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PRODUCT INFORMATION

A. PRODUCT DESCRIPTION

The HP 9871A is a full-character, serial impact printer. The platen accommodates paper up to 381mm (15 in.) wide. The 9871A prints a standard 132 columns at 10 characters/inch; however, character and line spacing can be defined to increase or decrease the number of characters per line. The 98 character interchangeable print disc provides full-character impact on the fixed carriage.

Bidirectional motions of the platen and print mechanism provide plotting capabilities for charts and graphs. Programmable tabulation, both horizontal and vertical, simplifies plotting and form filling.

B. PRINTING LIMITS

Maximum printing is recommended to not exceed two hours per day.

Up to six-part forms are supported (using 98021A form-feed mechanism) as long as the maximum pack thickness does not exceed 0.5mm (0.020 in.).

C. OPTIONS

9871A OPTION	DESCRIPTION
-001	HP-IB Interface
-010	9810A Compatible
-015	9815A Compatible
-020/021	9820A/9821A Compatible
-025	9825A Compatible
-030	9830A/B Compatible
-031	9831A Compatible
-035	9835A/B Compatible
-045	9845A/B Compatible
-240	264X Compatible
-800	European Character Disc
-801	ASCII Character Disc
-802	Katakana Character Disc
-803	Cyrillic Character Disc
-804	APL Character Disc
-888	Refurbished Unit

98032A OPTION	
−071	9825A Interface
−171	9831A Interface
−371	9835A Interface
−471	9845A/B Interface

D. PERFORMANCE SPECIFICATIONS

Speed

Average text line at 10 characters/inch ..... 30 character/s
Carrier return or tab, full length ..... 325 ms
Line feed – 4.23mm (0.167 in.) ..... 50 ms

Paper

Platen feed, single sheets max. recommended sheet thickness ..... 0.13mm (0.005 in.)
Pin feed, single part (with 98021A form-feed mechanism) ..... 0.13mm (0.005 in.)
Pin feed, multiple parts (with 98021A form-feed mechanism) ..... 2 to 6 parts
Max. recommended pack thickness 0.5mm (0.018 in.)

Paper Width

Minimum ..... 50mm (2 in.)
Maximum ..... 381mm (15 in.)

Character/Line Spacing

Character Font size ..... Courier 10
Characters per inch ..... Variable (Normal = 10 CPI)
Lines per inch ..... Variable (Normal = 6 LPI)

Power Requirements

Source (+5%, −10%) 100V
(switch selectable) 120V
220V
240V
Frequency ..... 48Hz to 66Hz
Consumption ..... 1.9A @ 100V
1.7A @ 120V
740ma @ 220V
840ma @ 240V
200 W (printing)
60 W (non-printing)

Environmental Range

Temperature ..... 0°C to 45°C
Relative Humidity ..... 5% to 95% (noncondensing)
Storage Temperature Range ..... −40°C through +60°C

Operating Controls

Power on-off switch
Self-test, push-button switch
Print-intensity adjustment switch
Safety interlock (stops printing when access cover is removed)

Buffer

158 characters – Automatically fills if characters are received faster than print rate. Status line indicates when 16 characters are left in buffer. The buffer may also be used for storing tab information and user-defined characters.

E. CONSUMABLES (Available from Computer Supplies Operation)

Following supplies also used with HP 13349A Subsystem.

Ribbon Cartridge

9282-0561 (minimum order 6) Prints black.

Print Discs (3)

1530-0697 (Standard)
1530-1810 (European)
1530-1811 (ASCII)
1530-1851 (Katakana)
1530-1895 (Cyrillic)
1530-2022 (APL)

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ENVIRONMENTAL/ INSTALLATION/PM

A. ENVIRONMENTAL

Temperature ..... 0°C to 45°C
Relative Humidity ..... 5% to 95% (noncondensing)
Storage Temperature Range ..... −40°C through +60°C

B. FUSES

The fuse is located on the rear panel, and is rated as follows:

VOLTAGE SETTING	FUSE RATING	HP PART NUMBER
100, 120 VAC	3.0 A	2110 - 0003
220, 240 VAC	1.5 A	2110 - 0043

German units, though configured for 120 VAC, require the 1.5 A fuse.

C. PREVENTATIVE MAINTENANCE

No CE Preventative Maintenance is required. Users should perform necessary "housekeeping" by cleaning paper dust, ink smudges, etc. Changing of ribbon and character disk is on an "as-required" schedule. Approximate life is listed below:

Cartridge/Ribbon Life

Ribbon Cartridge ..... Estimated life is 8 hrs. continuous printing
Character Disc ..... Estimated life is 80 hrs. continuous printing

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CONFIGURATION

A. STANDARD CONFIGURATION

The 9871A is most commonly used with an HP-IB interface when attached to a 9825, 9835, or 9845 Desktop Computer. When used in other applications such as with a 9815, 9830, or 264X Terminal, the standard interface is 8-Bit Parallel.

B. ROMs

A special ROM is required to configure the 9871A to a 264X terminal. This ROM is already present on the 09871-69513 PCA. The ROM part number is 1818-2649. Refer to page 21 of the 9871A Service Supplement manual (09871-90031) for detailed information.

C. HP-IB SWITCH SETTINGS

There are three different types of address switches used in the 9871A adapter PCA. All switches are preset to address 00001 at the factory.

First Type Second Type Current Type

SWITCH NUMBER	ADDRESS NUMBER	SETTING	LOGIC STATE
5	5 (MSB)	On (Closed)	0
4	4	On (Closed)	0
3	3	On (Closed)	0
2	2	On (Closed)	0
1	1 (LSB)	Off (Open)	1

A change was made in the HP-IB adapter assembly, starting with S/N 1537A04739 and above. The new adapter assembly does not contain the parallel poll sense switch, the mode switch, or the parallel poll bit select switch, but does contain a service request switch. Part numbers are listed below:

OLD ADAPTER ASSEMBLY	NEW ADAPTER ASSEMBLY
98011-68801 or 09871-66507	98011-68811 or 09871-66517

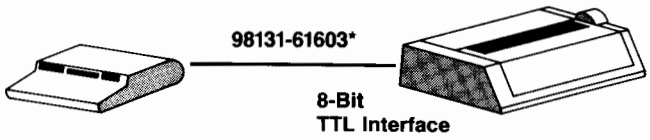
Refer to the following documents for detailed information:

9871A Opt 001 Operating and Service Manual	09871-90001	PP 3-6
Service Note 9871A-14		
9871A Service Supplement Manual	09871-90031	PP 22-26

D. SYSTEMS CONFIGURATION

The following pages contain configuration information for connecting the 9871A to various terminals, desktops, etc.

HP 9815A Full Font System Printer



9815A **9871A**

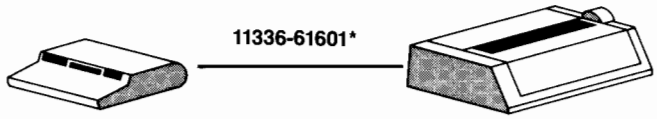
SYSTEM INFORMATION

*98131-61603 Interface Cable Assembly includes 98131-66503 PCA Interface.

PRINTER INFORMATION

–OPT 015

HP 9810/20/21/30 Full Font System Printer



9810, 9820, 9821, or 9830 — **9871A**

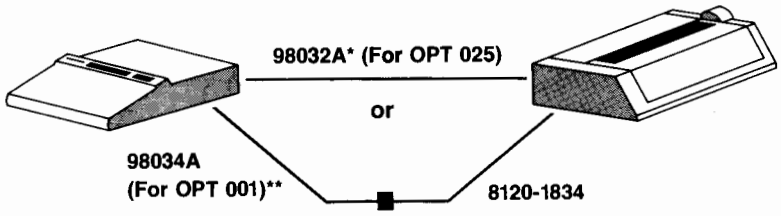
SYSTEM INFORMATION

*11336-61601 Interface Cable Assembly includes 11336-66591 PCA Interface.

PRINTER INFORMATION

-OPT 010 (8-Bit TTL)
or
-OPT 020 (8-Bit TTL)
or
-OPT 021 (8-Bit TTL)
or
-OPT 030 (8-Bit TTL)

HP 9825A Full Font System Printer



SYSTEM INFORMATION

*98032A consists of the following parts:

98032-66501	Control PCA
98032-66503	Data PCA
98032-66502	Config PCA† With Jumpers 4 and 5 Installed
98032-61609	Cable Assembly†

**98034A consists of the following parts:

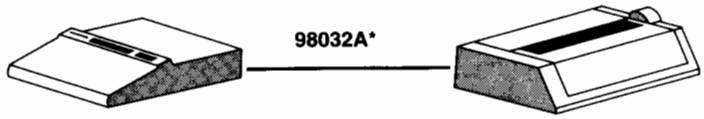
98034-66503	I/O PCA
98034-66504	I/O PCA
98034-61601	Cable Assembly

†These two parts are included in the Rear Housing Assembly, P/N 98032-67912.

PRINTER INFORMATION

–OPT 025 (8-Bit TTL)
or
–OPT 001 (HP-IB)

HP 9831A
Full Font System Printer



9831A 9871A

SYSTEM INFORMATION

*98032A consists of the following parts:

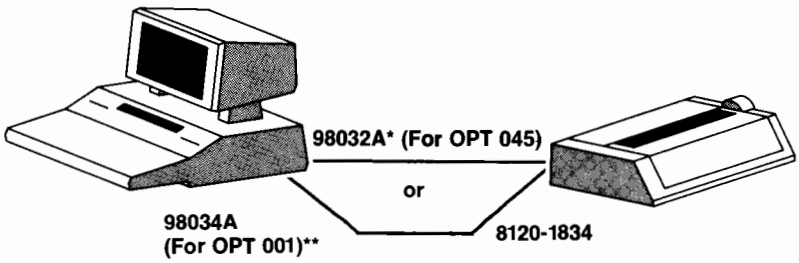
98032-66501	Control PCA
98032-66503	Data PCA
98032-66502	Config PCA† With Jumpers 4 and 5 Installed
98032-61609	Cable Assembly†

†These two parts are included in the Rear Housing Assembly, P/N 98032-67912.

PRINTER INFORMATION

–OPT 031

[redacted] HP 9845A/B
[redacted] Full Font System Printer



SYSTEM INFORMATION

*98032A consists of the following parts:

98032-66501	Control PCA
98032-66503	Data PCA
98032-66502	Config PCA† With Jumpers 4 and 5 Installed
98032-61609	Cable Assembly†

**98034A consists of the following parts:

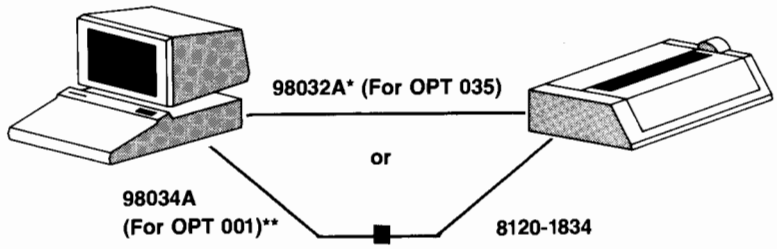
98034-66503	I/O PCA
98034-66504	I/O PCA
98034-61601	Cable Assembly

†These two parts are included in the Rear Housing Assembly, P/N 98032-67912.

PRINTER INFORMATION

–OPT 045 (8-Bit TTL)
or
–OPT 001 (HP-IB)

[redacted] HP 9835A/B
[redacted] Full Font System Printer



SYSTEM INFORMATION

*98032A consists of the following parts:

98032-66501	Control PCA
98032-66503	Data PCA
98032-66502	Config PCA† With Jumpers 4 and 5 Installed
98032-61609	Cable Assembly†

**98034A consists of the following parts:

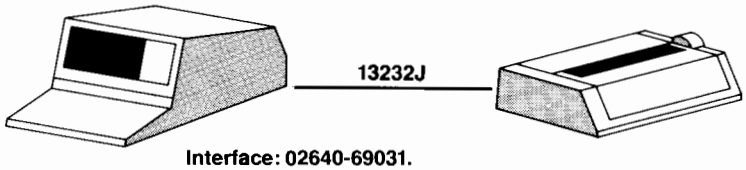
98034-66503	I/O PCA
98034-66504	I/O PCA
98034-61601	Cable Assembly

†These two parts are included in the Rear Housing Assembly, P/N 98032-67912.

PRINTER INFORMATION

–OPT 035 (8-Bit TTL)
or
–OPT 001 (HP-IB)

[redacted] HP 264X Terminals
[redacted] Alphanumeric Dump Device



Interface: 02640-69031.
Terminal must have device support firmware.

8-Bit
TTL Interface

264X

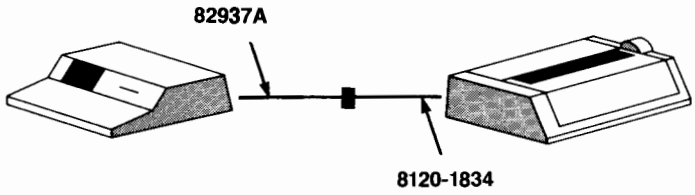
SYSTEM INFORMATION

9871A

PRINTER INFORMATION

-OPT 240
(Includes 09871-60513 Logic PCA)

HP 85A
Full Font System Printer



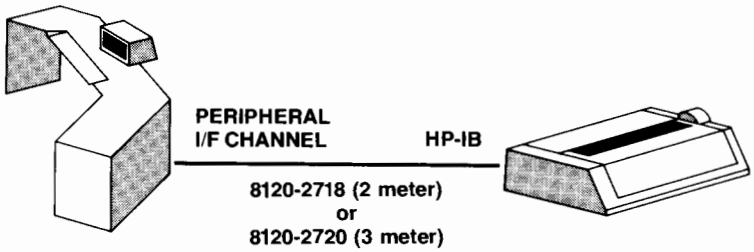
HP 85A **9871A**

SYSTEM INFORMATION

PRINTER INFORMATION

-OPT 001 (HP-IB)

HP 250
Full Font System Printer



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SYSTEM INFORMATION

9871A

PRINTER INFORMATION

–OPT 001 (HP-IB)

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TROUBLESHOOTING

A. MECHANICAL TROUBLESHOOTING

The following tables describe the major mechanical problems in the 9871A Printer. The first table lists various print quality problems and the second table covers hardware problems.

Typical Print-Quality Problems

PROBLEM	CAUSE	CHECK . . .
Light print intensity on all characters. (For printers with serial numbers before 1537A00240, refer to Service Note 9871A-6.)	Improper print intensity switch setting.	the print intensity switch setting.
	Worn ribbon.	ribbon cartridge.
	Worn character disk.	character disk.
	Binding hammer actuator arm or solenoid.	actuator arm for freedom of movement.
	Refer to Electronic Troubleshooting.	
Printout is faded on either side of page (horizontally).	Print module or carrier not positioned properly.	the Character Disk to Platen Spacing, and the Carrier Vertical Adjustment.
Top or bottom portion of characters are faded.	Print module or carrier not positioned properly.	the Character Disk to Platen Spacing, and the Carrier Vertical Adjustment.
Left or right portion of characters are faded. (For printers with serial numbers before 1537A01601, refer to Service Note 9871A-8).	Hammer is not hitting the characters accurately.	the fine reset adjustment (homing).
	Loose set screw used for homing adjustment.	the set screw and coat it with locktight then install it from the bottom of stop block.

(continued on next page)

Typical Print-Quality Problems (continued)

PROBLEM	CAUSE	CHECK . . .
Character disk spokes break. (For printers with serial numbers before 1537A00281, refer to Service Note 9871A-5).	Binding in hammer or actuator arm.	hammer and actuator arm for freedom of movement. Also check hammer housing for correct alignment with disk spokes.
Print quality varies. (For serial numbers before 1537A00376, refer to Service Note 9871A-9).	Flexible coupling platen.	to ensure there is a solid coupling platen.
Wrong characters printed. (For serial numbers before 1537A00171, refer to Service Note 9771A-3).	Hammer hitting wrong characters. Encoders.	the Course and Fine Reset Position Adjustment (homing). the Encoder Alignment.

Typical Hardware Problems

PROBLEM	CAUSE	CHECK . . .
Printer won't print.	Cover interlock switch. Refer to Electronic Trouble-shooting.	front cover and switch actuating arm.
Premature ribbon reverse. (For serial numbers before 1537A00141, refer to Service Note 9871A-4).	Ribbon is binding in cartridge. Worn upper carrier due to friction	ribbon cartridge. upper carrier and replace if necessary.
Prints slowly and erratically, but prints correct characters. (For serial numbers before 1537A00501, refer to Service Note 9871A-2).	Ribbon is binding in cartridge and is reversing constantly. Ribbon drive motor. Encoders out of alignment.	ribbon cartridge; remove it and execute the self-test. If print speed is normal, change ribbon cartridge. if speed is still low during self-test (cartridge removed), replace the ribbon motor. the Encoder Alignment.
Paper not advancing properly when using heavy or multipart forms.	Excessive drag (humidity increases weight of paper). Low torque. Platen gear rubbing against printer's frame.	the paper supply and elevate it so it is closer to the printer. The paper supply should generally be placed 12 to 15 inches below the printer. voltage switches. the platen gear. Center the gear by adjusting its set screw.
Printer inoperative (electrically dead)	Loose PC boards.	all PC boards and their connectors for a tight fit.
Printer won't home.	Left encoder.	the Encoder Alignment.
Inconsistent print quality; characters vary in intensity.	Excessive hammer housing wear.	hammer housing for possible wear, elongated hole rather than round hole. Replace hammer and barrel assembly if necessary.

B. ELECTRICAL/ELECTRONIC TROUBLESHOOTING

The following table lists the major electrical problems encountered during troubleshooting.

Typical Electrical Problems

PROBLEM	CAUSE	CHECK . . .
Printer inoperative (blown fuse).	Blown fuse.	and replace fuse, check for correct fuse rating.
	A1 and A6 motor drive assemblies.	if fuse blows again, remove A1 and A6; replace fuse. If fuse does not blow, replace A1 or A6. If fuse blows, check +5V and +12V regulators.
	+5V or +12V regulator shorted.	the +5V and +12V regulator for short. If these check out OK, repair or replace A0 power supply or primary power winding.
	A0 power supply.	the A0 power supply and its primary power wiring.
Printer inoperative (fuse is not blown).	One or both +3V supplies bad due to A1 and/or A6 Motor Drive Assembly(s).	and remove motor drive assemblies A1 and A6 and if +3V supply normal, replace A1 or A6, otherwise check A0 power supply.
	One or both +3V supplies bad due to A0 power supply.	the A0 power supply, repair or replace it.
	+5V and +10V supply bad due to A0 power supply.	A0 power supply, repair or replace it.
	+5V regulator or A0 power supply.	Check +5V regulator for shorts, plus check connections from the transformer secondary to the A0 power supply. Replace +5V regulator or the A0 power supply.
	+5V supply bad due to one of the PC assemblies being defective.	if after removing the plug-in PC assemblies (from the A0 power supply), the +5V supply is good, install one PC assembly at a time until defective assembly is found.
	+7V supply bad.	the A3 logic assembly. Remove A3, if the +7V supply is still bad, change A0 power supply or the +7V regulator; otherwise, the A3 logic assembly is defective.

(continued on next page)

Typical Electrical Problems (continued)

PROBLEM	CAUSE	CHECK . . .
Printer Inoperative (continued)	+ 7V, + 12V, and + 19V supply bad.	the A0 power supply, repair or replace it.
	+ 12V supply bad.	A2, A3, and A5. Remove these assemblies and disconnect J3. If the + 12V supply is still bad, replace + 12V regulator otherwise A2, A3, or A5 is defective.
	−12V and −19V supply bad.	the A0 power supply, repair or replace it.
	−12V supply bad.	A3 and A5. Remove these assemblies and if the −12V supply is still bad, replace the −12V regulator; otherwise, either the A3 or A5 is defective.
	+ 24V supply bad.	A2. Remove this assembly and if + 24V supply is still bad, change the A0 power supply otherwise the A2 assembly is defective.
	−24V supply bad.	A1, A2, and A6. Remove these assemblies and if −24V supply is still bad, change the A0 power supply; otherwise, A1, A2, or A6 assembly is defective.

This table lists some of the possible electronic problems.

Typical Electronic Problems

PROBLEM	CAUSE	CHECK . . .
Slow printing speed.	Improper encoder alignment. Motor difference counter (A3) bad. Ribbon Binding. Refer to Hardware Problems.	the Encoder Alignment. A3, replace if necessary. ribbon.
Light character intensity or no characters printed.	Hammer drive circuit, A2 defective. Refer to Hardware Problems.	the hammer drive circuit.
Wrong characters printed.	Improper Homing. Improper I/O hookup. Refer to Print Quality Problems.	after switching the printer off then on. I/O cable connection.
Printer beeps when switched on.	ROM (single beep). RAM (continuous beep).	A3, replace if necessary. A3, replace if necessary.
Carrier motion erratic.	Improper drive signals to either motor. Improper data from processor (A3).	the motor drive circuits (A1, A6), difference counters, and D0-D2 lines (A3). A3, replace if necessary.
Platen does not rotate.	Platen drive circuit bad (A2).	the platen drive circuit (A2).
Ribbon does not move or reverse.	Ribbon drive circuit bad (A2).	the ribbon drive circuit (A2).
Printer inoperative.	+5V supply bad. Clock inoperative. Refer to Electrical Troubleshooting.	the A0 power supply. the clock circuit (A3).
Gains a line linearly for a defined amount (e.g., gains 1 line for every 12).	Platen drive circuit bad (A2). Logic circuit bad (A3).	A2, replace if necessary. A3, replace if necessary.
Failure to stop on reset.	9825A or 9831A stop pulse not of sufficient duration (see Service Note 9871A-7).	the entire I/O assembly and replace it with I/O card, door, connector, and connecting wires (all one part 09871-31001).

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DIAGNOSTICS

Printer Test

The 9871A Printer has an internal self-test stored in ROM. This test performs a checksum test on the internal ROM, a RAM test, and prints a line of text. This test can be performed while the printer is isolated from any control device. To perform this test, refer to the following procedure.

1. Switch the printer on and load 15 inch wide paper.
2. Press the TEST button on the printer's rear panel. The following printout should occur:

```
M.M.M.M.M.M.M.M.M.M!"#$%&´()*+,-./0123456789:;<=>?@ABC
DEFGHIJKLMNOPQRSTUVWXYZ[√]^_`abcdefghijklmnopqrstuvwxyz
π|→~M.M.M.M.M.M.M.M.M.M
```

3. The printer then makes a check of its Read Only Memory (ROM) and its Random Access Memory (RAM). An error in the ROM-check is indicated by a single beep and an error in the RAM-check is indicated by a continuous series of beeps.
4. If the printer beeps or fails to give a quality printout, switch it off, then on and press TEST again. If the printer fails again, refer to the appropriate troubleshooting procedure.

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ADJUSTMENTS

The following checks/adjustments should be performed whenever the troubleshooting tables recommend it, or whenever one of the associated assemblies is removed or replaced.

A. PAPER GUIDE ALIGNMENT

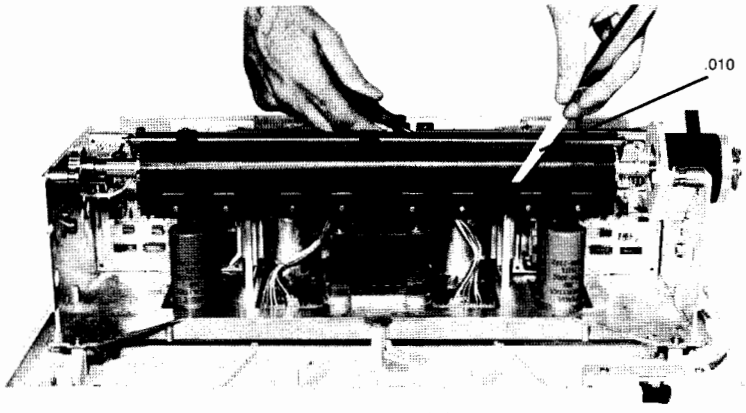
Paper Guide Alignment (before printer serial no. 1537A01490)

The paper guide is aligned at the factory. The paper guide alignment procedure should be performed only if the paper guide has been removed.

Tools Required

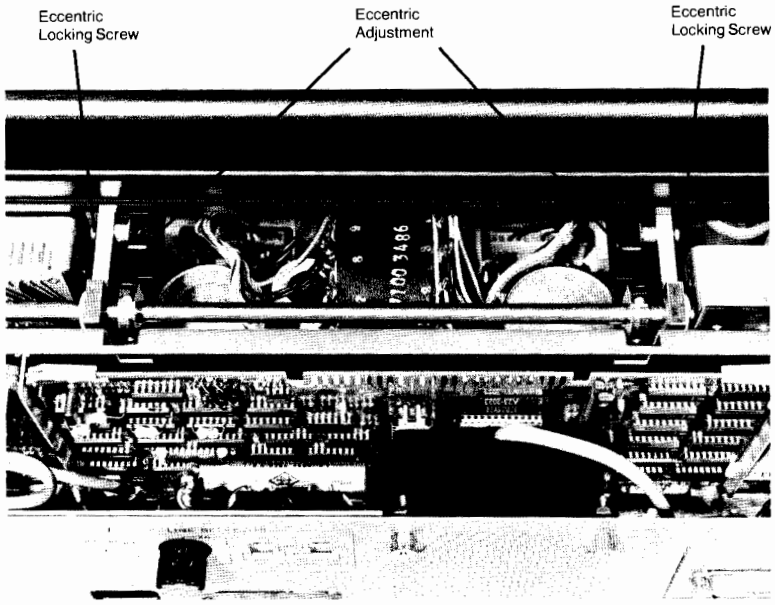
- POZIDRIV screwdriver
- Flat-blade screwdriver
- Feeler gauge

1. With the paper release lever back, the space between the paper guide and the platen should be .010 inch (0.254mm).



Paper Guide Alignment

2. The .010 inch gap is adjusted by loosening the eccentric locking screw on the paper guide and adjusting the eccentric screw for the specified gap.
3. Tighten the locking screw on each eccentric.
4. Perform the Character Disk to Platen Spacing check.



Eccentric Screws

Paper Guide Alignment (from printer serial no. 1537A01490)

For printers with serial numbers from 1537A01490, the Paper Guide Alignment procedure should not be necessary if the Paper Guide Removal procedure was followed accurately. (See Service Supplement manual, PIN 09871-90031, pages 13 and 14 for Paper Guide Removal procedure.) If, however, paper guide alignment is required, the following procedure should be used.

Tools Required

- Feeler gauge
- POZIDRIV screwdriver

1. Install the paper guide in the printer and tighten the two fixed position screws (without washers); one screw is located on each mounting bracket. Ensure the paper release lever is back (closed).
2. There are four variable adjustment screws (with washers); two on each mounting bracket. Loosen two of the screws on one side.
3. On the opposite mounting bracket, visually set the alignment of the paper guide so the front rollers are just barely engaged. Tighten both variable adjustment screws.
4. Perform step 3 for the opposite side.
5. Perform steps 3 and 4 until the front rollers are uniform and the paper guide to platen spacing in front is .020 inch (0.51mm) on both sides (see next photo).

Paper Guide Mounting

B. RESET POSITION ADJUSTMENT (Homing)

Tools Required

- #6 allen wrench

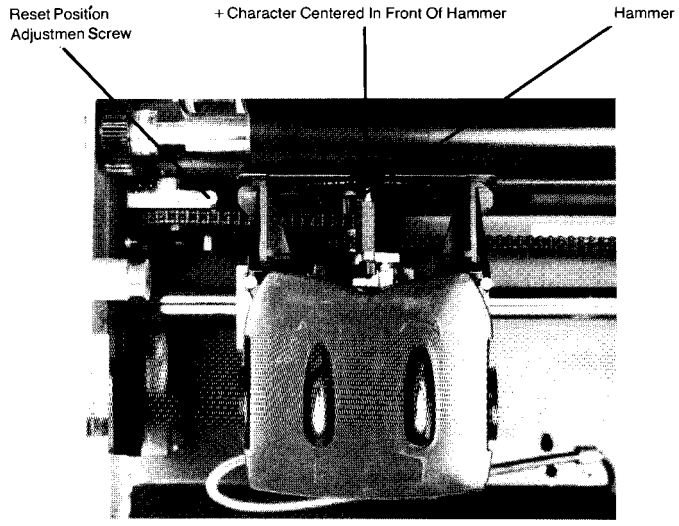
The reset position adjustment consists of a coarse and a fine adjustment.

Perform the coarse position adjustment when incorrect characters are printed.

Perform the fine position adjustment when one side of a character is printed lighter than the other side.

Coarse Reset Position Adjustment

1. Switch the printer OFF.
2. Remove the front cover.
3. Switch the printer ON; the carrier will move to the left and the character disk will rotate to the adjustment stop (see following diagram).
4. Turn the adjustment screw until the "+" character is centered in front of the hammer.
5. Install the front cover; then press the "test" button on the printer's rear panel. The correct test printout should occur. If necessary perform the fine position adjustment which follows.



Coarse Reset Position Adjustment

Fine Reset Position Adjustment

Print quality can be controlled with the fine reset position adjustment. When half-faded characters are printed, or when printing does not appear to be correct, follow the procedure below using your HP supplied #6 allen wrench and loading 15 inch paper.

1. Switch the printer on, press the TEST button on the rear panel, and note the print quality.
2. Check your printout against this example.

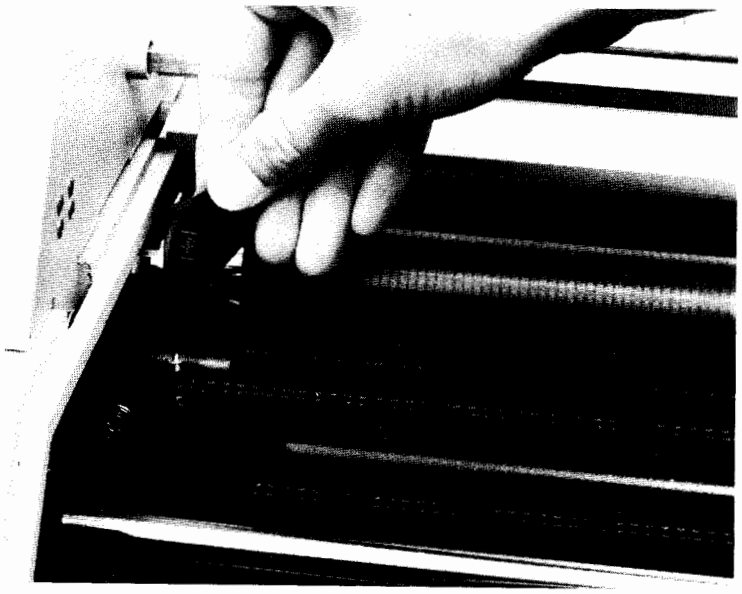
   Left faded printed characters:

   M.M.M.M!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOP

   Right faded printed characters:

   M.M.M.M!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOP

3. Remove the front cover.
4. If the right side of the characters are faded, turn the adjustment screw clockwise 45° (⅛ of a turn). If the left side of the characters are faded, turn the adjustment counterclockwise 45° (⅛ of a turn). (Refer to the following diagram.)



Reset Position Adjustment

5. Switch the printer off and replace the front cover.

> **NOTE**
> **The printer's front cover activates a cover interlock switch. The front cover must be on before the printer will print.**

6. Switch the printer on; the carrier will move to the left and reset itself.
7. Press the TEST button again and observe the characters (in particular the "M"s) for even print intensity. If it is necessary, repeat steps 2 through 7 until the print intensity is even.

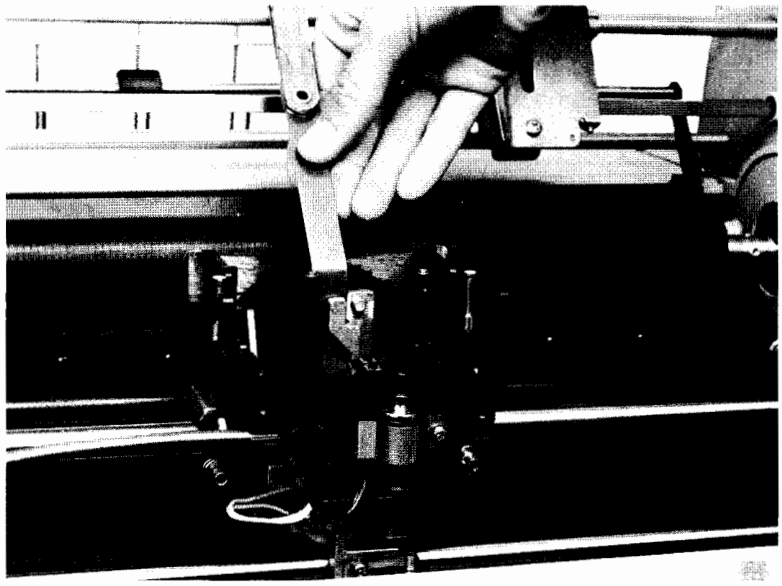
C. HAMMER ADJUSTMENT

The Hammer Solenoid Pull-In Voltage procedure (pages 5-20 of the Operating and Service Manual, P/N 09871-90030) has changed from an electrical measurement to a mechanical adjustment. To check the hammer's actuator gap, refer to the following procedure.

Tools Required

- 3/16 inch nut driver
- Feeler gauge
- Shims (2 mil and 5 mil)

1. With the carrier on or off, set the distance between the actuator stop (casting ear) and the lower rubber actuator pad (or arm) at .060 inch (1.52mm) with a feeler gauge (see next photo).
2. Use either the 2 mil shim (orange) or the 5 mil shim (blue) to adjust this gap. Remove a shim from behind the solenoid if the gap is small; add a shim if the gap is wide.



Actuator Gap

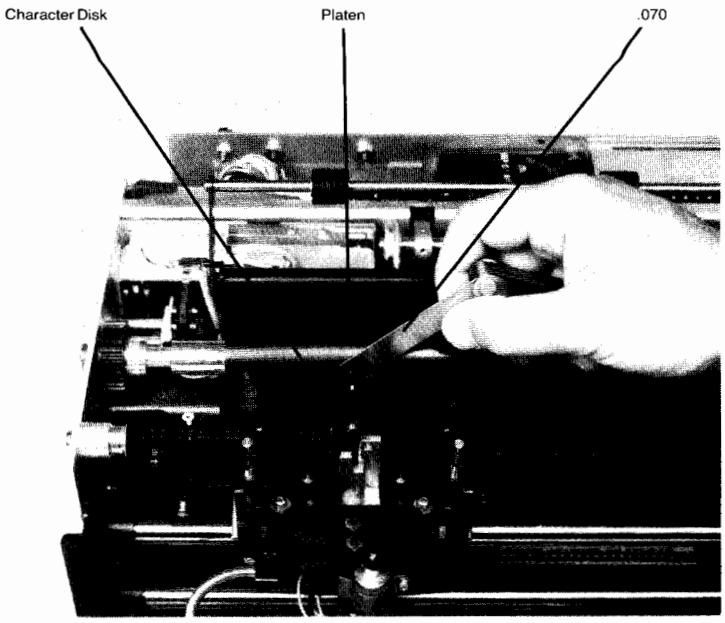
D. CHARACTER DISK TO PLATEN SPACING

This check should be performed whenever the print module has been removed for maintenance and reinstalled. This check ensures that the character disk is parallel to the platen.

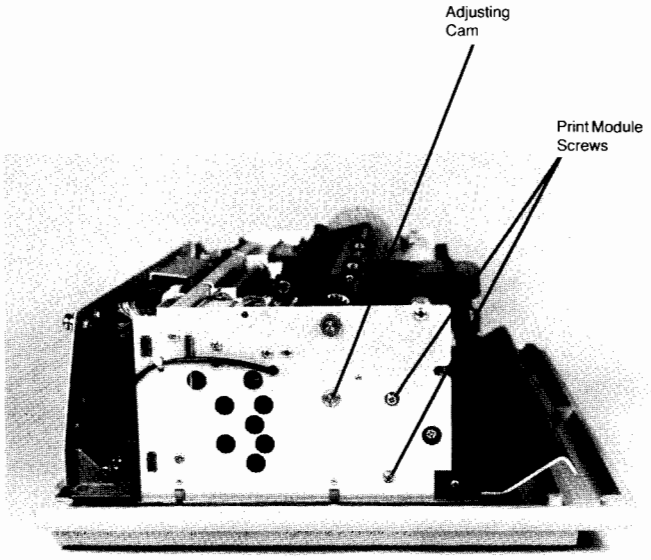
Tools Required

- POZIDRIV screwdriver
- 3/8 inch wrench
- Flat-blade screwdriver
- A set of feeler gauges

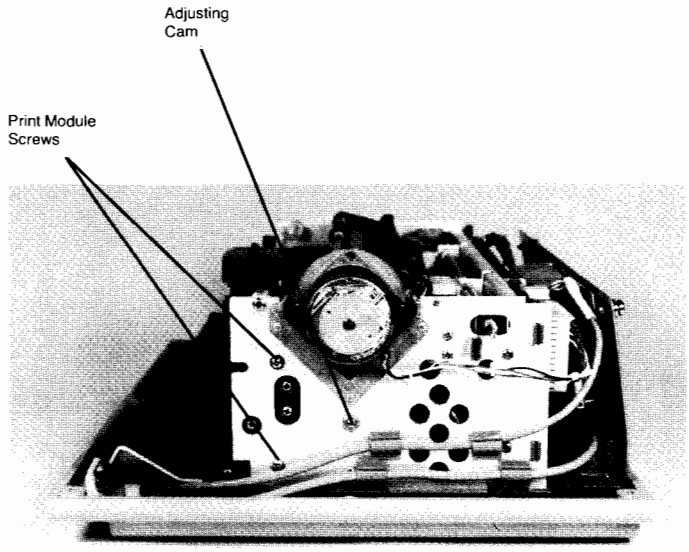
1. Remove the ribbon.
2. Move the carrier to the left-most position.
3. The gap between the character disk and the platen should be .070 ± .010 (1.78mm ± 0.25mm) (see photo). If not, see step 5.
4. Move the carrier to the right-most position. The gap should be .070 ± .010 (1.78mm ± 0.25mm). If not, see step 5. Be sure to use the same character on the disk.
5. If necessary loosen the left (or right) side of the print module and loosen the locknut on the module adjusting cam on the appropriate side (see photos).
6. Turn the module adjusting cam screw until the proper character disk to platen spacing is achieved; then tighten the print module screws.
7. Tighten the adjusting cam locknut.



Character Disk to Platen Spacing



LEFT SIDE



RIGHT SIDE

Spacing Adjustment

E. BELT TENSION CHECK

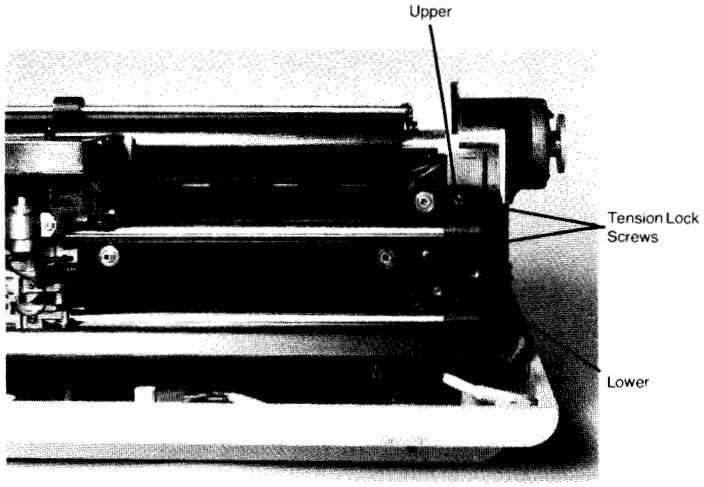
This check should be performed (when other maintenance is required) to see if the belt has stretched, and when a belt is installed.

Tools Required

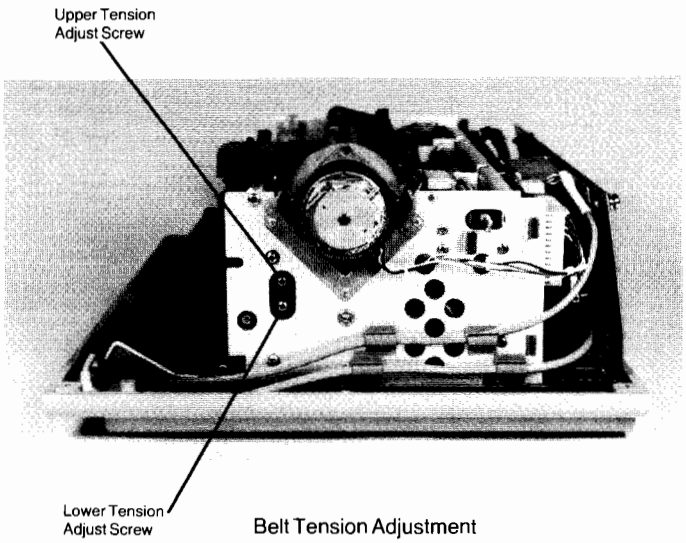
- POZIDRIV screwdriver

1. Move the carrier to the left-most position.
2. Loosen the two tension-lock screws shown in figure A.
3. Loosen the lower tension-adjusting screw (CCW) (figure B) until the metal washer is loose, then tighten the screw until the washer just touches the plastic end casting.
4. Tighten the lower tension-lock screw.

A



B



Belt Tension Adjustment

5. Turn the upper tension-adjust screw until the top belt strand has the same tension as the second belt strand (see Figure B).
6. Tighten the upper tension-lock screw.

F. CARRIER VERTICAL ADJUSTMENT

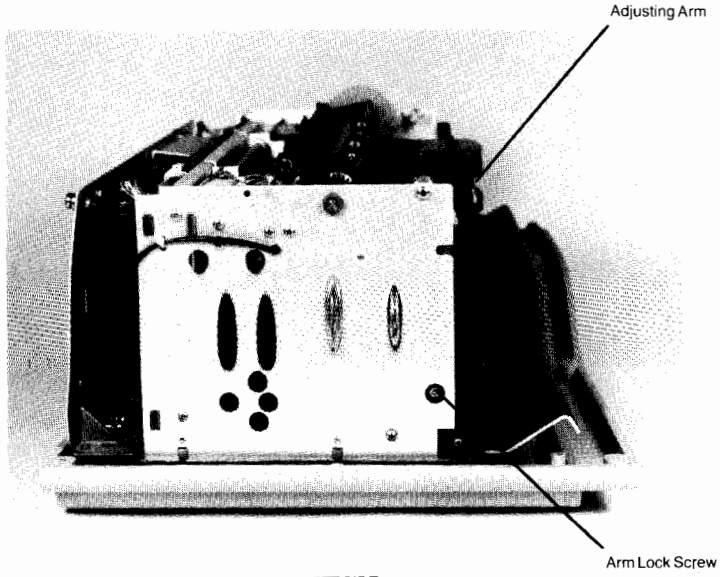
This adjustment should be made only if the top or bottom portion of each character is printed darker than the rest of the character.

Tools Required

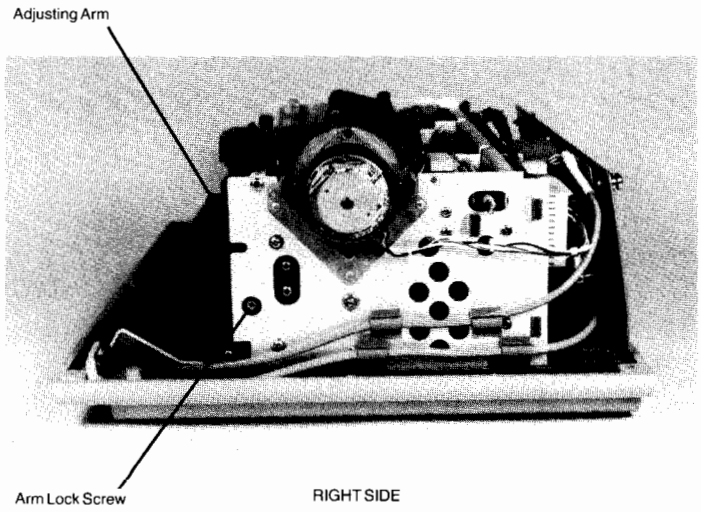
- POZIDRIV screwdriver

1. Remove the printer's top cover.
2. Loosen the adjusting arm lock screw on either side of the printer (see Figure).
3. Switch the printer ON and press the cover interlock switch down.
4. Press the test button on the printer's rear panel.
5. Observe the printout.
6. If the bottom of the character is darker, move the adjusting arms in, toward the platen (see Figure).

   If the top of the character is darker, move the adjusting arms out, away from the platen.
7. Press the test button again, and check the printout for even character intensity (vertically). If necessary, repeat steps 4 and 5.
8. Tighten the adjusting arm lock screws.
9. Replace the top cover.



LEFT SIDE



Carrier Vertical Adjustment

G. ENCODER ASSEMBLY ALIGNMENT

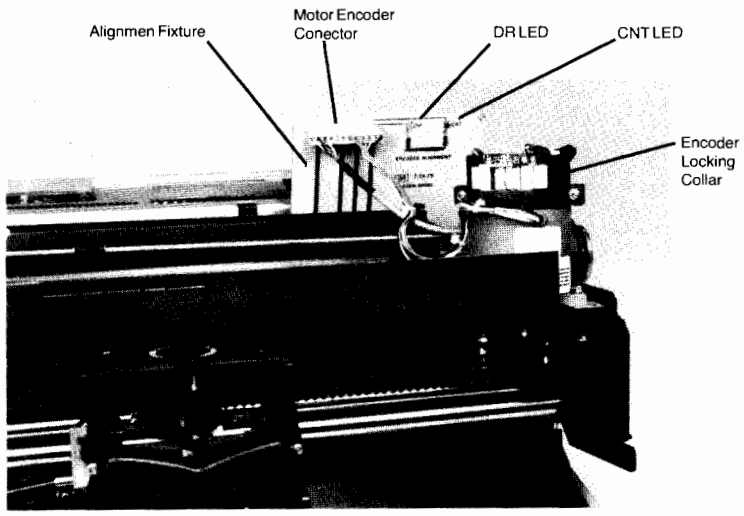
Each carrier drive motor has its own encoder assembly which is electrically aligned to the motor. When a motor or an encoder assembly is replaced, the motor and encoder must be realigned.

Equipment Required

- Encoder Alignment Test PCA, P/N 98011-67510

The alignment procedure is as follows:

1. This procedure can be performed with or without the print module removed.
2. Remove one of the motor drive assemblies (A1 or A6), and plug the alignment fixture into the motor drive assembly PC connector in the printer (see Figure). Disconnect the other drive motor.
3. Plug the motor/encoder connector on the fixture's molex connector.
4. Switch the printer ON.
5. Loosen the encoder assembly locking collar (see Figure) and turn the encoder until the DR-LED on the fixture is out.



Encoder Alignment Setup
(shown with print module removed)

6. With the DR-LED not lit,
   - apply rotational pressure (either CW or CCW) to the motor shaft. The CNT-LED should go out.
   - apply rotational pressure in the opposite direction to the motor shaft. The CNT-LED should light.
   - applying rotational pressure in either direction should sequence the DR and CNT LEDs on and off.
7. Tighten the locking collar and repeat step 6 to recheck the setting.
8. Turn the printer off, rotate the motor 45°, then power the printer back on and repeat step 6 to recheck the setting.
9. Check the alignment at several different increments on the motor.
10. Due to eccentricities in the motor, the encoder may not align properly at all rotational positions. It is necessary only that the encoder align at one point and the variance not be so great that the DR LED comes on at any point when power is applied.
11. Repeat steps 2 through 10 for the other encoder motor.
12. Disconnect the fixture and reinstall the motor drive assemblies.

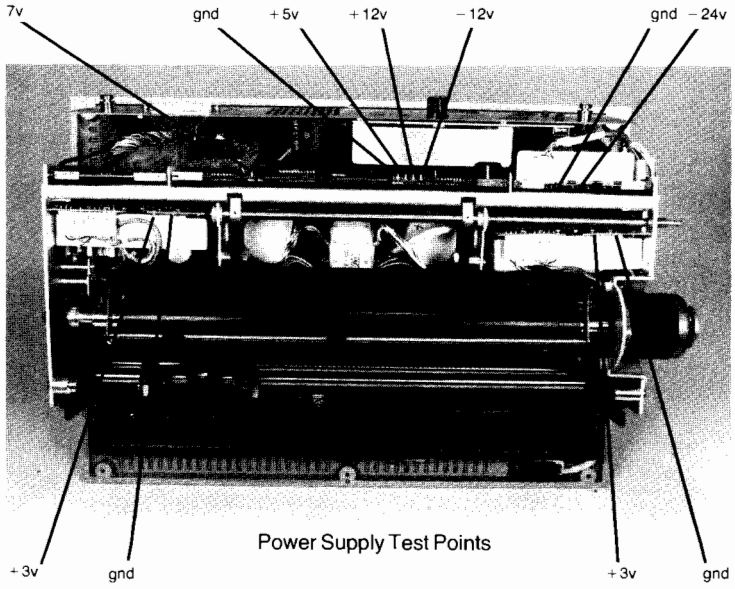
H. POWER SUPPLY CHECKS

The power supplies should be within the tolerances specified below. The voltages can be measured on the test points indicated in the figure.

Power Supply Voltages

POWER SUPPLY Voltage (Nominal)	Tolerance
+24V	±3V
−24V	±3V
+12V	±0.4V
−12V	±0.4V
+7V	±0.25V
+5V	±0.25V
+3V*	>1.9V <4.7V

*The value of the +3V supply depends on the state of the carrier drive motors.



Power Supply Test Points

7

PERIPHERALS

DOES NOT APPLY.

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REPLACEMENT PARTS

Below are listed some of the most commonly used replacement parts on the 9871A:

HP PART NUMBER	COMMONLY USED PARTS
09871-31001	8-Bit Parallel I/O PCA
09871-66501	Motor Drive PCA
09871-66502	Platen Drive PCA
09871-66516	HP-IB PCA
09871-67921	Lower Carrier Assembly
09871-67922	Upper Carrier Assembly
09871-68801	Right Motor Assembly w/Encoder
09871-68802	Left Motor Assembly w/Encoder
09871-68807	Platen Motor
09871-69500	Mother Board
09871-69503	Logic PCA (Non-264X Compatible)
09871-69513	Logic PCA (264X Compatible)
11336-61601	Interface Cable Assembly
11336-66591	Interface PCA
1500-0441	Drive Chain
1530-0321	LH Bi-Directional Tractor
1530-0322	RH Bi-Directional Tractor
1530-0697	Character Disc (Order From CSO)
1530-2076	RH Uni-Directional Tractor
1530-2077	LH Uni-Directional Tractor
2110-0003	3.0A Fuse
2110-0043	1.5A Fuse
3030-0022	Platen Set Screws
3101-1309	Cover Open Switch
9282-0561	Ribbon (Order From CSO)
98011-61901	Power Switch
98011-63201	Hammer Assembly
98011-67502	Encoder Assembly
98011-67503	Hammer Actuator Arm With Pads
98011-68811	HP-IB Adapter Assembly
98021-66011	Uni-Directional Form Feed Mechanism
98021-66014	Bi-Directional Form Feed Mechanism
98131-61603	Interface Cable Assembly
98131-66503	Interface PCA

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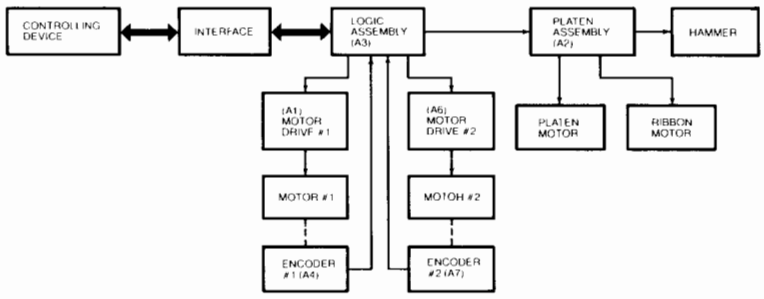
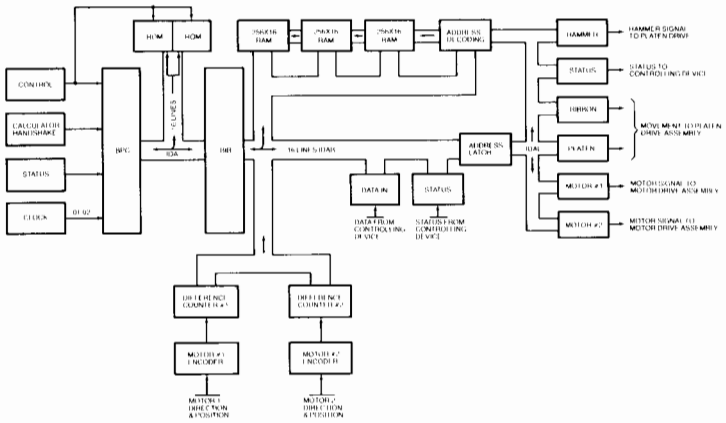
DIAGRAMS

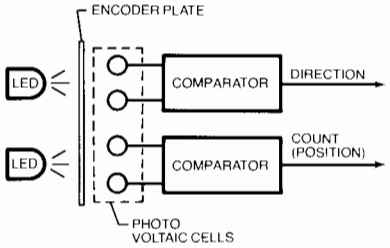


9871A BLOCK DIAGRAM

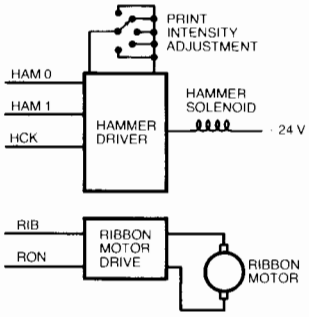
A3 LOGIC ASSEMBLY



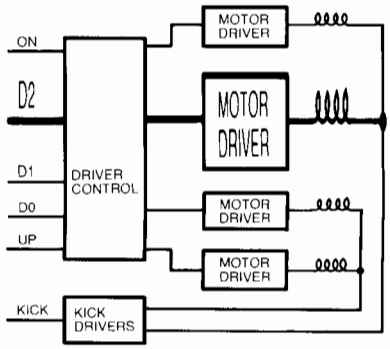
A4, A7 ENCODER ASSEMBLY

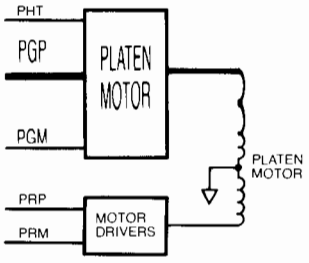


A2 PLATEN DRIVE ASSEMBLY



A1, A6 MOTOR DRIVE ASSEMBLY





10

REFERENCE

A. DOCUMENTATION SUMMARY

TITLE	HP P/N
Opt 10/20/21/30 Operating Manual	09871-90000
Opt 001 HP-IB Operating/Service Manual	09871-90001
Opt 001 Installation Note	09871-90007
Opt 240 Operating Manual	09871-90010
9871A Operating/Service Manual	09871-90030
9871A Service Supplement Manual	09871-90031
9871A Installation Manual	09871-90035
Opt 015 (9815A Calculator) Operating Manual	98131-90000
Opt 025 (9825A Calculator) Operating Manual	09825-90045
98032A Interface Installation/Service Manual	98032-90000
98034A HP-IB Interface Installation/Service Manual	98034-90000
Opt 35/45 Printer Programming Techniques	09845-90671
11336A Interface Installation/Service Manual	11336-90000

B. ESCAPE SEQUENCES

Function Codes

COMMAND	COMMAND CODE		
	ASCII Character	Decimal Code	Decimal Parameter
GENERAL			
• Bell	BELL	7	
• Backspace	BS	8	
• Linefeed	LF	10	
• Carrier Return	CR	13	
• Shift Out	SO	14	
• Shift In	SI	15	
• View Delay	ESC D	27,68	INT(N/64),INT N
• Reverse Line Feed	ESC LF	27,10	
• Character Replacement	ESC C	27,67	"CHAR",N,"LIST"
• Reset	ESC E	27,69	
• Self Test	ESC R	27,122	
HORIZONTAL TABULATION			
• Set Horizontal Tab	ESC 1	27,49	
• Clear Horizontal Tab	ESC 2	27,50	
• Clear All Horizontal Tabs	ESC 3	27,51	
• Horizontal Tab Right	HT	9	
• Horizontal Tab Left	ESC 4	27,52	
VERTICAL TABULATION			
• Set Vertical Tab	ESC 5	27,53	
• Clear Vertical Tab	ESC 6	27,54	
• Clear All Vertical Tabs	ESC 7	27,55	
• Vertical Tab Up	ESC 8	27,56	
• Vertical Tab Down	VT	11	
FORM AND MARGIN CONTROL			
• Set Top of Form	ESC T	27,84	
• Form Length	ESC F	27,70	INT(N/64),INT N
• Text Length	ESC L	27,76	INT(N/64), INT N
• Form Feed	FF	12	
• Set Left Margin	ESC M	27,77	
• Text Width	ESC W	27,87	INT(N/64),INT N

(continued on next page)

Function Codes (continued)

COMMAND	COMMAND CODE		
	ASCII Character	Decimal Code	Decimal Parameter
SPACING CONTROL			
• Horizontal Spacing	ESC H	27,72	INT(N/64),INT N
• Vertical Spacing	ESC V	27,86	INT(N/64),INT N
• Variable Spacing	ESC S	27,83	
PLOTTING CONTROL			
• Absolute Plot	ESC A	27,65	INT(X/64),INT X, INT(Y/64),INT Y
• Relative Plot	ESC R	27,82	INT(X/64),INT X, INT(Y/64),INT Y
• Character Fill Setup	ESC .	27,46	P1,INT(P2/64), INT P2, P3
• Absolute Plot With Fill	ESC a	27,97	INT(X/64),INT X, INT(Y/64),INT Y
• Relative Plot With Fill	ESC r	27,114	INT(X/64),INT X, INT(Y/64),INT Y
• Plot Origin	ESC O	27,79	INT(X/64),INT X, INT(Y/64),INT Y

C. CONTROL CODES

ASCII Control Codes

ACK = CTRL F	ETB = CTRL W	STX = CTRL B
BEL = CTRL G	ETX = CTRL C	SUB = CTRL Z
BS = CTRL H or BACKSPACE	FF = CTRL L	SYN = CTRL V
CAN = CTRL X	FS = CTRL \	US = CTRL _
CR = CTRL M or RETURN	GS = CTRL]	VT = CTRL K
DC1 = CTRL Q	HT = CTRL I or TAB	(= CTRL 9
DC3 = CTRL S	LF = CTRL J or LF	) = CTRL 0
DC4 = CTRL T	NAK = CTRL U	, = CTRL ,
DLE = CTRL P	NUL = CTRL @	. = CTRL .
EM = CTRL Y	RS = CTRL ^	; = CTRL ;
ENQ = CTRL E	SI = CTRL O	/ = CTRL /
EOT = CTRL D	SO = CTRL N	' = CTRL '
ESC = CTRL [	SOH = CTRL A	

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SERVICE NOTES/ IOSMs

The following service note list includes all published service notes for the 9871A.

Service Notes

SEQ. NO.	PUB. DATE	TITLE
9871A-1	Jan 1976	Defective Chassis Cable
9871A-2	Jan 1976	Power Transformer Change
9871A-3	Feb 1976	ROM Change on the A3 Logic Assembly
9871A-4	Feb 1976	Premature Ribbon Reverse
9871A-5	Mar 1976	Character Disk Breakage
9871A-6	Mar 1976	Print Ribbon Snagging and Low Print Density
9871A-7	May 1976	Failure to Stop on Reset
9871A-8	Aug 1976	Homing Adjustment
9871A-9	Jan 1977	Print Quality Variations due to flexible Coupling Platen
9871A-10	Aug 1977	Loose Platen Set Screws
9871A-11	Aug 1977	Printer Information
9871A-12	Aug 1977	ROM Installation on the A3 Logic Assembly
9871A-13	Feb 1978	Mother Board Failure
9871A-14	Mar 1978	HP-IB Upgrade
9871A-15	Aug 1978	Lower Carrier Failure
9871A-16	Jul 1981	Defective Motor Assemblies
98021A-1	Dec 1977	98021A Form Feed Mechanism New Tractor Assembly

Inter-Office Service Memos

PUB. DATE	TITLE
Jun 1976	9871A Product Support Plan
Jun 1976	98021A Product Support Plan
Sep 1977	98020A Product Support Plan
Jan 1978	9871A Field Support Information
Sep 1981	9871A Obsolete Product Support Plan