end of the printer, away from the stepper motor.

d. Locate the split collar approximately 2 to 3 mm away from the stepper motor, aligning the slot in the collar with the slot in the drive shaft (see Figure 6-7).

CAUTION

Make sure there is clearance between the end of the drive shaft and the motor housing and that the slots in the collar and the shaft are both aligned before tightening the collar set screw.

e. Tighten the split collar set screw.

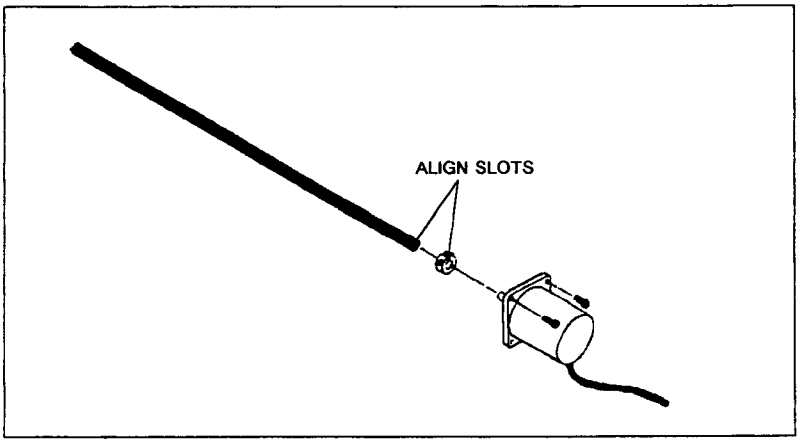


Figure 6-7. Stepper Motor and Shaft

PAPER FEED TRACTORS

The paper feed tractors may be removed with or without the printer weldment being removed from the printer.

NOTE

Before replacing the tractors, be certain that the tractors to be installed are correct for the printer. Refer to Figure 7-5 in Chapter 7 for a comparison of old vs. new tractor assemblies. 2563A tractors have an "A" located on the tractor side plate and are to be used on 2563A printers only.

Removal:

a. Verify that the printer is disconnected from the power source. (The top cover and operator panel should have been removed from the printer - see Section 6-3.)

b. Remove the three 3 mm hex head screws (four pozidrive on 2563A) securing the stepper motor to the printer weldment (see Figure 6-6).

c. Loosen the set screw in the split collar and slide the motor off the shaft. Lay the motor in the printer base (no need to disconnect motor cables).

d. Slide the splined tractor drive shaft toward the right and through the tractors to remove. Make sure the left weldment bearing stays in place.

e. From the left of the printer, remove the one 3 mm hex head (or pozidrive) screw securing the tractor guide shaft to the side of the weldment (see Figure 6-5, item 7).

NOTE

If the stepper motor was secured with four screws (2563A), the tractor guide shaft will now be free; skip to step g.

f. From the right side of the weldment, remove the 3 mm hex head screw securing the right end of the tractor guide shaft (screw was covered by the stepper motor).

g. Remove the tractors and the tractor guide shaft together from the printer. Slide the tractors off the guide shaft.

REPLACEMENT: Paper Feed Tractors

a. Slide the new tractors onto the end of the tractor guide shaft, making sure the locking levers are facing outward.

b. Align the rubber alignment mark on the splined hole of each tractor with the top mark on the tractor body (see Figure 6-8). Slide the splined tractor drive shaft through each tractor, making sure that the marks are aligned with the same groove on the shaft.

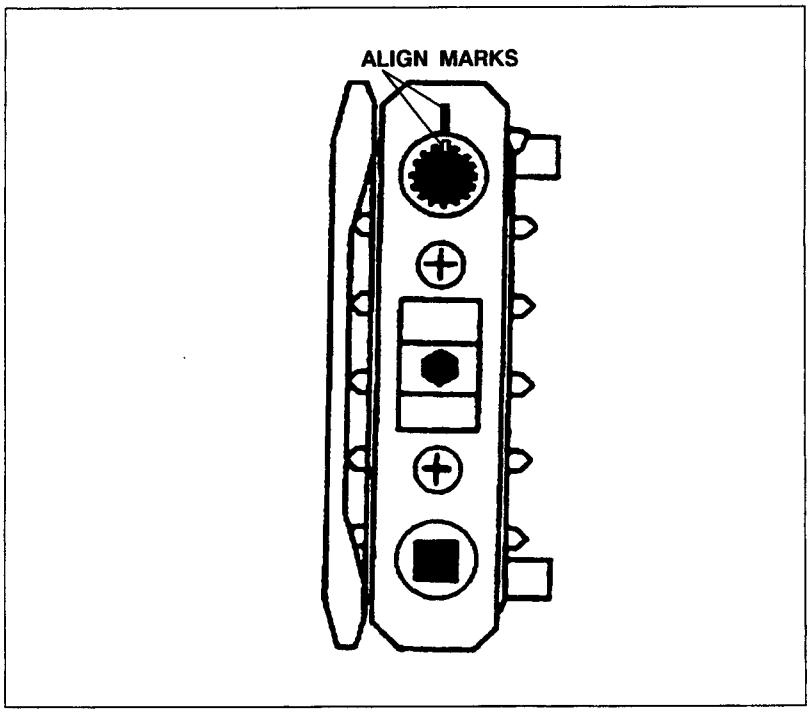


Figure 6-8. Tractor Alignment Marks

c. Holding the tractor and two shafts together as an assembly, slide the notched end of the splined drive shaft through its hole in the right end of the printer weldment.

d. At the left end of the weldment, align the tractor guide shaft with its detent.

e. Insert the 3 mm screw through the left end of the printer weldment. Do not tighten yet.

f. At the right end of the weldment, visually align the right end of the guide shaft with its hole and insert the 3 mm screw. While holding the guide shaft, tighten this screw and the left end screw securely.

g. Slide the splined drive shaft toward the left and into the bearing in the printer weldment.

h. Hold the stepper motor with the wires at the bottom. Insert the motor shaft into the splined drive shaft until the motor's shoulder is securely seated.

i. Replace the motor mounting screws. Do not tighten until all screws are in place.

j. Slide the splined drive shaft all the way toward the left and into the bearing in the printer weldment.

k. Align the slot in the split collar with the slot on the drive shaft. Slide the collar approximately 2-3 mm from the shoulder of the stepper motor and tighten the collar set screw.

l. Check the paper feed tractors on their drive and guide shafts to be sure they slide freely. There should be no binding as the tractors slide back and forth across the entire length of the spline shafts.

RIBBON MOTOR

The ribbon motor may be removed with or without prior removal of the printer weldment assembly.

Removal:

a. Verify that the printer is OFFLINE, is disconnected from the power source, and the top cover has been removed from the printer (see Section 6-3).

b. Disconnect connector J8 on the Analog/Backplane PCA and remove the ribbon motor cables from the cable fasteners on the side and rear of the printer weldment.

c. Remove the four pozidrive screws which secure the ribbon motor assembly to the printer weldment housing.

REPLACEMENT: Ribbon Motor

Install the new ribbon motor assembly by reversing the removal procedure. Apply a dab of Loctite 222 on motor mounting screws.

6-5. PRINT MECHANISM

The print mechanism consists of the print bar assembly, print bar drive motor, crank arrangement/casting and spring flexure assembly, paper/platen sensors and Encoder PCA.

NOTE

Removal of the printer weldment is not necessary to replace any of the paper/platen sensor switches. To access the switches, remove the entire print mechanism with the printer weldment still attached. This saves re-adjustment of the platen gap which must be performed whenever the printer weldment is removed.

Removal:

a. Verify that the printer is OFFLINE, is disconnected from the power source, and the top cover and operator panel have been removed from the printer (see Section 6-3).

b. Remove the printer weldment, refer to Section 6-4. (Skip this step if replacing only the paper/platen sensor switches - see "NOTE" above.)*

c. On the Analog/Backplane PCA, unplug the following connectors: J1, J2, J3, J4, J5, J6, J8, J7, J10 or J11, J12 and J9.

d. Disconnect the print mechanism grounding wire located near the power switch.

e. Using a 5mm internal hexagonal driver (allen wrench), remove the three screws, lock washers, and flat washers securing the print mechanism to the printer housing.

f. Carefully lift up on the print mechanism to remove it from the printer housing.

NOTE

Be careful when removing the print mechanism from the printer not to bend or damage the microswitches located at the lower rear of the mechanism.

REPLACEMENT: Print Mechanism

Replacement is the reverse of removal. Be careful when replacing not to damage the paper/platen sensor switches located on the lower rear of the print mechanism.

PRINT BAR

The print bar assembly may be removed with or without the print mechanism being removed from the printer.

CAUTION

When replacing the print bar, be certain to order the correct part number. 2562C and the HP 2563C option 025 use a "small dot" printbar. See Chapter 7, Table 7-4 for correct part numbers.

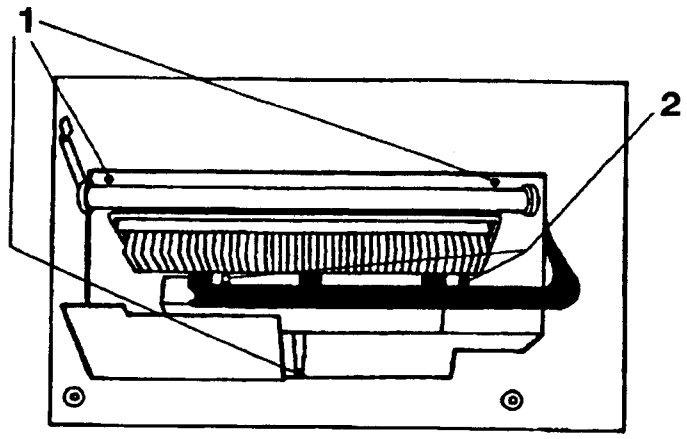
When handling the print bar, be careful not touch the hammers with your fingers. Also, do not wipe or clean the hammers with any liquid solvent. New print bar hammers are coated with a material that helps to prevent ink buildup. This material is not abrasion or chemical resistant, and can be easily removed or damaged.

Removal:

a. Verify that the printer is OFFLINE, is disconnected from the power source, and the top cover and operator panel have been removed (see Section 6-3).

b. Remove the two pozidrive screws which secure the print bar hammer driver cable routing bracket (see Figure 6-9, item 2).

c. Disconnect the three-hammer driver ribbon connectors installed in the print bar assembly; set the ribbon cable routing bracket to the side of the printer.



1 SCREWS SECURE PRINT MECHANISM TO PRINTER BASE
2 CABLE ROUTING BRACKET SCREWS

Figure 6-9. Print Mechanism (Top View)

d. Remove the three pozidrive screws or three 3mm socketed cap screws and the flat spacer plate from the right-end of the print bar (see Figure 6-10).

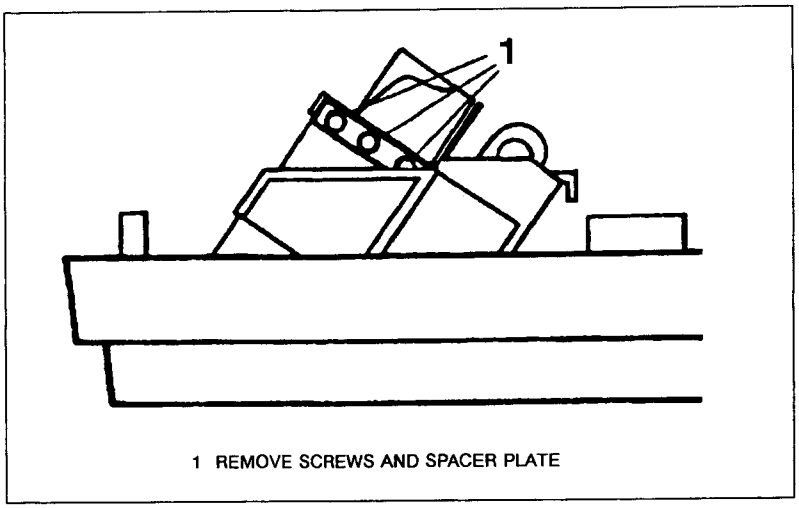


Figure 6-10. Print Mechanism (Right End View)

e. At the left-end of the print bar remove the following in the order listed (see Figure 6-11):

f. Remove the two screws/3mm socketed or pozidrive screws from the upper cam drive arm of the print mechanism (see Figure 6-12).

g. At each end of the print bar assembly, carefully push outward on the flex springs until the print bar guide pins are clear, then lift up to remove the print bar from the print mechanism.

REPLACEMENT: Print Bar

The print bar is installed in the print mechanism by reversing the removal procedure. Before tightening the bolts, push the print mechanism toward the rear of the printer to take up the space between the platen and the print bar.

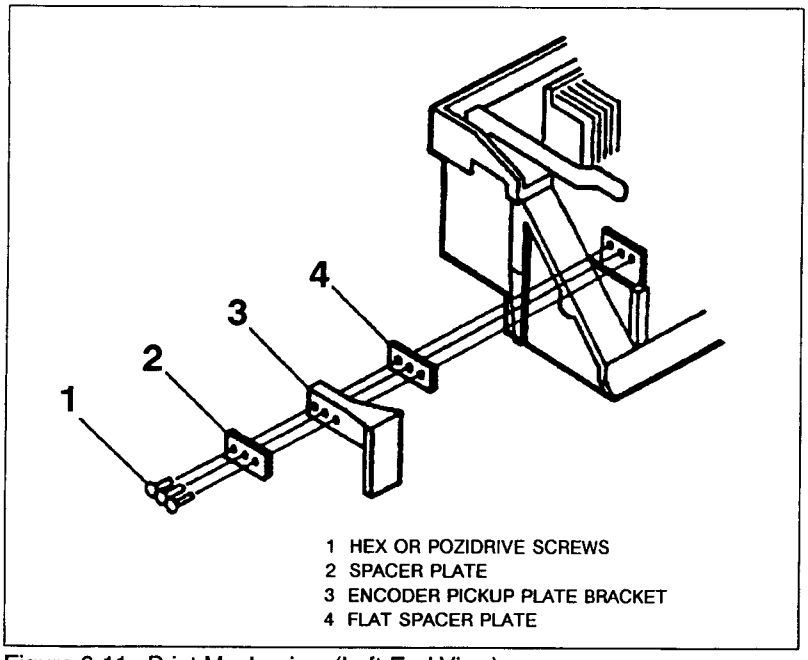


Figure 6-11. Print Mechanism (Left End View)

NOTE

Whenever the print bar is replaced, Crank arm Phasing, Encoder Gap and Platen Gap adjustments must be performed as described in Sections 5-4, 5-5 and 5-6.

NOTE

The Crank arm Phasing and Encoder Gap must be adjusted before the printer weldment assembly is re-installed.

RIBBON SHIELD

The print bar must be removed from the printer (described earlier) before the ribbon shield can be replaced. To replace the shield, remove the four pozidrive screws and flat washers which secure the shield to the print bar.

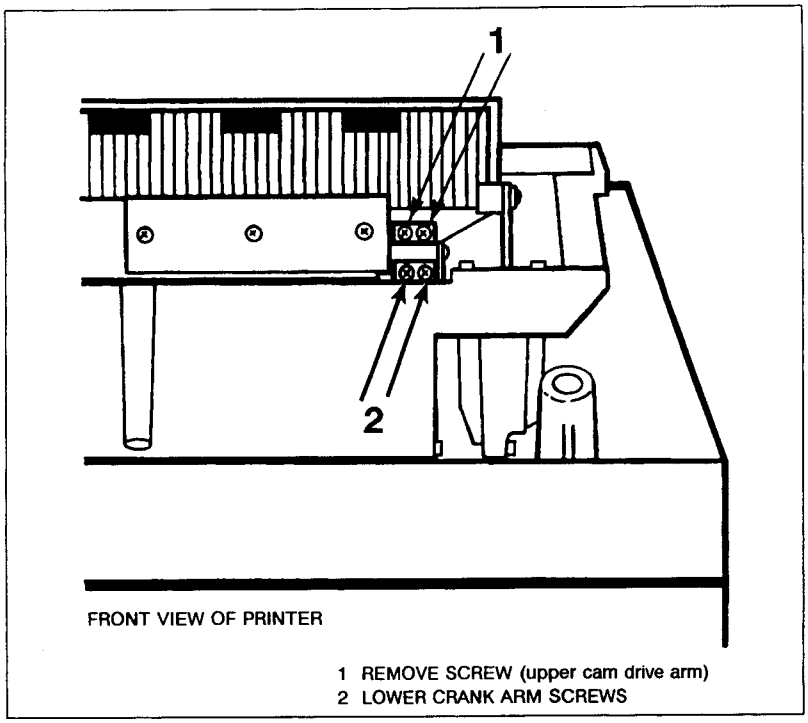


Figure 6-12. Print Mechanism (Front View)

When installing the shield ensure that the shield holes align with the hammer styli. Be careful not to bend or wrinkle the shield when tightening the screws.

NOTE

The bend at the top to the ribbon shield goes toward the Platen.

PRINT BAR DRIVE MOTOR

The printer top cover, weldment, Printbar, Encoder PCA, and print mechanism must be removed prior to removing the print bar drive motor (see Sections 6-3, 6-4 and 6-5).

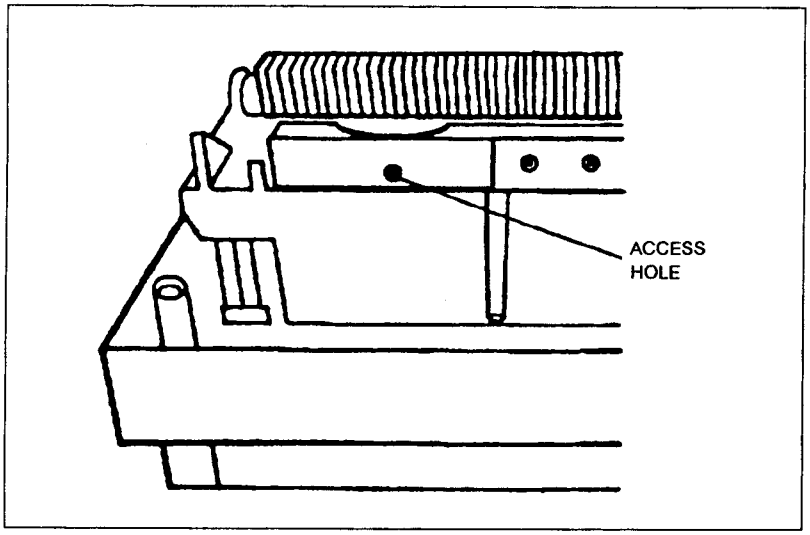


Figure 6-13. Accessing Crank Assembly Set Screw

Removal:

a. Verify that the printer is OFFLINE, is disconnected from the power source, and all parts are removed as mentioned above.

b. Unplug connector J1 of the Encoder PCA and remove the seven pozidrive (or 3 mm hex) screws which secure the PCA to the print mechanism. Remove the Encoder PCA.

c. Remove the print bar assembly. Refer to the Print Bar Removal procedure, Section 6-5.

d. Rotate the crank assembly until the set screw securing the crank assembly to the drive motor is accessible from the access hole in the print mechanism (see Figure 6-13). Using a 2.5 mm allen wrench, loosen the set screw.

e. Remove the two screws and flat plate which secure the lower crank arm to the print mechanism (see Figure 6-12).

f. Rotate the crank assembly until the top crank arm is in the rightmost position (the bottom crankarm is in its leftmost position). Positioning

the crankarms in this manner aids in removal of the crank arm assembly.

g. To remove the crank assembly from the motor shaft, use your right hand to lift up on the right end of the crank arm, applying a light upward pressure on it. With your left hand grasp the left edge of the crank counter weight assembly and lift up. The crank assembly should slide off the motor shaft (see Figure 6-14).

h. Remove the three 5mm hex screws which secure the print mechanism to the base of the printer, and remove the print mechanism from the printer.

i. Note the positions of the wires on the print bar motor and disconnect them from the motor.

j. Remove the motor from the print mechanism by removing the four motor screws.

REPLACEMENT: Print Bar Motor

When installing a new print bar motor it is important that the Set Screw be flush with the crank arm body and that the crank arm phasing be correctly aligned. Install the motor as follows:

a. Position the print bar drive motor so that the wire connector lugs point outward. Secure the motor in the print mechanism with the four pozidrive screws. Re-connect the print bar motor wires.

b. Rotate the drive motor shaft until set screw hole in the shaft is approximately in line with the set screw access hole in the print mechanism (see Figure 6-14, item 2).

c. Slide the crank arm assembly onto the drive motor shaft. Ensure that:

   1) the set screw hole in the crank arm assembly is aligned with the access hole in the counter weight and with the set screw hole in the motor drive shaft, and

   2) the cut-out portion of the crank arm assembly faces up (see Figure 6-15).

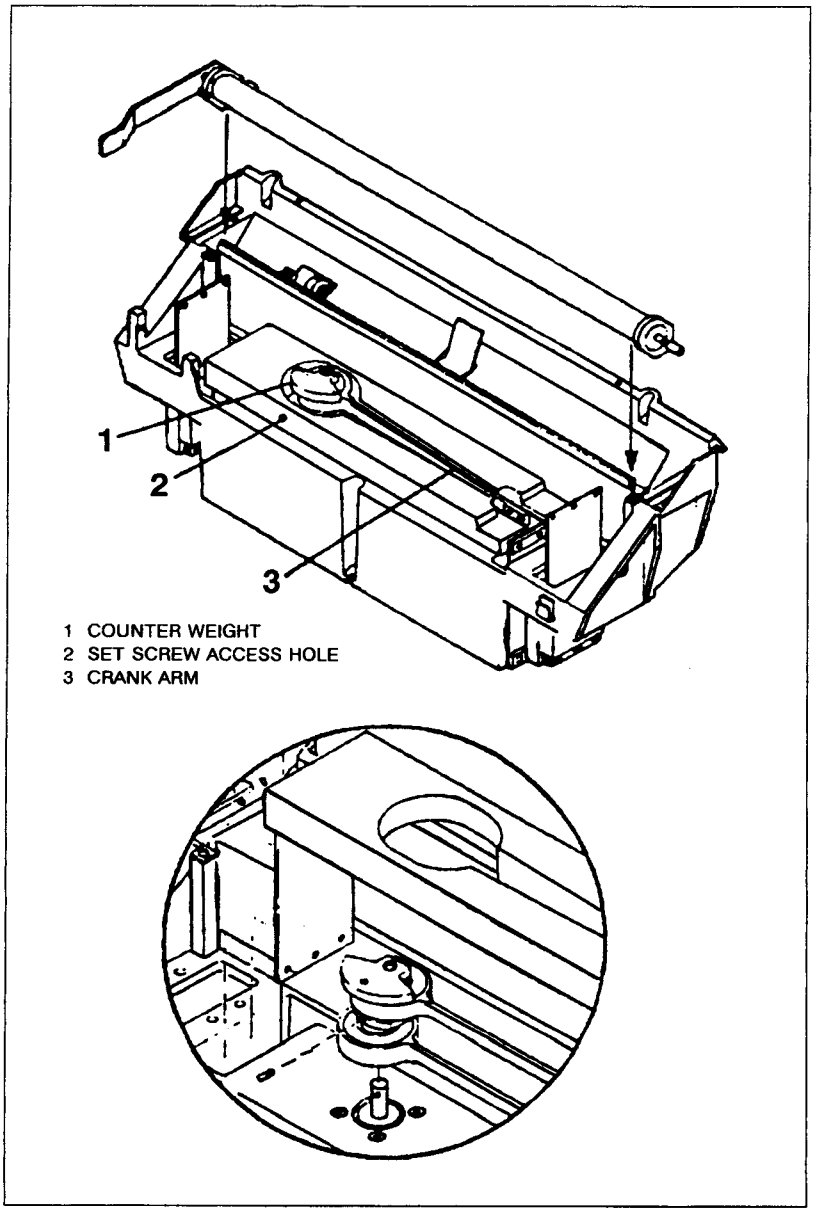
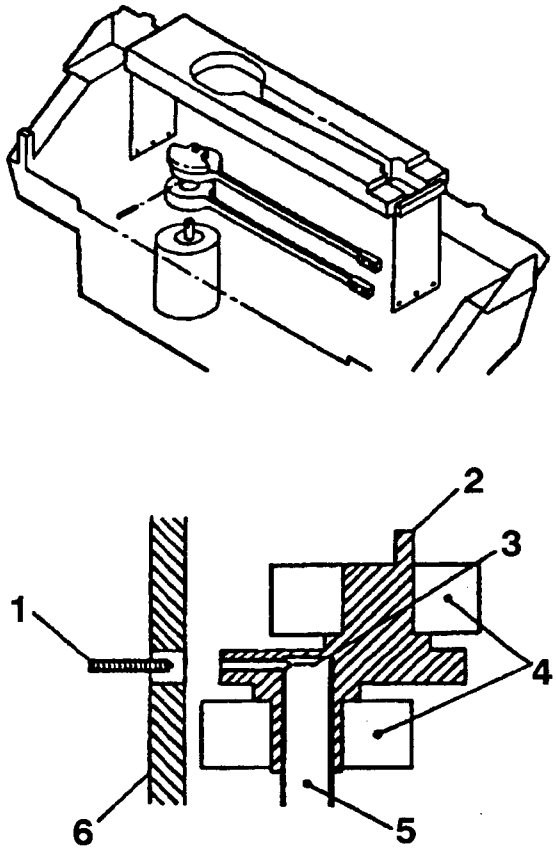


Figure 6-14. Crank Assembly Set Screw



1 SET SCREW
2 FLAT FACE OF THE HALF SHAFT
3 MOTOR SHAFT RECESS
4 CONNECTING ROD/BEARING
5 MOTOR SHAFT
6 COUNTERWEIGHT

Figure 6-15. Aligning Crank Arm Assembly and Motor Drive Shaft

d. With the print bar drive motor drive shaft, crank arm assembly, and casting access opening aligned, install the set screw into the flexure arm assembly.

CAUTION

If the set screw is not aligned into the hole in the motor shaft, this will damage the motor shaft, making removal difficult.

NOTE

The print bar drive shaft can be easily rotated from the bottom of the print bar drive motor. This action may be required when aligning the shaft and the assembly for installation of the set screw. While rotating the drive shaft with the set screw slightly tightened, you can feel the detent in the drive shaft.

e. Install the print mechanism into the base of the printer (3 each, 5 mm hex head screws).

f. Install the print bar into the print mechanism (refer to the Print Bar Replacement procedure, Section 6-5). Install the crank arm screws and spacer plates. Do NOT fully tighten these screws at this time. These screws should only be fully tightened after the crank arms are phased.

Before the printer's Encoder PCA and printer weldment can be re-installed, the Crank Arm Phase Adjustment procedure and Encoder Gap adjustment procedures must be performed (see Chapter 5, Sections 5-3, and 5-5).

ENCODER PCA

The Encoder PCA may be replaced without removing the print mechanism, however, the printer weldment must be removed to access the three pickup bracket mounting screws.

a. Verify that the printer is OFFLINE, is disconnected from the power source, and the top cover has been removed from the printer (see Section 6-3).

b. Disconnect the ribbon connector at J1 on the Encoder PCA.

c. Remove the seven 3 mm hex head (or pozidrive) screws which secure the Encoder PCA to the print mechanism and remove the PCA.

Install the new Encoder PCA by reversing the removal procedure. The Encoder Gap Adjustment must be performed when the Encoder PCA is replaced. Refer to Chapter 5, Section 5-3.

SENSOR SWITCHES

If any of the sensor switches fail (Paper Out, Platen Open, and Paper Motion), replace the entire sensor assembly. The sensor switches can be replaced by removing the entire print mechanism with the printer weldment still attached. This saves the adjustment of the platen gap. To replace any of these switches, proceed as follows:

a. Verify that the printer is OFFLINE, is disconnected from the power source, and the top cover has been removed from the printer (see Section 6-3).

b. Remove the print mechanism with the printer weldment attached as a unit (see Print Mechanism Removal procedure, Section 6-5).

NOTE

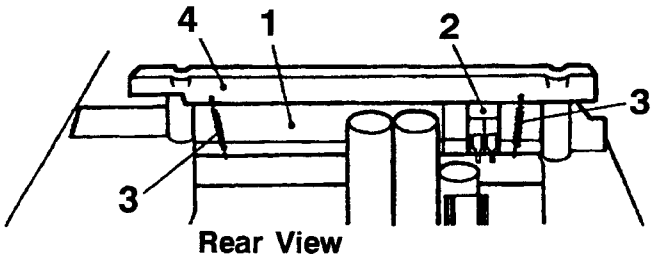
The platen should be closed at this time.

c. Remove the two springs which tension the rear paper guide to the print mechanism (see Figure 6-16, item 3).

d. Slide the rear paper guide down until it clears the print mechanism.

e. Remove the two screws which secure the paper sensor bracket to the rear paper guide. Replace the sensor bracket and cable with the new assembly.

Install the rear paper guide to the print mechanism by reversing the removal procedure.



1 REAR PAPER GUIDE
2 SESOR SWITCHES
3 PAPER GUIDE TENSION SPRINGS
4 PRINT MECHANISM

Figure 6-16. Print Mechanism Sensor Switches

NOTE

2563A printers had an additional switch on the weldment for "ribbon in place" detection. When replacing the sensor assembly on a 2563A, remove the "ribbon in place" switch from the weldment and associated wiring and discard.

PLATEN ASSEMBLY

Removal:

a. Verify that the printer is OFFLINE, is disconnected from the power source, and the top cover has been removed from the printer (see Section 6-3).

b. Remove the printer weldment assembly as described in Section 6-4.

c. With the platen lever forward (closed), use a needle-nose pliers to remove the two tension springs from the right side of the printer (see Figure 6-17).

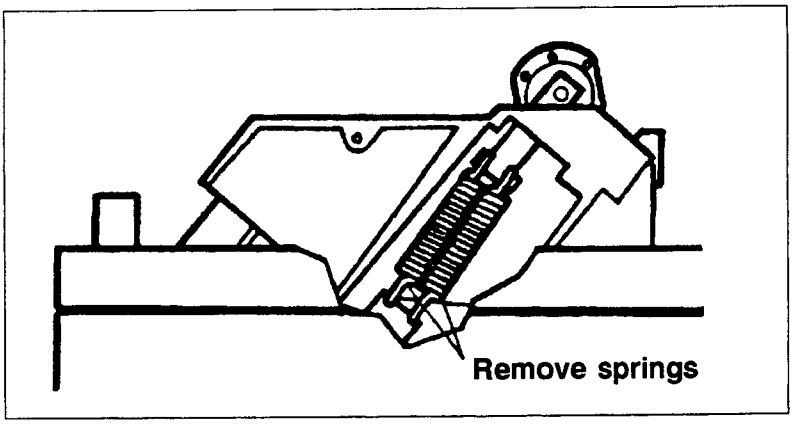


Figure 6-17. Platen Tension Springs

NOTE

Early versions of the HP 2563A (serial number less than 2629XXXXXX) have only one spring and spring hook, mounted on the left end of the print mechanism.

d. Using a 3mm hex driver (or allen wrench), remove the two screws (one at each end of the platen) which secure the platen mounting feet to the print mechanism.

e. Carefully lift up on platen to remove from the printer. Place the platen on a clean working surface.

f. Observe how the platen mounting feet and white spacer washers (shims) are mounted on the platen and slide the feet off of the platen.

NOTE

2563A printers had a spring pushing the Platen forward. Use the new Platen mounting blocks with white plastic shims when replacing a Platen on a 2563A.

REPLACEMENT: Platen Assembly

a. Install the feet onto the new platen using the same number of spacers on each side. Re-install the platen onto the print mechanism (see NOTE below).

NOTE

Current replacement platen assemblies will fit in all four printers (2562C and 2563A/B/C). For the 2563A, the pin on the right side of the platen will have to be tapped into the platen body with a hammer. The reason for this is that the pin in its original position will not clear the 2563A weldment. On the 2562C and the 2563B/C printers, no modification is necessary.

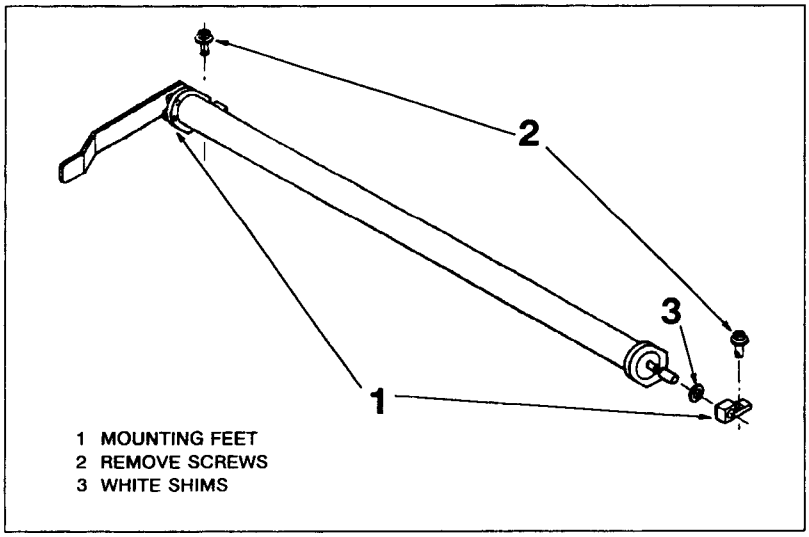


Figure 6-18. Platen Assembly

b. Perform the Platen Gap Adjustment procedure, refer to Chapter 5, Section 5-4.

c. Check the Flight Time and Offset Adjustments as described in Chapter 5, Section 5-6).

NOTE

Experience has shown that changes to these adjustments are rarely required. Changing Offset and Flight Time adjustments unnecessarily may introduce new problems.

6-6. LOWER FAN

The lower fan is located inside the cabinet under the printer (cabinetized printers only - see Figure 6-19).

Removal:

a. Verify that the printer is OFFLINE and is disconnected from the power source.

b. Open the front cabinet door.

c. Remove the single screw from the lower fan cover/bracket (Figure 6-19, item 1) and pull out on the four plastic fasteners to release the fan (Figure 6-19, item 2).

d. Pull the fan from the printer. The power connector and ground wire must be disconnected from the fan to allow its complete removal.

e. Remove the fan from the bracket by removing four screws (see Figure 6-20).

REPLACEMENT: Lower Fan

Reverse the above to reinstall. When reinstalling the fan, ensure that the ground wire (green wire with the yellow stripe) is connected securely to the fan.

6-7. UPPER FAN

The upper fan is located on the right rear of the printer (left side as viewed from the rear), behind the Formatter PCA (2563B/C factory cabinetized models only).

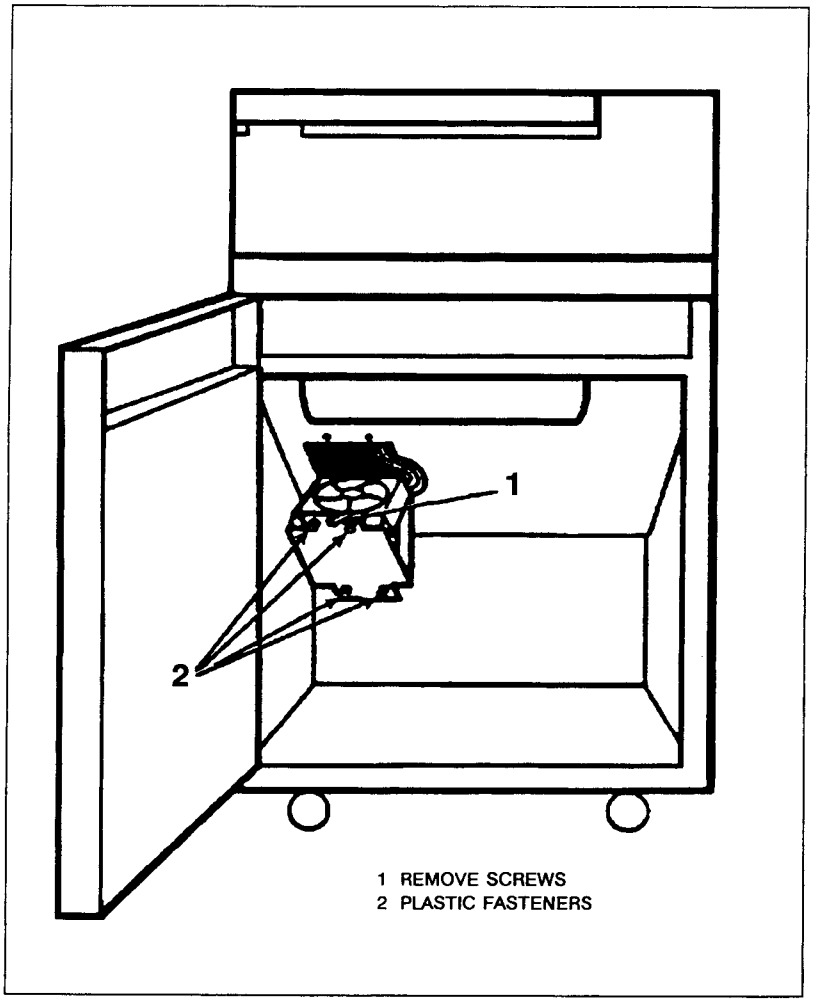


Figure 6-19. Lower Fan Removal

Removal:

a. Verify that the printer is OFFLINE and is disconnected from the power source.

b. Remove the printer top cover and Backplane PCAs as described in Section 6-3.

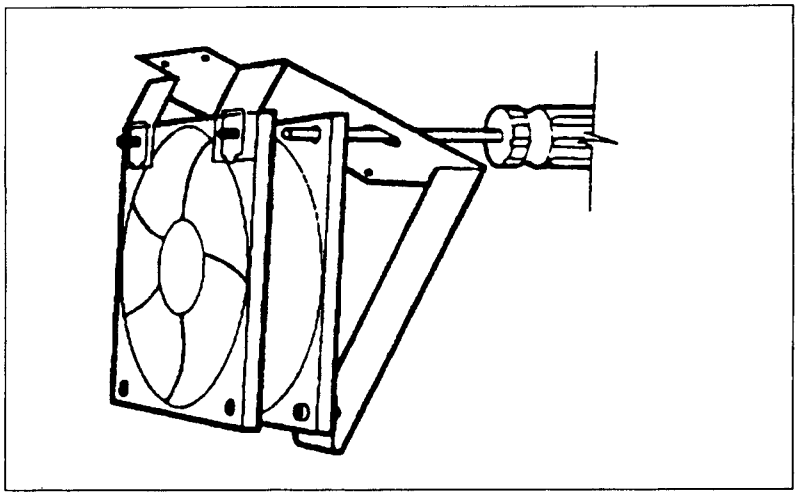


Figure 6-20. Lower Fan Bracket

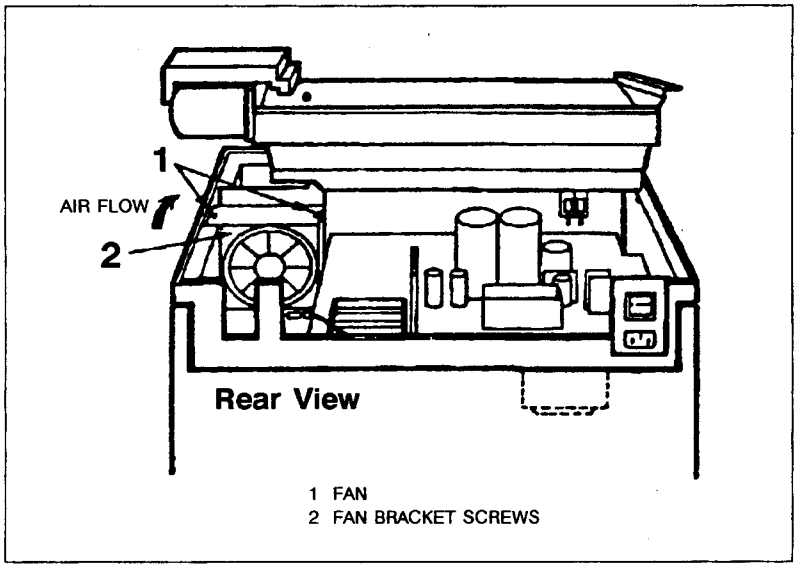


Figure 6-21. Upper Fan (Rear View of Printer)

c. Remove the two screws from the fan bracket and remove the bracket (see Figure 6-21).

d. Pull the fan upward and disconnect the power connector and the ground wire from before pulling it from the printer.

REPLACEMENT: Upper Fan

Reverse the above to replace. When replacing the fan ensure the airflow direction is as indicated (arrows on fan). Position the fan as far toward the front of the printer as possible.

6-8. TRANSFORMER

(For 2563B/C standard printer ONLY)

The transformer is located under the printer base. To access the transformer the printer base must be removed. This requires the removal of all the PCAs, the printer weldment, and the print mechanism.

Removal:

a. Verify that the printer is OFFLINE and is disconnected from the power source.

b. Remove the printer top cover as described in Section 6-3.

c. Remove the printer weldment as described in Section 6-4.

d. Remove the Analog/Backplane PCA as described in Section 6-3.

e. Remove the Print Mechanism as described in Section 6-5.

f. Remove the six screws from the base of the printer base (see Figure 6-22, item 1).

g. Lift the printer base from the printer cabinet and set the base upside down.

h. Disconnect any tie-wraps securing the transformer cables.

i. Remove the four 7/16 inch bolts from the transformer and remove the transformer.

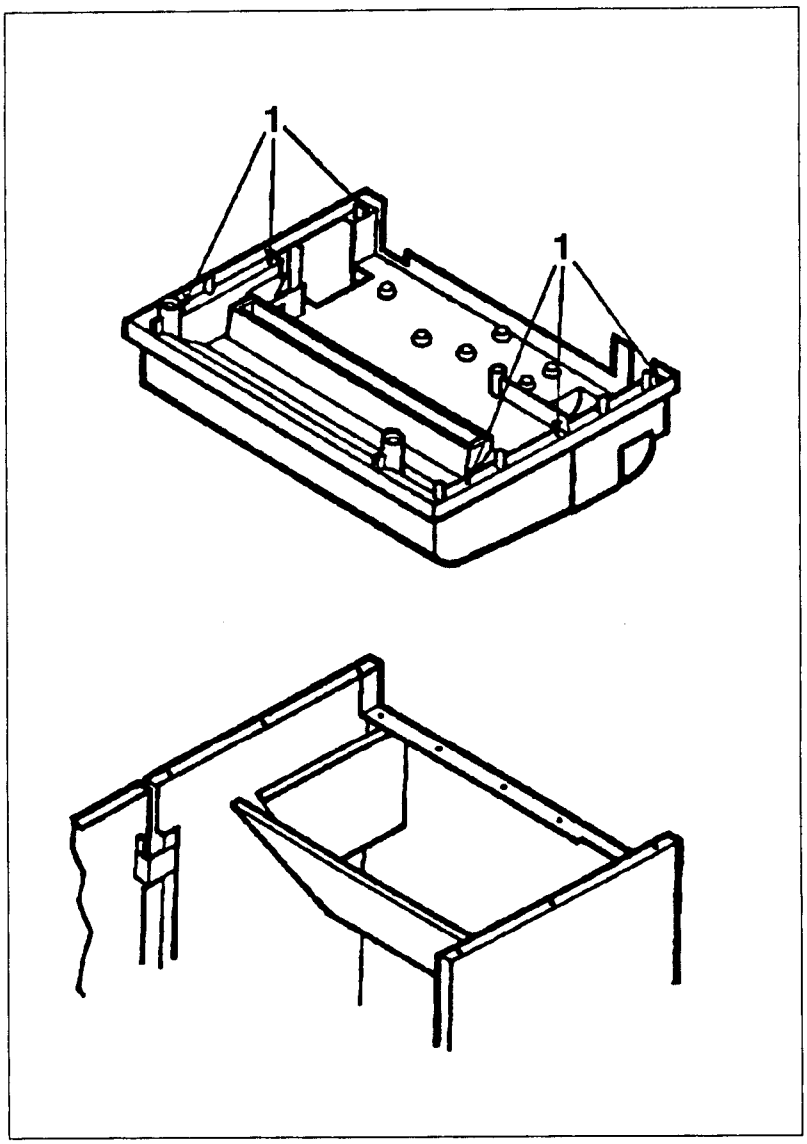


Figure 6-22. Printer Base Removal

REPLACEMENT: Transformer

To replace the transformer, perform the above removal procedure in reverse order. Ensure that the wires that go from the bottom of the base through to the top are securely placed in the slots provided.

WARNING

If the wires are not routed in the slots correctly they will be pinched. This may cause electrical shock.

Chapter 7

Parts & Diagrams 2562C 2563A/B/C

DiagramsDiagramsDiagrams DiagramsDiagramsDiagramsDiagrams DiagramsDiagramsDiagramsDiagrams DiagramsD

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7-1. INTRODUCTION

This chapter contains illustrated parts breakdowns (IPBs), parts location diagrams, schematics, and replacement parts list for the standard configurations of the HP 2562C and 2563 A/B/C Line Printers.

This chapter conatains the following sections:

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	FIGURE 7-11. Base Assembly Parts	7 - 25
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	FIGURE 7-17. Power Cables	7 - 35

7-2. USING THIS CHAPTER

Parts location diagrams, parts lists, IPBs, and schematics for an assembly are located on the same or following pages.

It is important to properly match the diagrams and parts lists with the unit needing repair. Each printed circuit assembly (PCA) is labeled with an assembly number, other printer assemblies are not labeled but can be identified from the IPBs (exploded view diagrams).

DESCRIPTION OF PARTS LIST.

The columns in the parts lists provide the following information:

a. REFERENCE DESIGNATOR - This column lists the reference designator which identifies the particular part on the IPB or the parts location diagram.

b. DESCRIPTION - This column gives the name or a brief description of the part.

c. HP PART NO. - This column lists the Hewlett-Packard part number for each item.

7-3. PARTS ORDERING PROCEDURE

To order parts from Hewlett-Packard or obtain further information call the nearest Hewlett-Packard Sales and Service Office and provide the following information:

a. Printer model and serial number.

b. Hewlett-Packard part number.

c. Description of the part.

d. The series code for the PCA.

7-4. DIAGRAMS AND PARTS LISTS

The illustrated parts breakdowns, parts location diagrams, and replacement parts lists are provided on the following pages.

Table 7-1. MAIN PRINTER ASSEMBLIES

REF. DES.	DESCRIPTION	HP PART NO.	NEW LOOK P/N
1	TOP COVER-CABINETIZED (2563B/2563C)	02564-60250	C2356-60009
1	TOP COVER-DESKTOPS (2562C/63A/63B-OPT 114)	02562-60041	02562-60004
2	BASE ASSY-desktops (2562C/63A/63B-OPT 114)	02562-60040	02562-60003
2	BASE ASSY-cabinetized (2563B/2563C)	02564-60194	C2356-60503
3	STND ASSY-2563B/C	02564-60158	C2356-60006
3	STND ASSY-2563A OPT114	92214P *	N/A
N/S	PAINT: DOVE GRAY	6010-1146	
N/S	PAINT: COCOA BROWN	6010-0694	
N/S	PAINT: PARCHMENT WHITE		6010-1148

NOTE: See the tables referenced in Figure 7-1 for component parts.
* Available from CPS
N/S = not shown

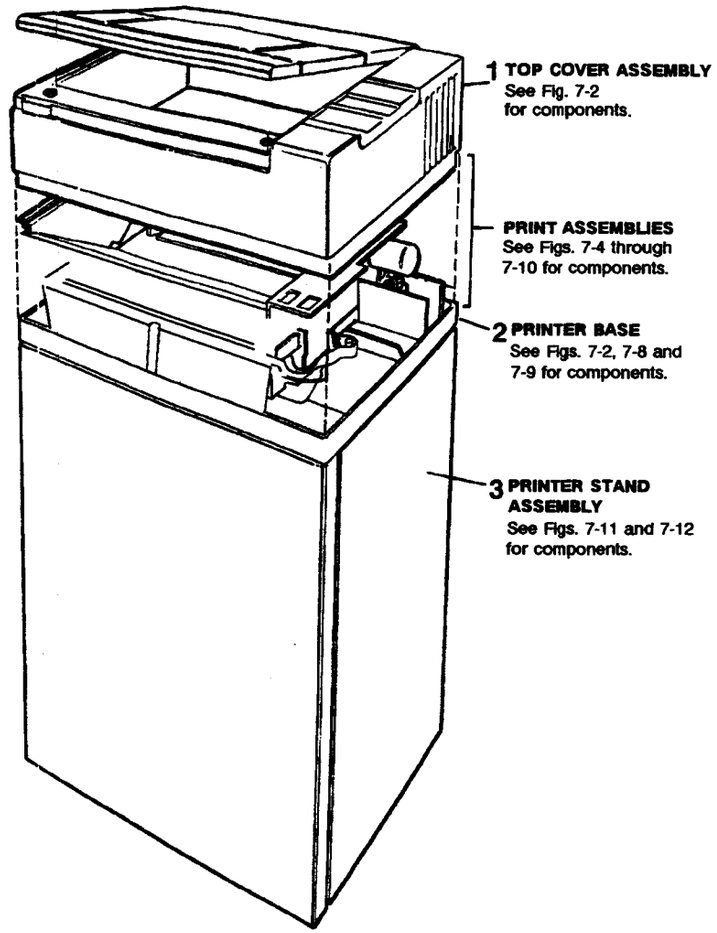

Figure 7-1. Main Printer Assemblies

Table 7-2. TOP LEVEL PARTS LISTS

REF	DESCRIPTION	HP P/N	NEW LOOK
1	ASSY: BASE (2562C/63A/63B opt 114) (See Figures 10 and 11) BASE: ASSY-Cabinetized (2563B/2563C)	02562-60040 - 02564-60194	02562-60003 - C2356-60503
6	FAN: AXIAL-65CFM (Desktop only)	3160-0409	
8	ASSY: PRINT MECH (See Figure 4)		
9	CLIP: INTERLOCK	02563-40027	
10	PCA: FRONT PANEL	5061-1709	
11	KEYPAD	5040-9002	5041-6907
12	BEZEL: CNTRL PNL	02563-20033	02562-20001
13	WINDOW: BEZEL	5040-9003	5041-6908
14	CBL: FRONT PANEL	5062-0476	
15	SCR-THRD RLG	0624-0594	
16	SHDCSCR: M6XI2 LG	0515-0501	
17	SCR-MACH M3X16LG	0515-1074	0515-1074
19	WSHR: M6 SPL LOCK	2190-0592	
31	WINDOW, Cover	02563-40004	C2356-40012
32	CABINET/COVER CABINET/COVER (55 dba)	02562-60041 02564-60250	02562-60004 C2356-60009
33	SPRING, Gas	02564-60005	
34	SCREW, Mach M4X0.7	0515-2075	
35	WASHER, Flat #10	3050-0002	
36	CONFIGURATION, Chart (HP2563A) User Menu (HP2563B/C)	02563-00048 02564-00134	02562-80101
37	HP NAMEPLATE (HP2562C) HP NAMEPLATE (HP2563A) HP NAMEPLATE (HP2563B) HP NAMEPLATE (HP2563C)	02562-00001 02563-00040 02563-00111 02563-00158	
41	BUCKLE, Hinge	1390-0809	
42	SCREW	0515-0077	
43	SCREW: 4MM-LG SHLDR	0515-0931	

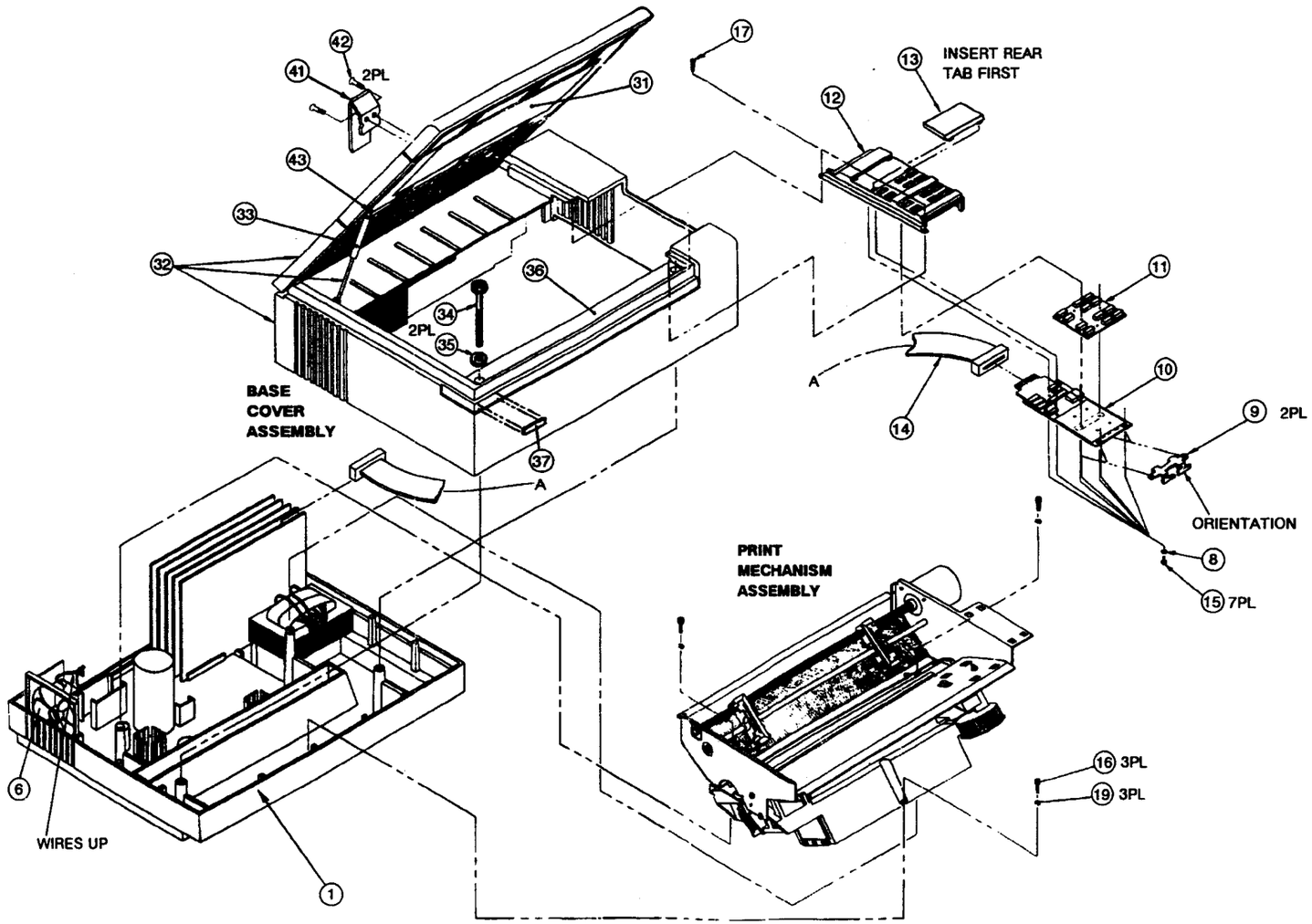

Figure 7-2. Top Level, IPB

Table 7-3. PAPER STACKING AID (2563C/64C & 26770C Upgrade Kit)

REF. DES.	DESCRIPTION	HP PART NO.
ALL	STACKING AID ASSY	02564-60227
1	SOUND SHROUD ASSY	02564-60225
2	WIRE FORM ASSY	02564-60234
3	BACKSTOP	02564-00189
4	PAPER BASKET	02564-00188
5	FORMS BREAK	02564-00187
6	PAPER TRAY	02564-00194
7	INPUT PAPER LABEL	02564-00179
8	PAPER TRAY LABEL	02564-00180
9	M5 SCREWS (4 EA)	0515-0758
10	FRICTION PADS	02682-00864
(not shown)	STATIC BRUSH	02564-60210
(not shown)	STATIC BRUSH SCREWS	0624-0618
(not shown)	PAPER POSITION LABEL	02564-00178
NOTE: This is the new stacking aid introduced with the 2563C printer. For 2563B stacker configuration (no longer available as complete units), see Figure 7-12.		

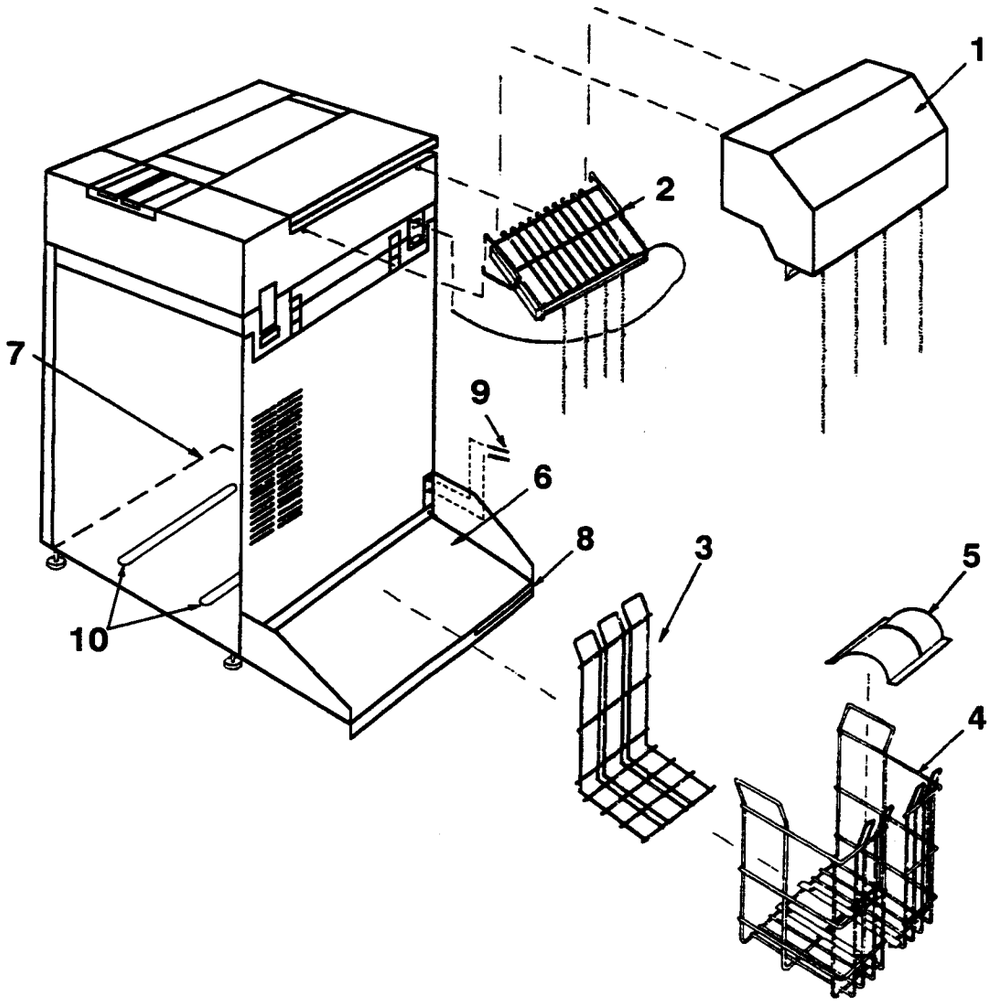

Figure 7-3. Paper Stacking Aid (2563C Version)

Table 7-4. SOUND ENCLOSURE (2563C NEW LOOK)

REF. DES.	DESCRIPTION	HP PART NO.
1	SHROUD ASSY	C2356-60510
2	WIRE FORM ASSY	C2356-60513
3	ENCLOSURE WINDOW	C2356-60515
4	CLIP: RIGHT (THIN)	1400-1169
5	PAPER TRAY	C2356-60516
6	ASSY: MAIN WELDMENT	C2356-60509
7	PAPER INPUT AREA PAPER POSITION LABEL	5181-9103
8	SOUND ENCLOSURE PAPER POSITION LABEL	5181-9104
9	M5 SCREWS (4 EA)	0515-0904
10	FRICTION PADS	02682-00864
11	STAND LEVELER FOOT	0403-0492
12	CASTER	1492-0108
13	ASSY: DOOR LEFT	C2356-60511
14	ASSY: DOOR RIGHT	C2356-60512
15	ENCLOSURE LEVELER FOOT	C2356-60508
16	HINGE	C2356-60507
17	CLIP: LEFT (FAT)	C2356-40025
N/S	STATIC BRUSH	02564-60210
N/S	STATIC BRUSH SCREWS	0624-0618
N/S	PAPER POSITION LABEL	5181-9102
N/S	CABINET RUBBER STRIP	02682-00864

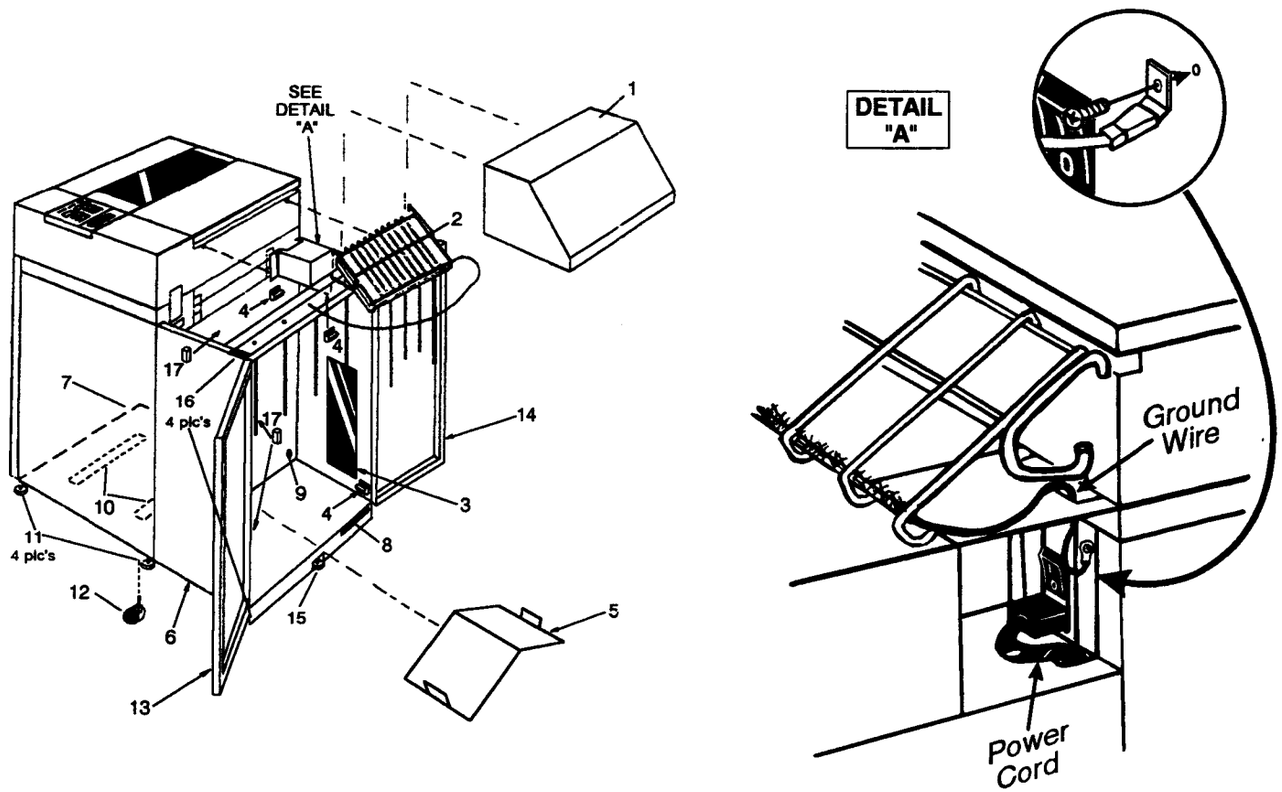

Figure 7-4. Sound Enclosure Assemblies

Table 7-5. PRINT MECH AND PAPER MOTION ASSY PARTS

REF. DES.	DESCRIPTION	HP PART NO.
1	PRINT BAR (2563A/B/C)	02563-60010 (new) 02563-69010 (refurb)
	PRINT BAR (2562C) (also LM300/315,OPT 025)	02563-60228 (new) 02563-69228 (refurb)
3	ENCODER PICKUP ASSY	02563-60163
5	BLOCK: CLAMP	02564-40008
6	PCA: ENCODER XMTR	02563-60019
7	CABLE ASSY: PRINT BAR	02563-60154
22	SCR: FLG M4 X 12	0515-1834
23	SCREW KNOB: M4 X 0.7 mm	02563-20005
25	SCR FHD M4X12	0515-1834
27	SCR-MACH M4X16LG	0515-1833
28	SCR: SKT-HD-CAP	02563-20037
31	NUT: PLATE	02563-00075
37	SCR: M4X8 POZI TT	0515-0861
40	RIBBON SHIELD	02563-00095
42	CRANK ASSY	02563-60155

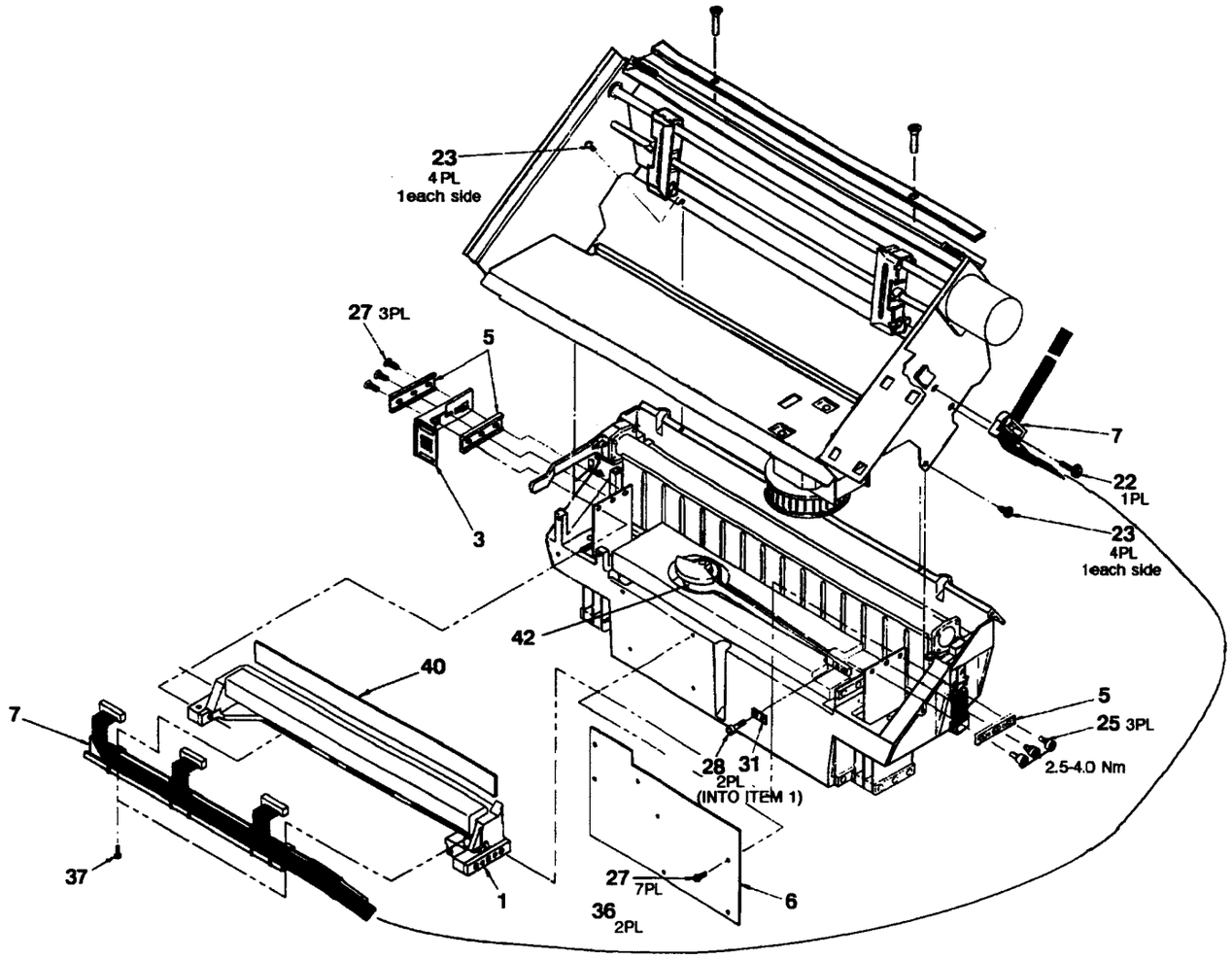

Figure 7-5. Print Mech And Paper Motion Assy Parts

Table 7-6. PRINT MECH PAPER/RIBBON ASSY PARTS

REF. DES.	DESCRIPTION	HP PART NO.
1	ASSY: PRTR WLDMT(55dba) WELDMENT: STD ASSY (2563A ONLY)	C2356-60502 02563-60173
2	BRG: FLG BALL	1410-0632
3	SHAFT: TRCT GUIDE	02563-20003
4 & 5	TRACTOR SET (2563B/C) TRACTOR SET (2563A only)	02563-60265 02563-60266
6	SHAFT: TRACTOR DR	02563-20002
7	COLLAR	0510-0598
8	ASSY: MOT STPR 2	3140-0690
10	MOT: RBN DR 50VAC	3140-0691
11	KNOB: PLATEN ADJ	02564-60237
13	SHAFT: PLTEN KNOB	02563-20006
14	PLGR: M4 BALL	02564-00173
25	SCR: MCH M4X8 POZ	0515-0825
26	WSHR: M4 FLAT	3050-0893
27	WSHR: M4 SPL LOCK	2190-0586
28	SCR: M4X8 SEM	0515-1834
29	SCR: M5X12PAN SEM	0515-0904
30	PAPER POSITION LABEL	5181-9102
33	PAPER OPEN/CLOSED LABEL	02563-00148

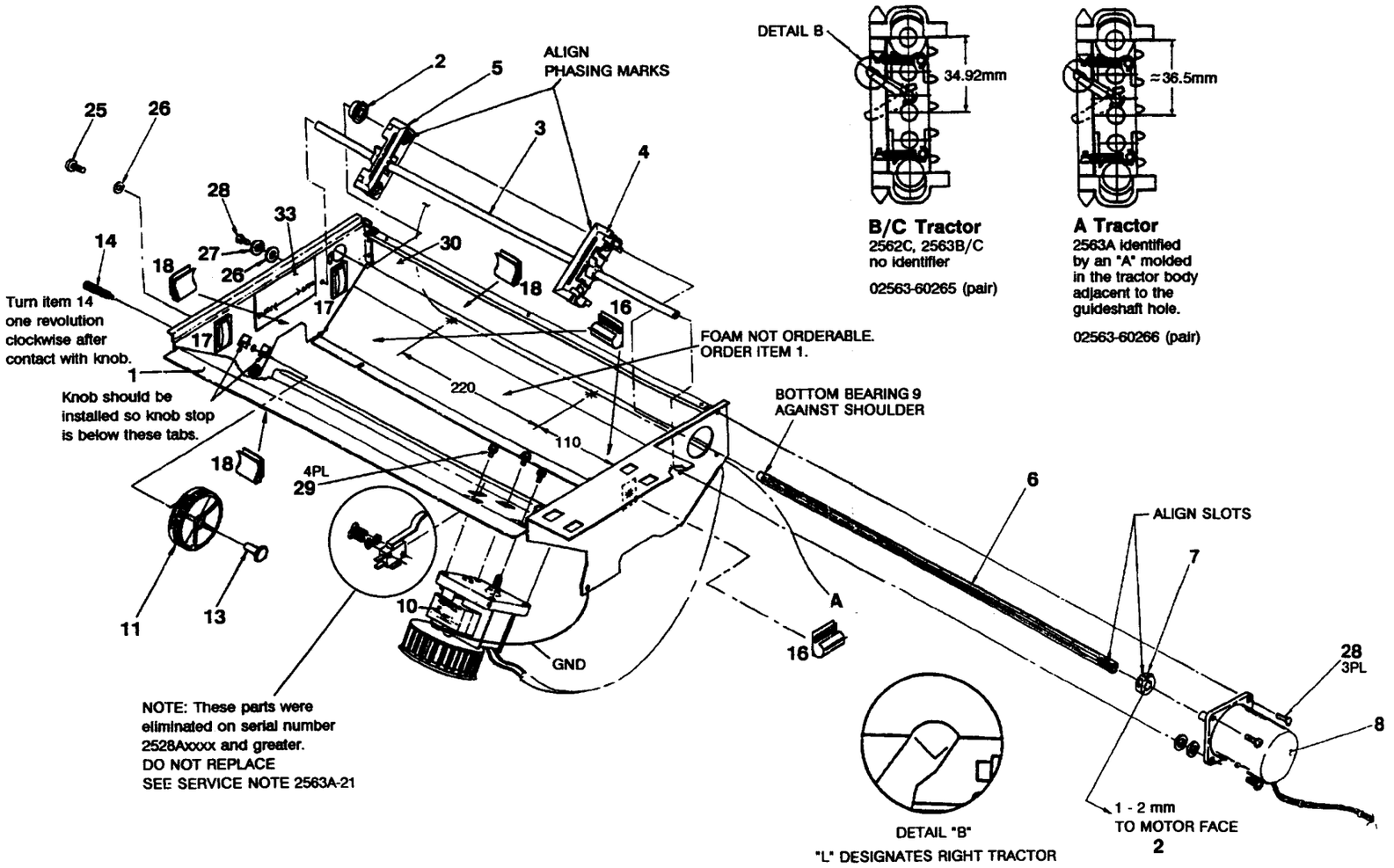

Figure 7-6. Print Mech And Paper/Ribbon Assy Parts

Table 7-7. PRINT MECHANISM ASSEMBLY PARTS

REF. DES.	DESCRIPTION	HP PART NO.
11	CLIP: RIGHT (THIN)	1400-1169
12	ASSY: PLATEN	C2356-60505
13	PLATE: SPRING HOOK (2563B/C)	02564-00023
14	PLATEN: SPRING	02563-00090
15	SCR-MACH ASSY M4	0515-1833
28	SCREW	02563-20037
30	FRICTION PAD	02564-00145
31	NUT: PLATE	02563-00075
34	PIVOT: PLATEN	02564-40013
41	SET SCREW	0515-1741
42	HOOK: PLATEN SPRING (2563A)	02563-00083
98	WSHR-FL MN	3050-0180

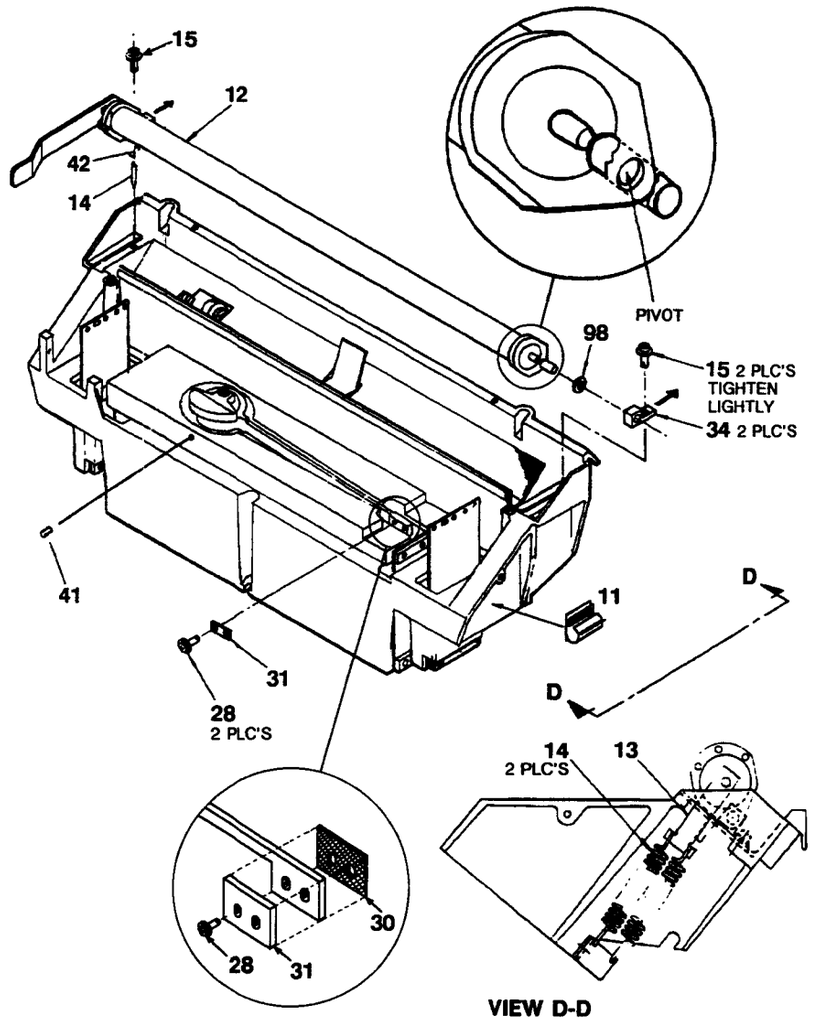

Figure 7-7. Print Mechanism Assembly

Table 7-8. PRINT MECH CASTING (Rear View) ASSY PARTS

REF. DES.	DESCRIPTION	HP PART NO.
2	MOTOR: D.C.	3140-0678
3 * 4 *	SPRG: PPR TENSION GUIDE: PPR FRONT	02563-00109 02563-00124
5	SENSOR ASSEMBLY (see Figure 10) 7-12	02563-60200
6 * 7 * 8 * 9 *	RR GUIDE: INP PPR SPRING: PPR PATH FOAM: PM #3 FOAM: PM #4	02563-00004 02563-00073 02563-00042 02563-00043
10	CABLE: DC MOTOR	02563-60123
13	TIE, Cable, Small	1400-1015
20	SCR: MACH M4X0.7	0515-1013
21	SCR: MCH M3X10POZ	0515-1005
22	SCR: M4X12 SEM	0515-1834
23	SCR: BTTN HD M4	0515-0838
24	SCR: M4X8 POZI,TT	0515-0861
30	WSHR: M4 SPL LOCK	2190-0586
31	SPRING HOOK: LOWER (2563A ONLY)	02563-00156
32	SPRING HOOK: LOWER (2562C, 2563B/C)	02564-60020
33	KIT: PAPER PATH	02563-67907

* These parts are no longer available. Order new Paper Path Kit, item 33.

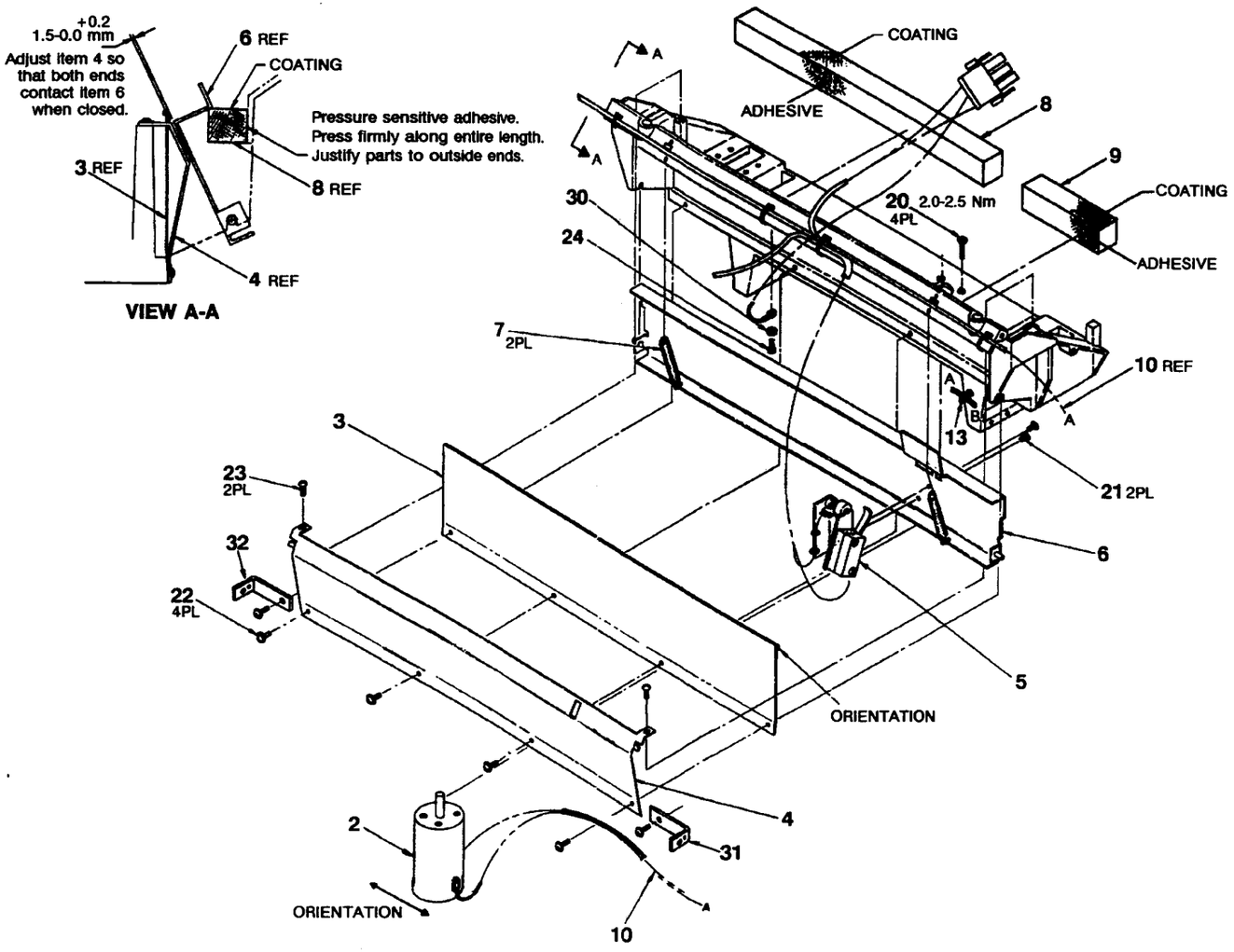

Figure 7-8. Print Mechanism Casting Assembly

Table 7-9. NEW PRINT MECH PAPER PATH ASSEMBLIES

REF. DES.	DESCRIPTION	HP PART NO.
2	MOTOR: D.C.	3140-0678
3	ASSY: PAPER GUIDE	C2356-60501
4	PPR GUIDE: FRONT	C2356-00038
7	SPRING: PPR PATH	02564-00053
10	CBL: DC MOTOR	02564-60123
13	TIE: CBL SMALL	1400-1015
20	SCR-MACH M4X0.7	0515-1013
22	SCR M4X12 SEM	0515-1834
23	SCR BTTN HD M4	0515-1680
24	WSHR: M4 FLAT	3050-0893
25	SHIELD: PAPER DUST	02564-00082
26	SHIELD: PAPER DUST CMPLTS	C2356-80603
31	PLATE: SPRG HOOK	02564-00020
NOTE: Since early Dec. '92, all 2562C & 2563C are shipped with the C2354A paper path.		

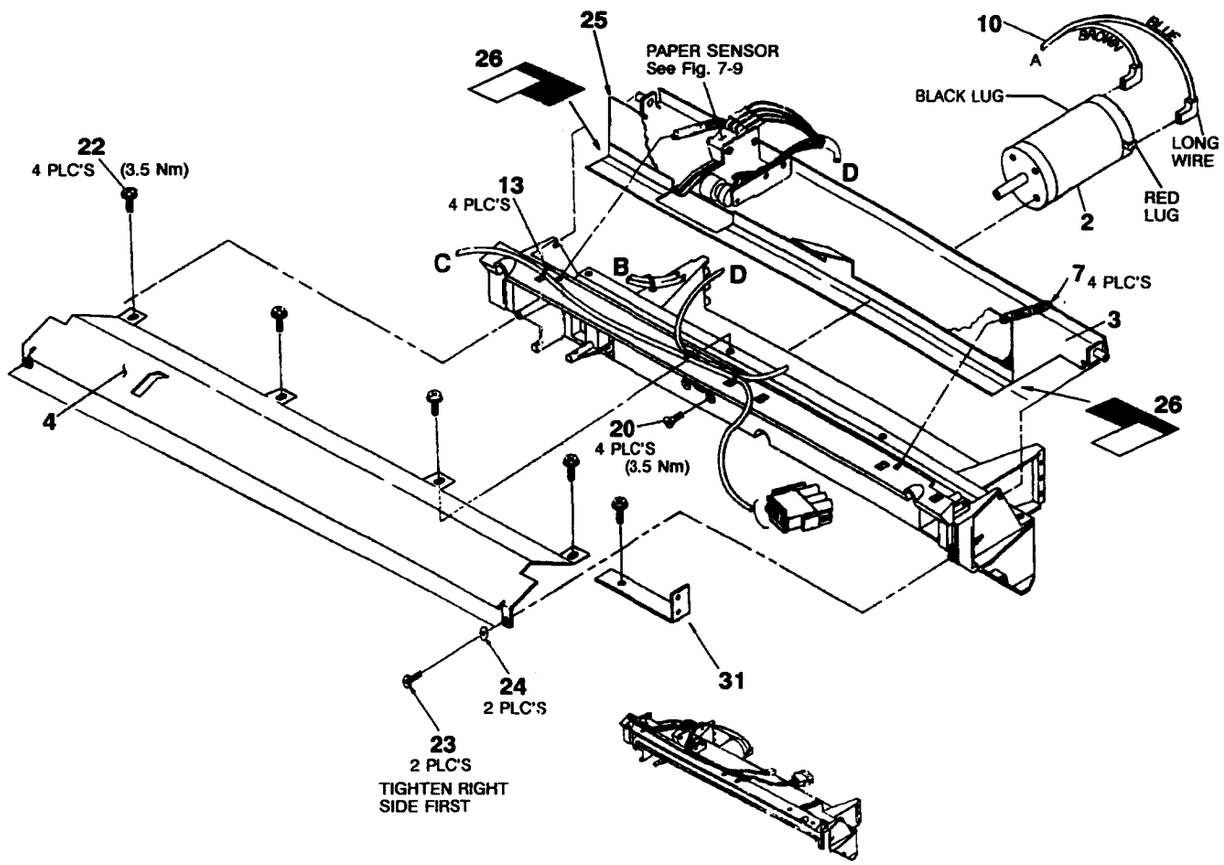

Figure 7-9. New Paper Path Assembly

Table 7-10. STAND AND PRINTER BASE AREA ASSEMBLIES
STANDARD HP2563B (55 dba Version)

REF. DES.	DESCRIPTION	HP PART NO.	NEW LOOK
1	FAN TBAX 120FM	3160-0513	
2	BRKT: FAN MTG	02564-00015	
3	BRKT: LWR FAN MNT	02564-00048	C2356-00004
5	AY: STAND FAN CBL	02564-60120	
6	STND ASSY (2563B/C)	02564-60158	C2356-60006
8	SCR: TPG 10-16	0624-0585	
12	SCR: TPG 4-24	0624-0585	
14	FOAM: FAN	02564-00058	
15	NUT-SHMET-U-TP	0590-0760	
16	SKT HD CAP	3050-0893	
19	SCR: POZ 6-19x0.5"	0624-0400	
22	TIE: CBL SMALL	1400-1015	
24	FSTNR: SNP-IN	1390-0635	
25	FSTNR: SNP-IN	1390-0634	
26	WSHR: L DAMPER	02564-00096	
27	FRONT DOOR	02564-60257	C2356-60046
28	MAGNETIC STRIP	9164-0250	
29	INSULATION TAPE: 50 FT ROLL, 0.125 x 0.438"	0330-0393	
30	STAND HINGE	5001-1916	C2356-00042
31	HINGE SCREW	0515-0758	
32	SCREW: FIX FAN BRACKET Order 4 items only when replacing this fan (1).	3030-0064	

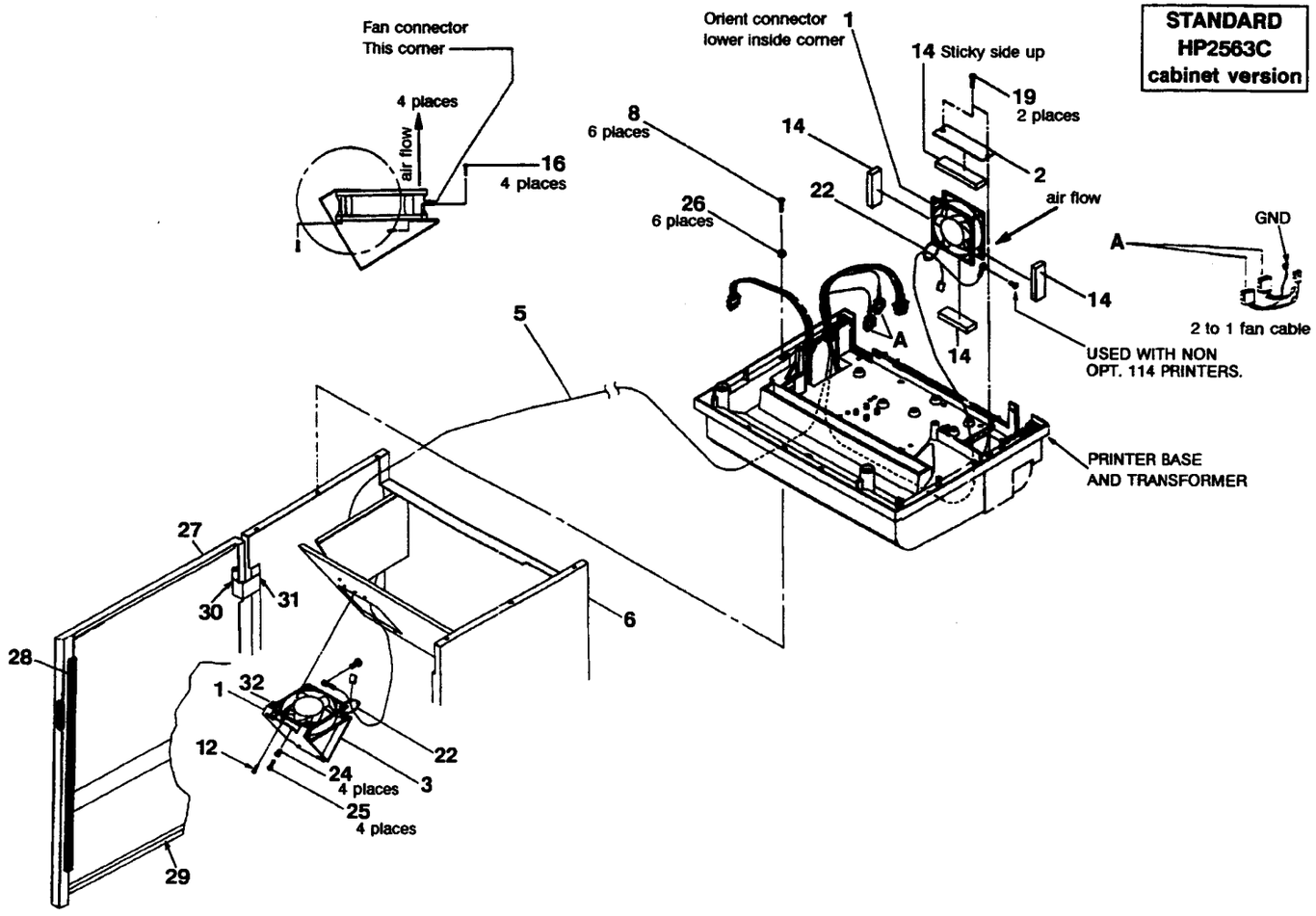

Figure 7-10. Stand & Printer Base Area Assembly

Table 7-11. BASE ASSEMBLY PARTS

REF. DES.	DESCRIPTION	HP PART NO.	NEW LOOK
1	BASE ASSY-desktops (2562C/63A/63B-OPT 114)	02562-60040	02562-60003
2	BASE ASSY-cabinetized (2563B/2563C)	02564-60194	C2356-60503
3	TRANSFORMER, Power	9100-4593	
4	SCR: MCH M4X50 POZ	0515-0906	
5	PCA: ANALOG/BACKPLANE FUSES: F1- 7 AMP F2- 5 AMP	02563-60006 - 2110-0614 2110-0010	
7	PCA: FORMATTER 2563A/B 2562C 2563C STATE FARM ANZAC FORMATTER	02563-60015 - - - 02563-60021	 02562-60025 02563-60035 02563-81084
8	PCA: I/O HPIB RS-232C/422 SUPER CENTRONICS MULTIPOINT HP2608A PARALLEL CENTRONICS DATAPRODUCTS-SHRT DATAPRODUCTS-LONG MULTIPLE I/O (RS232-422, Supercentronics)	 5062-0477 5062-1703 5062-1754 5061-1703 5061-1721 5061-1708 5061-1714 5061-1715 C2356-30101	
22	WSHR: M4 SPL LOCK	2190-0586	
25	TIE: Cable, Large	1400-0493	
26	CABLE: ENCODER	02563-60121	
27	GRAPHICS PCA's: LABEL CARD LABEL CARD II	4175008-QMS 4382022-QMS	
N/S N/S N/S	HOLDING BRACKET: I/O's HOLDING BRACKET: FORMATTER HOLDING BRACKET SCREWS	02563-00161 02563-00162 0515-0866	

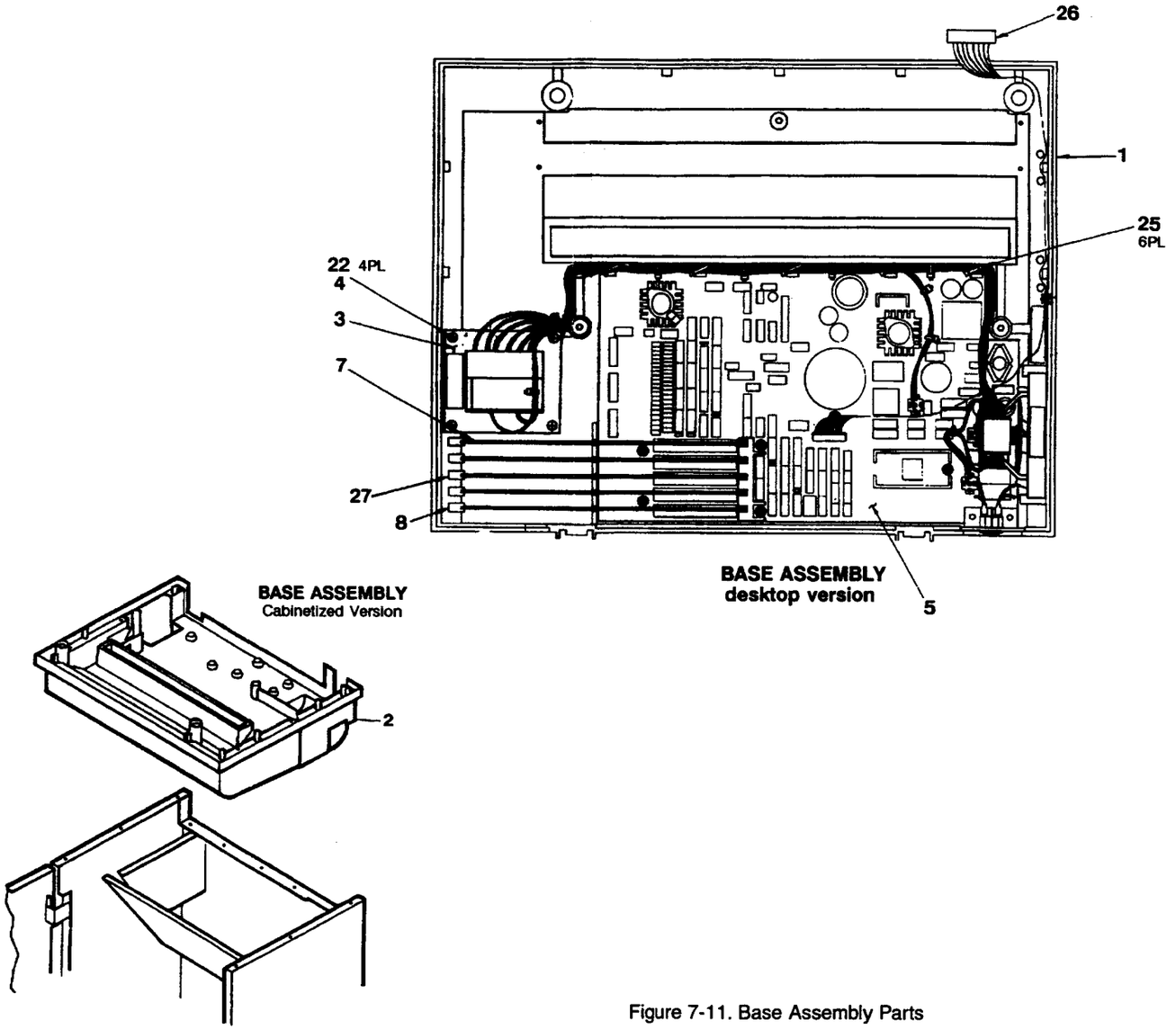

Figure 7-11. Base Assembly Parts

Table 7-12. SENSOR ASSEMBLY PARTS

REF. DES.	DESCRIPTION	HP PART NO.
1	PAPER MOTION SENSOR	02563-60200

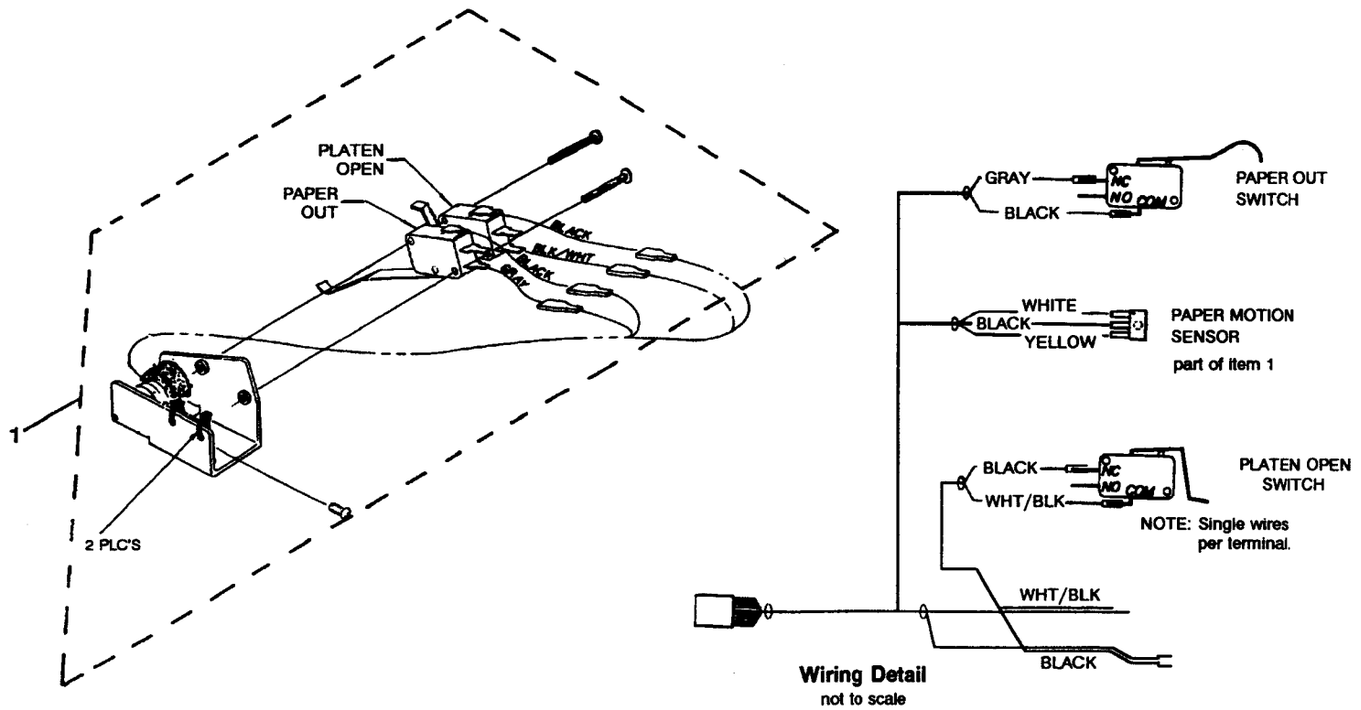

Figure 7-12. Sensor Assembly Parts

Table 7-13. PRINTER STAND (2563A OPTION 114) *

REF. DES.	DESCRIPTION	HP PART NO.
	STND ASSY-2563A OPT 114	92214P
1 *	GROMMET, Snap-In	1390-0638
2	DOOR, Stand	5001-1919
3	CASTER, Friction Fit CASTER, Thread Fit (not shown)	1492-0108 1492-0092
4	GLIDE	0403-0492
5	HINGE, Standside	5001-1916
6	SCREW, M5X12 PAN POZI	0515-0758
8 *	STUD, Snap-In	1390-0639
9	TRAY, Paper	5001-1920
10	SCREW	0515-1033
11 *	MAGNETIC STRIP	9164-0250
12	PAPER TRAY W/TABS	5001-1920
13	PAPER POSITION LABEL	5181-9103

* Items 1 & 8 can be replaced with item 11.

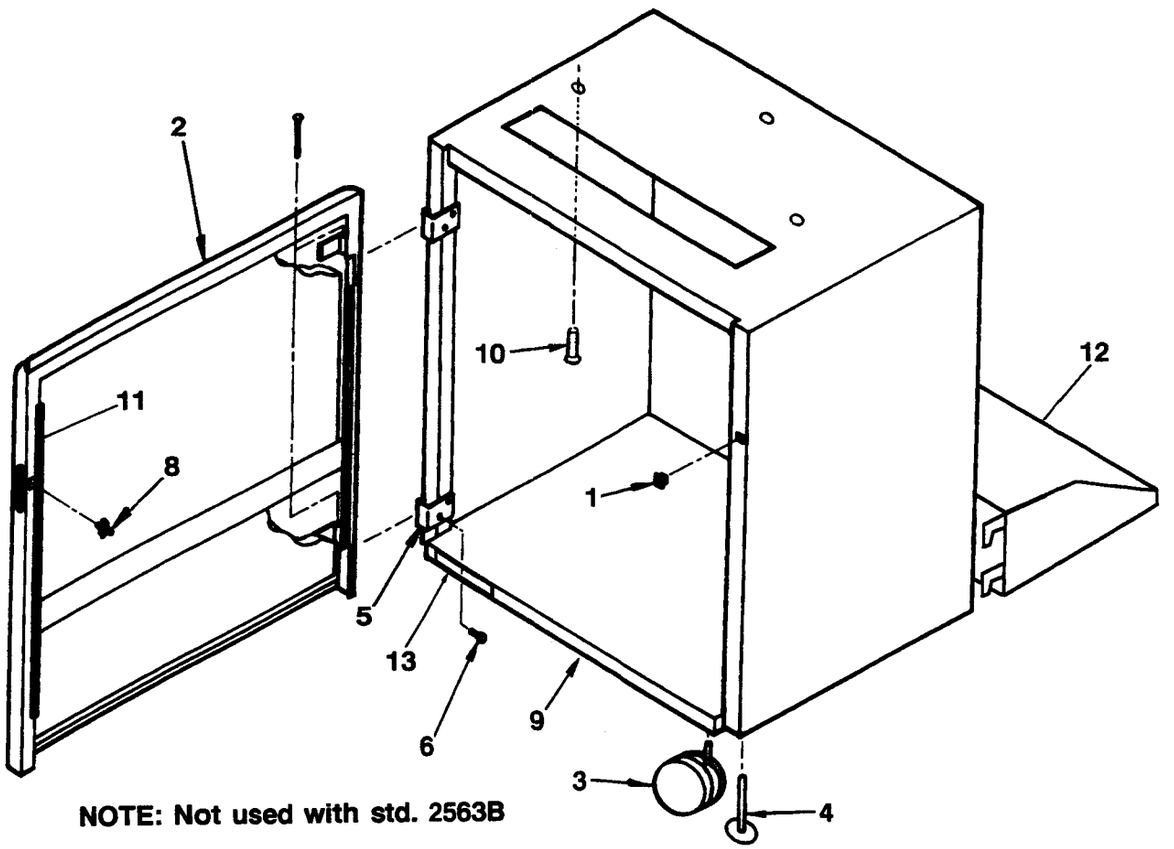

Figure 7-13. Printer Stand (2563A Option 114)

Table 7-14 SOUND SHROUD STACKING AID (2563B)

REF. DES.	DESCRIPTION	HP PART NO.
1	LEVELER FOOT	0403-0492
2	CASTER	1492-0108
3	SOUND SHROUD STACKING AID	02563-60244
4	PAPER TRAY PAPER TRAY 55dB	02564-00052 02564-00194
5	SCREW: TPG 8-18 (4 PLCS)	0515-0758
6	NO SKID STRIPS	02682-00864

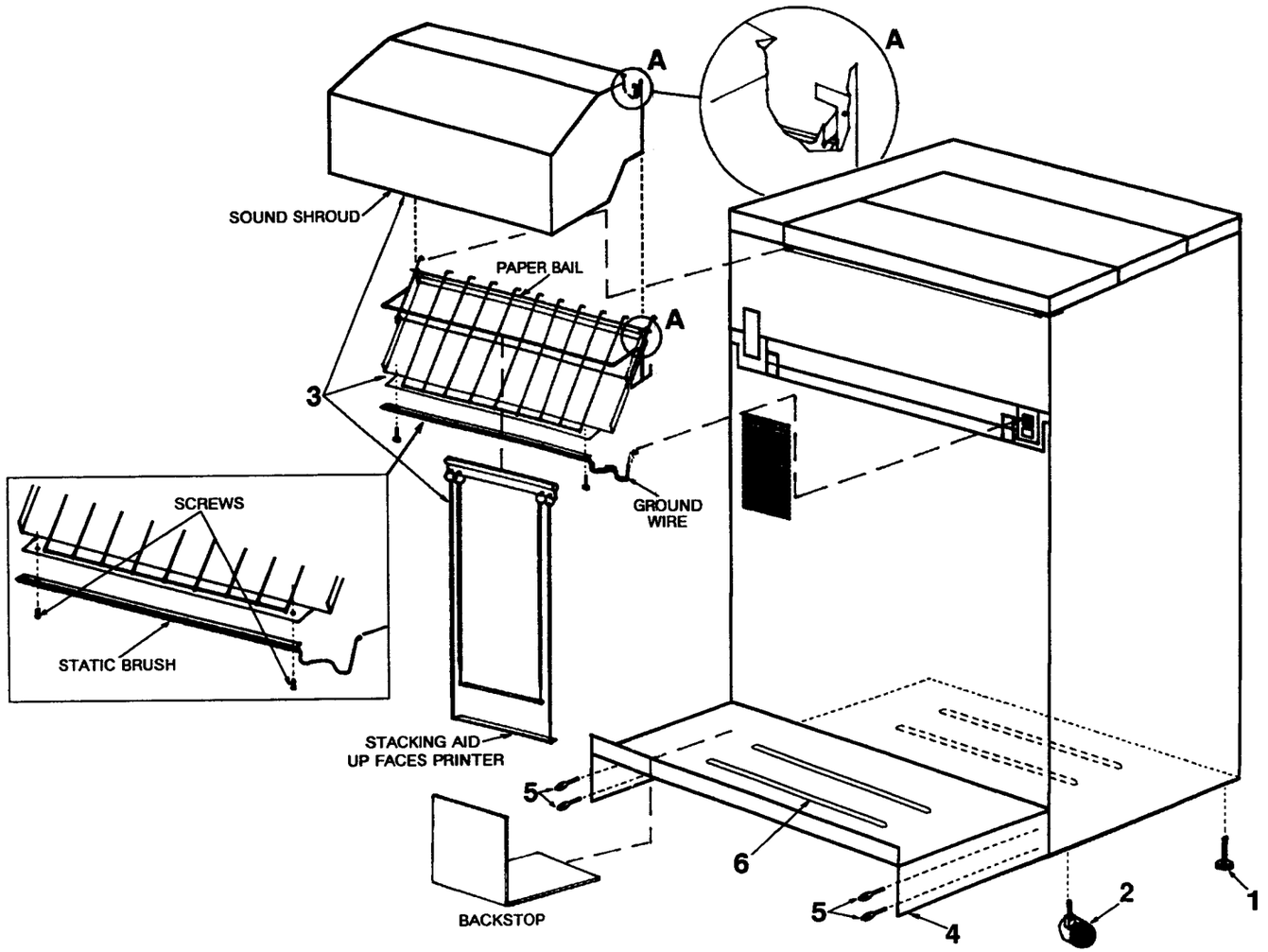

Figure 7-14. Sound Shroud / Stacking Aid (2564B)

Table 7-15. SOUND COVER (26764A) PARTS

REF. DES.	DESCRIPTION	HP PART NO.
1	BAIL, PAPER	02563-00055
2	COVER, SOUND	02563-60145

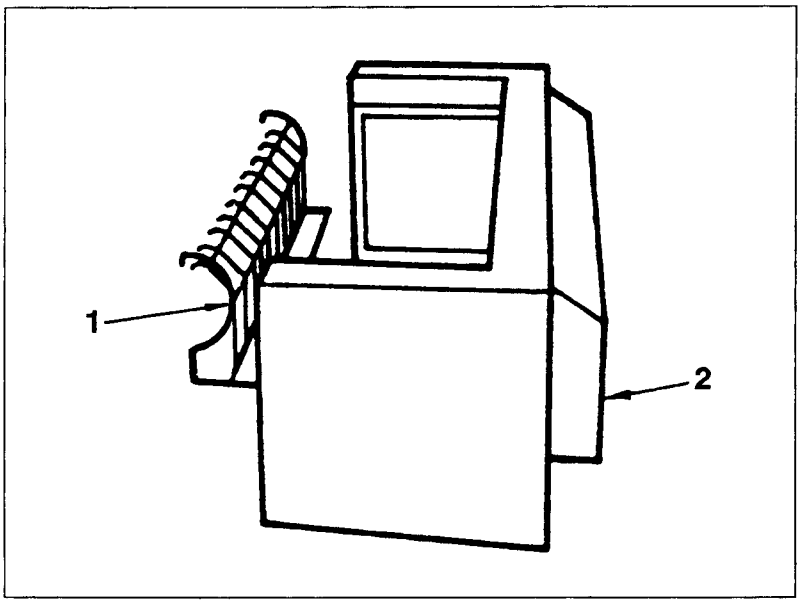

Figure 15. Sound Cover

Table 7-16. PAPER STACKER (2563A VERSION - P/N 26763A) *

REF. DES.	DESCRIPTION	HP PART NO.
1	UPPER ASSEMBLY	02563-60151
2	SCREW	0515-0904
3	BASE SUPPORT	02563-00078
4	BASE ASSEMBLY includes Castor	02563-60150
7	SCREW, Pivot	2360-0193
* For use with 92214P Stand		

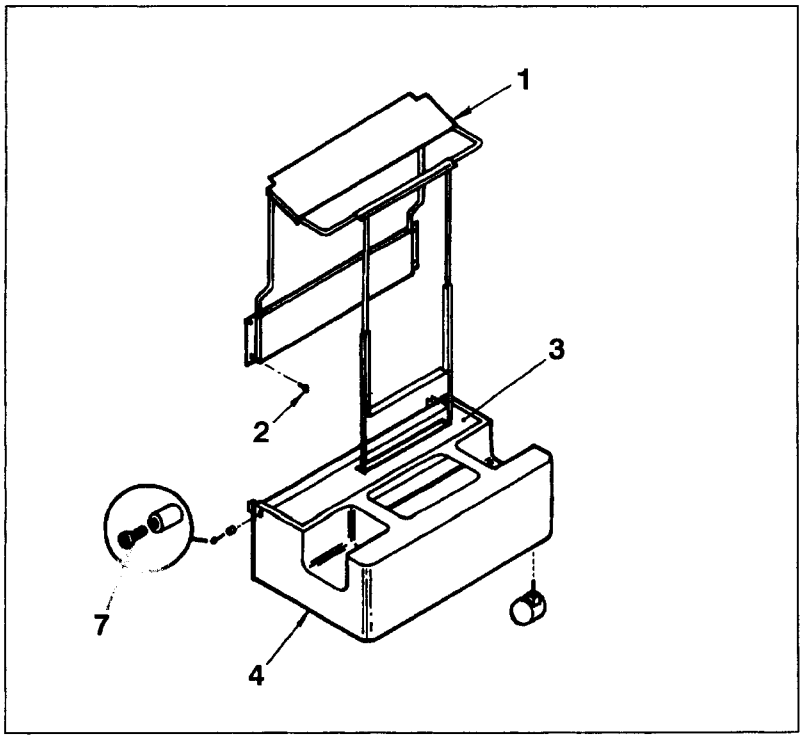

Figure 16. Paper Stacker (2563A Version - P/ 26763A)

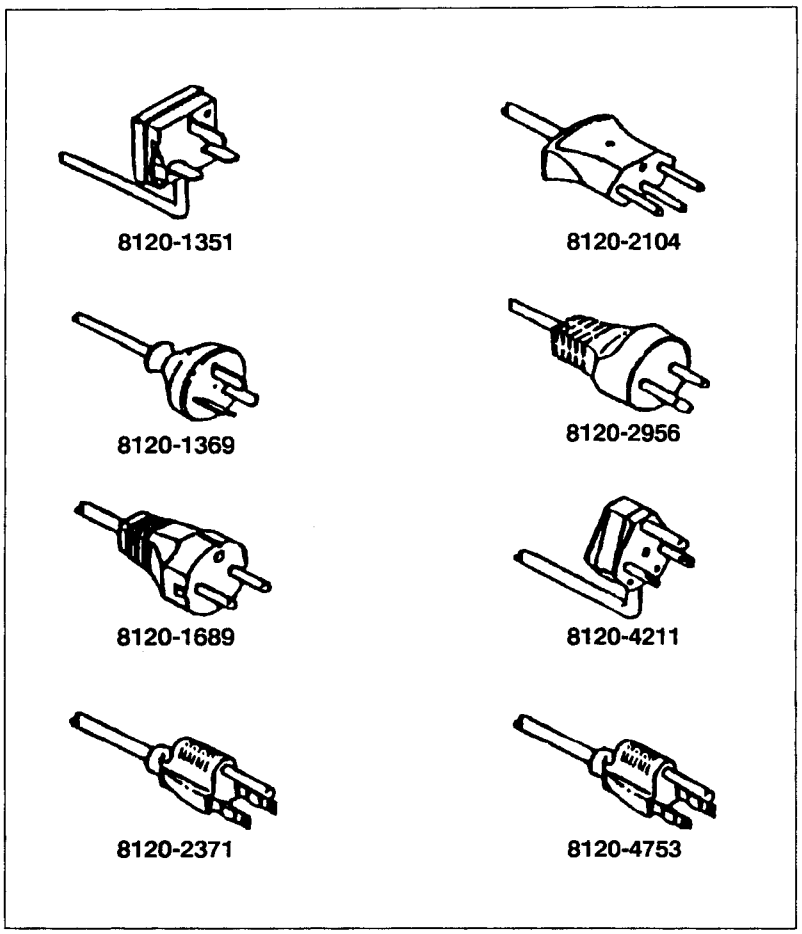

Figure 7-17. Power Cables

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Appendix A

Diagnostics Errors 2562C 2563A/B/C

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DIAGNOSTIC ERRORS

The following is a list of all printer errors which are displayed on the printer's Control Panel. The fail code (which is associated with each status error) is displayed by pressing the ENTER key on the printer's Control Panel.

■ Errors Fn, 11, 12, 13: GENERAL PROBLEMS

F0 SPURIOUS INTERRUPT DECODE

Suspects:
a. Analog PCA
c. Control PCA
d. I/O PCA
e. Encoder PCA

F1 ILLEGAL INTERRUPT DECODE

Suspects:
a. Analog PCA
b. Control PCA
c. I/O PCA
e. Encoder PCA

F8 NEGATIVE PAGE LENGTH

Suspects:
a. Progammically received negative page length.

F9 SELFTEST ABORT

Suspects:
a. Control PCA
b. Analog PCA

FC PAPER MOTION FAIL AT POWER UP

Suspects:
a. Analog PCA
b. Stepper Motor
c. Paper Motion Sensor

FF TOTAL SYSTEM FAILURE

Suspects: a. Control PCA
b. Analog PCA

1100 OUT OF PAPER

1200 PLATEN OPEN OR RIBBON OUT

1300 PAPER ADVANCE INOPERATIVE OR PAPER JAM

Error 14: PRINT MECHANISM PROBLEMS

1401 PRINT BAR DRIVER FAIL
Overcurrent or Overvoltage at the motor driver.

Hints: Run standard self test

Suspects: a. Analog PCA
b. Print Bar Motor Cable
c. Print Bar Motor

1402 PAPER DRIVER FAIL
Overcurrent to the stepper driver circuitry.

Hints: Unplug stepper motor, if the error persists, the Analog PCA is at fault. Note, with motor unplugged a paper jam indication will occur.

Suspects: a. Analog PCA
b. Stepper Motor Cable
c. Stepper Motor

1403 HAMMER DRIVER + FAIL
Current is flowing through the print bar but not through the hammer drive transistors when HAMMER IDLE is high or PRINTING is low.

Tests: Examine the hammer cables for signs of wear and rubbing against the sheet metal.

Unplug the hammer cables from the Analog PCA and run self test, if the error persists the PCA is at fault.

Plug in each cable one at a time (the power should be off. Observe if the error follows a particular cable or is inherent to a particular connector.

Suspects:
a. Hammer Cable Assembly
b. Print Bar
c. Analog PCA
d. Print Bar Motor

1404 HAMMER DRIVER "-" FAIL
Current is flowing through one or more hammer drive transistors when HAMMER IDLE is high or PRINTING is low.

Suspects: a. Analog PCA

1405 DGL IDLE MISSING ON TURNAROUND
The Idle Flag generated by the DGL is not active at the beginning of turnaround.

Suspects: a. Control PCA

1406 ENCODER COMMUNICATIONS TIME-OUT
The communications between the Controller processor and the Encoder processor did not function correctly.

Hints: Ensure the encoder ribbon cable is properly seated on both PCAs. Run standard self test or CE Mode test 14

Suspects:
a. Encoder PCA ribbon cable
b. Encoder PCA
c. Control PCA
d. Analog PCA

1407 PRINT BAR START FAULT
The print bar motor will not start after five tries.

Hints: Open the platen gap as wide as possible and try to start the motor (run standard self test or CE Mode test 21.

Suspects:
a. Print Mechanism (binding)
b. Encoder PCA or Cable
c. Analog PCA
d. Print Bar Motor

1408 PRINT BAR SPEED OUT OF SPECIFICATION
The print bar mogation frequency is either too fast or too slow.

Hints: Open the platen gap as wide as possible and try standard Self Test. Observe the print bar as it starts, if it's motion appears normal but the failure persists, check the Encoder Gap adjustment.

Suspects:
a. Encoder Gap (adjustment)
b. Encoder PCA
c. Analog PCA
d. Print Mechanism
e. Control PCA
f. Print Bar Motor

1409 PRINT BAR DRIVER OVERLOADED
The firmware must overdrive the print bar motor to maintain proper speed.

Hints: Try opening the platen as wide as possible (with the Adjustment Knob) and then run standard Self Test. Check for debris in paper path.

Try moving print bar back and forth manually; check for rubbing or obstructions.

Suspects:
a. Print Mechanism (binding)
b. Analog PCA
c. Print Bar Motor

1410 POWER-UP FAULT (CB DRIVER FAIL)
Overvoltage or overcurrent detected on print bar motor driver when power first comes up after reset.

Hints: Try running standard self test or CE Mode test 21

Suspects:
a. Analog PCA
b. Print Bar Motor Cable
c. Print Bar Motor

1411 POWER UP FAULT (PAPER DRIVER FAIL)
Overcurrent on the paper driver when power first comes up after reset.

Hints: See error 14-02.

Suspects:
a. Analog PCA
b. Stepper Motor

1412 POWER UP FAULT (HAMMER DRIVER + FAIL)
Current is flowing through the print bar but not through the drive transistors when power first comes up after reset.

Hints: See "Hammer Drive + Fail" error message explanation (14-03).

Suspects:
a. Printbar
b. Printbar Cables
c. Analog PCA

1413 POWER UP FAULT (HAMMER DRIVER - FAIL)
Current is flowing through one or more hammer driver transistors when power first comes up after reset.

Suspects:
a. Analog PCA

1414 +50 VOLTS DID NOT POWER UP
The 50 volt supply did not rise above +40 volts (the 50V STATUS signal did not go high).

Hints: Check for proper line voltage

Suspects: a. Analog PCA
b. Transformer

Error 15: GRAPHICS RUN TIME FAILURES

1500 UNRECOGNIZED NON-PACKET REQUEST OR RESPONSE
The Graphics PCA has sent a communications pattern that the Control processor can not recognize.

Tests: CE Mode standard self test

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1501 RETURN STATUS INDICATES A FAILURE FROM THE GRAPHICS PCA
The Graphics PCA detected a failure while executing a function.

Tests: CE Mode standard self test

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1502 UNDEFINED RETURN STATUS
A communications error occurred while the processor attempted to communicate with the Graphics PCA.

Tests: CE Mode standard self test

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1503 UNDEFINED OR UNEXPECTED GRAPHIC COMMAND
Protocol error while the Control processor attempted to communicate with the Graphics PCA.

Tests: CE Mode standard self test

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1505 UNDEFINED BUFFER TYPE
Protocol error while the Control processor attempted to communicate with the Graphics PCA.

Tests: CE Mode standard self test

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1507 RESET RESPONSE TIME OUT.

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1508 FAILURE TO DELINK PACKET.

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1509 FAILURE REPORTED GRAPHICS PCA.

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

1510 NO RESPONSE FROM GRAPHICS PCA.

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

Error 16: I/O RUN TIME FAILURES

1600 UNRECOGNIZED NON-PACKET REQUEST OR RESPONSE

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

1601 RETURN STATUS INDICATES I/O FAILURE
The I/O detected a failure while executing a function.

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

1602 UNDEFINED RETURN STATUS

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

1603 UNDEFINED OR UNEXPECTED I/O COMMAND

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

1604 UNEXPECTED DATA PACKET RECEIVED WHEN NON-CIPER

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

1605 UNDEFINED BUFFER TYPE

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

1606 POWER-ON SELF TEST FAILURE
The I/O PCA fails it's own self test when power first comes up after a reset.

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

1607 RESET RESPONSE TIMEOUT
The I/O PCA is installed but failed to communicate with the Control processor within two seconds.

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

Error 17: PRINTER TIMED OUT

1701 ERROR LOCATION IS IN THE DATA PROCESSOR
Printing timeout.

Suspects: a. Control PCA

1702 ERROR LOCATION IS IN QPRINT
Printing timeout; the printer did not complete the printing of one line within 15 seconds.

Suspects: a. Control PCA

1703 PRINT ONE LINE EXTERNAL TIMEOUT
A timeout occurred when print one line function was being done with data from the host system.

Suspects: a. Control PCA

1705/1706 PRINT ONE LINE INTERNAL TIMEOUT
A timeout occurred when print one line function was being perform with internally generated data.

Suspects: a. Control PCA

1900 ATTEMPT TO GO ONLINE IN CE MODE

Hints: Ensure the jumper is removed from test points TP3 through TP7 on the Controller PCA.

Suspects: a. Control PCA

Error 20: 50V SUPPLY TEST FAILURE

2001 ANALOG I/O FAILURE
The Control PCA is unable to read the input ports from the Analog PCA.

Hints: Try reseating the Control PCA

Suspects: a. Control PCA
b. Analog PCA

2002 +50 SUPPLY CONTROL LINE IS ALWAYS ON (ACTIVE).

Suspects: a. Analog PCA
b. Control PCA

2003 THE +50V SUPPLY WILL NOT TURN OFF
The 50V Status indicates that the 50 V supply is still greater than 35V when it is supposed to be off.

Hints: Observe if the print bar is trying to move, if not, check print bar motor cable and connector.

Tests: CE Mode test 21

Suspects: a. Analog PCA

2004 HARDWARE FAILURE INDICATED WITH THE +50V SUPPLY SWITCHED OFF
One of the hardware failure indication lines is active (low) after the +50V supply is switched off and after the failure port is updated.

Hints: Reset the printer (power off then on) Rerun standard self test

Suspects: a. Analog PCA
b. Hammer cables
c. Print Bar
d. Stepper Motor
e. Print Bar Motor

2005 HARDWARE FAILURE AFTER THE +50V SUPPLY LINE IS ON
One of the hardware indicator lines is active (low) after the +50V supply has been re-enabled.

Hints: Unplug J1, J2, J3, and J4; if the failure persists, replace the Analog PCA Run CE Mode test 20

Suspects:
a. Analog PCA
b. Print Bar
c. Print Bar cable (shorted to ground)

2006 THE +50V SUPPLY FAILS TO TURN ON
The 50V Status flag indicates that the supply is below 35 volts after supply is re-enabled.

Hints: Unplug J1, J2, J3, J4, and J9 and rerun self test, if the 50V error persists, replace the Analog PCA. Expect a 14-07 error with J4 unplugged and a Paper Jam with J9 unplugged.

Suspects:
a. Analog PCA
b. Control PCA

Error 21: STATIC ENCODER TEST FAILURES

2101 COMMUNICATIONS FAILED TO THE ENCODER
The initial command instructing the encoder to execute a diagnostic can not be completed.

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2102 ENCODER FAILED TO RESPOND IN TWO SECONDS
No response from the Encoder was received after the initial command to execute the static self test was given.

Suspects: a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2110 THE DATA LINE FROM THE ENCODER IS ALWAYS LOW (DATA IN)

Suspects: a. Encoder PCA
b. Encoder Cable
c. Analog PCA

2111 HANDSHAKE TIME-OUT WHILE WAITING FOR A "1"
The encoder did not respond to a Control PCA handshake line within 2 milli- seconds.

Suspects: a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2112 HANDSHAKE TIME-OUT WHILE WAITING FOR A ZERO

Suspects: a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2121 ENCODER ROM CHECKCODE ERROR DETECTED

Suspects: a. Encoder PCA

2122 ENCODER RAM FAILURE
The encoder processor was unable read/write to all RAM address locations.

Suspects: a. Encoder PCA

2123 ENCODER TRANSMITTER FAILED
The transmitter circuitry on the Encoder PCA (transmitting to the pick-up plate) is not working correctly.

Suspects: a. Encoder PCA

2124 ENCODER RECEIVER FAILURE
The position signals from the pickup plate can not be received.

Suspects: a. Encoder Gap out of tolerance
b. Encoder PCA

2135 DATA LINE FROM THE ENCODER IS ALWAYS HIGH
The serial data line from the Encoder to the Control PCA is always high.

Tests: The DATA IN signal should toggle while running the static encoder test

Suspects: a. Encoder PCA
b. Analog PCA

Error 22: PRINT BAR MOTOR DRIVE TEST FAILURES

2201 PRINT BAR FAILED TO START AFTER FIVE TRIES
The algorithm used to start the print bar failed after five attempts.

Hints: Open platen gap (with Adjustment Knob) and rerun test. Ensure the print bar motor cable is fully seated.

Suspects: a. Print Mechanism (binding)
b. Encoder PCA
c. Analog PCA
d. Print Bar motor or cable

2202 PRINT BAR SPEED OUT OF RANGE OR DIRECTION SIGNAL INCORRECT
The controller firmware measures print bar speed by monitoring time between print bar direction changes.

Hints: If mechanism seems to start but motion is terminated by the fail code, check the encoder gap. Open platen gap (with Adjust Knob) and rerun standard test

Suspects:
a. Encoder Gap (misaligned)
b. Print Mechanism (binding)
c. Analog PCA
d. Counter-balance phasing (see para 5-6)

2203 ANALOG PCA I/O FAILURE
The Control PCA was unable to read the input ports from the Analog PCA.

Hints: Reseat Control PCA

Suspects:
a. Analog PCA
b. Control PCA

2204 COMMUNICATIONS TO THE ENCODER PCA FAILED
The handshake procedure for transferring commands to the Encoder PCA timed-out before the command was fully transferred.

Hints: Ensure Encoder cable is seated.

Suspects:
a. Encoder Cable
b. Encoder PCA
c. Analog PCA

2205 PRINT BAR DRIVE DOES NOT TURN OFF
Examination of the +50V supply indicates the print bar drive did not turn off.

Suspects:
a. Analog PCA

Error 28: ACTIVE ENCODER TEST FAILURES

2802 COMMUNICATIONS FAILED TO THE ENCODER
The initial serial command to the encoder to execute the active encoder test could not be transmitted correctly.

Hints: Ensure the encoder cable is seated at both ends of the cable. Run standard self test or CE Mode test 14

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2803 ENCODER FAILED TO RESPOND WITHIN TWO SECONDS
The command to execute the active encoder test was sent correctly but the encoder has initiated no communication after two seconds.

Hints: Ensure the Encoder cable is fully seated. Run CE Mode test 14

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2804 SERVO FAILED AFTER FIVE ATTEMPTS
The print bar could not be started so the encoder test could not be run.

Hints: Ensure the print bar motor cable is fully seated. Open platen with the Adjust knob and run CE Mode test 21

Suspects:
a. Encoder PCA
b. Analog PCA
c. Print Bar Motor
d. Print Bar cable

2805 SERVO SPEED OUT OF RANGE OR DIRECTION SIGNAL INCORRECT

The print bar is mogating either too fast or slow, or the DIRECTION signal is changing at the wrong time.

Hints: Open platen gap (with Adjust Knob) and rerun test. Check Encoder Gap. Run CE Mode test 14.

Suspects:
a. Encoder PCA
b. Analog PCA
c. Print Mechanism

2806 I/O TO ANALOG PCA FAILED

The SELFTEST signal can not be set.

Suspects:
a. Analog PCA
b. Control PCA

2807 COMMUNICATIONS TO THE ENCODER FAILED DURING SERVO START

The print bar start algorithm failed due a communications problem between the encoder and the control processors.

Hints: See error 28-02

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2811 HANDSHAKE ERROR WHILE WAITING FOR A ONE

The encoder did not respond to a high level on the handshake line within the specified 2 millisecond window.

Hints: See error 28-02

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2812 HANDSHAKE ERROR WHILE WAITING FOR A ZERO
The encoder did not respond to a low level on a handshake line within the specified 2 millisecond window.

Hints: See error 28-02

Suspects: a. Encoder PCA
b. Control PCA
c. Analog PCA

2821 AUTO-CENTERING ALGORITHM OUT OF BOUNDS
The correction factor used to center the print has exceeded a preset limit.

Hints: Rerun CE Mode test 14

Suspects: a. Encoder PCA
b. Print Mechanism
c. Analog PCA

■ Errors 29, 30, 31, 32, 33, 34 and 36:

CONFIGURATION PRINTOUT ERRORS

2901 PRINTER TIME OUT
The printing of configuration parameters has not started within five seconds after being initiated.

Suspects: a. Control PCA
b. Encoder PCA

2902, 2905, 2912, 2915, 2922, 2925, 2932
COMMUNICATIONS ERROR
The control processor is trying to read the configuration data from the encoder processor (i.e., date code, flight time). The initial command to the encoder can not be transmitted correctly.

Hints: Run the Static Encoder test (CE Mode test 14). If the test passes, the Encoder PCA or the cable are probably not the source of the problem.

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

2903, 2906, 2913, 2916, 2923, 2926, 2933
COMMUNICATIONS FAILURE
A timeout error occurred while the control processor was attempting to read the configuration data from the encoder processor. The two millisecond handshake response window has been exceeded (for a positive going handshake signal).

Hints: See error for 29-02

Suspects:
a. Encoder PCA
b. Encoder cable
c. Control PCA
d. Analog PCA

2904, 2907, 2914, 2917, 2924, 2927, 2934
COMMUNICATIONS FAILURE
A timeout error occurred while the control processor was attempting to read the configuration data from the encoder processor. The two millisecond handshake response window has been exceeded (for a negative going handshake signal).

Hints: Run Static Encoder Test.

Suspects:
a. Encoder PCA
b. Encoder cable
c. Control PCA
d. Analog PCA

2940 FAILED TO DELINK THE I/O PACKET FOR STATUS
The control processor was unable to read the status of the I/O processor.

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

2941 COULD NOT SEND AN I/O PACKET POINTER FOR STATUS

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

2942 FAILED TO DELINK I/O POINTER FOR CONFIGURATION

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

2943 COULD NOT SEND AN I/O PACKET POINTER FOR CONFIGURATION

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

2945 FAILED TO DELINK GRAPHICS PACKET FOR STATUS

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

2946 COULD NOT SEND GRAPHICS PACKET FOR STATUS

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

2947 FAILED TO DELINK GRAPHICS PACKET FOR CONFIGURATION

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

2948 COULD NOT SEND GRAPHICS PACKET FOR CONFIGURATION

Suspects: a. Graphics PCA
b. Control PCA
c. Analog PCA

3001 STANDARD RIPPLE PRINT TIME-OUT
The ripple print test has not executed within five seconds of being initiated.

Suspects: a. Control PCA
b. Encoder PCA
c. Analog PCA
d. Print Mechanism

3101 DOUBLE SIZE RIPPLE PRINT TIME-OUT
The test has not run within five seconds of being initiated.

Suspects: a. Control PCA
b. Encoder PCA
c. Analog PCA
d. Print Mechanism

3201 COMPRESSED RIPPLE PRINT TIME-OUT
The test has not run within five seconds of being initiated.

Suspects: a. Control PCA
b. Encoder PCA
c. Analog PCA
d. Print Mechanism

3301 HIGH DENSITY RIPPLE PRINT TIME-OUT
The test has not run within five seconds of being initiated.

Suspects: a. Control PCA
b. Encoder PCA
c. Analog PCA
d. Print Mechanism

3401 RASTER GRAPHICS PRINT TIME-OUT
The test has not run within five seconds of being initiated.

Suspects: a. Control PCA
b. Encoder PCA
c. Analog PCA
d. Print Mechanism

3601 BLACKOUT PRINT TIME-OUT
The test has not executed within five seconds of being initiated.

Suspects: a. Control PCA
b. Encoder PCA
c. Analog PCA
d. Print Mechanism

Error 40: DGL ROM TEST FAILURES

4006 CHARACTER SET SOCKET 1 FAILURE
Failed ROM check code.

Suspects: a. Character Set ROM-1
b. Control PCA

4007 CHARACTER SET SOCKET 2 FAILURE
Failed ROM check code.

Suspects: a. Character Set ROM-2
b. Control PCA

4008 CHARACTER SET SOCKET 3 FAILURE
Failed ROM check code.

Suspects: a. Character Set ROM-3
b. Control PCA

4009 CHARACTER SET SOCKET 4 FAILURE
Failed ROM check code.

Suspects: a. Character Set ROM-4
b. Control PCA

4010 CHARACTER SET SOCKET 5 FAILURE
Failed ROM check code.

Suspects: a. Character Set ROM-5
b. Control PCA

4011 CHARACTER SET SOCKET 6 FAILURE
Failed ROM check code.

Suspects: a. Character Set ROM-6
b. Control PCA

Error 41: CONTROL (Digital) PCA TEST FAILURES

4101 CONTROL PROCESSOR ROM CRC FAILURE

Suspects: a. Control PCA

4102 DOT GENERATION LOGIC SHARED RAM FAILURE
The processor was unable to read/write to the DGL RAM.

Suspects: a. Control PCA

4103 NON-VOLATILE RAM FAILURE
The processor can not read/write from the non-volatile RAM.

Suspects: a. Control PCA

4104 VOLATILE RAM FAILURE
The processor can not read/write data from the processor's RAM.

Suspects: a. Control PCA

4105, 4106 CTC FAILURE
The processor's counter-timer-chip is not counting correctly.

Suspects: a. Control PCA

4112 FAILED GRAPHICS RIGHT 70 DPI
The Dot Generation Logic can not process the graphics data when the print bar moving to the right.

Suspects: a. Control PCA

4113 FAILED GRAPHICS RIGHT 110 DPI
The Dot Generation Logic could not process the graphics data when the print bar is moving from left to right.

Suspects: a. Control PCA

4114 FAILED GRAPHICS RIGHT 140 DPI
The Dot Generation Logic could not process the graphics data properly when the print bar is moving from left to right.

Suspects: a. Control PCA

4115 FAILED GRAPHICS LEFT 70 DPI
The Dot Generation Logic could not process the graphics data properly when the print bar is moving from right to left.

Suspects: a. Control PCA

4116 FAILED GRAPHICS LEFT 110 DPI
The Dot Generation Logic could not process the data as the print bar is moving from right to left.

Suspects: a. Control PCA

4117 FAILED GRAPHICS LEFT 140 DPI
The Dot Generation Logic could not process the data as the print bar is moving from right to left.

Suspects: a. Control PCA

4118 FAILED NO DESCENDER SCAN
The processor detected characters with descenders in the print buffer when characters without descenders were actually loaded.

Suspects: a. Control PCA

4119 FAILED SINGLE DESCENDER SCAN
The descender check routine was unable to detect a character in the print buffer with a single descender.

Suspects: a. Control PCA

4120 FAILED DOUBLE DESCENDER SCAN
The descender check routine could not detect a character that had two descenders.

Suspects: a. Control PCA

4121 DGL TIME-OUT
The Dot Generation Logic does not go into idle mode within ten seconds of data being loaded into the print buffer.

Suspects: a. Control PCA

4122 ENCODER COMMUNICATIONS FAILURE
The serial transfer of data between encoder and control processors was not completed properly.

Hints: Try running the Static Encoder test (CE Mode test 14)

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA

4123 FAILED TEST RIGHT 210 DPI
210 dot per inch character data can not be processed properly when the print bar is moving from right to left.

Suspects: a. Control PCA

4124 FAILED TEST LEFT 210 DPI
210 dot per inch character data can not be processed properly when the print bar is moving from left to right.

Suspects: a. Control PCA

Error 42: PRINT BAR COIL TEST FAILURES

42NN HAMMER COIL "NN" (1-33) APPEARS OPEN
The firmware attempts to fire each hammer #33 to #1 (right to left). If no current is sensed a failure is indicated. If there are two or more failures, only the lowest number is recorded.

Hints: Swap hammer cables (either J1, J2, or J3) on the Analog PCA; note if the error (fail code) moves with the error.

Suspects:
a. Print bar (open coil)
b. Ribbon cable (J1,J2, or J3)
c. Analog PCA

4250 ANALOG PCA I/O FAILURE
The Control PCA is unable to read an output port on the Analog PCA.

Hints: Reseat the PCAs

Suspects: a. Analog PCA
b. Control PCA

4251 +50V SUPPLY FAILS TO TURN ON
The 50V Status line indicates the voltage level to be less than 35V.

Hints: Ensure the screws to C53 on the Analog PCA are secure.

Suspects: a. Analog PCA

4252 DGL TIME-OUT
The processor issued a command to the DGL and the processor did not receive an interrupt from the DGL signifying the command was completed.

Suspects: a. Control PCA

4253 HANDSHAKE FAILURE
Communications to Encoder PCA failed the handshake procedure for transferring serial commands to Encoder PCA timed out before the commands were fully transferred.

Hints: Run CE Mode test 14 (Static Encoder test)

Suspects: a. Encoder Ribbon Cable
b. Encoder PCA
c. Analog PCA
d. Control PCA

4254 HAMMER COIL CURRENT SENSED AT THE WRONG TIME
Hammer current was sensed before the hammer was instructed to fire. The hammer detection circuitry could be bad or the hammer driver circuitry has malfunctioned.

Hints: Examine hammer cable assembly for wear or rubbing. Unplug J1, J2, and J3 on the Analog PCA; if the failure persists, replace the Analog PCA (Expect a 42-01 error with cables unplugged). Plug in the cables separately to try to isolate the problem. If the error occurs with the same cable installed in either J1, J2, or J3, the cable or print bar is at fault. If the failure occurs no matter which cable is installed in J1, J2, or J3, the Analog PCA is at fault.

Suspects: a. Analog PCA
b. Hammer cable assembly

4255 PRINT BAR MOTOR DRIVER FAILURE
A hardware failure for the print bar motor driver circuitry has been detected.

Hints: See error 14-01

Suspects: a. Analog PCA

4256 PAPER DRIVER FAILURE
Overcurrent to the paper drive motor.

Hints: See error 14-02

Suspects: a. Analog PCA

4257 HAMMER DRIVER "-" FAIL
Current is detected in the hammer driver transistors when printing is presumed to be halted.

Hints: See error 14-04

Suspects: a. Analog PCA

4258 HAMMER DRIVER "+" FAIL
Current is detected in the print bar hammer coils when printing is presumed to be halted.

Hints: See error 42-54

Suspects:
a. Print Bar
b. Hammer Cable assembly
c. Analog PCA

4259 +50V SUPPLY FAILURE
+50V Supply failed after the hammers fired the 50V Status line indicates that the voltage level is less than 35 volts.

Hints: Examine the print prior to the failure, if there are printed dot in every position (horizontal bands one character high across the page) the Control PCA is probably at fault. Run CE mode test 21 Ensure the screws securing the cabling to C53 are tight.

Suspects:
a. Control PCA
b. Analog PCA

Error 50: RS 232-C, HP-IB OR CENTRONICS INTERFACE ERRORS

5001 I/O RAM FAILURE

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

5002 I/O ROM FAILURE

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

5003 SERIAL HARDWARE FAILURE

Suspects:
a. I/O PCA
b. I/O Cable
c. Control PCA
d. Analog PCA

5004 MULTIPLE I/O ERRORS
Two or more of the above interface errors

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

Error 51: MULTIPOINT INTERFACE ERRORS

5101 RAM FAILURE

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

5102 ROM FAILURE

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

5103 CTC FAILURE

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

5116 RTS-CTS TIME-OUT

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5117 NO RECEIVED CHARACTER

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5118 FRAMING ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5119 CHARACTER MATCH ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5120 TRANSMITTER TIME-OUT

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5132 OCD3-OCR2 ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5133 OCD2-OCR2 ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5134 OCD1-OCR1 ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5135 DTR-OCR4 ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5136 RTS-DCD,CTS ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5148 DRT-OCR4 ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5149 RTS-CTS ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5164 OCR4-ST ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

5165 TT-RT ERROR

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

■ Errors 60 - 66:

HP-IB OR CENTRONICS INTERFACE ERRORS

6000
Failed to complete non-destructive graphics test.

Suspects: a. Graphics PCA

6100
Failed complete graphics destructive test.

Suspects: a. Graphics PCA

6200
Non-destructive ROM test failure on the Graphics PCA.

Suspects: a. Graphics PCA

6300
Non-destructive Static RAM test failure on the Graphics PCA.

Suspects: a. Graphics PCA

6400
Destructive Graphics Controller test failure.

Suspects: a. Graphics PCA

6500
Destructive Dynamic RAM test failure on the Graphics PCA.

Suspects: a. Graphics PCA

6600
The Graphics PCA failed to create a self test image.

Suspects: a. Graphics PCA

Errors 80 - 86:

FRONT PANEL OPERATION ERRORS

8001
Character set errors at power-on possible invalid language ID read from character set ROM; possible high density character set ROM in normal density position.

Hints: Run self test 13 (DGL ROM Test). Verify the correct character set ROMs are installed.

Suspects: a. Character Set ROM
b. Control PCA

8002
Failed to receive cold start default flight time from the Encoder PCA

Hints: Run CE mode test 14 Reseat Encoder Cable

Suspects: a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

8003
Failed to receive cold start default offset time.

Hints: Reseat the Encoder cable Run CE mode test 14

Suspects:
a. Encoder Cable
b. Encoder PCA
c. Control PCA
d. Analog PCA

8004
Could not send default flight time to the Encoder.

Hints: Reseat the Encoder cable Run CE mode test 14

Suspects:
a. Encoder Cable
b. Encoder PCA
c. Control PCA
d. Analog PCA

8005
Could not send power-on default offset to the encoder.

Hints: * Reseat the Encoder cable Run CE mode test 14

Suspects:
a. Encoder Cable *
b. Encoder PCA
c. Control PCA
d. Analog PCA

8006
No character set ROM installed in ROM socket 1.

The wrong ROM is installed or is missing

Suspects:
a. ROM (U91)
b. Control PCA

8100
Slave self test select error using FINE ADJ UP key. Unable to communicate with the slave processor.

Hints: Note the self test number which caused the failure, if this is an I/O test number, replace the I/O PCA

Suspects:
a. Slave PCA (I/O PCA or Graphics PCA)
b. Control PCA
c. Front Panel

8200
Slave self test select error using FINE ADJ DOWN key.

Hints: See error 81-00 hints

Suspects:
a. Slave PCA
b. Control PCA
c. Front Panel

8300
Internal firmware self test table error.

Suspects:
a. Control PCA Firmware (ROM)
b. Control PCA

8430
Could not get flight time configuration from the Encoder.

Hints: Run self test 11 (Digital). Run self test 14 (Static Encoder).

Suspects:
a. Encoder
b. Encoder Cable
c. Control PCA
d. Analog PCA

8431
Could not get offset adjustment information from the Encoder.

Hints: Run Digital test (11). Run Static Encoder test (14).

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

8531
Could not sent offset adjustment information to the Encoder.

Hints: Run the Digital test (11) Run Static Encoder test (14)

Suspects:
a. Encoder PCA
b. Encoder Cable
c. Control PCA
d. Analog PCA

8601
Could not delink a packet.

Hints: Run Digital test (11) Run the appropriate I/O test

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

8602
Could not send packet to I/O.

Hints: See error 86-01.

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

8603
Error encountered on I/O.

Hints: See error 86-01

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

Errors 90 - 91: I/O SLAVE TIMEOUTS

9050
Failed to return self test description.

Hints: Run appropriate I/O test

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

9051
Failed to return from self test in the prescribed time.

Hints: Run appropriate I/O test

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

9052
Returned incorrect command.

Hints: Run appropriate I/O test.

Suspects: a. I/O PCA
b. Control PCA
c. Analog PCA

9053
Failed to delink packet.

Hints: Run appropriate I/O test.

Suspects:
a. I/O PCA
b. Control PCA
c. Analog PCA

9150
Failed to return self test description.

Suspects:
a. Graphics PCA
b. Control PCA

9151
Failed to return from self test in the prescribed time.

Suspects:
a. Graphics PCA
b. Control PCA

9152
Returned with an incorrect command.

Suspects:
a. Graphics PCA
b. Control PCA

9153
Failed to delink a packet.

Suspects:
a. Graphics PCA
b. Control PCA

PROTOCOL ERRORS

6-CF
System protocol errors communications errors between the printer and the host system.

Hints: Run Digital test (11) Run appropriate I/O test

Suspects: a. Control PCA
b. I/O PCA

Appendix B

Print Quality Problems 2562C 2563A/B/C

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PRINT QUALITY PROBLEMS

The following are some suggestions for detecting and/or correcting HP 2562C 2563A/B/C print quality problems.

DROPPED DOTS

Implications: Each print bar hammer prints across four character positions. Of the four characters printed by each hammer, often the inner two characters are dropped or printed lightly. This is most easily observed by inspecting underlines. Fading is usually abrupt!

Dropped dots

Suspects:
1) Platen Gap (Misadjustment)
2) Print Bar Wear
3) Analog PCA

Tests:

1) Adjust the platen gap by rotating the Platen Adjust Knob until all dots are of uniform darkness (a good check is to examine underlines). With 15 pound paper this should be 8 clicks from fully closed.

   If the platen is adjusted in as far as the Adjustment Knob allows, and the dots are still faded, re-adjust the Platen Setting (refer to paragraph 5-4).

   If the hammers rub against the paper before the dots are uniform proceed to Hint 2.

2) Closely examine the printed output. If the dropped dots tend to be only on one side of the paper, check the platen gap (one end of the platen may have a smaller gap than the other end).

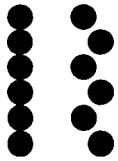
3) Examine the printed output. If the dropped dots appear on alternate hammers (disregarding the first four hammers), the source of the problem is probably the Analog PCA.

4) If the platen gap is verified correct, examine the hammers. If some hammers stick out farther than others, the print bar is probably the source of the problem; replace the print bar.

DOT SLALOM

Implications: The horizontal positioning of vertical dot columns varies from dot row to dot row (see example below).

Ideal Dot slalom



Suspects:
1) Platen Gap misadjusted
2) Flight time incorrect
3) Offset time incorrect
4) Print Bar

Tests:

1) Use the Platen Adjust Knob to alter the platen gap. Inspect the printed output to determine if the slalom problem is being corrected. If NOT, proceed to Hint 2. Ideally, there should be no dot slalom problem, the hammers should not rub against the paper and no dots should be dropped.

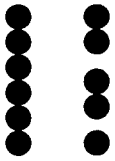
2) Remove the paper and ribbon from the printer. Using a feeler gauge, rotate the Platen Adjust Knob to set a platen gap of 0.013 inches. Reload the paper and ribbon in the printer. Adjust the Hammer Flight Time (refer to section 5-5 of this manual). If the slalom problem does not go away by varying the Flight Time, proceed to Hint 3.

3) Alter the Hammer Offset Adjust value (refer to section 5-5) If altering the offset value does not correct the dot slalom problem, the print bar may need to be replaced. If the print bar is replaced, ensure that the hammer flight time and offset parameters are set to their nominal values (see table 5-6).

DOT BUNCHING

Implications: If the paper stepper does not move the paper the same distance between every dot row, the dots in vertical lines will appear bunched and then widely spaced, as shown below.

Ideal Dot bunching



Suspects:
1) Paper tension is too high
2) Analog PCA
3) Stepper motor

Tests:
1) Check the paper tension. If it is too high try backing out the platen using the adjustment knob and check the tension again. If the paper tension is still too high, loosen the paper tension as outlined in the Operator's Manual.

The paper tension can be checked in two ways:

1) Check the holes in the paper for excessive deformation.

2) Remove the paper from the tractors and pull the paper through the printer by hand. Compare the tension of the printer with dot bunching to a printer that is working properly.

Be sure to check the paper path for obstructions before taking the mechanism apart to adjust the paper tension. Its not uncommon for debris (especially sticky labels to plug the paper path.

DOT UNIFORMITY

Implications: Some dots appear lighter or smaller than those near them.

Suspects:
1) Platen misaligned
2) Analog PCA
3) Print Mechanism (print bar not moving parallel to the print mechanism).

Tests:
1) If dots fade from light to dark over the entire length of the print bar (as opposed to fading over the four character range of each hammer) the platen gap may be wider at one end of the print bar. Reset the platen gap.

2) If BANDS of light print .4 inches wide (four characters) appear in the text on alternate hammers, the Analog PCA is probably at fault.

3) If the DOTS fade from light to dark over 0.4 inches of print (four characters), the print bar is probably not moving parallel to the platen. If such a problem exists, replace the print mechanism.

VERTICAL CHARACTER COMPRESSION

DOT SCRUNCH

Implications: Vertical space between dots are compressed irregularly. This could be a result of the stepper motor not moving the paper the same distance between each dot row.

Suspects:
1) Paper tension is too high.
   See Service Note 2563A-07.
2) Analog PCA
3) Spline shaft collar
4) Stepper Motor

Tests:
1) The paper tension may be checked by:
   a) Examining the paper tractor holes to look for excessive deformation. If deformation is pronounced on one side check for foreign substance in paper path. See Service Note 2563A-07.
   b) Removing the paper from the tractors and then manually pulling the paper through the printer.

2) If paper tension is excessive, rotate the Platen Adjust Knob to open the platen gap.

   Verify that there are no obstructions in the paper path (debris, sticky labels, etc.).

3) If the paper tension guide plate appears warped the print mechanism may need to be replaced.

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Appendix C

Test Point Diagram 2562C 2563A/B/C

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TESTPOINT DIAGRAM

The testpoint connector shown below (J500) is located on the Analog/ Backplane PCA and provides the service representative convenient access to the printer's voltages and clocks.

* The +2.5 Volt Reference Supply testpoint is not found on the Rev. B versions of the Analog/Backplane PCA or greater.

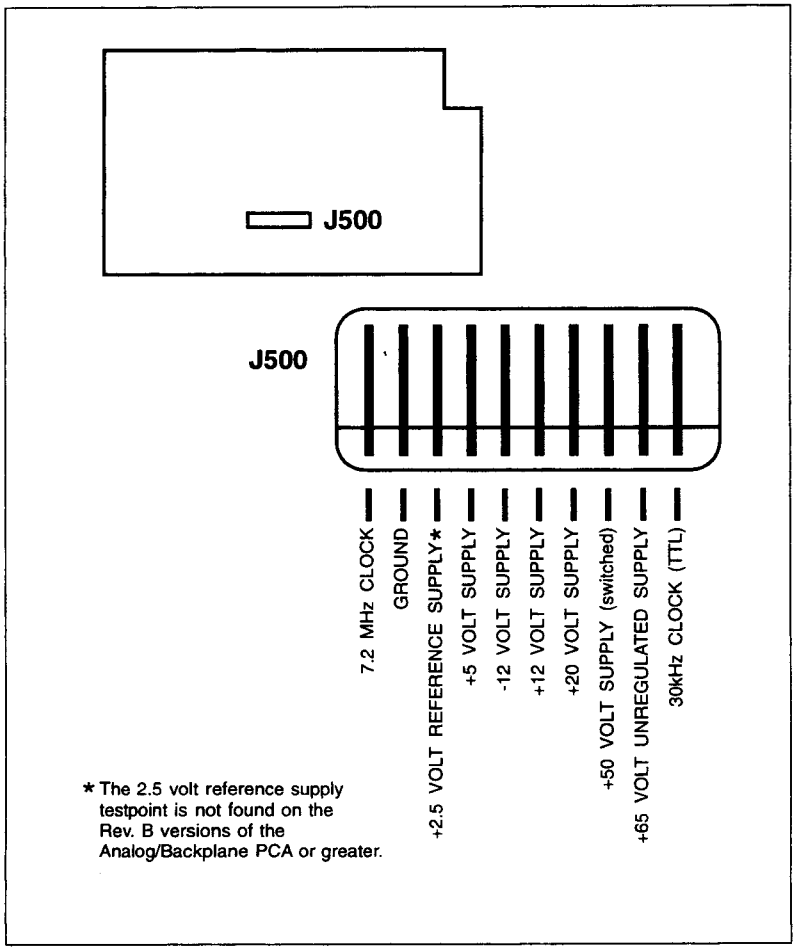

Figure C-1.

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Appendix D

Anzac Support Supplement 2562C 2563A/B/C

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ANZAC SUPPORT SUPPLEMENT

Anzac Computer Equipment Corp. is one of Hewlett-Packard strategic partners. They OEM (original equipment manufacture) the Guadalajara family of printers (256X & HP2300) and resell them into the IBM system environment. The Anzac printers are designed to emulate an IBM 4214 model 2 printer or IBM 5225-1 printer and connect to the IBM System AS/400 and IBM systems 34, 36, 38. Anzac changes the HP front panel logo and inserts two IBM twinax boards (interface and backpanel) into the 256X & HP2300 transforming the HP printer into the "Anzac Shuttle Matrix Printer". Anzac also uses the HP Super Centronics PCA not the standard HP Centronics PCA. The Anzac 5080-2 and the Anzac 5011 are being shipped with the Super Centronics PCA or the Multiple I/O depending on the customer's needs.

All Anzac printers come with a 90 day on site warranty from GPR. The response time in a warranty call is next day for travel zones 1, 2 and 3 or more for other zones (see Worldwide Customer Support Travel and Office Directory, P/N 5091-2356E). All warranty is coded 02N and billed back to GPR (DO NOT use 02Y or bill to DIV 5060). The warranty does not cover installation; customers will be charged for this. Technical assistance for printer problems is available through the response centers. Technical assistance for the Anzac/IBM interface is available through the Anzac support desk at 1-800-223-9673, or, if outside the USA, you can dial Anzac direct at (415)475-4600 and ask for the support desk.

NOTE

You must call the Anzac support desk before going on site and you must close the call with the Anzac support desk before leaving the customer's site. Always keep the Anzac support desk informed of the customer's status. Anzac is your customer not the end user. Address all customer issues to the Anzac support desk.

THE ANZAC SUPPORT DESK IS MANNED 0500 hrs to 1700 hrs MONDAY THRU FRIDAY PACIFIC COAST TIME.

For Anzac support issues or Anzac escalations you can contact the Anzac Account Team, for USA accounts only:

Anzac Account Manager: Don Robinson, 510/460-1667, telnet 460-1667
Anzac Escalations: Larry Brasesco, 415/694-2118, telnet 694-2118

Anzac Support Supplement

The Hewlett-Packard/Anzac printer comparison is listed below in table 1.

Table 1. HEWLETT-PACKARD/ANZAC PRINTER COMPARISON LIST

HP PRINTER	ANZAC PRINTER	PRODUCT DESCRIPTION
2562C	ANZ5030	300 LPM
2563B/C	ANZ5040	420 LPM
2564B/C	ANZ5080	840 LPM
2566B/C	ANZ5012	900/1200 LPM
2567B/C	ANZ5016	1200/1600 LPM
C2354A	ANZ5080-2	840LPM
C2356A	ANZ5011	1100LPM

Unique Anzac PCA switch setting and parts are listed in the following sections.

Table 2. ANZAC FORMATTER MASTER FIRMWARE LIST
All PROMS must be labeled as shown below

5030/5040	5080	5012/5016	5080-2	5011
63-250 U125 3305 8E6D	64-231 U13 2938 EBC7	66-406 U12 2928 7889	33422-67901 U191 3322 E7FB	C3206-67901 U191 3322 E716
63-251 U115 3305 660A	64-232 U33 2938 6CDC	66-407 U11 2938 E322		
63-252 U105 3305 F291	64-233 U63 2938 EFF5	66-408 U32 2938 4231		
63-253 U95 3305 18EA		66-409 U31 2938 3050		

Table 3. UNIQUE ANZAC PARTS BREAKDOWN

ANZAC P/N	DESCRIPTION	MODELS
ANZX0310003	Anzac Twinax I/F PCA	All except 5080-2 / 5011
ANZ-0310003FMK	Firmware for interface. **The Anzac Twinax I/F and the interface firmware must be ordered together**	All except 5080-2 / 5011
ANZX0310042	Anzac Twinax I/F PCA. * No firmware on new interface. IBM printer model number is downloaded from the host.	5080-2 / 5011
ANZ-0300016	5 position power harness for Analog revision 3046 and below. Wires must be soldered to Cap on Analog Board.	5030/5040/5080
ANZ-0300046	5 position power harness for Analog revision 3046 and above. Plug-in connector.	5030/5040/5080
ANZ-0300018	36 pos cable assy	all
ANZ-0300028	Backpanel assy	5012 / 5016
ANZ-0300015	Backpanel assy	5030/5040/5080
ANZX0300059	Backpanel assy	5080-2 / 5011
ANZ-1300010	Mounting plate	5030/5040/5080
ANZ-1300084	Mounting Plate	5080-2 / 5011
ANZ-1200007	3/16" Adj. standoff	all (4)
ANZ-0300023	Power harness	5012 / 5016
ANZ-2400025	Label, Anzac	5040
ANZ-2400026	Label, Anzac	5016
ANZ-2400027	Label, Anzac	5012
ANZ-2400028	Label, Anzac	5080
ANZX2400037-5080-2	Label, Anzac	5080-2
ANZX2400037-5011	Label, Anzac	5011
ANZ-0300019	60 pin assy (QMS opt. only)	5040 /5080

Table 3. UNIQUE ANZAC PARTS BREAKDOWN

ANZAC P/N	DESCRIPTION	MODELS
ANZ-1300064	CKT board spacer 5/8" (x2), QMS	5040 / 5080
ANZ-1300065	Nylon 632 hex nut (x4), QMS only	5040 / 5080
5062-1754	HP Super Centronics (new)	all
26067-69081	HP Super Centronics (rebuilt)	all
C2356-30101	Multiple I/O PCA	5080-2 / 5011
02566-60036	Anzac Formatter PCA. This PCA is loaded with Anzac firmware less character sets.	5012 / 5016
02566-69030	HP Formatter PCA See Table 2 for unique firmware	5012 / 5016 2566/67B
02563-69021	Anzac Formatter PCA. This PCA is loaded with Anzac firmware less character sets.	5030 / 5040
02563-69015	HP Formatter PCA See Table 2 for unique firmware	5030 / 5040 2563B
02564-69021	Anzac Formatter PCA. This PCA is loaded with Anzac firmware less character sets	5080
02564-69012	HP Formatter PCA See Table 2 for unique firmware	5080 / 2564B
4175006-QMS 4382022-QMS 02563-90974 26062-90902	HP Label Card (NEW) HP Label Card II (NEW) Label Card II Handbook Label Card Handbook	all (obsolete) all all all
26062-69101	HP Label Card (rebuilt)	all
33422-60001 C3206-60002	Anzac Formatter Anzac Formatter	5080-2 5011

Table 4. HP LABEL CARD. ANZAC TYPICAL CONFIGURATION

ORIGINAL HP LABEL CARD 256X & HP2300		FUNCTION NUMBER	HP LABEL CARD II 256X only *
JUMPER SETTING	FUNCTION SETTING		FUNCTION SETTING **
JW1 2,3	0 (No HP Label Card Installed)	80	0 (No HP Label Card Installed)
JW2 2,3	1 (HP Label Card installed)	80	1 (HP Label Card installed)
JW3 2,3	1	81	1
JW5 2,3	0	85	0
JW7 1,2	04	86	0
	10	87	0
	13	88	10
	11	89	00 5030/5040 01 5080/5080-2 10 5012 11 5016

* To configure HP Label Card II on the HP2300 refer to the proper manual, P/N 02563-90974. Anzac typical configuration for HP2300 in next edition.

** No jumpers on Label Card II.

Table 5. HP SUPER CENTRONICS 5062-1754 / 26067-69081
Hardware 8 Pin Dip Switch Setting and Front Panel Configuration

DIP SWITCH #	DIP SWITCH SETTING
1	on
2	off
3	off
4	off
5	off
6	off
7	off
8	off

FUNCTION SETTINGS
20 = 0
21 = 0
22 = 0
23 = 0
24 = 0
25 = 0
26 = 11
27 = 0
28 = 0
29 = 0

NOTE: Anzac typical configuration for the Multiple I/O will be included in the next edition.

TROUBLESHOOTING THE ANZAC INTERFACE

Twinax basics:

The Anzac printer is connected to the IBM System via the twinax interface and cable. Anzac printers use two type of cable assembles from the IBM System:

1. Twinax cables daisy chained from the IBM channel through a maximum of seven devices (0 thru 6) not to exceed 5000 ft.

2. Twisted Pair (phone lines), connected from the IBM channel via a balun (transformer) into a .5 foot twinax cable to the back panel of the Anzac printer. The twinset will only support 7 devices (0 thru 6). This configuration may be daisy chained together, but it is usually in a star configuration from a patch panel.

The specific device number is setup through the Anzac back panel switch (0 thru 6). Switch position #7 is used to select the Anzac interface selftest.

CAUTION

It is very easy to bump the back panel device select switch and change the printers configuration. Always check the position of the switch with the printers position on the daisy chain to avoid unnecessary troubleshooting time.

System commands: IBM vs. HEWLETT-PACKARD

In the Hewlett-Packard system environment you can ask the operator to down a particular device (down 6), Or, you can ask the operator to stop the spooler (stopspoolfile 6). In the Anzac / IBM environment you can do the exact same thing by using the IBM terminology (Table 6).

Table 6. SYSTEM COMMANDS

Hewlett-Packard	IBM
Down (#)	Vary Offline (#)
UP (#)	Vary Online (#)
Stopspoolfile (#)	Endwtr (#or discpt)
Startspoolfile (#)	Strprtwtr (#or discpt)

CAUTION

Never disconnect the printer's twinax or twisted pair without making sure the operator has ended the writer and varied the printer offline. Failure to insure that the printer is offline and the writer is stopped will result in taking down the rest of the devices on that channel. The operator will have to up all the devices on the daisy chain, not a pleasant task.

RUNNING PRINTER SELFTEST:

You have available to you two types of selftest:

1. Front Panel Selftest
2. Anzac Back Panel Selftest.

The front panel test is run with the printer in the Offline position. There are several printing and non-printing selftests available. The front panel selftest can be run anytime as long as the printer is in the offline position.

NOTE

Before running the Anzac selftest mark down the present device address and make sure the operator has stopped the IBM system writer (Endwtr).

The Anzac back panel selftest is enabled by turning the printer off, setting the printers back panel device select switch to #7 (refer figure 1) and turning the printer on. This will test 90% of the Anzac interface back into the printer.

The test will also give you the following information:

1. Provide you with a sliding alpha test pattern for print quality issues.
2. Firmware revision

HP41.D = IBM 4214 model 2 emulation
HP51.D = IBM 5225-1 emulation

You can then use this information to make sure the IBM system configuration matches the Anzac printer emulation. The operator or system administrator should have the system configuration.

ANZAC BACKPANEL ASSEMBLY

The Anzac back panel assembly can give you a quick snapshot of what is going on with the IBM system. The Parity, Sync, and the Printer lights (refer figure 1) will help you determine the present state of the printer.

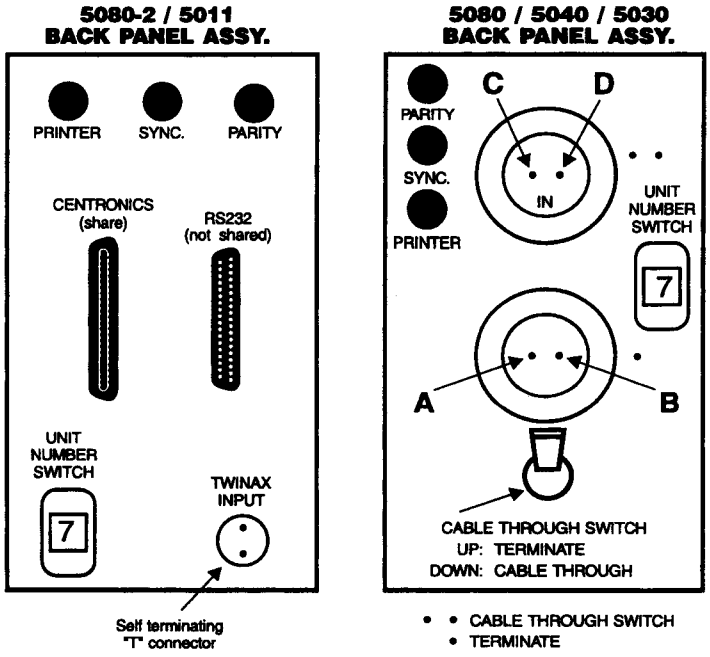
Parity light: Parity light must be off for proper operation. If the parity light is illuminated then the Anzac printer is having trouble seeing the system. If parity light is on look away from the printer back to the system. The printer is receiving or has received an incorrect packet. Possible bad data cable (twinax cable or phone line). Possible poor connection between Anzac backpanel and Anzac interface board in the printer.

Sync light: The sync light must be illuminated for proper printer operation. If the sync light is flashing the Anzac interface has looked for a poll and has not received it. With sync light flashing look for a bad cable connection in the daisy chain path back to the IBM channel or patch panel.

Printer light: The printer light must be off for proper printer operation. The printer light is tied to the printers fault line. The printer light will be lit if the printer is out of paper, or a fault condition exists (error12, 14-50). Correct the printer fault condition.

Cable thru switch — If the Anzac printer is device #6 or the last device on the channel the switch must be up (terminated). If the Anzac printer is not the last device on the channel then the switch must be down (cable thru).

Power on: — On power-on all three back panel lights will illuminate for ~ 1 second. If any of the lights fail to come on within that brief moment you have a defective LED.



CAUTION

It is easy to bump the switch while moving the printer. If you change the switch setting you will down all the devices past yours. Again the operator will have to up all the devices you have downed.

You can check the Anzac back panel assembly for continuity. This test will check out the continuity between the back panel and the Anzac interface board and cable. Figure 1 shows all the test points needed for this final test. Compare the values with table 6 below.

Table 6.

TEST POINTS	TERMINATE	CABLE THROUGH
A - B	OPEN	OPEN
A - GND	OPEN	OPEN
B - GND	OPEN	OPEN
A - C	OPEN	<2 ohms
B - D	OPEN	<2 ohms
C - D	110 ohms	OPEN
C - GND	54.9 ohms	OPEN
D - GND	54.9 ohms	OPEN

DEVICE ADDRESS SEVEN TEST

To enter the Device 7 test, turn the printer off, change the device switch to address 7, and turn the printer on again. The Device 7 test should be used when installing printers for the first time. Successful completion of a Device 7 test indicates that the Anzac Interface PCA is receiving power, and that the board is communicating with rest of the printer. It DOES NOT mean that the printer is receiving data from the computer system(s).

A successful Device 7 test also indicates the following:

1. **The Firmware Revision Number and Checksum.**
   The firmware revision number identifies the type of code on the Anzac Interface PCA. The checksum identifies the code based on numeric characteristics. Unless the code has been write protected, the printer's checksum will change whenever the printer is used.

2. **Config Bytes.**
   The configuration byte settings are used to make changes to the printer's setup. Due to the constant changes in functionality, access to these configuration bytes is limited to programming support. Customers may be given information about the configuration bytes only in very special cases.

3. **Page Count And Line Count.**
   This option is enabled or disabled based on whether or not the Anzac Interface PCA's firmware has been write protected.

4. **The System Emulation.**
   This is the emulation which the minicomputer system uses to identify the printer. System emulations commonly being used are 3812, 5225 and 4214.

5. **Virtual Printer Type And Protocol.**
   This identifies the printer language used by the printer engine. Commonly used printer types are HP Laser and 9/18 pin, which respectively use PCL5 and Epson FX protocol. Advanced programmers may want to access such protocols in order to utilize special printer functions.

6. **The Character Set.**
   A description of the accessed printer character set.

7. **Available Fonts According To GFID.**
   Fonts listed according to their GFID numbers vary according to the amount stored inside the printer. Repetition of font styles is common and often intentional, because many fonts have more than one GFID number assigned to them.

VOYEUR MODE

Printers with the Anzac Interface PCA include a self diagnostic tool called Voyeur mode. It is similar to Hex Dump provided by many printers. However, Voyeur mode allows the user to analyze the data being sent to the printer, instead of the data that has been converted by the Anzac Interface PCA. Voyeur mode prints the exact IBM system commands being used, as well as their Hexadecimal equivalents.

Retrieving a Voyeur Mode Test is often the first step in diagnosing a problem unit. If possible, retrieving a Voyeur along with an equivalent Hex

Dump test will provide Programming Support the clues to determine whether a problem is hardware or firmware related. Whereas entering Hex Dump mode is a different process from printer to printer, entering Voyeur Dump Mode requires the following steps:

1. Turn the printer off and on.

2. Change the device setting switch using one of the switch's buttons until the device switch is again at its original value.

3. The system operator must now send the file or print job which needs to be analyzed.

To exit Voyeur mode, make sure the device switch setting is still set to its original value. Turn the printer off and on.

Appendix E

Paper Specifications

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This appendix provides specifications for selecting continuous form paper appropriate for use in the HP 2562/63 Printers. This section also identifies ribbon specifications. These specifications are intended to ensure that the highest quality print and reliability of the printer are maintained and are not intended to recommend a specific brand of paper or ribbon.

PRINTER OVERVIEW

The HP 2562/63 Printers use dot-matrix technology which allows a high degree of printing flexibility. The printing mechanism in this family of printers is a printbar containing 33 hammers; one hammer printing 4 characters (at 10 characters per inch). The printbar oscillates horizontally to allow dot placement in any allowable dot positions across the page. Dot-matrix technology provides flexibility to adjust character formation, allowing multiple languages, line draw characters, special characters and graphics images to be printed.

DOT-MATRIX VS. FULL-FONT PRINTERS

A major difference between dot-matrix printers and full-font printers is the print gap, the distance between the print hammer in its retracted position and the platen. While the hammers of full-font printers fire only once to form an entire character, the hammer of a dot-matrix printer fires an average of 13 times per character and as many as 26 times to form a standard-density character. The high-repetition rates that dot-matrix hammers are required to operate at requires a significantly small print gap. Figure D-1 gives a comparison of typical dot-matrix and full-font print gaps.

For most standard paper and multi-part forms, the smaller print gap of dot-matrix printers does not present any problems. However, some specialty forms may cause unacceptable paper jam rates and/or print smearing even though they perform satisfactorily in full font printers. This paper specification guide will help you identify and purchase paper that will perform well in your Hewlett-Packard Printer. This guide will help you work with your forms vendors in designed and or purchasing forms that will give you optimum print quality and stacking in your printer.

NOTE

Always test your paper and forms prior to purchasing a large quantity for proper print quality, feeding and stacking.

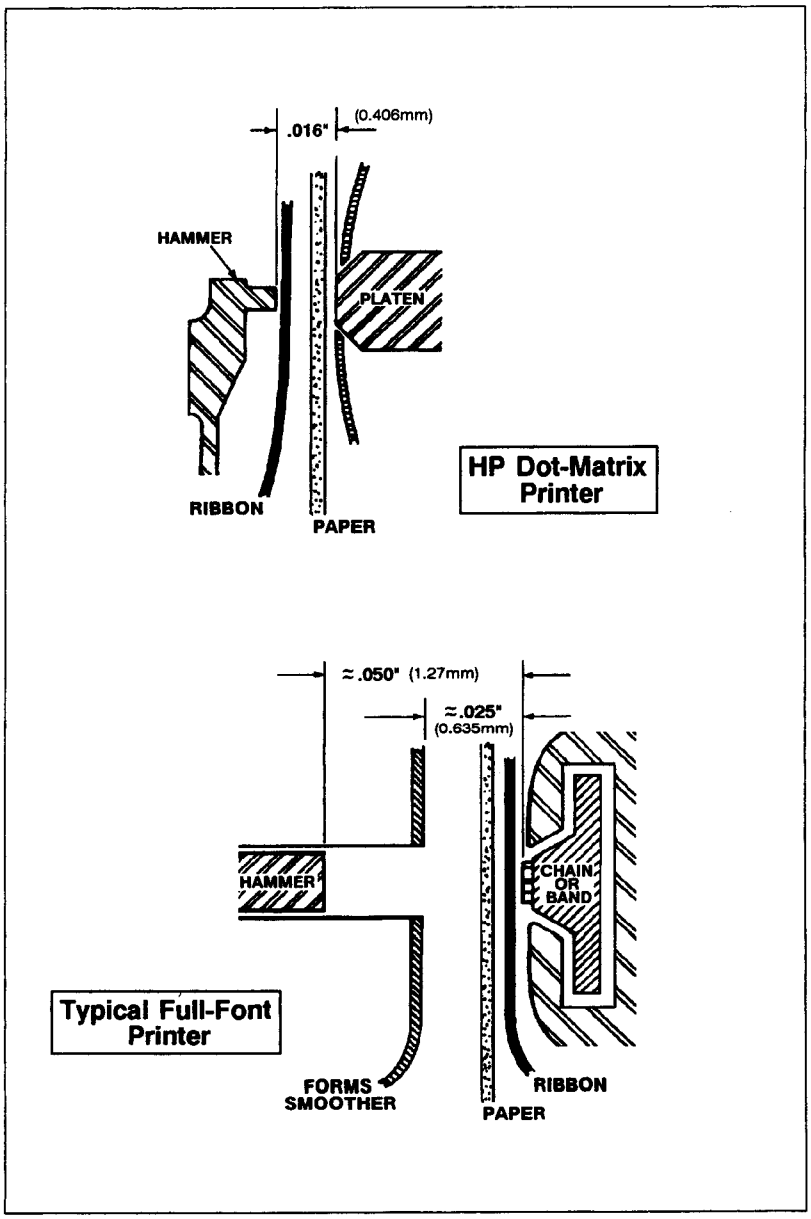

Figure E-1. Dot -Matrix and Full-Font Print Gap Comparison

GENERAL PAPER REQUIREMENTS

The printer uses continuous fan-fold edge-perforated paper varying in width from 3.0 inch (7.62 cm) to 16.7 inch (42.4 cm). Although the printer accepts paper as wide as 16.7 inches, the farthest right it can print is 14.6 inch (37.0 cm). It will handle paper weights in the range of 15 to 100 pound (18 - 60 pound optimum). Multi-part forms up to six parts may be used with a maximum overall pack thickness of 0.024 inch (0.61 mm).

If paper is to be used in humidity extremes (greater than 55% or less than 20%) it should first be tested. Paper to be used at high humidity should be tested for satisfactory feeding, handling and stacking. Paper to be used at low humidity should be tested to determine if static buildup must be eliminated for proper stacking.

In general, any special application paper, such as multi-part forms, labels, etc. should be tested in the printer prior to purchase.

PAPER SPECIFICATIONS

This section describes the paper specifications which must be met to ensure optimum performance of the printer.

Hewlett-Packard conforms to ANSI standard X3.96-1983, "American National Forms Information Systems for Continuous Business Forms", and ISO Recommendation No. 2784, which cover common form widths and depths, standards for sprocket feed holes and margins, as well as other basic tolerances.

All measurements should be made at 20 to 26 degrees C (68 to 78 degrees F) and 45 to 55 percent relative humidity.

STANDARD FORMS SPECIFICATIONS

The Hewlett-Packard 2562/63 Printers were found to perform adequately with forms that meet the following specifications:

Paper Sizes:

Maximum form width	16.75 in (42.5 cm) edge-to-edge
Minimum form width	3.0 in (7.6 cm) edge-to-edge
Maximum left margin	1.4 in (3.6 cm)
Maximum right margin	1.4 in (3.6 cm)
Maximum printing width	13.2 in (33.5 cm)
Maximum form length	12.0 in (30.5 cm)
Minimum form length	2.0 in (5.1 cm)

Paper Weights:

- **Single-part:**

Standard	15 to 100 pound	(57 - 380 gm/sq meter)
Optimum print quality	18 to 80 pound	(68 - 304 gm/sq meter)
Optimum paper stacking	20 to 80 pound	(76 - 304 gm/sq meter)

- **Multi-part forms:**

Carbons Paper:	12 pound (46 gm/sq meter) up to 6 total pages
Carbons:	8 pound (30 gm/sq meter) up to 6 total pages
Pack Thickness:	Maximum .024 inches (0.61 mm) total
Carbonless:	Up to 4 part forms

Standard line printer paper purchased from Hewlett-Packard meets the above specifications and will perform well in the printer. Many other papers purchased from other sources will also provide satisfactory results. For forms other than single-part or simple carbon-type multi-part forms, refer to the next paragraph, "Specialty Forms Specifications". The forms used in the printer should not vary in thickness across the printable surface. If paper is to be used in humidity extremes (greater than 80% or less than 20%), it should first be tested. Paper to be used at high humidity should be thoroughly tested for satisfactory feeding and handling. Paper to be used at low humidity should be tested to determine is static buildup must be eliminated for proper stacking.

SPECIALTY FORMS SPECIFICATIONS

Due to the variations in manufacturing processes, quality, and composition of forms, Hewlett-Packard cannot guarantee satisfactory performance with all paper and forms. This section of paper specifications is intended to familiarize and alert the user to some of the characteristics of specialty forms which may cause unsatisfactory performance of the printer. This paper specification is NOT intended as a substitute for actual testing.

NOTE

All specialty forms, including special single-part paper, multi-part forms, forms with glue strips, carbonless forms, card stock, and labels should be tested for satisfactory feeding, registration, and print quality prior to purchase.

RECYCLED PAPER

Recycled paper is a combination of **waste paper, pre-consumer waste,** and **post-consumer waste.** Printed paper is usually washed to remove most of the inks and other contaminants. A recycled sheet of paper may contain dark specks or appear gray or dirty. You should choose a recycled paper that meets the same specifications as standard paper and that has an appearance suitable for your needs. Hewlett-Packard recommends that recycled paper contain no more than 5% **groundwood.**

FORM THICKNESS UNIFORMITY

Because of the small print gap in dot-matrix printers, they are less tolerant of form thickness variations than are full-font printers. Sometimes these thickness variations can be caused by defects such as bubbles or wrinkles. Other times they are due to varying paper composition or the number of parts within the form.

Nominal differences in thickness and compressibility make it impossible to specify allowable thickness variations exactly. The following cases are intended to serve as a guide, but all forms with thickness variations must be tested for satisfactory performance. (In the following cases, T = maximum thickness.)

Case 1: Form Defect

In order to avoid hammer dragging, the overall thickness of a form plus any defects should be no more than as shown in Figure E-2 (.015+T/2) inch.

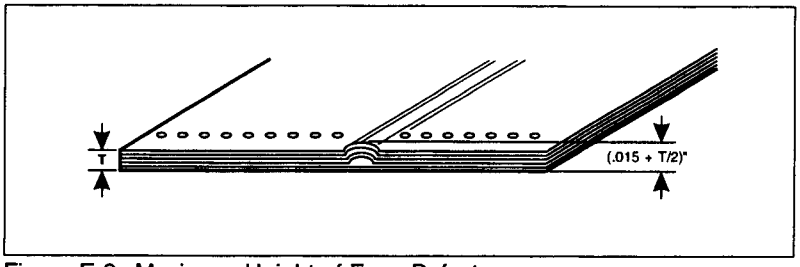

Figure E-2. Maximum Height of Form Defects

Case 2: Varying Thickness Forms: Printing on All Areas.

In order to ensure satisfactory print quality on all areas of the form, the difference in thickness between the thickest and thinnest section of the form should be no more than .008 inch (as shown in Figure E-3). The print gap should be adjusted to optimize print quality on all thicknesses of the form. Since dot-matrix printing is optimized when printing at one gap size, print quality can in some cases be compromised when printing on forms of varying thickness. This is especially true on the copy sheets of multi-part forms. When printing on forms of varying thickness, the maximum depth of depression defects on the thick part of the form is also .008 inch.

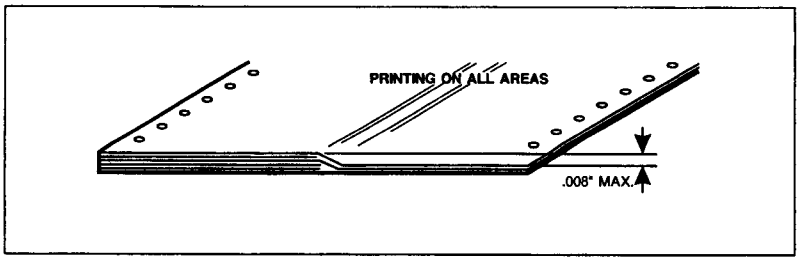

Figure E-3. Maximum Thickness Variations for All Areas of a Special Form

Case 3: Varying Thickness Forms: Printing on Thin Area.

In order to avoid smearing on the thickest area of the form when printing on the thin area only, the difference in thickness between the thinnest area and the thickest should be no more than as shown in Figure E-4 (.015-T/2) inch. For forms with larger variations in thickness, the print gap may be opened beyond the optimum gap to reduce smearing, but print quality on the thinner areas will degrade accordingly.

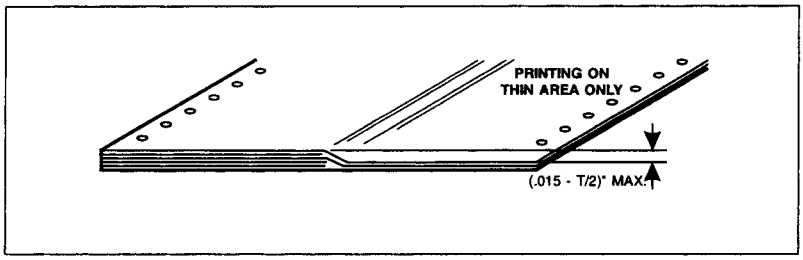

Figure E-4. Maximum Thickness Variations for the Thin Areas of a Special Form

Case 4: Varying Thickness Forms: Printing on Thickest Areas.

In this case, as long as the thickest area of a form does not exceed the specifications listed (see "Paper Weights" page E-6), there is no lower limit to the thickness of the thinnest area as long as it is sufficient to support the form as it is fed through the printer.

PERFORATION PROJECTION

The perforation projection (perforation tent) is measured by laying the form on a flat surface as shown in Figure E-5. Perforation projections exceeding the value shown (.015+T/2 inch) can result in excessive smearing at the perforations and/or an unacceptable jam rate. This is because the perforations may snag on the hammers as the paper slews through the print area. Opening the print gap will reduce smearing or jamming, but may also degrade print quality.

Paper crimps should not come loose and tails should not be showing. If these occur they will catch on the inward fold and cause paper jams.

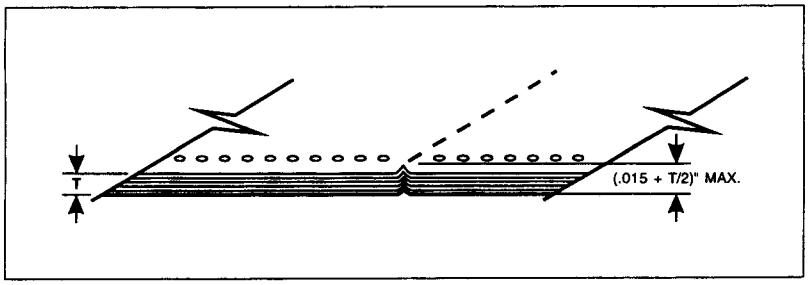

Figure E-5. Maximum Allowable Form Perforation Projection

OTHER SPECIAL FORMS

Forms with windows, cutouts, flaps, or attached cards, and other specialized forms may jam excessively in the printer. The only way to ensure satisfactory performance of these forms is to test them thoroughly before purchase.

LABELS

Most standard labels work well in the printer as long as they meet the specifications outlined in the section "Standard Forms Specifications". However, due to variations in the label products offered, all labels should be tested for satisfactory performance before purchase.

CARBONLESS FORMS

When using carbonless forms, poor print quality can be a result of the forms. The following considerations can result in poor print quality:
If shelf life of the form is past, if the chemical coating on the form is not distributed evenly, and certain chemicals have longer developer times. A 24 hours development time is usual for carbonless forms after printing.

CONCLUSION

Since it is impossible to test all possible form types available for use in the printer, Hewlett-Packard recommends that paper conform to the specifications outlined in this document for optimum printer performance.

Table E-1. RECOMMENDED PRINTER PAPER

Part No.	Description	Quantity
92157A	One-part, white, 9.5 x 11 in 18 lb bond	2400 sheets/box
92157C	One-part, white, 9.5 x 11 in 20 lb #1 bond	2400 sheets/box
9320-1515	One-part, blue bar, 14.9 x 11 in 18 lb, 132 column	2400 sheets/box

Once again, this paper specification is NOT intended as a substitute for actual testing. ALL SPECIALTY FORMS, INCLUDING SPECIAL SINGLE-PART PAPER, MULTI-PART FORMS, FORMS WITH GLUE STRIPS, CARBONLESS FORMS, CARD STOCK, AND LABELS SHOULD BE TESTED FOR SATISFACTORY FEEDING, AND PRINT QUALITY PRIOR TO PURCHASE. For the best results in selecting standard or specialty forms, consult a forms vendor who can ensure conformance to these specifications and can recommend cost-effective purchases.

PAPER STORAGE AND HANDLING

Since the performance of the printer is dependent on the condition of the paper used, the following recommendation for packaging, handling and storing are included in this document.

PACKAGING

To avoid damage during handling, top and bottom fillers should be used in continuous paper cartons to hold the stack firmly in place. Because the physical condition of the paper affects printer reliability, proper packaging ensures that the paper remains flat and is not damaged along the edges.

Paper Specifications

STORAGE

Do not store cartons directly on the floor, and do not stack more than six high. Each carton should be set upright squarely on the one underneath. Placing additional weight on top of the stack of cartons can damage the paper.

ENVIRONMENTAL CONSIDERATIONS

Since performance is affected by environmental conditions, paper should be protected from temperature and humidity extremes (as listed in the next section).

PRECONDITIONING FORMS

Paper should be stored in an environment similar to the printer's controlled environment for 48 hours prior to use. This conditioning allows moisture content in the paper to stabilize. HP 2562/63 Printers are intended for operation in a controlled environment. This environment consists of temperatures 10 to 50 degrees C (50 to 122 degrees F) with a relative humidity of 30% to 80% non-condensing. For best results, however, the cartons should be stored and used at 18 to 24 degrees C (65 to 75 degrees F), with a relative humidity of 40 to 50 percent.

In the event the printer is in an environment subject to extremes of relative humidity or temperature, it may be necessary to store the forms in a controlled environment and withdraw them on an as-needed basis.

SHIPPING

When paper is shipped through different environments, the entire stack of cartons on the pallet should be plastic wrapped. When shipping across bodies of water, individual cartons should be wrapped as well.

Appendix F

Service Notes

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