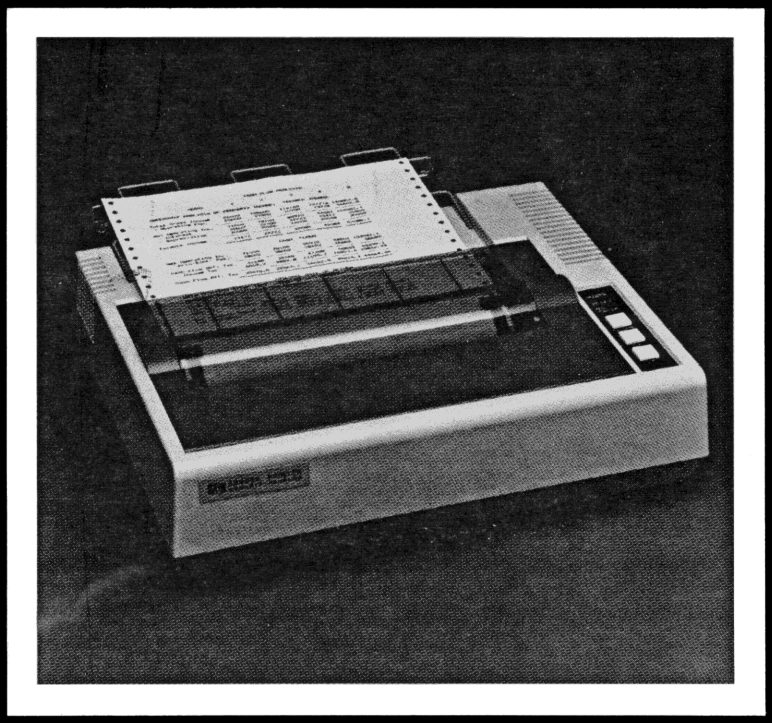
HP 82905
PRINTER

SERVICE MANUAL



HEWLETT PACKARD

HP 82905

Printer

SERVICE MANUAL

Reorder Number
82905-90063

Printed January 1983

Personal Computer Division
1010 N.E. Circle Blvd.
Corvallis, OR 97330 U.S.A.

Contents

Contents (continued)

Tables

Illustrations

General Information

1.1 INTRODUCTION

This manual contains the necessary information to allow you to test and troubleshoot the HP 82905B Printer. For ease of use, this manual has been divided into seven sections:

Section I	General Information
Section II	Principles of Operation
Section III	Disassembly and Reassembly
Section IV	Maintenance and Adjustments
Section V	Troubleshooting and Repair
Section VI	Replaceable Parts
Section VII	Reference Diagrams

Before using this manual in an actual repair, first read all of this section to become familiar with the printer and the organization of the manual, then read through the rest of the manual to become familiar with the service procedures.

1.2 PRODUCT DESCRIPTION

The HP 82905B is an OEM product based on the MX-80 Dot Matrix Printer by Epson, Shinsu Seiki Co. The major differences are in the casings, the interface options, and the ROM code which determines the character sets which are available with the printer. The HP 82905B supercedes the HP 82905A.

The printer design is based around a printer mechanism which contains a print head with nine dots vertically spaced to form either 5 x 7 characters with underline capability or graphics data of 8 x 480 dots per printed line.

There are compressed and expanded modes for emphasis, as well as normal and graphics modes. These are specified by escape (command) sequences, and the proper commands are listed in the owner's manual for the HP 82905B.

There are four interface options currently available:

HP-IL	Hewlett-Packard Interface Loop
HP-IB	Hewlett-Packard Interface Bus
RS-232C	Serial Interface
Parallel	Centronix-type Printer Interface

These are usually determined at the time of sale of the printer, by ordering the desired option; however, it is possible to order the interface PCAs and change the type of interface for each printer. The parallel interface is included in the basic printer unit, and may be used by simply removing the interface PCA from the printer control PCA. Attempting to use the parallel interface with another interface PCA installed will cause bus conflicts and will result in printer hardware damage.

1.3 SPECIFICATIONS

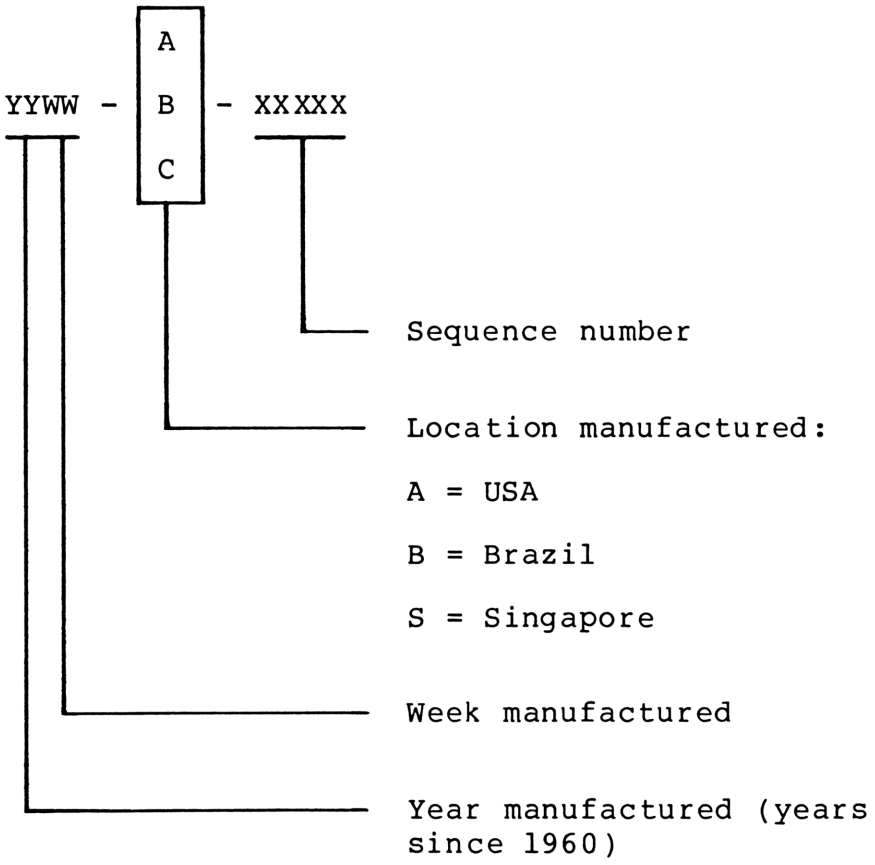
The specifications for the printer are listed in table 1-1.

Table 1-1. Specifications

Printing Method	Impact dot matrix
Character Set	ASCII 96 + Graphic 64 + 9 special symbols (selectable by operator)
Character Font	9 x 9 dot matrix
Character Size	2.1 mm (W) x 3.1 mm (H) (0.08 x 0.12 inches)
Paper Feed	Adjustable sprocket feed
Paper	Fanfold paper, 101 mm to 254 mm (4-10 inches)
Copies	One original, plus two carbon copies, max.
Paper Thickness	0.3 mm (0.01 inch) max.
Line Spacing	4.23 mm (1/16 inch), or programmable
Columns	80-Normal or Emphasized, 132-Compressed, 66-Expanded-Compressed, 40-Expanded-Doublewidth
Print Speed	80 CPS, Normal
Ribbon	Cartridge, Black
Dimensions	374 mm (W) x 305 mm (D) x 107 mm (H)
MTBF, Mechanism	5,000,000 lines (excluding print head)
Print Head Life	70,000,000 characters

1.3 IDENTIFICATION

The serial number of the printer is used for identification and determination of warranty status. It is located on the back panel, near the line connector. Its format is shown below:



1.4 Recommended Tools

Table 1-2 lists the recommended tools for servicing the HP 82905B.

Table 1-2. Recommended Tools

HP PART NUMBER	DESCRIPTION
HP 85	HP Series 80 Computer, with interface (to match interface of printer)
HP 3465/3466	Digital Voltmeter
HP 1220A	Oscilloscope
8710-1107	Pliers, long nose
8710-1217	Nut driver, 7mm
8710-0899	Screwdriver, Posidriv, #1
8730-0008	Screwdriver, small flat-blade
8520-0023	Swabs, cotton
82905-90014	HP 82905B Printer Owner's Manual
82905-90002	HP 82905B Printer Service Manual

Functional Description

2.1 INTRODUCTION

This section provides an overview of the principles of operation of the printer, and explains the functional aspects of each of the component assemblies. Refer to the printer diagram, figure 2-1 for locations of most assemblies.

2.2 PRINCIPLES OF OPERATION

The printer mechanism generates a timing signal (PTS) which determines the position of the print head, and a reset signal (RS) which determines the left margin position of the printer. In addition, a signal which senses the presence or absence of paper (PE) in the printer, is output to the controlling circuits. These three signals govern the operation of the printer. The driver PCA sends to the printer the print head solenoid drive signals, the paper-feed stepper motor drive signals and current limiting signals which minimize the heat generated by the respective stepper motors. All these signals are controlled by the one-chip microprocessors, 8049 and 8041, located on the control PCA. The printer mechanism executes each operation according to the signals from the driver PCA which serves as a controller. These electrical circuits and mechanical operations are detailed in the following paragraphs.

2.3 Fuse and Filter Circuit

The fuse and filter cicuit is located on a Bakelite circuit board, together with the power switch. Figure 2-2 shows the layout of the components on the fuse and filter PCA, and figure 2-3 shows the schematic of the line voltage area. The AC line voltage is passed through fuse F1, and a double-pole power switch. Between this line and ground, three noise supressing capacitors C1, C2, and C3 are connected. The capacitors function to filter the line noise that is carried on the power line; both the noise generated by the printer and that noise that comes in from the power source.

2.4 Power Supply Circuit

In this circuit, the 115, 220, or 240 VAC from the primary side is transformed by T1 to produce the voltages required by the control PCA, driver PCA, and interface PCA. Figure 2-4 shows the windings and output voltages of the power transformer. These should not be different than stated here, by more than 10 percent. These lower

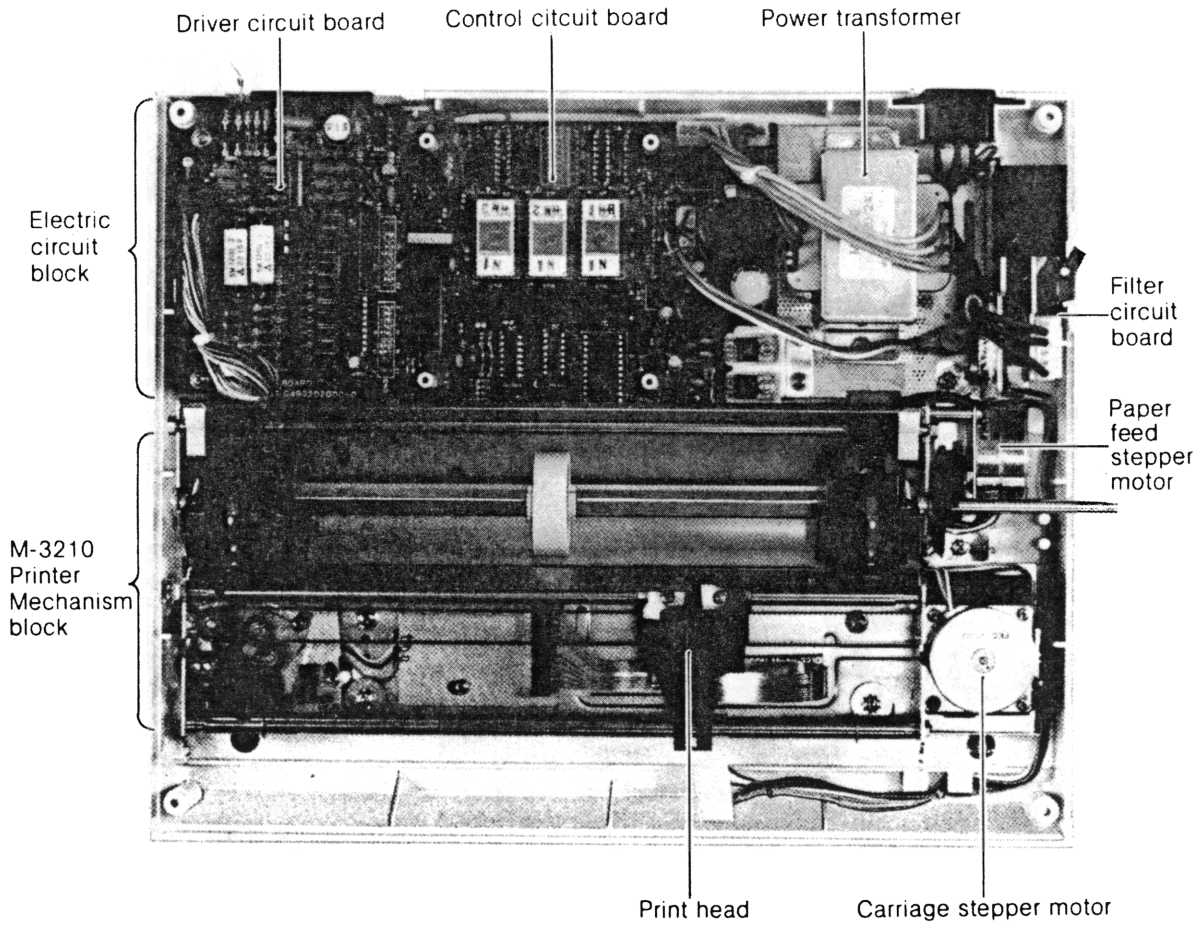


Figure 2-1. Assemblies Visible Upon Removal of Upper Case

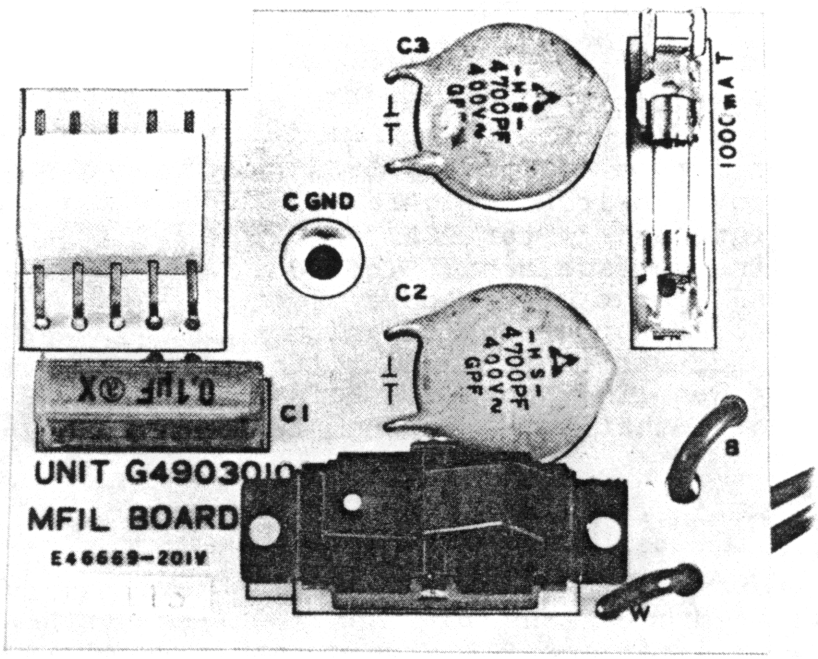


Figure 2-2. Fuse and Filter PCA, Layout

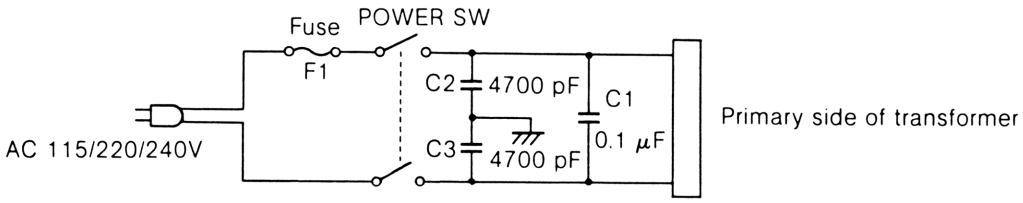


Figure 2-3. Fuse and Filter PCA Schematic

voltages are converted into the required DC supplies by means of rectifier and regulator circuits contained on the control PCA. Figure 2-5 shows the rectifier and constant voltage circuit schematic. The following voltages are produced:

+ 24 VDC	Print head solenoid and stepper motors
+ 5 vDC	TTL logic supply
+ 12 VDC	Buzzer, LEDs, etc.
+ 14 VDC	Stepper motor holding current
12 VAC	Interface (Serial, e.g.) driver supply

If any supply voltage drops below normal, the constant-voltage circuitry detects this condition and causes a reset signal to be generated in the control circuit and also inhibits voltage from being applied to the print-head solenoid driving transistors, thus assuring proper energization of the print head solenoid.

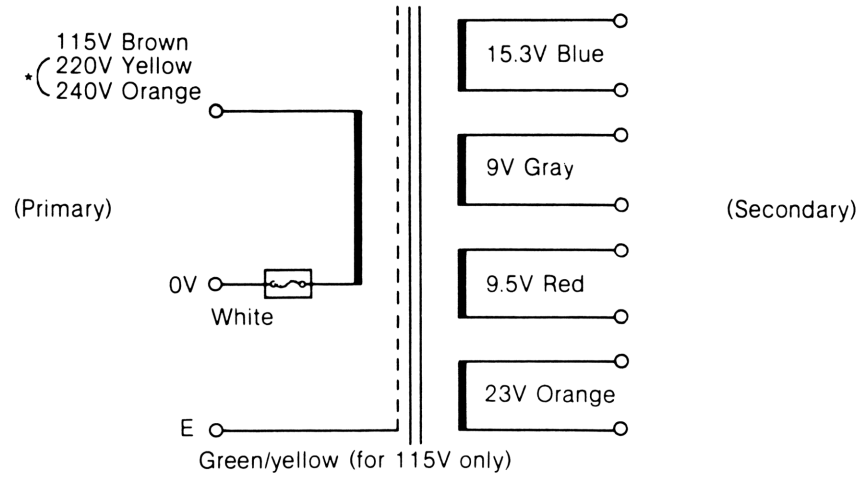


Figure 2-4. Transformer Windings Diagram

2.5 I/O Processor

Data and control signal exchange with an external computer is performed by an 8155 IC, which is an I/O processor with 256 bytes of RAM. The 8155 is operated in the ALT3 mode according to the command from the 8049 (main) microprocessor. In this case, port PC2 is used as the input port for the strobe pulse (STB), and ports PA0-PA7 as the input ports for all data. Accordingly, when data is taken in by the strobe signal, the ready signal (RDY) is immediately output to port PC1. The strobe pulse of the data is latched by the 8155 at the trailing edge of the pulse. Ports PC4 and PB0-PB7 of the 8155 are used to output the respective drive signals for the nine printhead solenoids. The 256 bytes of RAM are used as a storage buffer.

Data exchange with the main microprocessor (8049) is performed through address data bus lines AD0-AD7. Figure 2-6 shows the flow of signals through the 8155 and figure 2-7 the 8155 and its support circuits. The data transfer sequence timing is shown in figure 2-8.

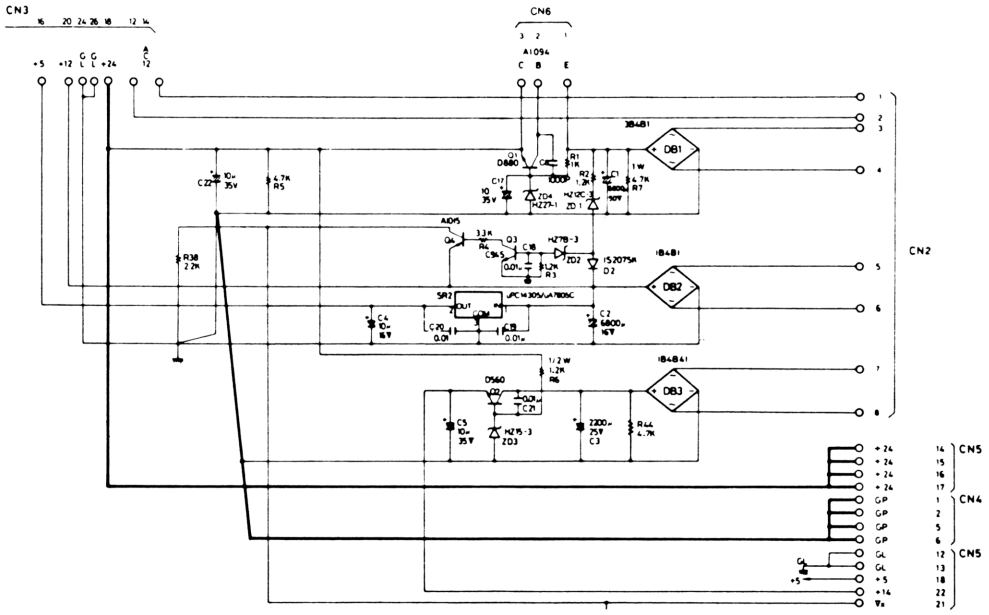


Figure 2-5. Constant Voltage Circuits

2.6 Slave Processor

The 8041 processor is called a slave CPU, since it receives its instructions from the main CPU, the 8049. The 8041 produces the drive signals for the two stepper motors; one to control the carriage assembly, and the other to control paper feeding. These two stepper motors are driven by two-phase excitation signals. The sequence of each phase for the carriage motor is shown in figure 2-9, and the paper-feed sequence is similar. The driving pulse width, t1, of the carriage stepper motor differs, depending on the type of character to be printed, as shown overleaf (continued on page 2-6 after diagrams):

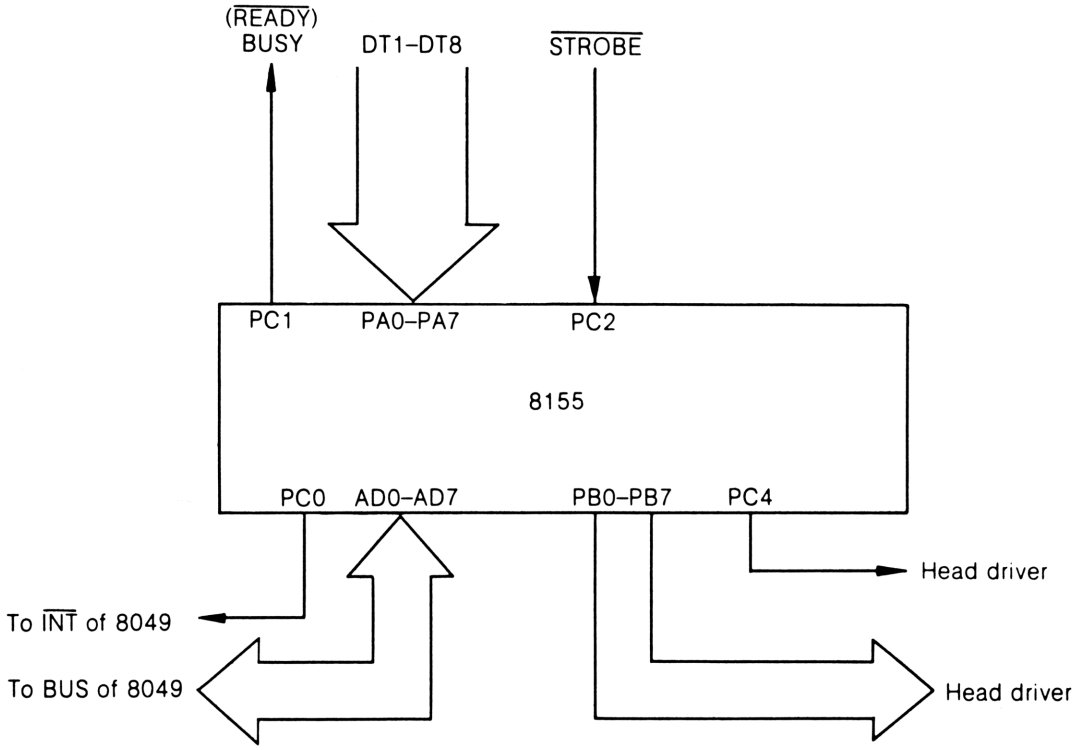


Figure 2-6. I/O Processor, 8155, Signal Flow

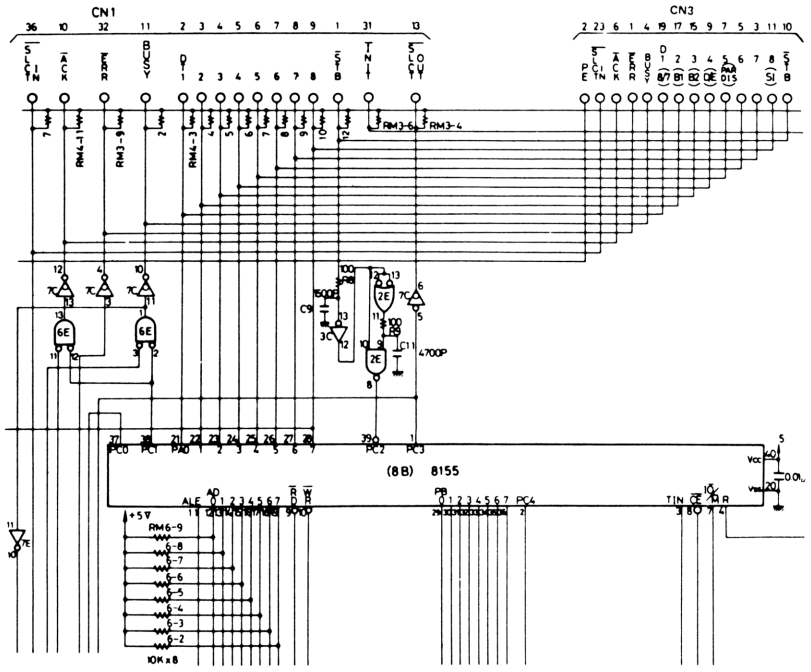


Figure 2-7. I/O Processor (8155) Schematic

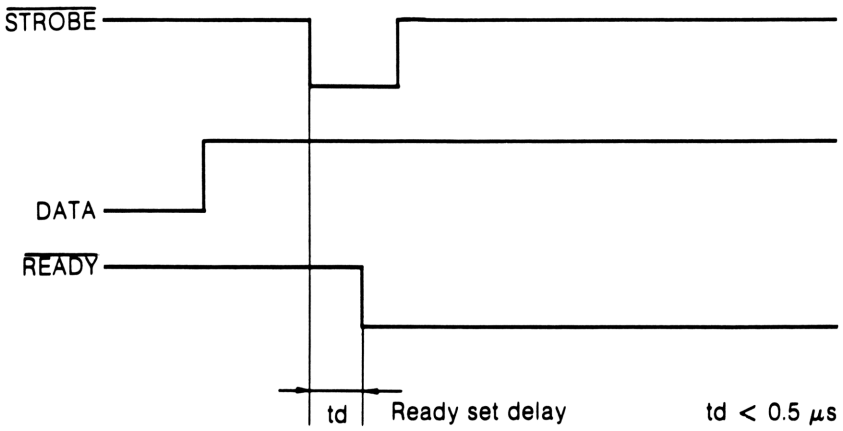


Figure 2-8. I/O Processor Data Transfer Timing

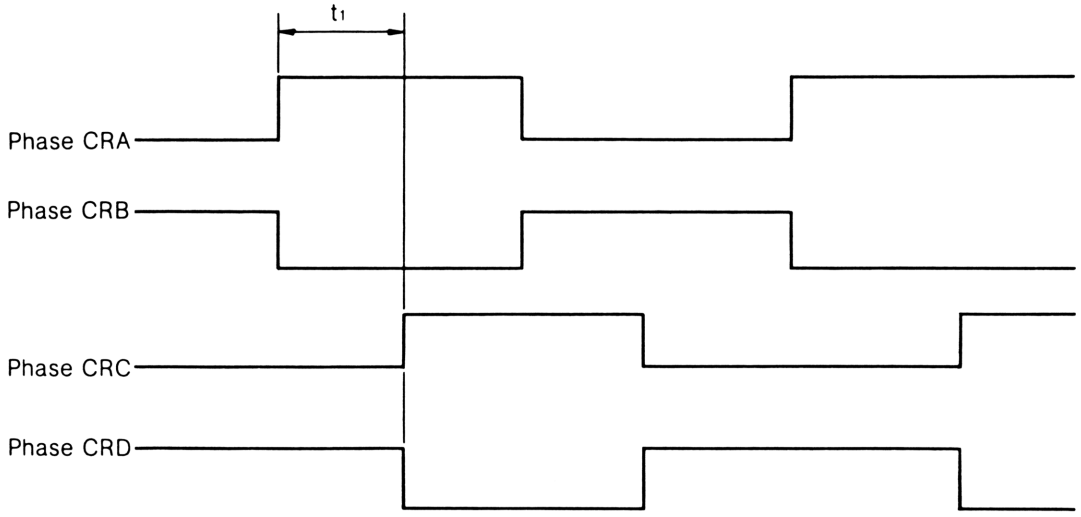


Figure 2-9. Carriage Motor Phase Relationships

a. Pulse width, t1, of carriage stepper motor-

- approximately 2.08 msec for normal and enlarged characters.
- approximately 4.16 msec for condensed characters.

b. Pulse width, t2, of paper feed stepper motor-

- approximately 4.16 msec.

In addition to the two stepper motor drive signals, the 8041 generates a control signal which lowers the applied voltage of each stepper motor so that the motor is not generating unwanted heat when it is not driven. Figure 2-10 shows the 8041 and its support circuitry.

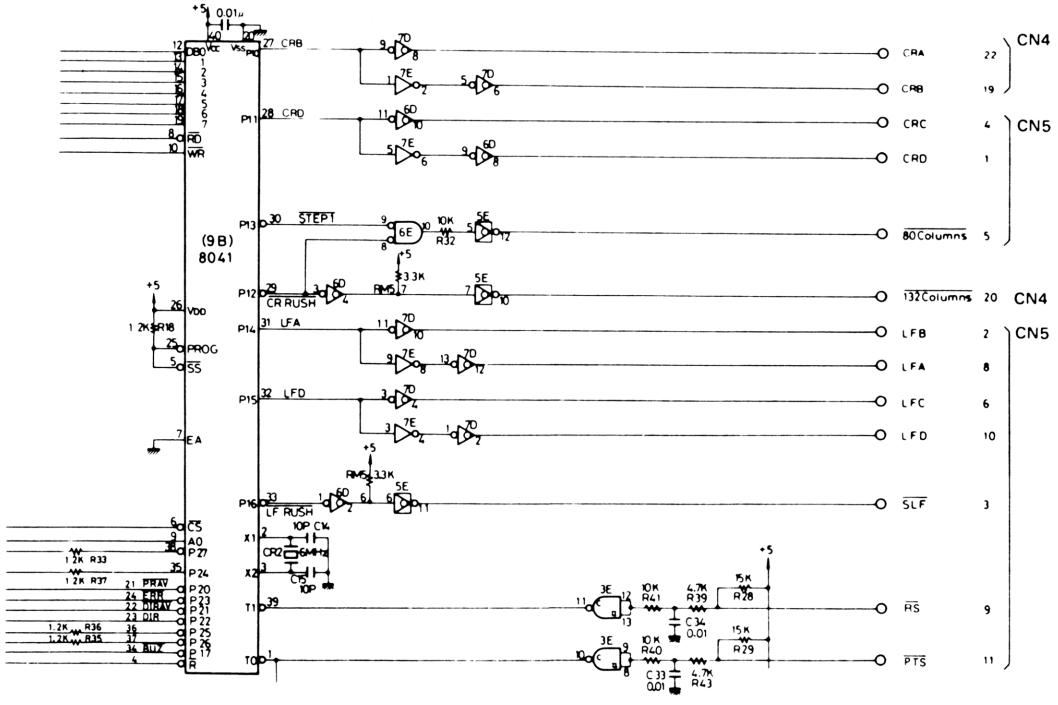


Figure 2-10. Slave Processor Schematic

2.7 Main Processor

The 8049 LSI functions as the main controller for the printer. The 8049 executes all instructions according to data stored in the 2332 or 2716s (ROM or EPROMs). The ROM data is latched into the 74LS175 by the ALE (address latch enable) signal of the 8049 and taken into the 8049 through the address/data bus lines, for decoding. The basic clock of the 8049 is generated by a 6 MHz crystal oscillator. The pulse spacing of the ALE signal is about 2.5 microseconds, as shown in figure 2-11. Figure 2-12 is the schematic for the 8049 IC and its support circuitry, including the fixed program ICs, which consist either of one ROM, a 2332, or three EPROMS, type 2716 or equivalent. There is also 2K bytes of ROM contained within the 8049 and these ICs cannot be exchanged between different versions of printers, (that is A or B) unless EPROMs are used. When EPROMs are used, jumper J1 on the control PCA must be cut so that the 8049 will use external memory only.

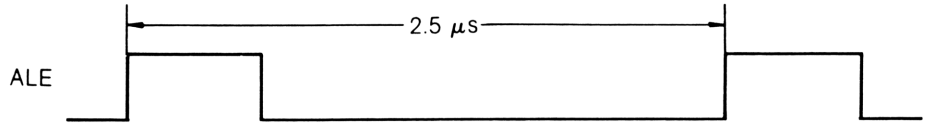


Figure 2-11. ALE Signal Timing

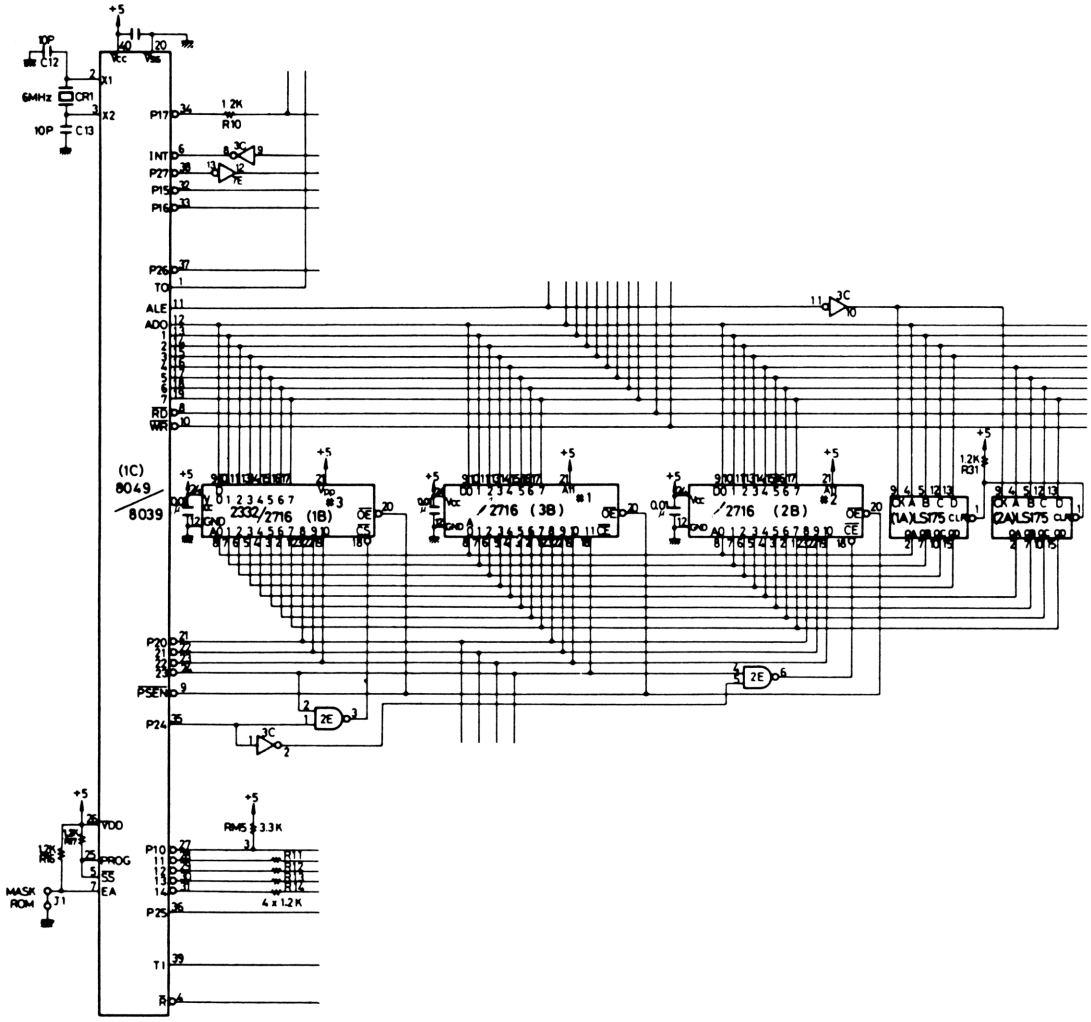


Figure 2-12. Main CPU (8049) Schematic

2.8 DIP Switch Status Read Circuit

Since varied requirements exist for different uses of the HP 82905B, there are two DIP switches located on the control PCA to allow some reconfiguration to the printer. These switches and two latches, type 74LS367, are used to change the status of the printer. The latches are assigned to the external memory space (D00H-EFFH) of the 8049. The DIP switches consist of an eight-pole switch and a four-pole switch, and the status of these can be read under software control. The use of these switches is detailed in table 2-1. Figure 2-13 shows the location of these switches, and figure 2-14 contains the schematic of the DIP switch status circuit. Table 2-1 also shows the factory settings of these switches for each printer version.

Table 2-1. DIP Switch Settings

PIN NO.	FUNCTION	ON	OFF	FACTORY SETTING 'A'	'B'
1-1	Default line spacing.	1/8"	1/6"	OFF	OFF
1-2	Default form length.	12"	11"	OFF	OFF
1-3	*Columns per line.	3 ON, 4 ON-132 3 ON, 4 OFF-96		OFF	OFF
1-4	*Columns per line.	3 OFF,4 ON-132 3 OFF,4 OFF-80		OFF	OFF
1-5	*Selects high-geared or normal mechanism.	High	Normal	OFF	OFF
1-6	*Paper end detector.	Not Valid	Valid	OFF	OFF
1-7	*Character set:	ASCII	JIS	ON	OFF
1-8	SLCT IN signal.	Fixed.	Not Fixed.	ON	ON
2-1	*Special character	USA:1 ON	2 ON	ON	OFF
2-2	*sets, as follows:	France 1 ON Germany:1 OFF England:1 OFF	2 OFF 2 ON 2 OFF	ON	OFF
2-3.	*AUTO FEED XT signal.	Fixed.	Not Fixed.	OFF	OFF
2-4.	Skip over perforation.	Valid.	Not Valid.	ON	ON

* Note: Switch function descriptions marked with an asterisk are defined for the HP 82905A only. These functions are selected by software on the HP 82905B. All other switches are defined the same for both.

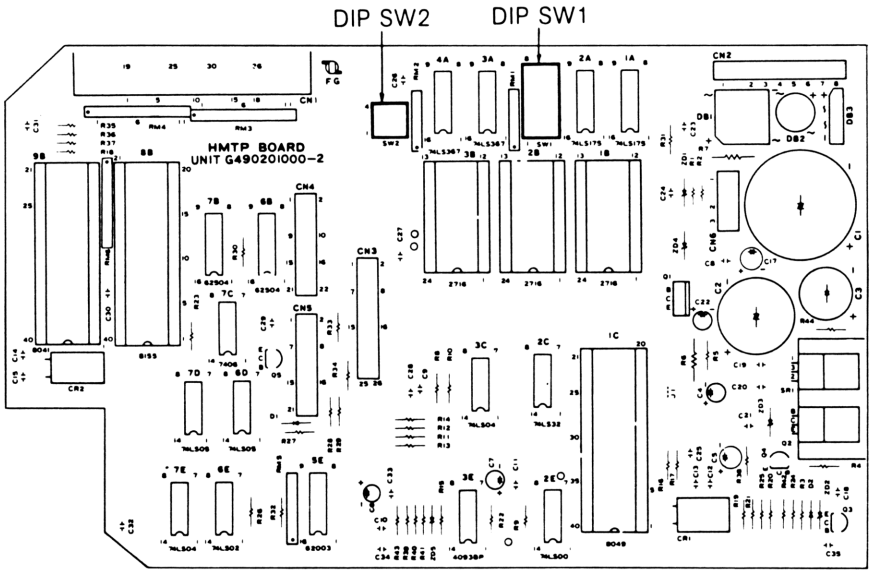


Figure 2-13. DIP Switch Locations

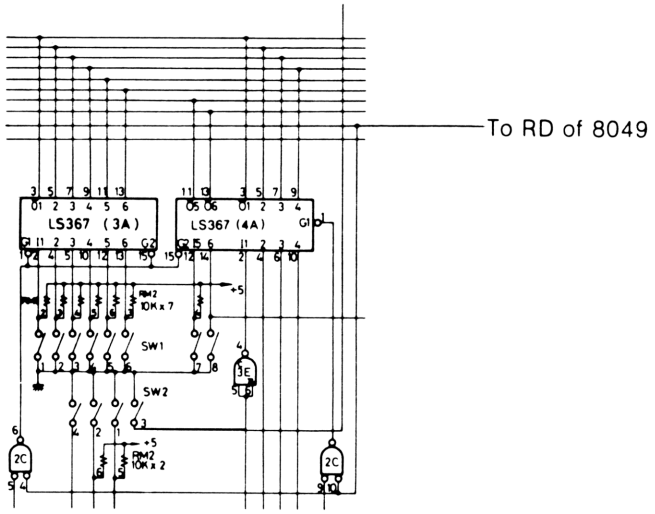


Figure 2-14. DIP Switch Schematic

2.9 Reset and Timing Sensor Circuits

The reset (HP sensor) circuit is provided to detect the left end, or home position, of the print head when the power switch is first turned on, or whenever the initialize (INIT) signal is applied to the printer. The detection of this signal is performed by an optocoupler. Figure 2-15 shows the schematic of this circuit. The output from the phototransistor is integrated and applied to a Schmitt trigger which prevents the signal from being disturbed due to noise or mechanical vibrations.

The print-timing signal (PTS) sensor circuit functions to confirm the position of the print head driven by the carriage stepper motor. The timing sensor circuit is identical in operation to the reset circuit. Figure 2-16 shows the nature of the timing of these signals.

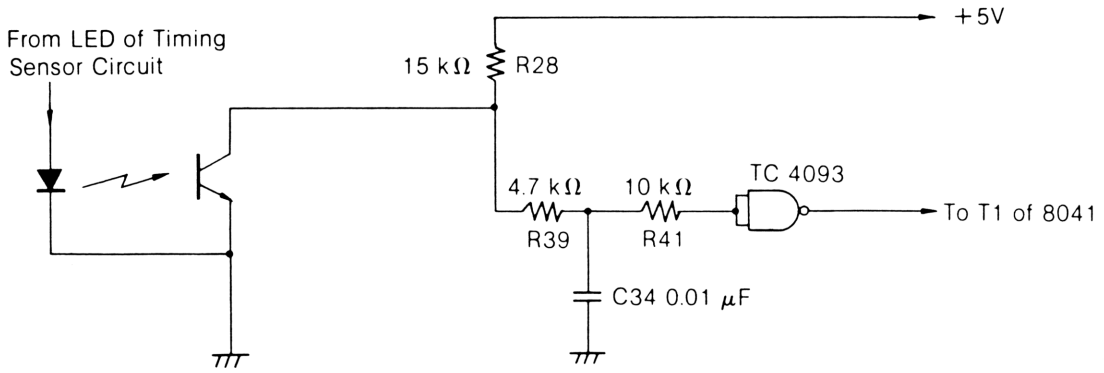


Figure 2-15. Home Position Sensor Schematic

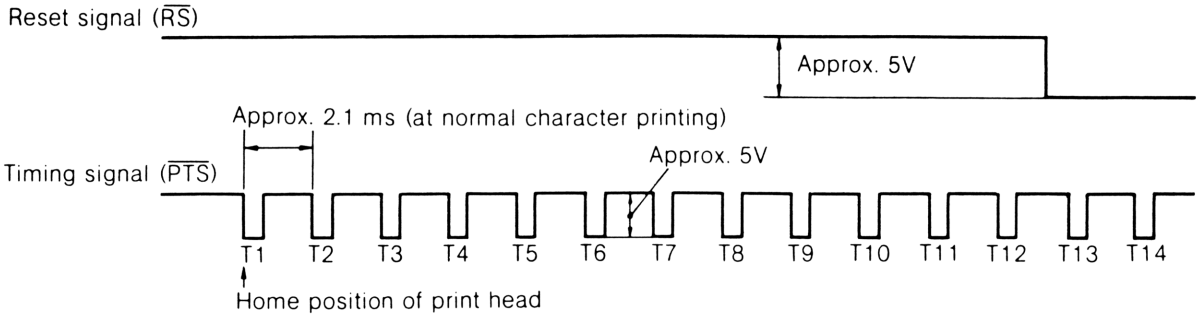


Figure 2-16. Timing Relationships (PTS)

2.10 Driver PCA

The driver circuit amplifies the control signals for the motors and print head to supply the currents necessary for driving these. Reference diagram 7-5 shows the driver circuitry, which basically consists of transistor amplifiers. The driver PCA can be divided into two main parts; the print head drive, and the motor drive. These will be discussed separately. The 555 IC sets the pulse width for the print head drive signals, and insures that constant energy is applied, even with voltage fluctuations. The trimming potentiometer, VR1, allows adjustment of this pulse width. This adjustment is described in the troubleshooting section. The current waveform for the print head drive is shown in figure 2-17. Since the load of the amplifier is an inductive component, the output transistor must be regulated by a zener diode so that a collector breakdown will not occur.

The stepper motor driver functions to amplify the two-phase excitation signals, as well as to lower the applied voltage of each motor so that it is not unnecessarily heated, when it is not driven. Both the carriage and paper feed motors require a mean current of approximately 0.3A when they are driven by two-phase excitation signals. The carriage motor operates at approximately 500 pulses per second when the character is printing in Normal mode at 80 columns.

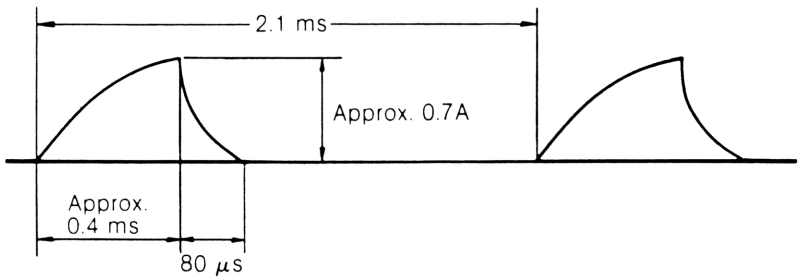


Figure 2-17. Print Head Current Waveforms

2.11 Control Panel

The HP 82905B Printer has three non-locking switches and four green light emitting diode (LED) indicators on the front panel. These switches and indicators are connected directly to ports of the 8041 and 8049 and their operations are under software control. The nine signal wires extending from the control panel PCA to the control PCA (do not confuse the two), are desribed in table 2-2.

Table 2-2. Control Panel Signals

Connector Pin No.	Signal Name	Description of Signal	Color of Lead
1	ON LINE LP	Signal for illuminating ON LINE indicator	Purple
2	PE LP	Signal for illuminating NO PAPER indicator	White
3	READY LP	Signal for illuminating READY indicator	Gray
4	ON/OFF LINE SW	ON LNE switch	Yellow
5	FF SW	FORM FEED switch	Orange
6	LF SW	LINE FEED switch	Blue
7	GL	Ground	Black
8	+12	+12VDC	Brown
9	BUZZER	Buzzer	Red

2.12 Printer Mechanism

The printer mechanism can be divided into the following functional blocks:

1. Print head
2. Head carriage mechanism
3. Paper feeding mechanism
4. Ribbon feeding mechanism and ribbon assembly
5. Detecting assemblies (sensors)
6. Printer mechanism frame

These will be discussed in turn in the following paragraphs:

2.13 Print Head

The print head is the heart of the printer, and serves as the nucleus of the printer operations. Refer to the diagram of figure 2-18 for the following description of the print head functions.

When a current is applied to the magnet, the collar portion of the dot wire is forced out, against the pressure of the spring. The clearance between the actuator and each dot wire has been adjusted so that the dot wire protrudes about 0.6 mm when its collar portion is pushed. The protruding wire strikes the paper though the ribbon and is forced to return both by the spring action and the reaction of its impact against the paper.

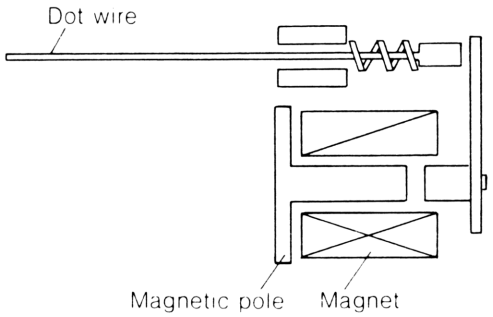


Figure 2-18. Print Head Operation

2.14 Head Carriage and Paper Feed Mechanisms

The operations of these mechanisms are controlled by the excitation signals applied to the stepper motors. The turning force from each motor is converted by a simple gear train and conveyed to the timing belt for head carriage driving, or to the sprocket wheel, for paper feeding. These stepper motors are 4-phase, 48-pole motors. The angle of revolution per phase of each motor corresponds to the movement of the mechanics as follows:

- one phase of paper feed motor 1/216 inch (0.12 mm)
- one phase of carriage motor 1/60 inch (0.42 mm)

2.15 Ribbon Feed Mechanism

When the timing belt for head carriage driving rotates, a train of planetary pinions are also rotated by the belt driving pulley, causing the ribbon driving gear to rotate. This rotates in the same direction, whether the carriage is moving left or right, and does not rotate if the carriage is not moving. The ink ribbon itself is of the endless type, enclosed in the cartridge, and is used until the ink impregnated in the ribbon is depleted.

2.16 Detecting Mechanism

The printer mechanism has two main sensors to detect the timing and home position. The home position sensor generates the reset signal when the carriage assembly slides to the left and the optocoupler is interrupted by a protrusion on the bottom of the head carriage assembly. The print timing sensor sends the PTS signal whenever the carriage motor rotates, since the optocoupler straddles a slit disc (a disc provided with slits along its circumference), which is connected to the motor shaft. There is a third sensor, which lets the control PCA know when the printer runs out of paper. This consists of a lightweight arm to which a magnet is attached. As the magnet moves, a reed switch opens and closes, to cause the out-of-paper signal to be generated.

2.17 Printer Mechanism Frame

The frame section consists of the two side frames and one base frame, all of sheet metal construction. Between the two side frames secured on both sides of the base frame, are the mechanical components, such as the carriage assembly, the motors, the sprocket assembly, and platen.

Disassembly and Reassembly

3.1 INTRODUCTION

The following procedure describes the steps necessary to disassemble and reassemble the HP 82905B Printer in order to replace or repair faulty assemblies.

> **CAUTION**
>
> Ensure that adequate precautions are taken regarding electrostatic protection. Work at a bench that is electrostatically protected and wear a grounded wrist strap. Otherwise, ICs may be damaged.

3.2 DISASSEMBLY

In this section, the disassembly procedures are explained step-by-step with illustrations. Unless otherwise stated, reassembly is done in the exact reverse order from disassembly. Following this section is a section containing assembly notes which point out some assembly precautions and differences from the reverse disassembly procedures.

The assembly procedures are divided into three main areas: removal of the upper case, disassembly of the electrical circuits, and disassembly of the printer mechanism.

3.3 Removal of Upper Case

Note: Before proceeding with step 1 below, be sure that the paper is removed from the printer.

1. Remove the paper feeding knob by pulling it off the shaft.
2. Using a Posidriv #1 screwdriver, remove the four screws from the bottom of the printer, located near the corners of the bottom case.

3. Taking care to clear the paper feeding shaft, remove the upper case. The front panel connector does not allow the upper case to be moved very far, and if the printer is to be further disassembled, the control panel connector should be removed. Tilt the upper case until the connector is visible (located at the edge of the control panel PCA) and then gently pull the connector off of the PCA to finish separating the case from the printer.

3.4 Removal of PCAs

Figure 2-1 shows the locations of the printer components that are visible upon removal of the upper case.

The electric circuit portion of the printer consists mainly of a driver PCA, a control PCA, a power transformer, a fuse and filter PCA, and an optional interface PCA. The disassembly procedures described here are useful when replacing any of the electrical components found to be defective as a result of troubleshooting.

Note: Many of the circuit boards contained in the printer are made of a lightweight phenolic which will not withstand rough handling. Even moderate handling has been found to cause hairline cracks or fractures in the circuit board traces. Therefore, do not bend the PCAs, and do not stack them, to avoid these problems.

CAUTION

Prior to dismounting any components from the printer, be sure that the power connector is disconnected from the AC power source. Line voltages can be lethal.

3.5 Driver PCA

Refer to figure 3-1 for this disassembly procedure.

1. Unplug the male contact-type connector, CN6 (1) extending from the printer mechanism to the driver PCA.

2. Remove the two screws (2) located by the female connector (CN6), that secure the driver PCA to the bottom case.

3. Taking care to exert force at the connected edge of the driver PCA, lift the PCA up and off of the two control PCA connectors, CN4 and CN5.

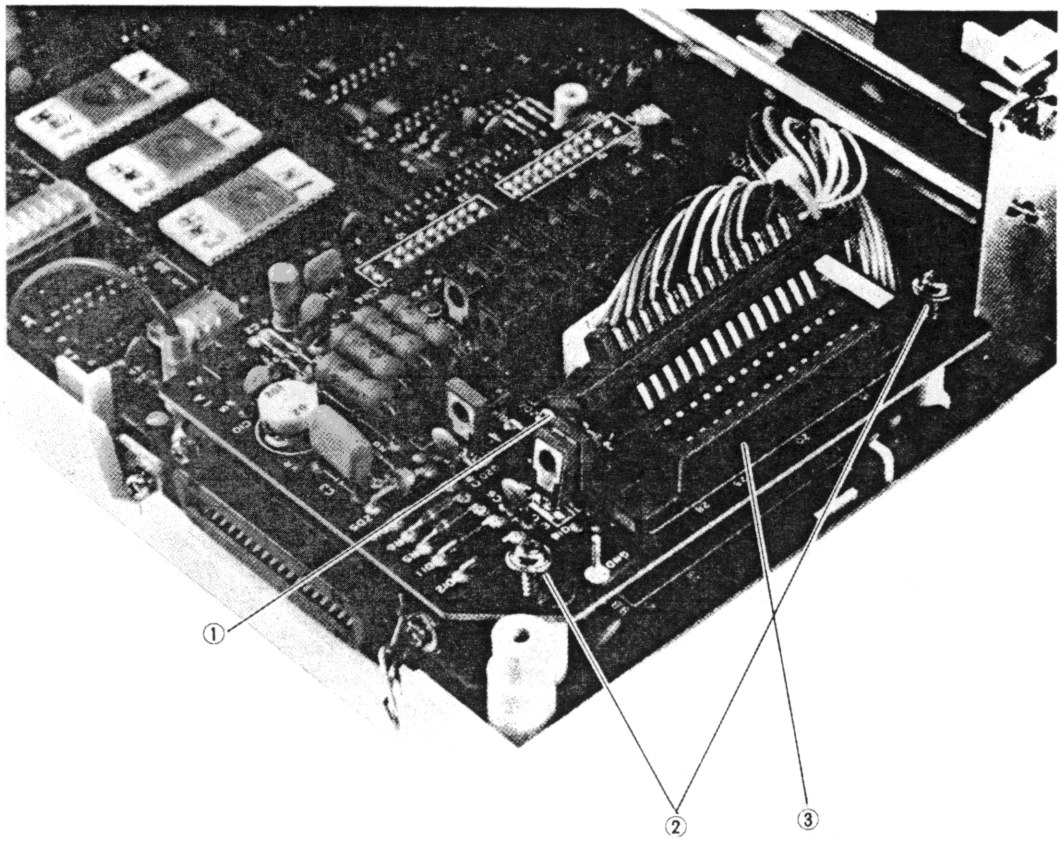


Figure 3-1. Driver PCA Removal

3.6 Interface PCA Removal

If the printer utilizes the parallel interface, then there will be no interface PCA. Otherwise, one of the optional interface PCAs will be installed. To remove it, follow this procedure:

1. Unplug the interface PCA from any interface cables which may still be plugged in.

2. Remove the screw, located at the back of the printer, which connects the interface grounding briad to the control PCA.

3. Remove the frame ground wire which connects the interface PCA to the line filter by lifting the wire from the lug on the interface PCA.

4. Remove the four screws, located at the edges of the interface PCA, which secure the PCA to the bottom case.

5. Carefully lift the interface PCA off the control PCA connectors, exerting force mainly at the connector edge of the PCA.

3.7 Control PCA

The control PCA is the main circuit board, and must be handled with extra care. Refer to figure 3-2 for the following procedure.

1. Unplug the connector (1) which extends from the power transformer to the control PCA and disconnect the frame ground wire (2) extending from the line filter to the control PCA. This will have already been removed if there was an interface PCA present.

2. Unplug the connector (3) extending from the heat sink to the control PCA, and remove the two screws (4) securing the smaller heat sink to the chassis.

3. Remove the screw (5) securing the control PCA to the bottom case.

4. Unhook the control PCA from the bottom case, held in three places at the edge farthest from the line filter PCA.

5. Loosen the screws securing the transformer to the bottom case, if necessary, to give more clearance to the control PCA, and then lift the latter up and out of the printer.

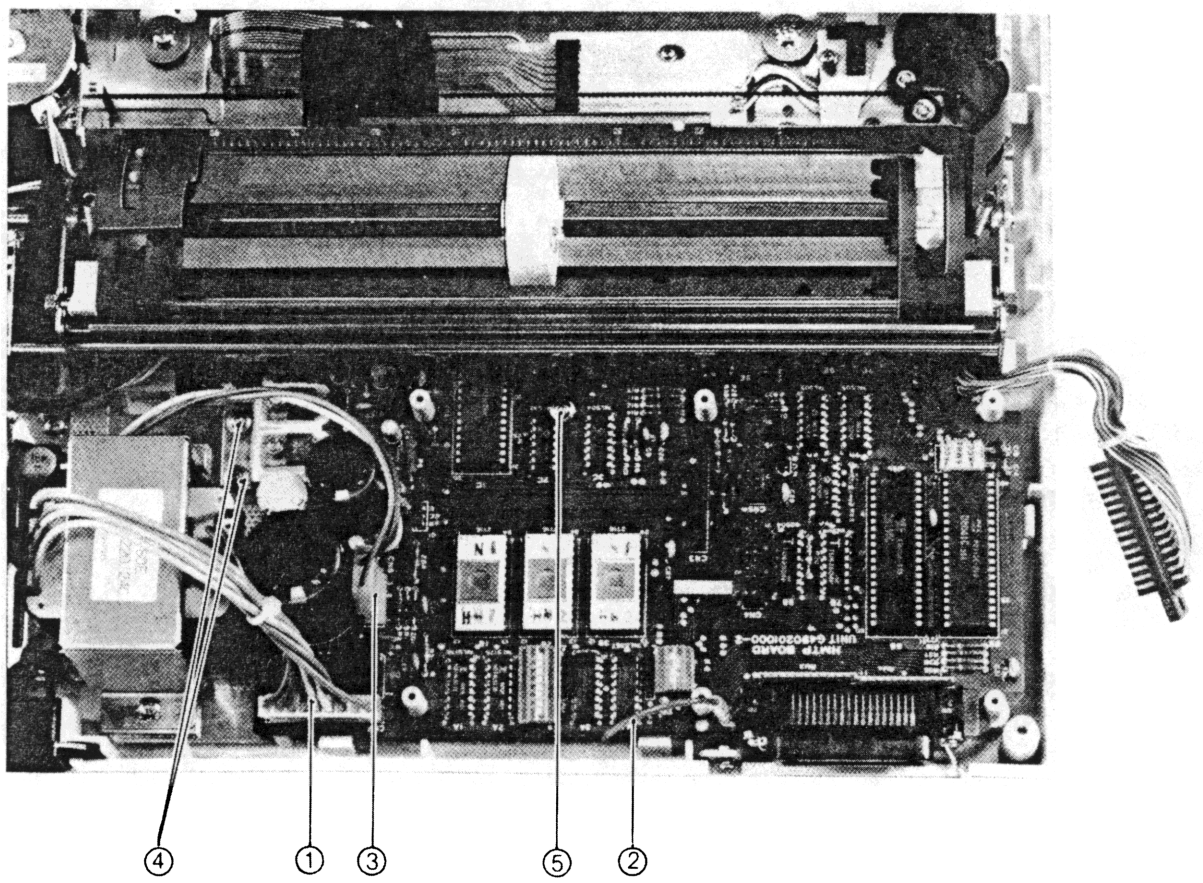


Figure 3-2. Control PCA Removal

3.8 Power Transformer

The power transformer varies with the voltage option. For the 220/240V specifications, there is no electrostatic shield wire. For the purposes of disassembly, the versions are otherwise identical. See figure 3-3 for removal of the transformer.

1. Unplug the connector (1) extending from the power transformer to the fuse and filter PCA and remove the screw (2) securing the electrostatic shield wire.

2. Remove the two screws (3) securing the power transformer to the bottom case.

3. Remove the power transformer.

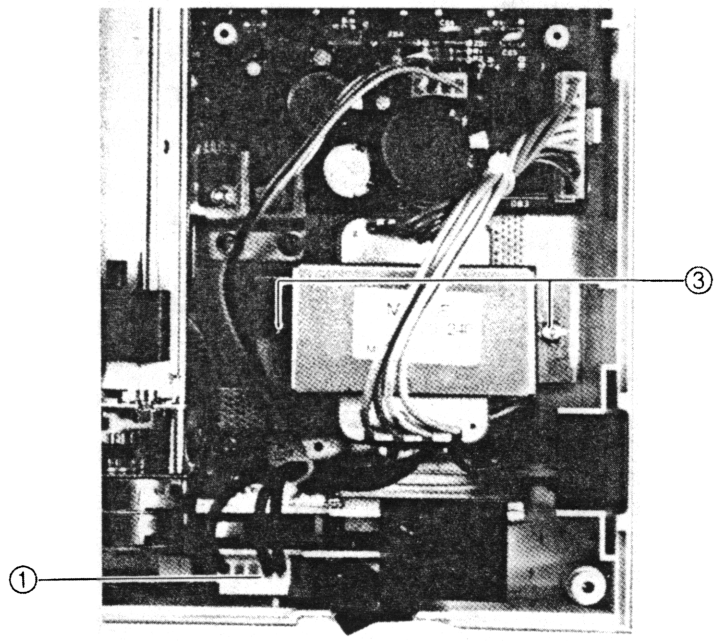


Figure 3-3. Power Transformer Assembly Removal

3.9 Fuse and Filter PCA

Refer to figure 3-4 while dismounting the fuse and filter PCA.

1. Remove the screw (1) securing the ground wire to the lower case.

2. Remove the 'C GND' screw (2) on the fuse and filter PCA.

3. Lift and remove the fuse and filter PCA together with the power connector.

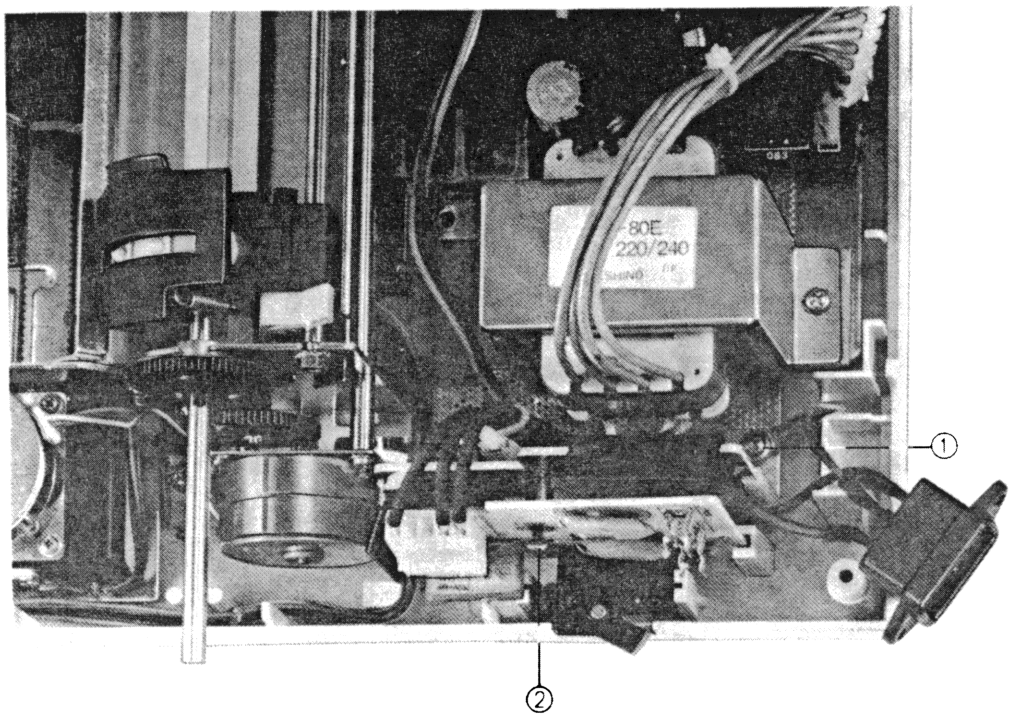


Figure 3-4. Fuse and Filter PCA Removal

3.10 Printer Mechanism

Before removing the printer mechanism from the bottom case of the printer, the control PCA must be removed. Also, check to make sure the shipping screws, located on both sides of the center of the bottom of the printer, are removed. These may not have been removed by the user, or may have been installed to ship it for repair. See figure 3-5 when removing the printer mechanism from the printer.

1. Remove the three cup screws (circled in the illustration) which secure the printer mechanism to the bottom case. There are two in front and one in the ground strap, a sheet metal strip located at the right side of the mechanism.

2. Lift the printer out of the case.

3.11 Replacing the Print Head

The print head can be replaced very easily as follows (referring to the figure):

1. Manually move the print head to the right end of the unit.

2. Remove the head cable (FPC) from the connector of the terminal board on the base of the printer. This cable is fragile and must not be bent. It is best to pull the cable apart from the connector by holding the cable and the reinforcing sheet which is part of the cable assembly. This will ensure that the cable is not damaged while being removed and inserted during trouble-shooting and adjusting.

3. Turn the head lock lever at the base of the print head clockwise and lift the print head out of the printer.

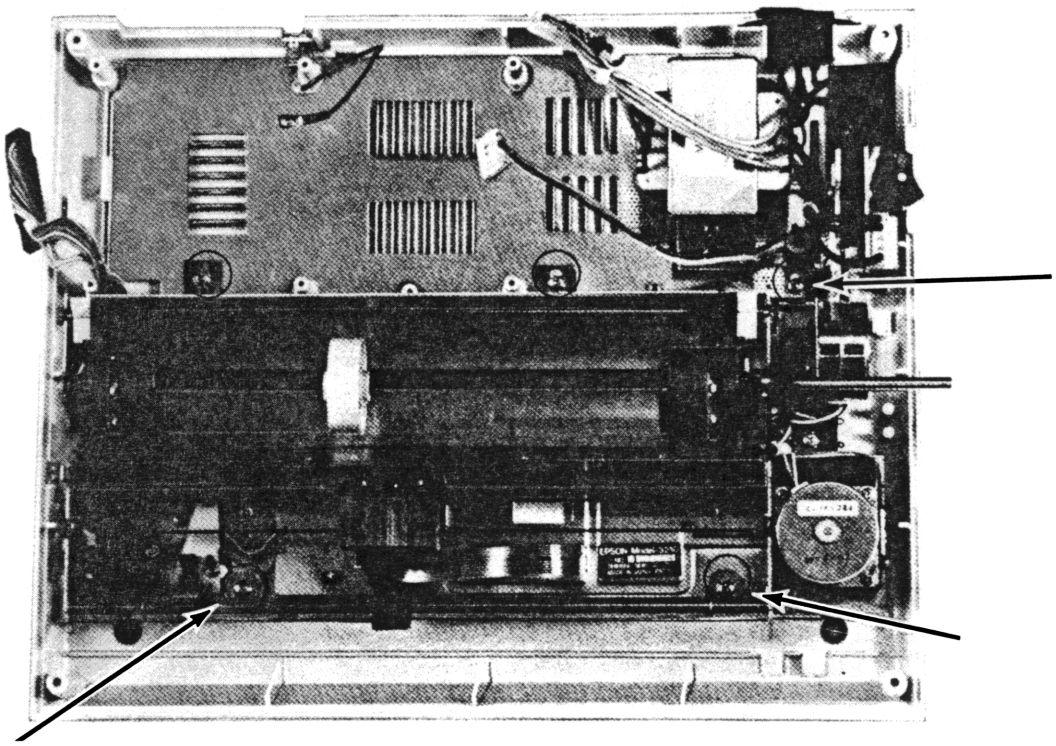


Figure 3-5. Removing the Printer Mechanism

3.12 Replacing the Home Position Sensor Assembly

Refer to figure 3-7 when replacing this assembly.

1. Unsolder the three lead wires of the home position sensor from the terminal board.

2. Remove the cup screw and retaining ring securing the home position sensor assembly.

3. Remove the home position sensor assembly.

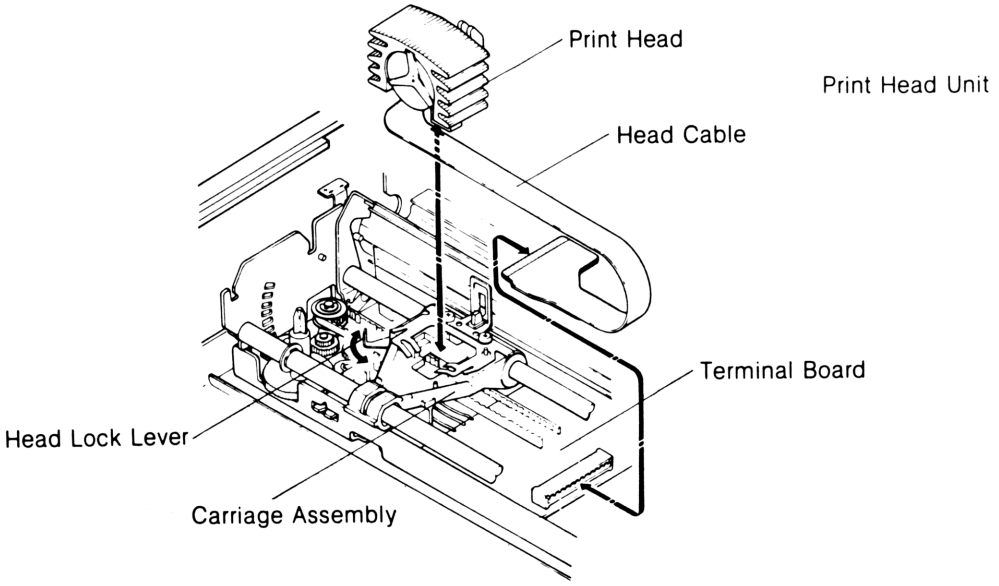


Figure 3-6. Removing the Print Head

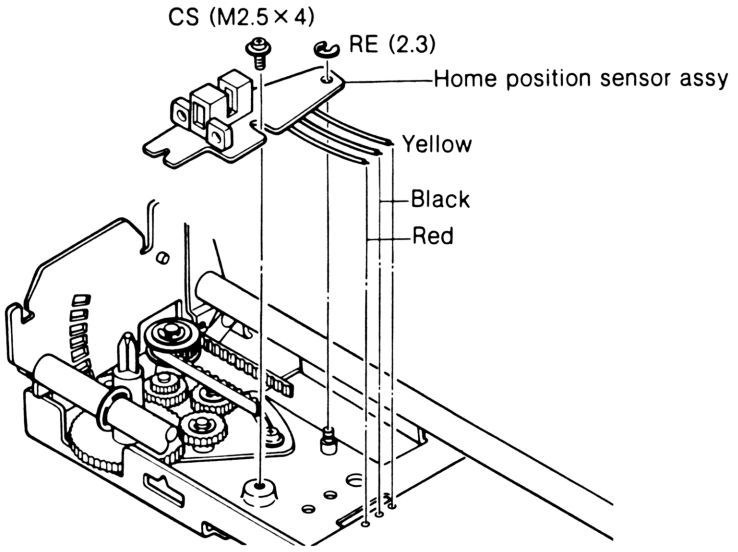


Figure 3-7. Removing the Home Position Sensor

3.13 Replacing the PTS PCA Assembly

Refer to figure 3-8 for the following procedure.

1. Unsolder the four lead wires of the PTS PCA assembly.
2. Remove the cup screw securing the PTS sensor assembly to the motor heat sink.
3. Remove the PTS sensor assembly.

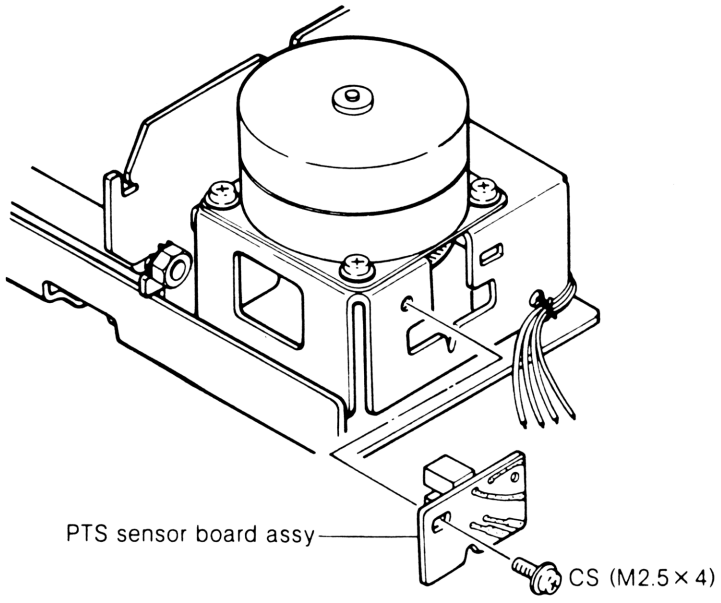


Figure 3-8. Removing the PTS Sensor

3.14 Replacing the Timing Belt Motor Assembly

Refer to figures 3-9 and 3-10:

1. Remove the printer mechanism from the printer base if it is not already removed.

2. Untie the wire band securing the bundle of lead wires that supply the signals to the timing motor.

3. Remove the four cup screws securing the timing belt motor assembly to the motor heat sink.

4. Unsolder the six lead wires for the timing belt motor from the terminal board and remove the timing belt motor.

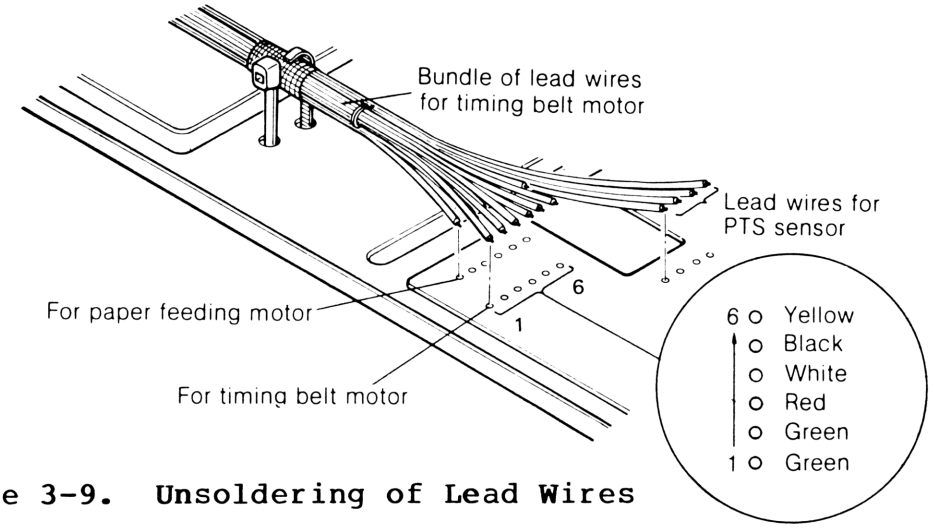


Figure 3-9. Unsoldering of Lead Wires

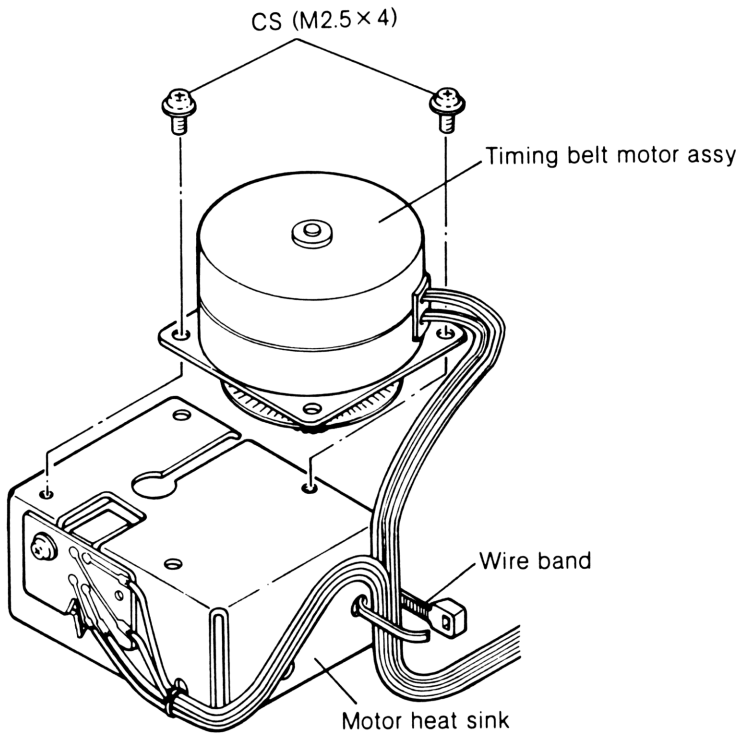


Figure 3-10. Removing the Timing Belt Motor

3.15 Replacing the Paper-Feed Motor Assembly

See the illustration in figure 3-11:

1. Remove the printer mechanism from the printer if it has not already been removed.

2. Untie the wire band securing the bundle of lead wires that go to the paper-feed motor assembly.

3. Unsolder the six lead wires for the paper-feed motor from the terminal board.

4. Remove the two cup screws which secure the paper-feed motor to the printer mechanism and remove the motor.

3.16 Replacing the PE PCA Assembly

The PE (paper end) sensor PCA assembly consists of a magnet mounted on an actuation lever and a reed switch. Refer to the diagram, figure 3-12, when replacing this assembly.

1. Unsolder the two lead wires from the PE sensor assembly.

2. Unhook the PE lever spring from the outer paper guide.

3. Remove the PE sensor assembly.

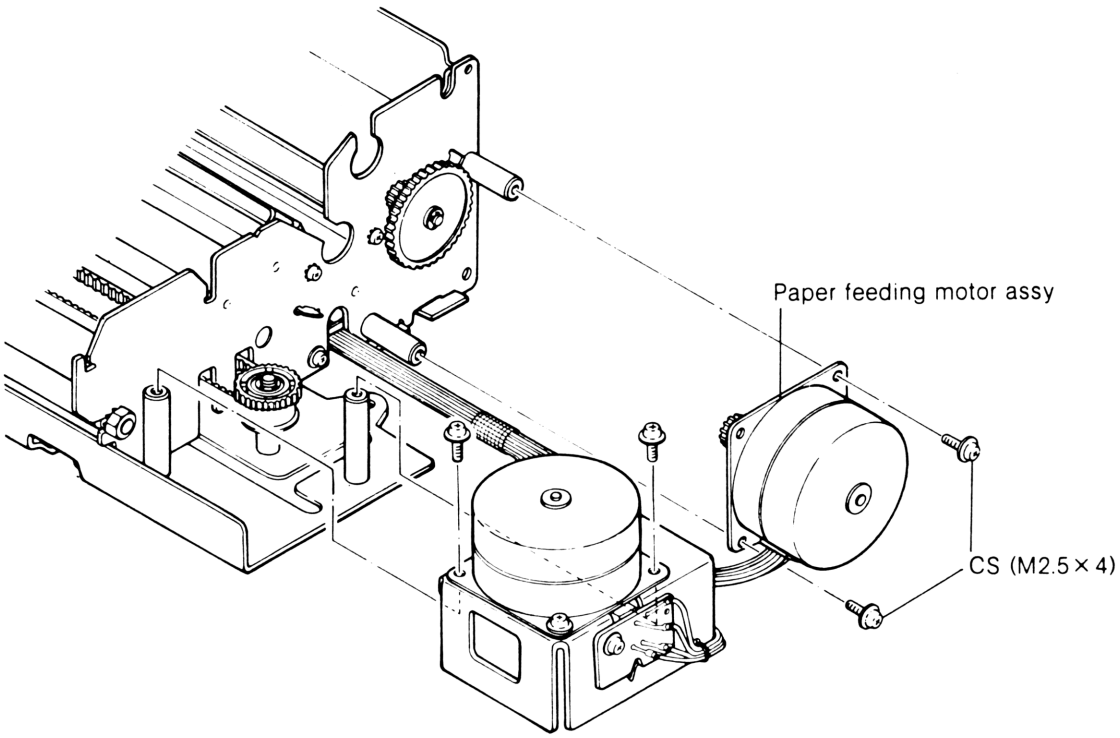


Figure 3-11. Removing the Paper Feed Motor

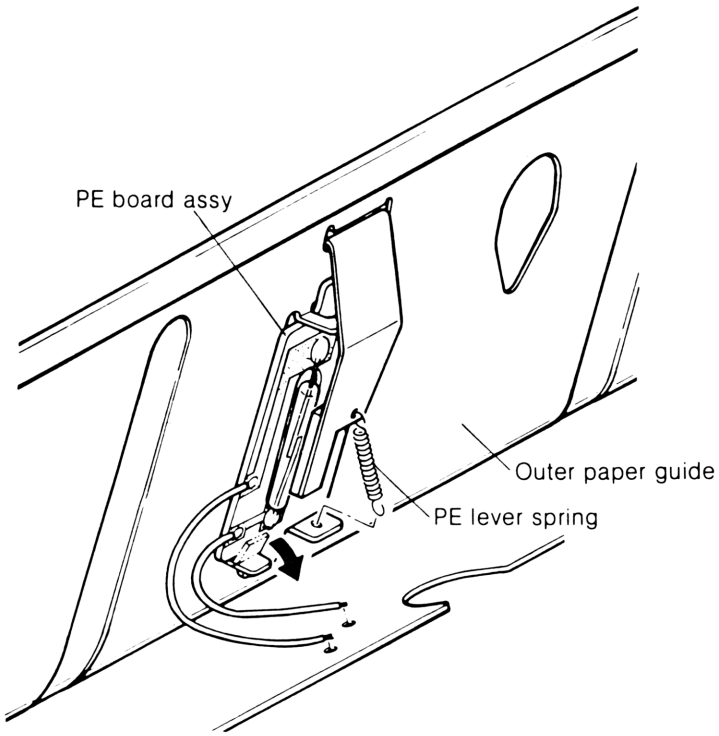


Figure 3-12. Replacing the Paper End Sensor

4.1 INTRODUCTION

This section describes the recommended lubrication and adjustment methods for the HP 82905B Printer. Lubrication and alignment are important to sustain the rated performance characteristics of the printer.

4.2 LUBRICATION

Perform lubrication in accordance with the procedures outlined in this section.

4.3 Lubricants

Performance and durability are greatly affected by the type of lubricant employed. In particular, attention must be paid to the low temperature characteristics of each lubricant to be used for the printer. The two kinds of lubricants listed below have been selected for use on the printer based on extensive technical studies conducted by Shinshu Seiki.

4.4 Lubrication Standards

The printer mechanism employs two kinds of lubricants, O-2-EPS (oil) and G-2-EPS (grease). Before lubricating the printer in reassembly be sure that all points requiring lubrication have been thoroughly cleaned, and then perform lubrication by referring to table 4-1 for the lube point and lubricant to be used. Periodic lubrication of the printer must be performed upon overhaul or after having printed 5,000,000 lines, with the exception that lube point 1 (see table), requires lubrication every 1,000,000 lines or every 6 months. Note that lubrication is mandatory after parts replacement or unit disassembly, or when the lubricant has been removed as a result of cleaning.

Table 4-1. Lubrication Points

NUMBER	LUBRICATION POINT	LUBRICANT
1	Carriage shafts A and B	O-2-EPS
2	Moving part of head lock lever	G-2-EPS
3	Hook parts of head lock lever spring	G-2-EPS
4	Sliding part of head adjusting lever	G-2-EPS
5	Toothed part of belt driving pulley	G-2-EPS
6	Gear teeth of timing belt motor assembly	G-2-EPS
7	Teeth of sprocket transmission gear	G-2-EPS
8	Gear teeth of paper feed motor assembly	G-2-EPS
9	Teeth of ribbon driving gear and shaft	G-2-EPS
10	Teeth of planetary pinion, contact area between pinion and leaf spring, and shaft	G-2-EPS
11	Toothed part of planetary lever assembly and securing shaft	G-2-EPS
12	Contact area between belt driven pulley flange and plain washer	G-2-EPS
13	Teeth of sprocket gear	G-2-EPS

4.5 BONDING

It is recommended that an adhesive be applied to the set screws and nuts securing the parts of the printer mechanism to prevent the assembled parts from loosening due to vibration during operation of the printer. Therefore, whenever the printer mechanism is disassembled for repair or parts replacement, be sure to apply a small amount of set screw locking compound, NEJI-EPS to the specified bonding points listed below.

Note: Be sure to apply only enough compound to ensure that the parts do not loosen. Avoid applying adhesive on the slot of a screw head, or on parts adjacent to the one being bonded.

Table 4-2. Bonding Points

NUMBER	BONDING POINT
1	Platen securing screws (4 places)
2	Base frame A securing screws (2 places)
3	Head adjusting lever securing nut (1 place)
4	Carriage shaft A securing nuts (2 places)
5	Ribbon mask securing screws (2 places)
6	Paper feed motor assembly securing screws (2 places)
7	Timing belt motor assembly securing screws (4 places)
8	PTS sensor PCA securing screws (1 screws)
9	Paper guide plate A securing screws (3 places)
10	Terminal PCA securing screws (2 places)
11	Home position sensor PCA securing screw (1 screw)
12	Belt tension securing screw (1 place)
13	Sprocket guide shaft securing nuts (2 places)

4.6 ADJUSTMENTS

The HP 82905B has several points requiring adjustment, both electrical and mechanical. The following paragraphs describe these adjustments. In some case, an oscilloscope may be required. In several places, alternate procedures are specified which do not require the use of an oscilloscope. In each case, the recommended procedure is given first, and the alternate procedure is labeled as such.

4.7 Adjustment of Head-Driving Pulse Width

To permit the constant generation of proper printing energy in the print head, the pulse width for energizing the print head is controlled according to the voltage applied to the print head. In figure 4-3, the relationship between these quantities is specified. When measuring the print head voltage at the recommended test point, exactly 1 volt must be subtracted from the reading since the measurement is not made directly at the print head. Thus, a reading of 25V would correspond to 24V on the graph, and the pulse width must be adjusted to between .39 and .41 ms. Perform the adjustment as follows:

1. Check the voltage at the cathode of D1 on the driver PCA. If the voltage deviates more than 10%, the 24V circuit is defective.

2. Observe the pulse width at the T0 post on the driver PCA and adjust the trimmer potentiometer VR1 for the specified width, according to figure 4-3. At 24V (25V read at cathode of D1), this should be .40 ms. This adjustment can be most easily made in the self-test mode with the print head removed. The out-of paper sensor needs to be depressed while in the self-test mode.

4.8 Print-Timing Signal (PTS) Adjustment

This adjustment can be made effectively, without the aid of an oscillosope, as follows:

1. Loosen the screw on the PTS sensor PCA. See figure 4-1.

2. Listening to the sound of the printer while it is printing, slide the PCA left or right until the printer sounds the same when printing in both directions. The adjustment is off if the printer sounds slow when moving in one direction relative to the other direction. Secure the sensor by tightening the screw.

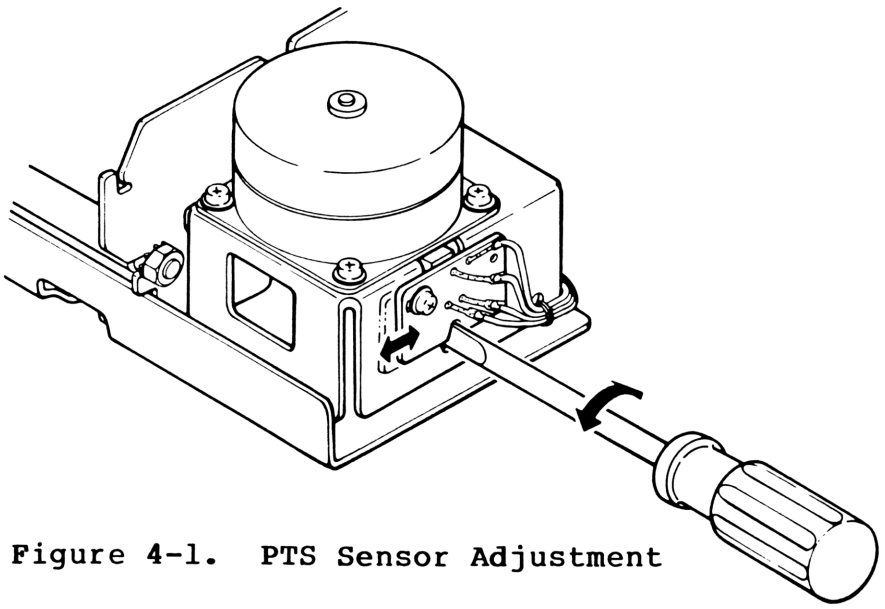


Figure 4-1. PTS Sensor Adjustment

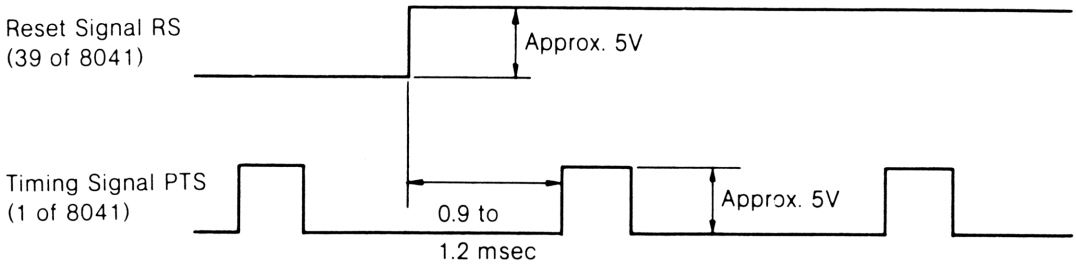


Figure 4-2. PTS Signal Waveform

Alternate Procedure:

1. Observe the PTS signal at pin 39 of the 8049. The signal will have a period of approximately 2.08 ms, with a duty cycle of nearly 50%. See the illustration, figure 4-2.

2. Loosen the screw and slide the PTS sensor PCA left or right until the pulse widths are nearly equal for printing in either direction. Use the leading, positive-going edges for reference. Make this adjustment with the print head and ribbon cartridge installed.

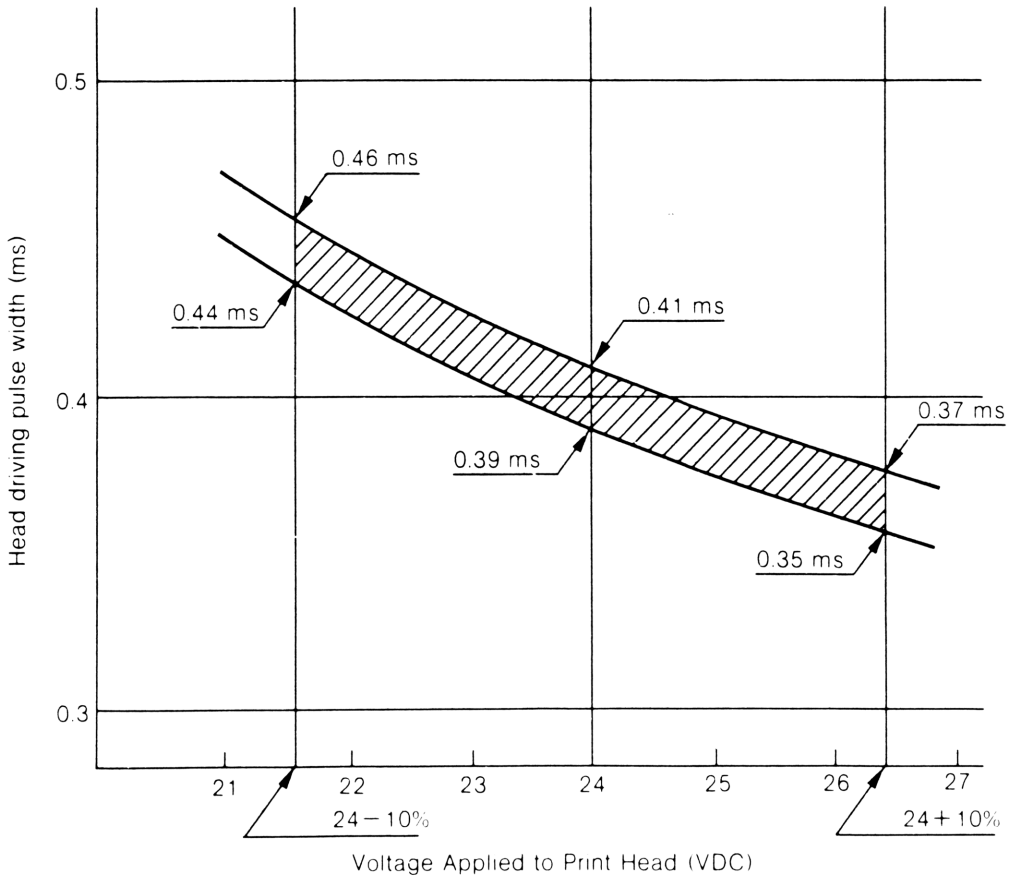


Figure 4-3. Print Head Applied Voltage versus Driving Pulse Width

4.9 Home Position Sensor (RS) Adjustment

This adjustment affects the starting position of printing. Refer to figure 4-4 and make the adjustment as follows:

Loosen the screw on the sensor PCA. Move the sensor assembly right or left until the first character printed lines up with the first position on the bail. Tighten the screw.

4.10 Carriage Motor Adjustment

This adjustment is made to allow a small amount of play between the metal gear on the carriage motor and the plastic belt-driving pulley.

1. Insert a finger through the front hole on the carriage motor bracket and hold the carriage gear with upward pressure. Grasp the carriage assembly and move it right and left gently. The timing belt should move very slightly and you should be able to feel the plastic gear move slightly.

2. Adjust for the proper play by loosening the two screws holding the carriage motor bracket to the studs and move it forward or backwards until the proper mesh is achieved. These screws must be tight when checking.

Note: This adjustment will affect vertical alignment. When adjusted properly, in normal print mode (10 characters per inch), the vertical alignment between two adjacent lines will vary between 1/4 to 3/4 of a dot width.

4.11 Paper Feed Motor Adjustment

This is also a free play adjustment, in this case between the metal gear on the motor and the plastic sprocket transmission gear.

1. Place a finger below the motor and between the side plate and motor applying upward pressure on the gear so that it does not move. Grasp the paper guide roller with your other hand and rock gently back and forth. There should be a slight movement in the sprocket gear.

2. To adjust, loosen the two screws on the motor and move up or down until the proper play is observed.

3. Tighten the screws and recheck for correct play.

Note: This adjustment affects spacing between lines. When this is correctly set, the spacing between lines will vary, but the dots should not overlap.

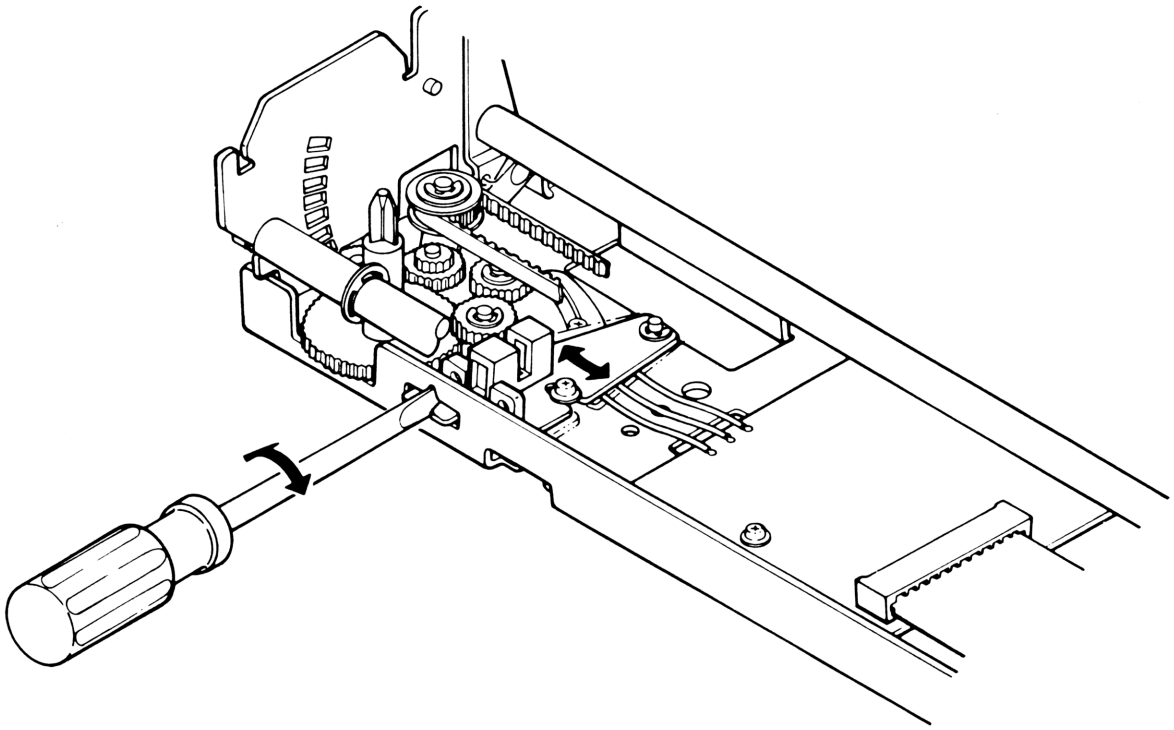


Figure 4-4. Home Position Sensor Adjustment

4.12 Carriage Belt Tension

This may be checked without a tension gauge as follows:

1. Move the print head to one end of the carriage. With one finger press in on the middle of the belt. The belt should become taut about halfway to the other side of the belt. In other words, the belt will begin to stretch when pressed in more than 3/8" at the center.

2. Loosen the screw holding the belt tension and pull out with more or less tension, as needed. Recheck after tightening.

If an adjusting gauge is available, use the following procedure:

1. Remove the printer mechanism from the base.

2. Insert a tension gauge in the hole on the left side of the sliding plate.

3. Loosen the screw holding the belt tension plate and pull to obtain a tension of 1300 grams (2.2 lbs). Tighten the screw while maintaining this tension.

4.13 Print Head to Platen Adjustment

The gap between the print head and platen should be .65 mm at the middle of the platen. Adjust as follows.

1. Remove the ribbon and ribbon guide.

2. Place the head adjustment lever in the center position.

3. Insert a small screwdriver through the hole on the left side of carriage shaft B.

4. Hold the head-adjusting lever firmly and rotate the carriage shaft with the screwdriver until a gap of .65 mm is obtained between the print head pins and the platen.

4.14 Platen Adjustment

The platen is held in place by two self-tapping screws through the side plate of each side of the printer mechanism. Since the platen is aluminum, the screws will strip their holes if they are overtightened.

1. Loosen the screws and press down and forward on the platen, so that the plastic strip on the platen comes in contact with the tabs on the side plate.

2. Tighten the screws, then check the squareness of the platen by using a feeler gauge.

3. Measure the gap between the platen and the print head at both sides and the middle of the carriage. If the gap is not even, readjust, and test again.

4.15 Paper End (PE) Sensor Adjustment

With no paper in the printer, the magnet of the PE assembly should be just resting on the glass-encapsulated reed switch. The upper lever should protrude through the upper pan assembly. The switch should actuate just before the lever goes below the top paper pan. In order to achieve these conditions, bend the levers carefully. When the paper is inserted, there should be a faint 'click' as the reed switch closes.

5.1 INTRODUCTION

This section helps isolate the cause of a problem to a part or an assembly.

In many cases, a printer will be returned for repair with a note from the operator, describing the nature of the problem. This information can be very helpful when troubleshooting. Nevertheless, because of the complexity of the printer, you should always perform the recommended procedures, listed in the next few paragraphs, to further isolate the problems and confirm that the printer has the problem noted.

There are two main methods of troubleshooting described in this section. Both rely on the self-test as a major troubleshooting aid. Both methods begin logically (from the block diagram) and attempt to isolate the cause of a problem without disassembly by observing the symptoms. The difference between the methods is mainly one of depth. If there is an oscilloscope available, the second method will be preferred; otherwise, simple assembly replacement and retesting will be used. The troubleshooting charts contain many waveform illustrations and test point details. These will not be able to be tested without an oscilloscope. Most adjustments can be made without an oscilloscope, and in many cases a repair can be made much faster in this manner provided that logical troubleshooting methods are followed.

CAUTION

Ensure that the bench setup for troubleshooting and testing has adequate provisions for electrostatic protection. Otherwise, ICs may be damaged.

WARNING

Line voltages are exposed when the top case of the printer has been removed. For your own safety, always remove the power cord from the AC line voltage source when the top cover has been removed.

5.2 SYSTEM OVERVIEW

The HP 82905B Printer (see the block diagram, figure 5-1) consists of:

- A printer mechanism, with a print head, two motors, and three sensors.
- A driver PCA, with two independent sections; one for driving the print head dot wires, one for driving the motors.
- An 8041 slave microprocessor, for generating the motor drive signals according to instructions received from the main CPU.
- An 8049 main microprocessor, for controlling the operation overall of the printer, especially for directing the activities of the slave and I/O processors.
- A ROM IC (or in early versions, a set of three EPROM ICs), which contains the instructions for the 8049, along with the character set information that the printer needs to create each of the character fonts (and the graphics symbols).
- An 8155 I/O processor, which performs the buffering of data in and out of the printer (along with the interface PCA, if the printer does not use the parallel interface), and generates the print head control signals.
- A power supply, consisting of a fuse and filter PCA, a power transformer, rectifiers, and constant voltage regulators.
- Optionally, an interface PCA which allows the printer to listen to computers that have HP-IB, HP-IL, or Serial interfaces.

These are shown in the block diagram, with their relationships to each other, in terms of the signal flow. It should be pointed out that troubleshooting always begins here. After the printer self test is performed, and a printed line is attempted across the interface, this diagram should be referred to. In almost all cases, the cause of a failure can be pinpointed logically, without even opening the printer, by noting the areas that are working along with those that are not.

Also, take note of these general troubleshooting guidelines:

1. After running a printer for a while, check for excessively hot ICs. Any IC that is hot to the touch is suspect. Check also for bent pins.
2. Check the power supply, both primary and secondary, for problems before troubleshooting circuitry since a functional power supply is necessary for all printer functions.

3. Use the customer's description of the problem or symptoms to speed the troubleshooting process.

4. Handle the PCAs with care.

CAUTION
Some PCAs contained in the printer are made of a lightweight phenolic which is not very sturdy. In order to avoid cracks and PC flaws, do not stack the PCAs, and handle them gently.

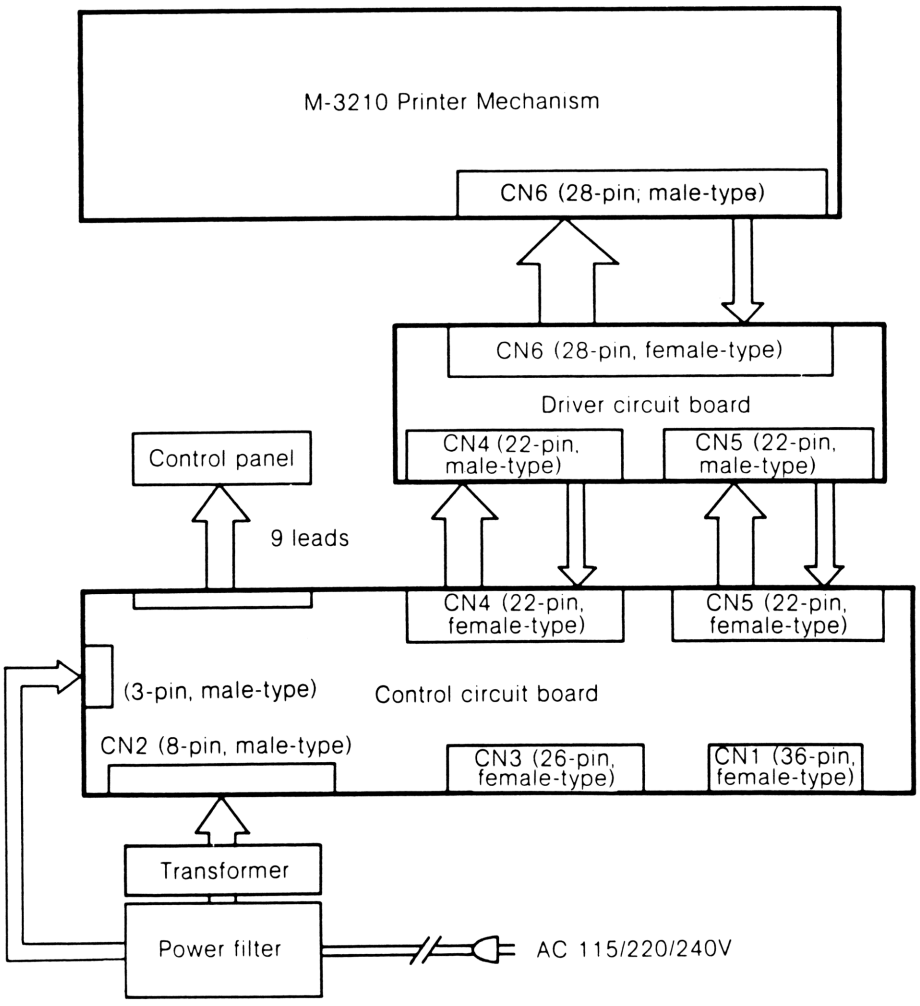


Figure 5-1. Block Diagram

5.3 TROUBLESHOOTING PROCEDURES

In order to isolate the cause of failure of an HP 82905B Printer, this general troubleshooting procedure should be followed:

1. Run the printer self test. This is done by turning the printer on, while holding the LINE FEED switch pad down. The printer should begin to print out its entire character set, offsetting the set by one on each consecutive line. See the self test results, figure 4-2.

2. Note the results of the self test, paying attention to all aspects of printer operations. Note the areas that are working correctly, along with the areas that are not.

3. Attempt to pinpoint the cause of failure to an assembly or functional portion of the printer, based on your observations.

4. If needed, run a short program on an HP Series 80 Computer to test the interface and 8155 functions. This is not needed if the nature of the problem has already been verified in steps 1 through 3, but will further isolate the cause of the problem in all cases. If the interface is suspected to be the cause of the problem, this test must be run. The following program is an example of the type of program that may be devised, as a testing routine:

```
PRINTER IS 701
PRINT "CAN YOU READ ME, SCOTTY?"


10 FOR I = 1 TO 100
20 PRINT "abcdefghijklmnoPQRSTUVWXYZ"
30 NEXT I
40 END
```

   The first two lines establish that the interface is working, and that the printer address has been selected correctly. If the printer fails to respond to the PRINT statements, check to make sure that you have specified the proper select code for the interface that you are using. The device address of the printer is set by means of a DIP switch, located on the HP-IB interface PCA, under an opening in the top case of the printer. See the owner's manual for the proper settings of the switches. If the select code is correct for the printer and interface that you are using, and the printer still does not print anything, or is missing some characters, there is likely a problem in the interface PCA. This may not further isolate the cause of failure if the printer does not run the self test correctly.

5. Note the results of this test and, using the block diagram, attempt to further isolate the cause of failure.

6. Refer to the troubleshooting charts for the specific symptoms noted above. Perform the additional tests outlined in the charts, if the proper tools are available.

7. Replace the suspected assembly or IC, referring to the section on disassembly and reassembly. Make sure that all connectors have been reconnected, and that there are no wires near the mechanical portions of the printer, that could get caught in the mechanisms.

8. Perform the tests outlined above again, and observe the results to determine if the printer has been completely or partly repaired. Good notes will help here, to record the symptoms, and to observe the differences in operation at each stage of troubleshooting.

Note that repair is done only to the assembly level, with the exception of socketed ICs. Not all mechanical parts are available from Epson, and in many cases the repair can be made faster and more cost-effectively by replacing the entire assembly containing the faulty part.

5.4 TROUBLESHOOTING THE CONTROL PCA

Each of the socketed ICs can be replaced to avoid replacing the entire control PCA. Each of the ICs can be tested for the proper signals at each of its pins, but the following tests are usually sufficient to determine if the IC is defective:

a. Trouble with the 8049 can be discovered by checking the PSEN and ALE signals of the 8049, located on pins 9 and 11, respectively. See the waveform diagrams.

b. Trouble with the 8041 slave processor may show up in the SYNC signal, pin 11 of the 8041. See the waveform diagram.

c. Since the 8155 is on the same bus as the 8049 and 8041 ICs, there can be some difficulty in isolating problems to this IC. However, the I/O ports can be checked to determine proper operation of this IC. Each of the ports listed in table 5-1 can be monitored for voltage level. They should all be at approximately +5 VDC when the conditions are as described in the chart. If a line is not at about +5 VDC, it may be because it is being pulled down by another fault. Replace the 8155 and check again to determine this. If the problem persists, replace the control PCA.

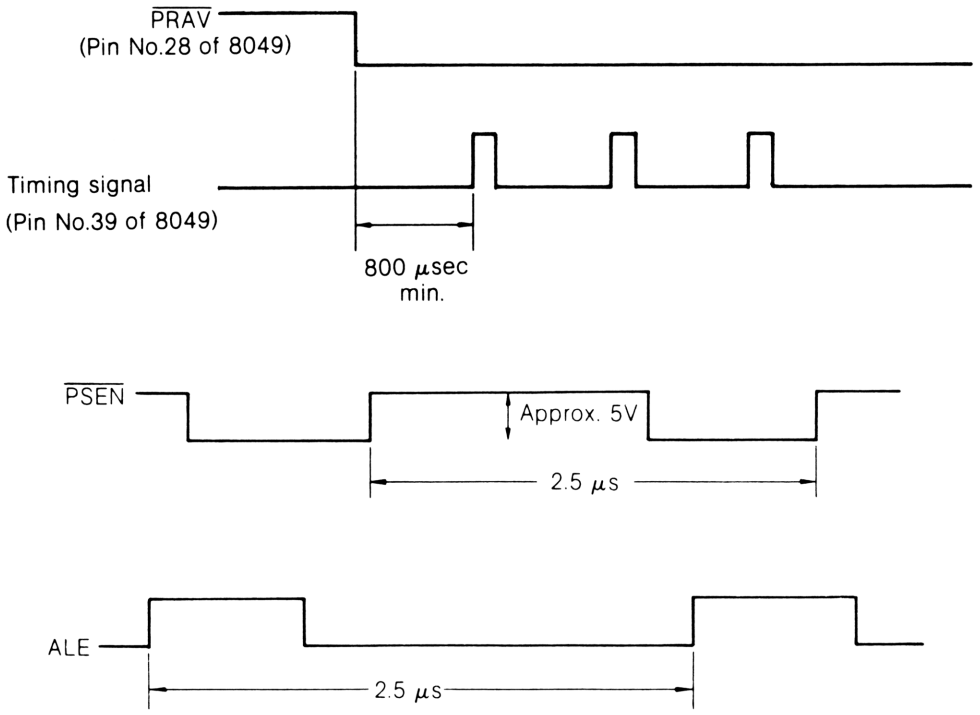


Figure 5-2. Waveform Diagrams

Table 5-1. I/O Port Voltages

I/O PORTS	8155 PINS	DIRECTION	CONDITION TO OBSERVE +5 VDC
PA0-7	21-28	IN	Printer is not connected to an external device.
PB0-7	29-36	IN	Print head is not driven.
PC1 (BUSY)	38	OUT	Printer is BUSY.
PC2 (STB)	39	IN	Printer is not reading data.
PC3 (SLCT)	1	OUT	Printer not selected.
PC4	2	OUT	Print head not driven.

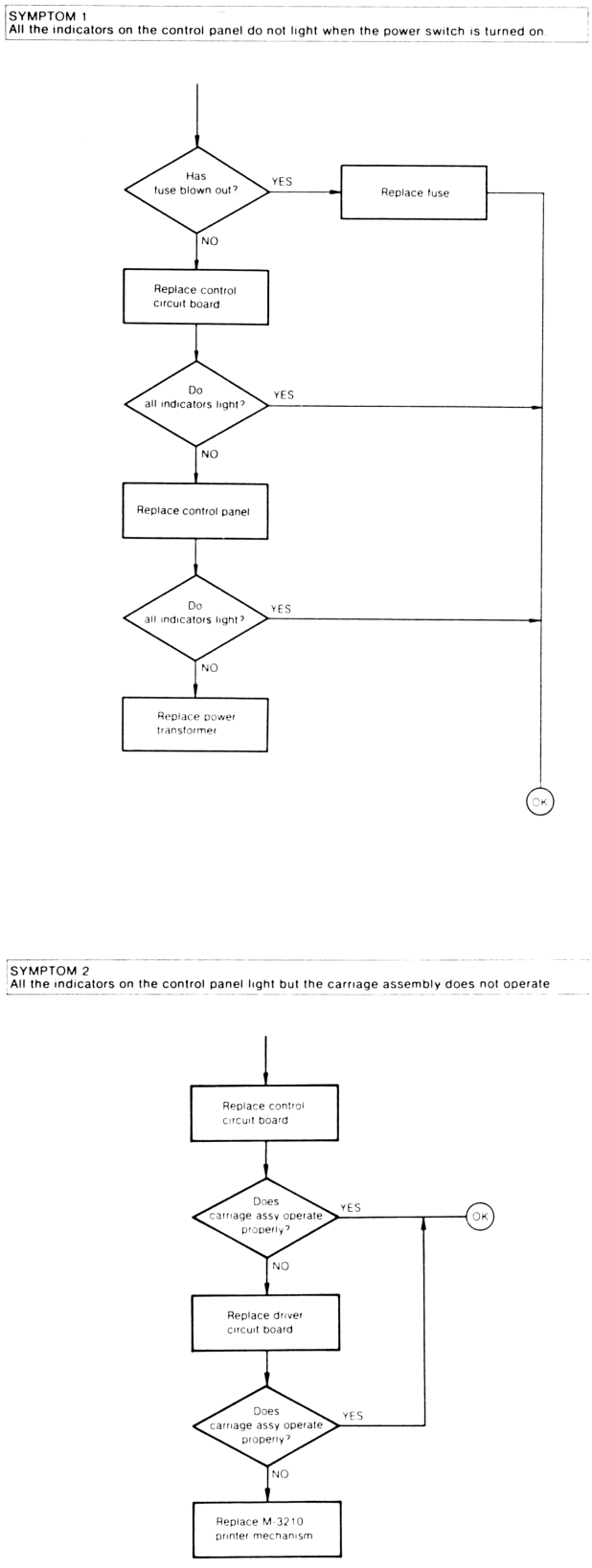


Figure 5-3. Basic Troubleshooting, Flowcharts

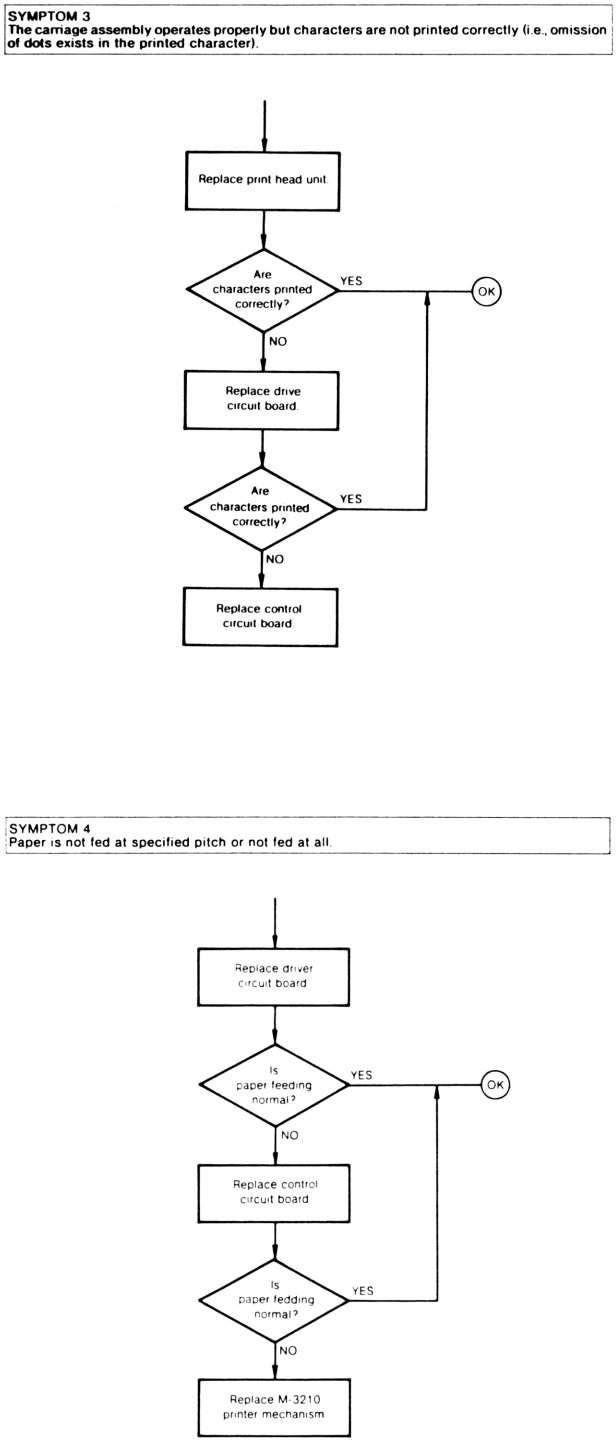


Figure 5-3. Basic Troubleshooting, Flowcharts (cont.)

SYMPTOM 1a. No action, no indicators, when printer is powered.

POSSIBLE CAUSE	TEST PROCEDURE	REPAIR ACTION
1. Blown fuse.	Check the fuse and filter PCA to see if the fuse has blown.	If blown, replace. If new fuse also blows, check items 2 and 3 below.
2. Defective fuse and filter PCA.	If fuse is OK, disconnect transformer primary connector, and test for proper line voltage.	If primary voltage is not correct, replace the fuse and filter PCA. See the disassembly section.
3. Defective power transformer.	If the primary AC voltage is OK, check the secondaries, on CN1. Pins 1 and 2: 10VAC Pins 3 and 4: 25VAC Pins 5 and 6: 10VAC Pins 7 and 8: 16VAC	In absence of proper secondaries, replace the defective power transformer.

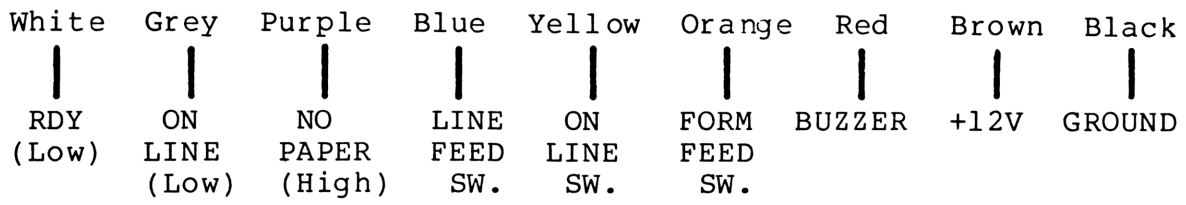
SYMPTOM 1b: None of the indicators on the control panel lights, although the secondary transformer voltages are normal.

POSSIBLE CAUSE	TEST PROCEDURE	REPAIR ACTION
1. Broken signal line between control panel and control PCA.	Check the nine lead wires extending from the control panel for breaks. See diagram of connector below.	Repair broken lead wire.

SYMPTOM 1c: Some of the indicator lights come on.

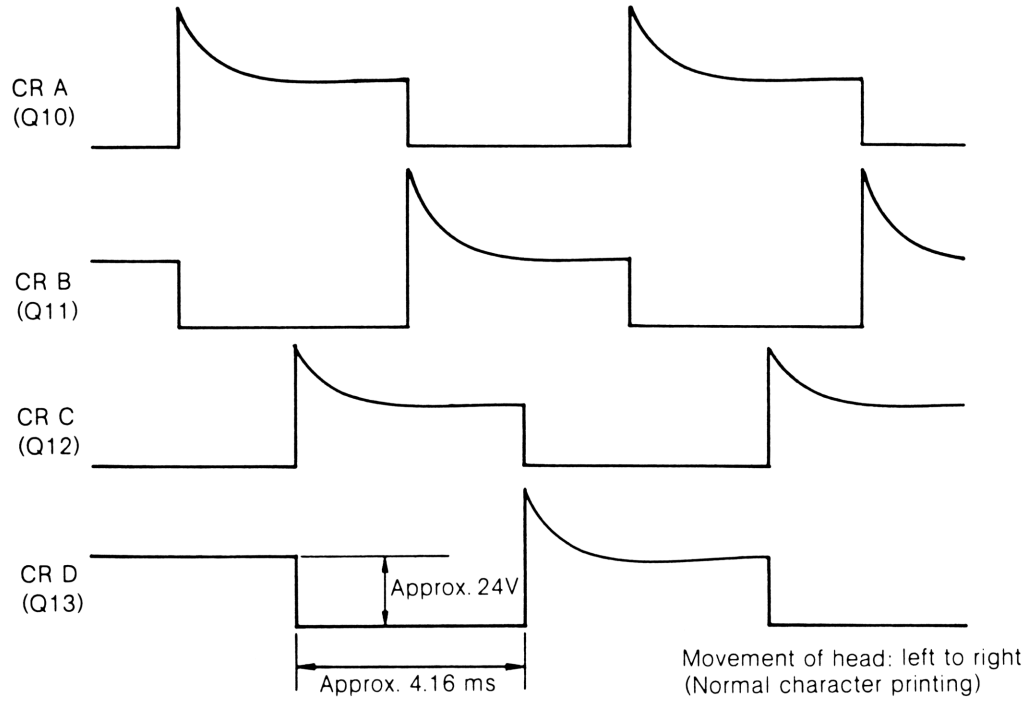
2. LED, Buzzer or ICs defective.	Check to see that the correct signals are present at the panel connector.	Replace the defective part or the entire control panel PCA. If RDY light is not lit, replace the 8155; if the buzzer does not sound, replace the 8041; if no-paper switch does not light, replace the PE sensor; and if ON LINE does not light, replace the 8049 CPU.

Control Panel Connector Pinout:

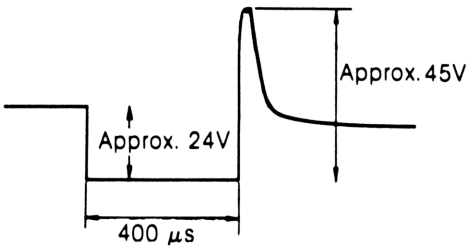
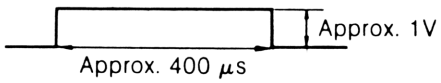


SYMPTOM 2: The carriage assembly does not operate at all.

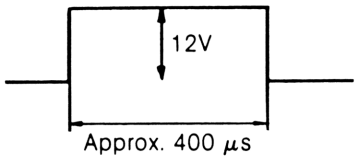
POSSIBLE CAUSE	TEST PROCEDURE	REPAIR ACTION
1. Defective timing belt motor assy.	If timing signal is output at pin 1 of the 8041, check the four carriage driving transistors (Q10-13) for normal collector waveform output at pins 21-24 of CN6.	If the collector waveform is normal, (proper voltage output for each phase), the motor is defective. Replace it. See disassembly section.
2. Defective control PCA.	If the collector waveform is abnormal, check the base of the same transistors for driving voltage, of about 1V peaks.	If no base voltage is output, the control PCA is bad. Replace. Try a different 8041 IC first, if possible.
3. Defective PTS sensor assy.	If timing signal is not output at pin 1 of 8041, check PTS sensor.	If sensor is bad, replace it. The control PCA is the other suspect, if timing signal OK.



SYMPTOM 3a: The carriage assembly moves properly, but some of the dots do not print.

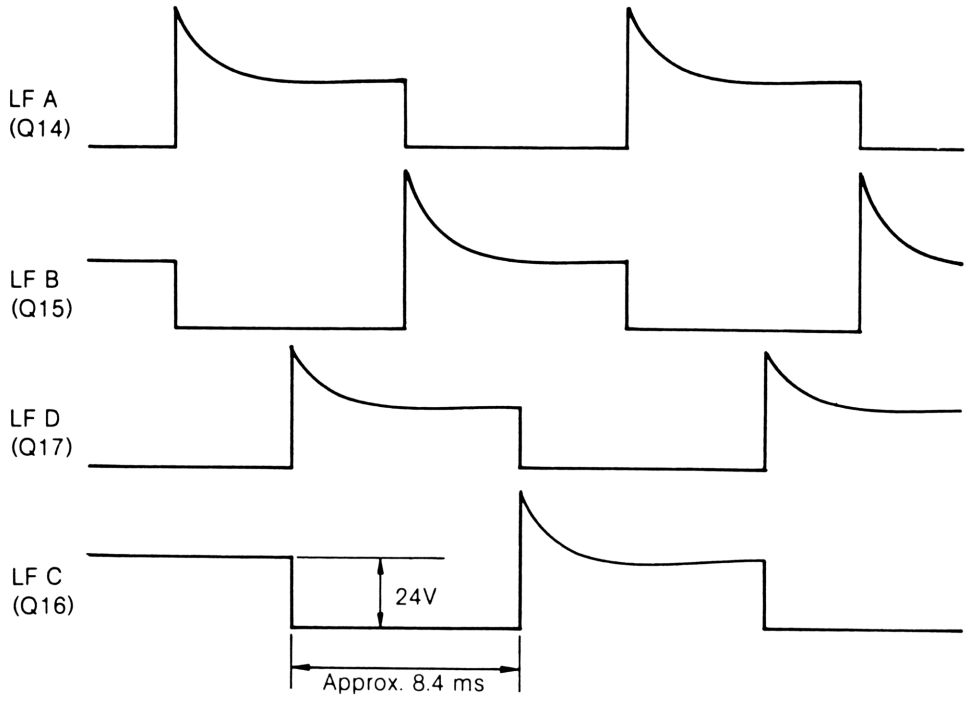
POSSIBLE CAUSE	TEST PROCEDURE	REPAIR ACTION
1. Defective print head.	Check the driving transistor of each dot wire that does not operate, for drive waveform, at anodes of diodes D1 through D9. See waveform below: 	If the waveform is normal, replace the print head. If not, see step 2. Each print head dot wire coil can be measured, to have a minimum of 20 ohms resistance.
2. Defective driver PCA.	If the waveform is abnormal in above step, check the base voltage of the driving transistor, Q1-Q9. See waveform below: If no collector voltage appears, check pin 13, CN6, for +24 VDC. 	If the base voltage of any transistor is abnormal, replace the driver PCA. If improper +24V, the driver PCA is possibly at fault. Replace it first, then the 8155, and then the control PCA as a last resort.

SYMPTOM 3b: The carriage assembly moves properly, but none of the dot wires operate; no print.

POSSIBLE CAUSE	TEST PROCEDURE	REPAIR ACTION
1. Faulty head-driving pulse width, or no pulse at all.	Check test point T0 on the driver PCA for proper pulse width. See section 4.5. Check CN4, pin 16, for 555 pulse, and CN5, pin 7, for head trigger pulse. 	If the pulse is abnormally short (less than 200 us), adjust VR1 so that the pulse width becomes 400 us at 24 VDC. If no pulse is output, the control PCA is defective. The 8155 or the timer IC (555) on the driver might also be bad.
2. No drive signal input to the head portion of driver PCA.	Check the base of of each of the 9 head drive transistors (Q1-9) for proper input voltage. These signals may also be found at pins 7 through 15 of CN4.	If no signal is input, replace the 8155 or the control PCA.

SYMPTOM 4: Paper not fed, or not fed at specified pitch.

POSSIBLE CAUSE	TEST PROCEDURE	REPAIR ACTION
1. Defective paper feed motor assy.	If PTS sensor is not defective, check the four line feed drive transistors (Q14-17), for normal collector waveforms, pins 25-28 of CN6. See waveform diagrams below:	If the collector waveform is normal, replace the paper feed motor assembly. If the waveform is abnormal, the driver PCA is defective. Replace it first; then try the 8041 if unsuccessful; finally replace the control PCA.



6.1 INTRODUCTION

This section lists the replaceable parts and assemblies of the HP 82905B Printer. This section also contains exploded view drawings of the major subassemblies of the printer. The parts listed, except for a very few, are ordered by using the Epson part number, which is given for each available part. There are a few parts which have HP part numbers, and there are several parts shown in the drawings which are not replaceable by themselves, but only as part of the larger assembly.

6.2 ORDERING INFORMATION

To order replacement parts or assemblies, address your order or inquiry to your authorized HP dealer, to the nearest HP sales and service facility, or to Corporate Parts Center or Parts Center Europe. Specify the following information for each part ordered:

a. Printer version and power supply option.

b. HP (Epson) part number.

c. Part description.

The abbreviations on the small parts represent the following meanings:

CP : Cross-recessed head machine screw (Pan head)
CPB: Cross-recessed head machine screw (Bind screw)
CPS: C.P. screw with spring lock washer
CF : Cross-recessed head machine screw (Flat head)
HF : Hexagonal socket headless setscrew (Flat point)
HC : Hexagonal socket headless setscrew (Cone point)
HD : Hexagonal socket headless setscrew (Double point)
PW : Plane washer
OW : Outside toothed lock washer
IW : Inside toothed lock washer
SW : Spring lock washer
HN : Hexagonal nut
LS : Leaf spring
RE : Retaining ring TYPE-E
RC : Retaining ring TYPE-C
RR : Retaining ring
SP : Spring pin

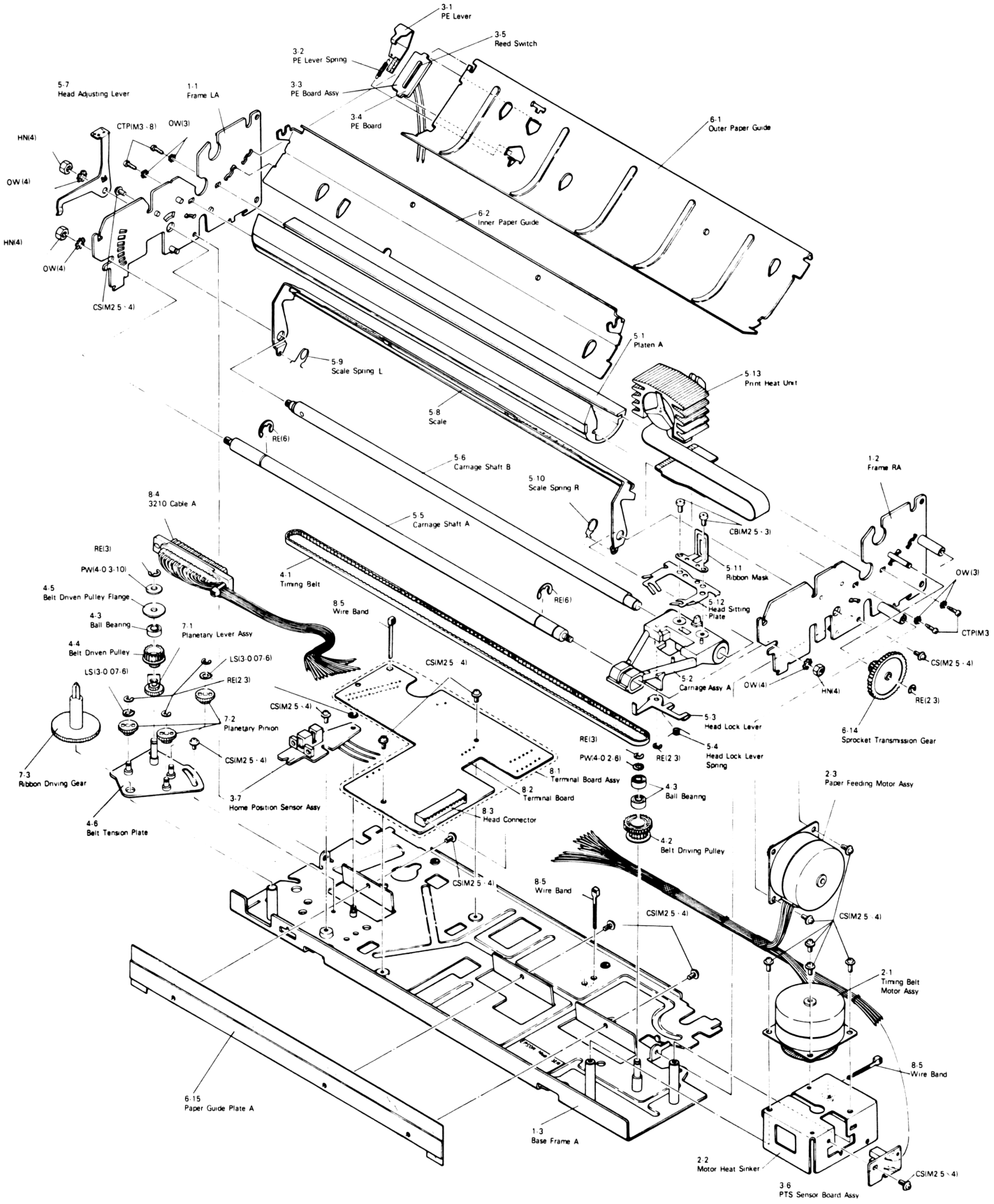


Figure 6-1. Exploded View, Printer Mechanism

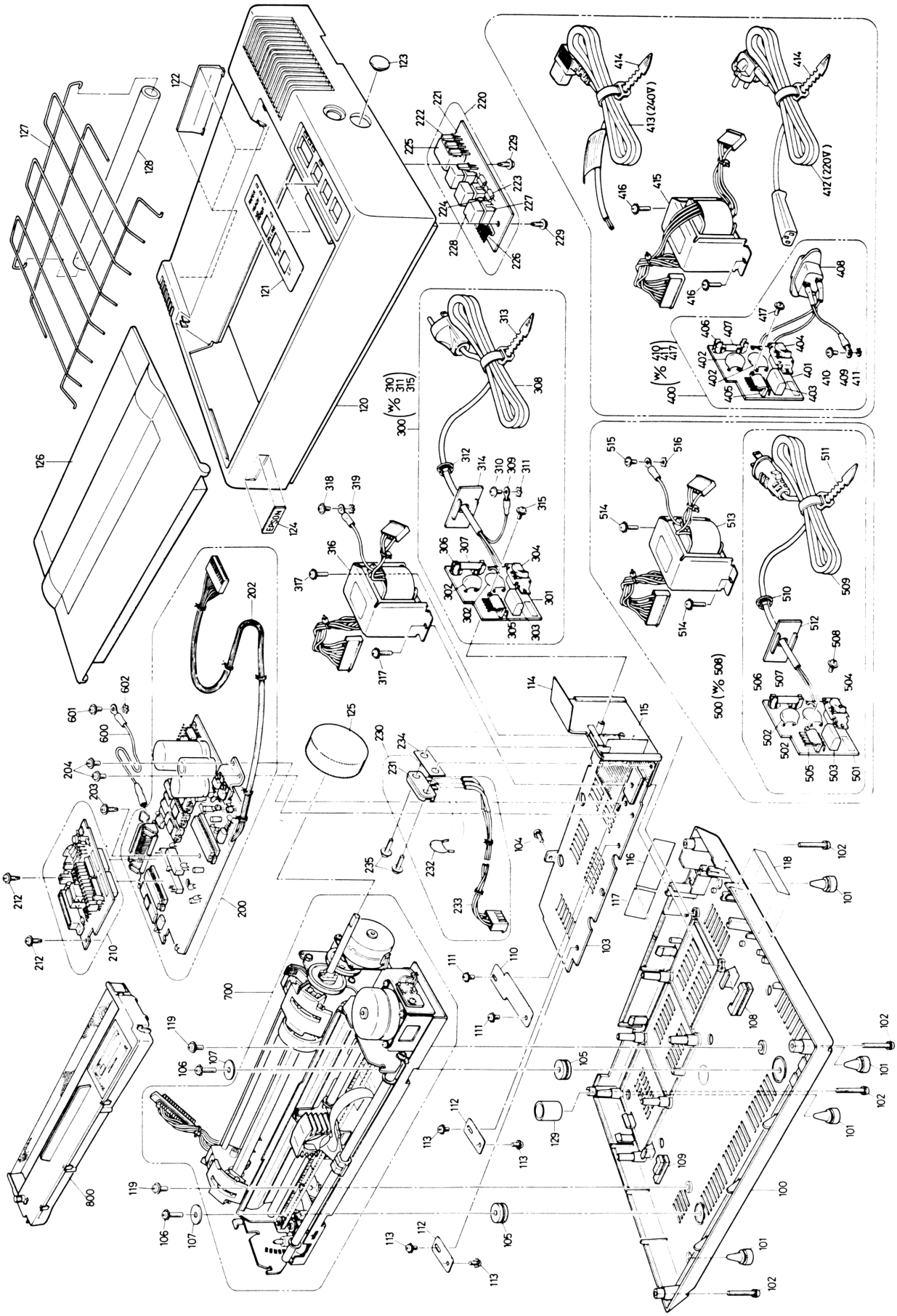


Figure 6-2. Exploded View, Printer Assemblies

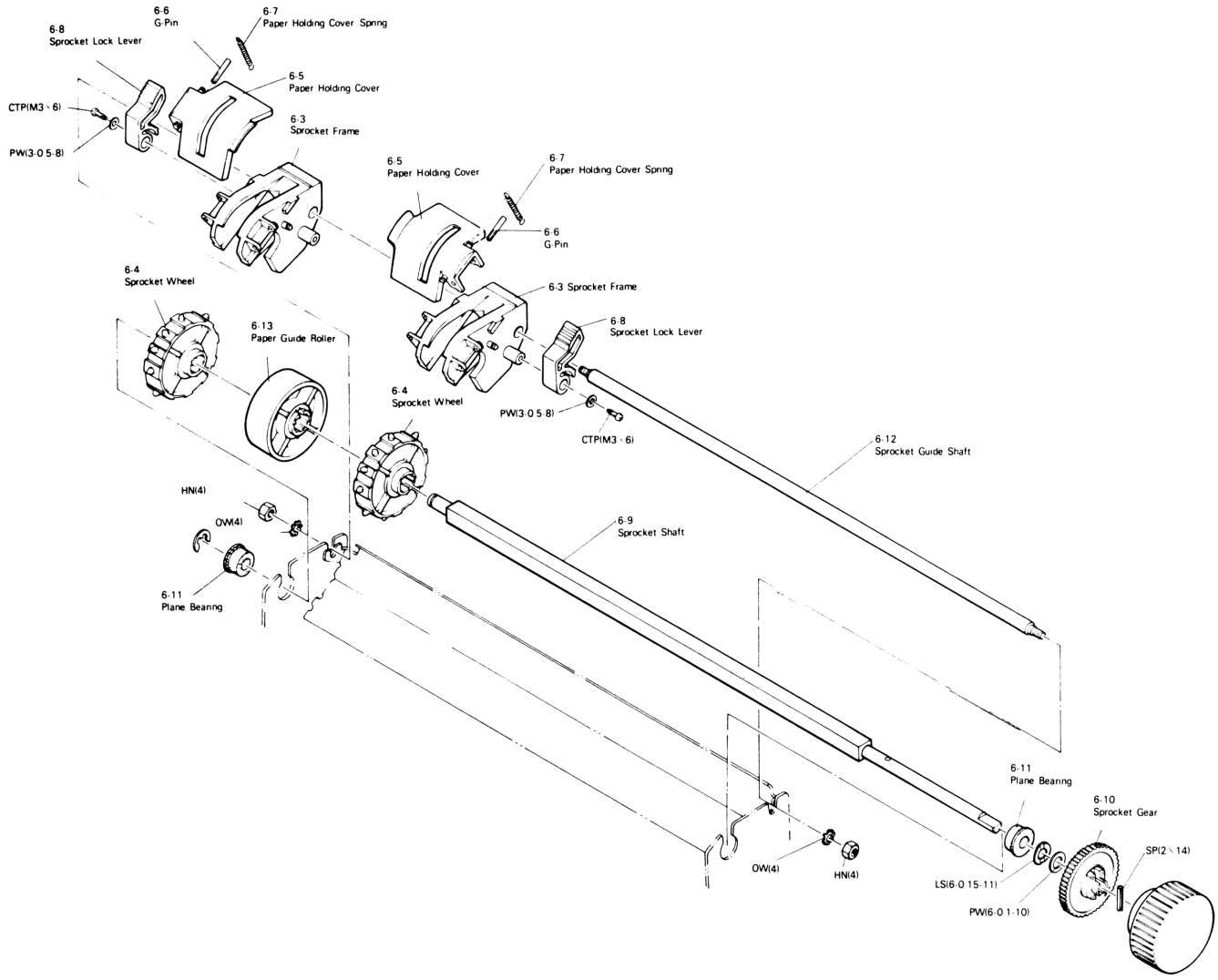


Figure 6-3. Exploded View, Sprocket Assembly

Table 6-1. HP 82905B Replaceable Parts

DRAWING NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
100	G490101000-EPS	LOWER CASE-HP	1
106	B040450711-EPS	C.P. SCREW WITH SW	2
111	B040450411-EPS	C.P. SCREW WITH OW	2
119	B040300811-EPS	TRANSPORTATION SCREW	1
120	G490102010-EPS	UPPER CASE-HP	1
123	Y422009201-EPS	INTERFACE PLUG-HP	1
125	G490105000-EPS	KNOB-HP	1
126	G490103000-EPS	PRINTER LID-HP	1
127	G490104010-EPS	SEPARATOR	1
128	G490104020-EPS	SEPARATOR ROLLER	1
200	Y422205000-EPS	HMTP (CONTROL) PCA W/O LSI	1
9B	Y422800203-EPS	LSI RAM 8041	1
1C	Y422800601-EPS	LSI CPU 8049 "A"	
	Y422801901-EPS	LSI CPU 8049 "B"	1
8B	X400081550-EPS	LSI (RAM) 8155	1
1B	Y422800602-EPS	LSI (MASK ROM)-HP "A"	1
	Y422801902-EPS	LSI (MASK ROM) "B"	
204	B040302811-EPS	CUP SCREW	2
203	B012601811-EPS	C.T. SCREW (BINDING HEAD)	1
230	G490205000-EPS	TRANSISTOR SET	1
233	Y422306000-EPS	TRANSISTOR/CABLE SET	1
210	Y422202000-EPS	MDRI (DRIVER) PCA UNIT	1
220	G490203000-EPS	MPEL CIRCUIT BOARD UNIT	1
400	G490301001-EPS (EUROPEAN)	FILTER CIRCUIT BOARD (220/240V)-HP	1
	OR		
400	G490302000-EPS (US,JAPAN)	FILTER CIRCUIT BOARD (100/120V)-HP	1
	X502050020-EPS	FUSE, EUR 315 MA 220/40	1
	X502060020-EPS	FUSE, USA 2A, 115V	1
410	B040302511-EPS	CUP SCREW	
	B040430411-EPS	CP SCREW WITH OW	

Table 6-1. HP 82905B Replaceable Parts (cont.)

DRAWING NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
416	B040450711-EPS	C.P. SCREW WITH SW	2
700	F303000000-EPS	PRINTER MECHANISM	1
CS	B040301311-EPS	CUP SCREW	2
2-1	F303027000-EPS	TIMING BELT MOTOR ASSY	1
2-3	F303031000-EPS	PAPER FEEDING MOTOR ASSY	1
3-1	F303008000-EPS	PE LEVER	1
3-2	F303007020-EPS	PE LEVER SPRING	1
3-3	F303009000-EPS	PE BOARD ASSY	1
3-6	F303029000-EPS	PTS SENSOR BOARD ASSY	1
3-7	F303030000-EPS	HOME POSITION SENSOR ASSY	1
	B150300911-EPS	RETAINING RING TYPE E	
RE	B150350111-EPS	RETAINING RING TYPE E	1
4-1	F303014010-EPS	TIMING BELT	1
4-2	F303017000-EPS	BELT DRIVING PULLEY	1
RE	B150300611-EPS	RETAINING RING TYPE E	1
4-4	F303018010-EPS	BELT DRIVEN PULLEY	1
4-5	F303018020-EPS	BELT DRIVEN PULLEY FLANGE	1
5-1	F303004000-EPS	PLATEN A	1
5-2	F303006000-EPS	CARRIAGE ASSY A	1
5-3	F303005010-EPS	HEAD LOCK LEVER	1
5-4	F303005020-EPS	HEAD LOCK LEVER SPRING	1
RE	B150300911-EPS	RETAINING RING TYPE-E	1
HN	B070100411-EPS	HEXAGON NUT	3
5-9	F303001060-EPS	SCALE SPRING L	1
5-10	F303001070-EPS	SCALE SPRING R	1
5-11	F303001092-EPS	RIBBON MASK	1
5-12	F303001100-EPS	HEAD SITTING PLATE	1
415	Y422501200-EPS	POWER TRANSFORMER SET	
	(EUROPEAN)	(220/240V)-HP	1
	OR		
415	G490307000-EPS	POWER TRANSFORMER SET	
	(US)	(120V)-HP	1
	OR		
	G490308000-EPS	POWER TRANSFORMER SET	
	(JAPAN)	(100V)-HP	1

Table 6-1. HP 82905B Replaceable Parts (cont.)

DRAWING NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
CB	B010309911-EPS	C.B. SCREW	5
6-3	F303036010-EPS	SPROCKET FRAME, LEFT	2
	F303037010-EPS	SPROCKET FRAME, RIGHT	
6-4	F303011020-EPS	SPROCKET WHEEL	2
	F303014020-EPS	RIBBON DRIVE GEAR	
6-5	F303011030-EPS	PAPER HOLDING COVER	2
	F303036020-EPS	PAPER HOLDING COVER, LEFT	
	F303037020-EPS	PAPER HOLDING COVER, RIGHT	
6-7	F303011040-EPS	PAPER HOLDING COVER SPRING	2
6-8	F303011050-EPS	SPROCKET LOCK LEVER	2
CTP	B011401611-EPS	C.T.P. SCREW	2
6-10	F303013020-EPS	SPROCKET GEAR	1
6-14	F303001080-EPS	SPROCKET TRANSMISSION GEAR	1
6-15	F303021000-EPS	PAPER GUIDE PLATE A	1
8-1	F303023000-EPS	TERMINAL BOARD SETA	1
	Y422040501-HP	LABEL, FRONT "A"	
	Y422040801-HP	LABEL, FRONT "B"	
	Y422043601-HP	LABEL, CONTROL PANEL	
	X610093600-EPS	DUST COVER	
	NEJI-EPS	NEJI LOCK, GREEN, 50cc	
	O-2-EPS	OIL	
	G-2-EPS	GREASE	
	T-61-EPS	FEELER GAUGE, 0.6mm	
	Y490202000-EPS	IEEE PCA ASSY	
	8145HP-EPS	RS232 PCA ASSY	
	82905-60901	HP-IL PCA ASSY	
	82905-67904	HP82905A/B KIT	
	82905-68901	PSP FOR MX-80	
	82905-90008	MANUAL, GRAPHICS	
	82905-90014	MANUAL, HP82905B OWNER'S	

Reference Diagrams

This section contains the schematic diagrams and the component location diagrams for the HP 82905B Printer and the optional interface PCAs.

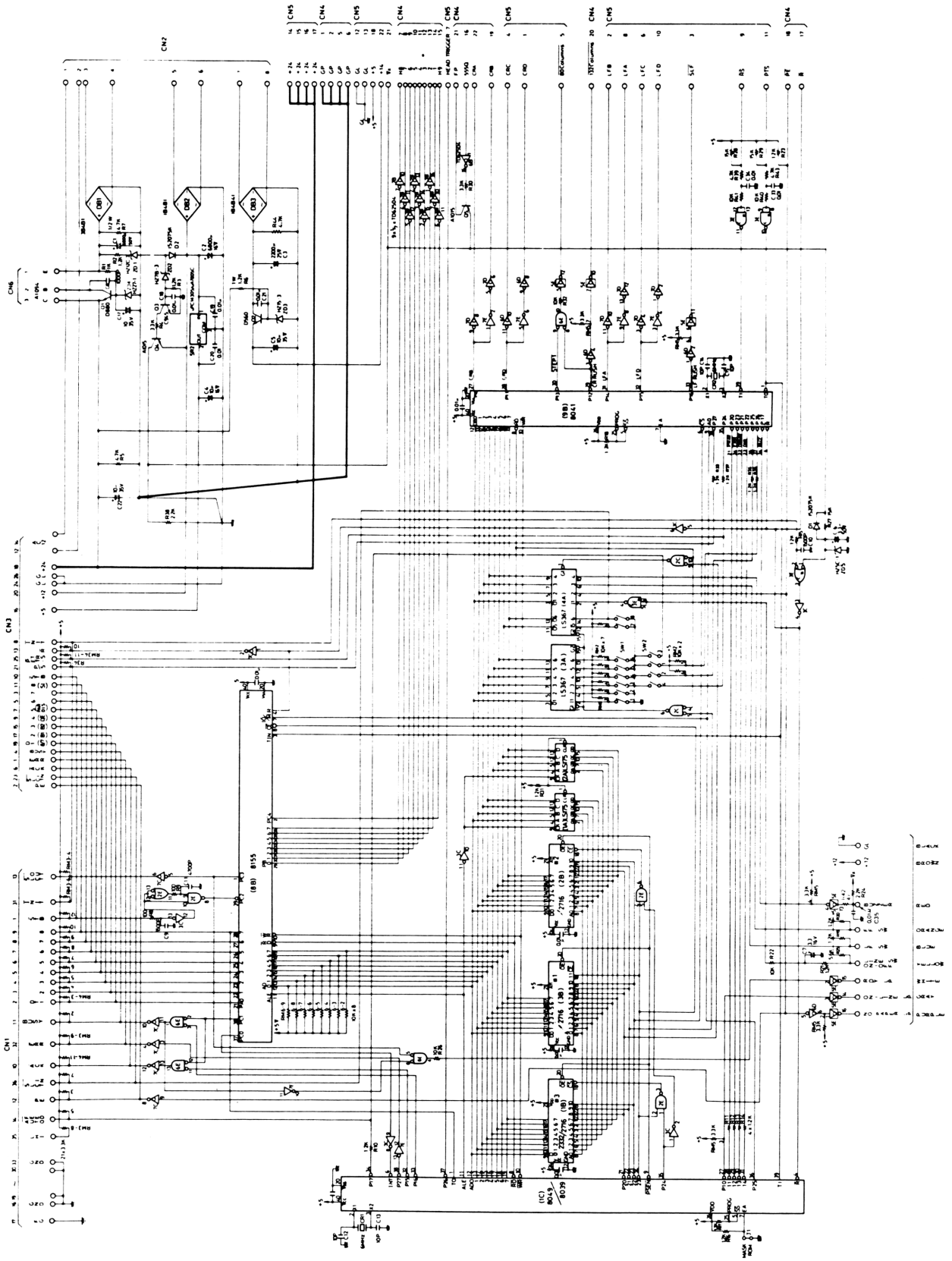


Figure 7-1. Control PCA Schematic

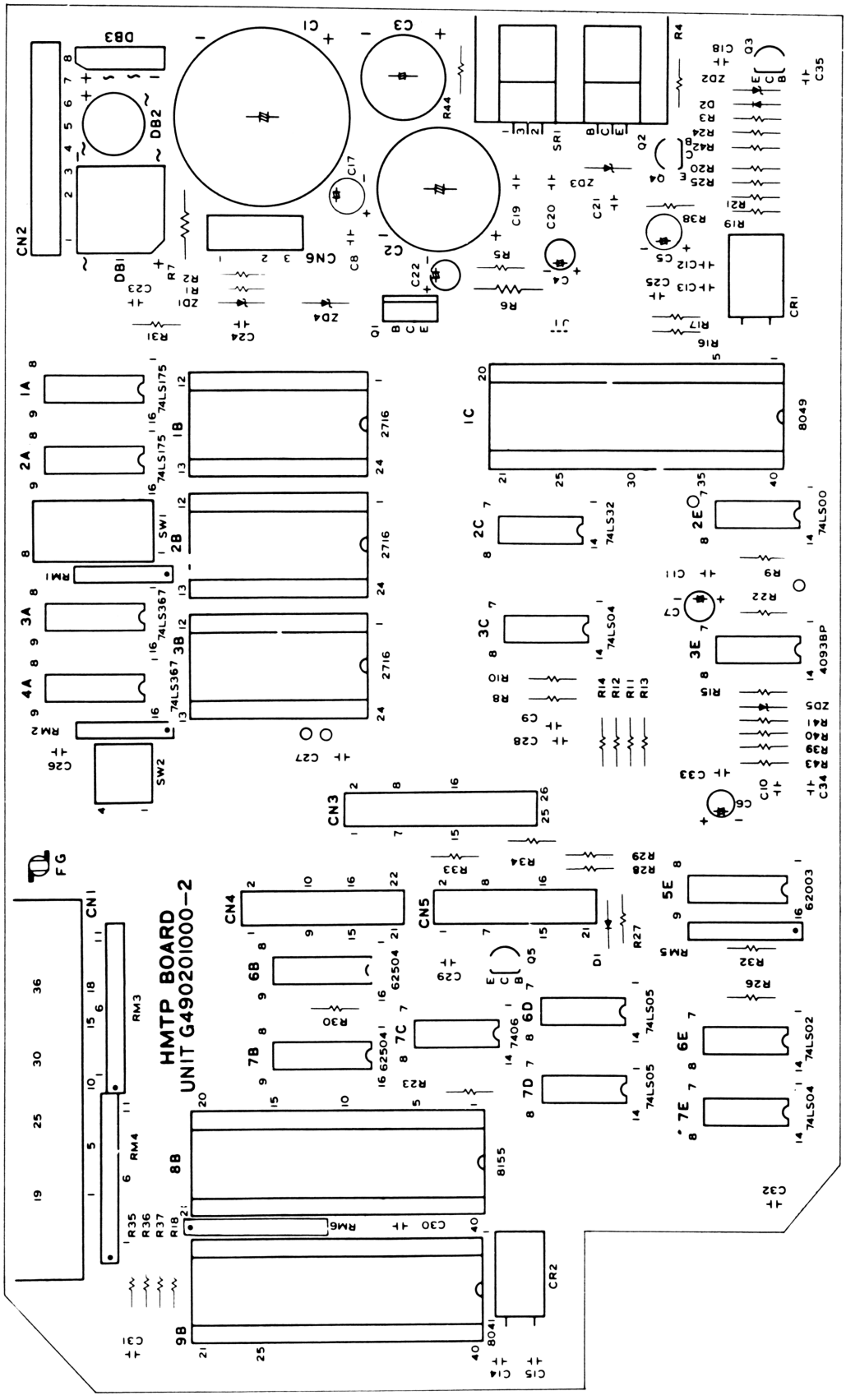


Figure 7-2. Control PCA Component Location Diagram

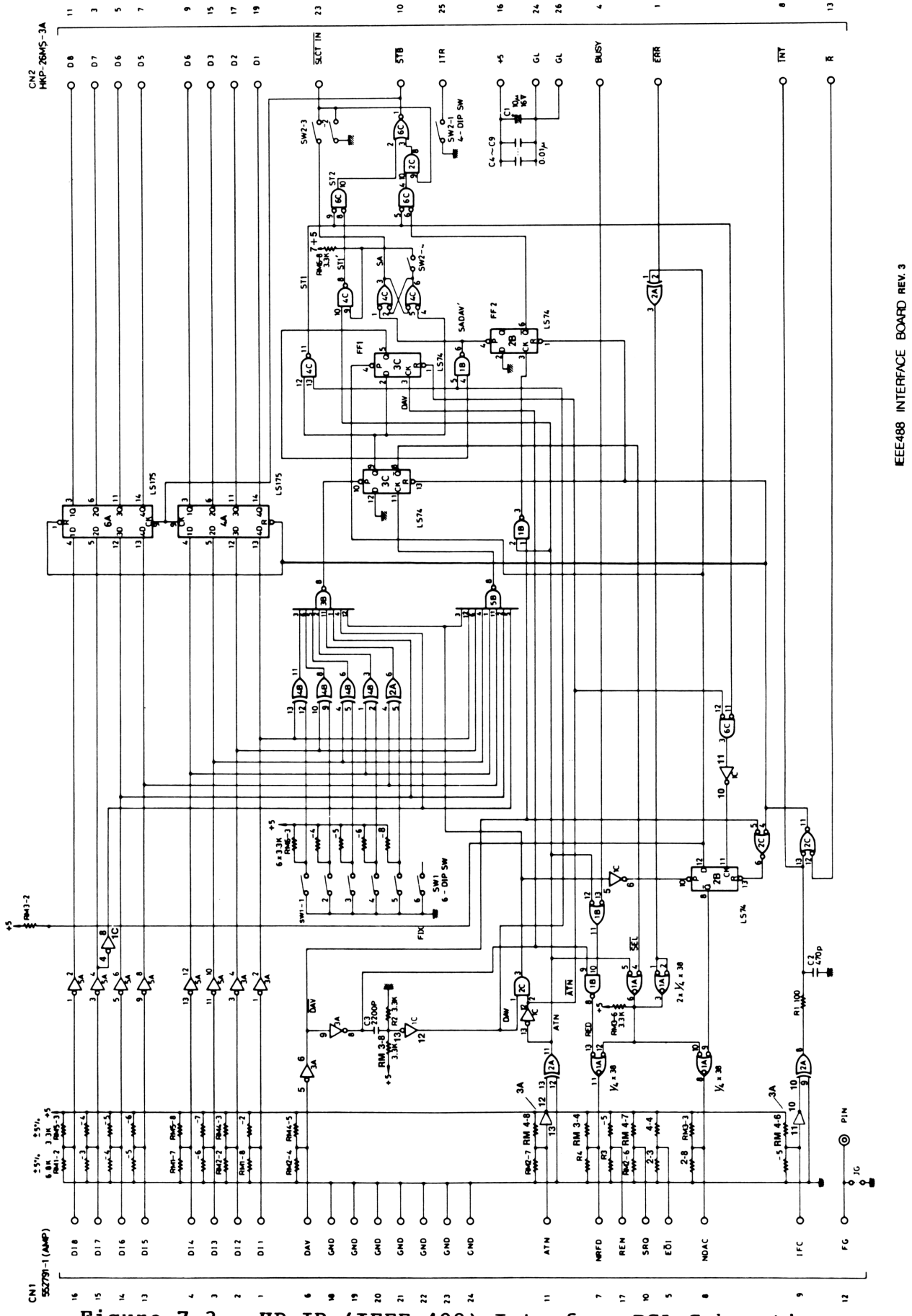
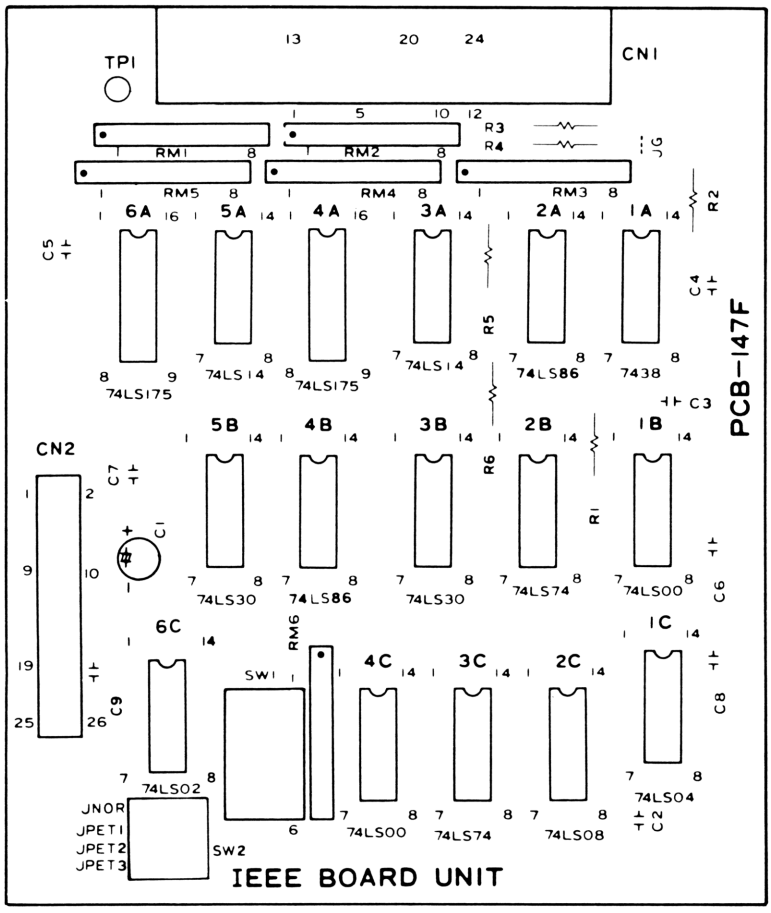


Figure 7-3. HP-IB (IEEE-488) Interface PCA Schematic



Parts Location

7-4. HP-IB Interface PCA Component Location Diagram

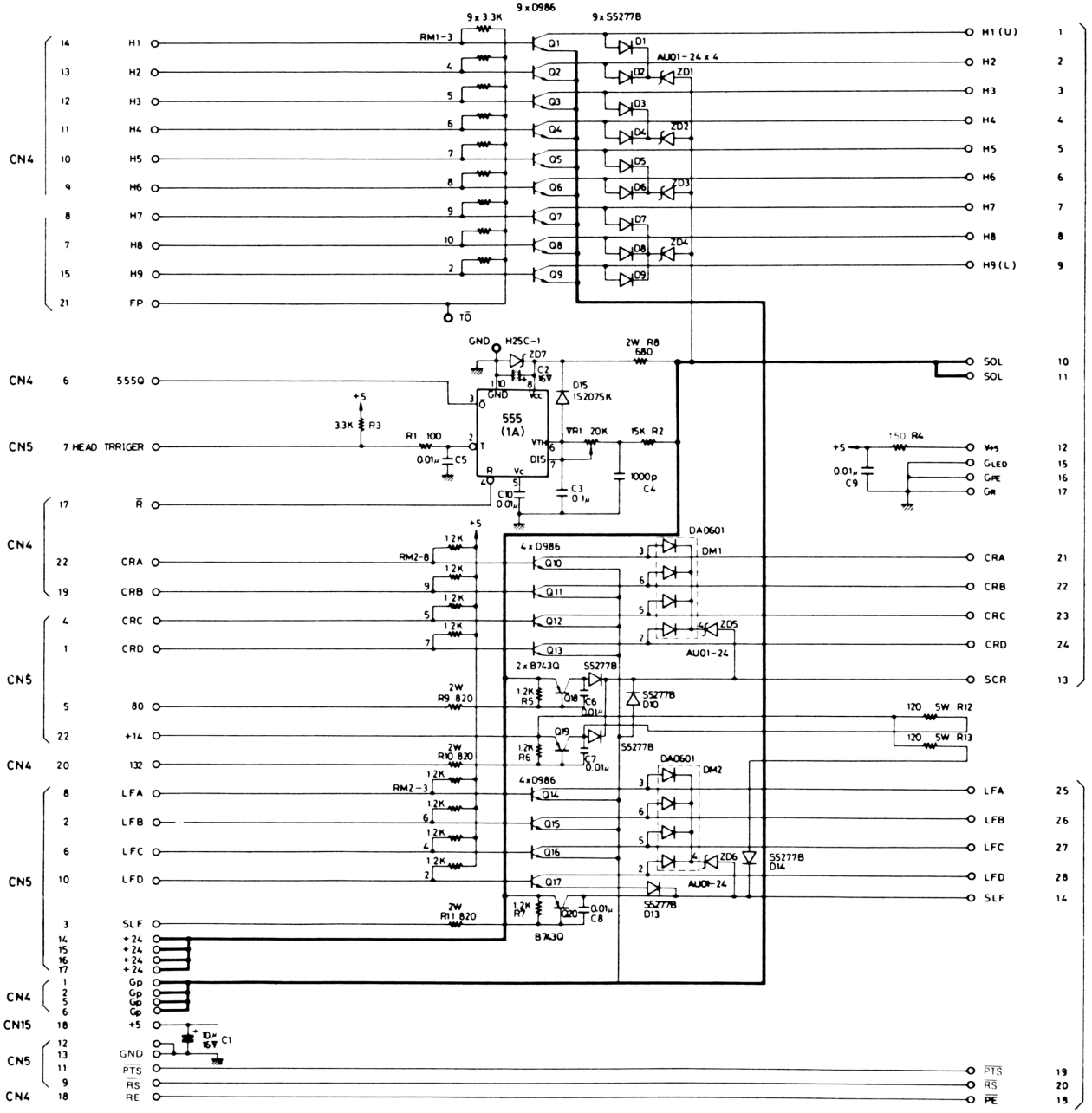


Figure 7-5. Driver PCA Schematic

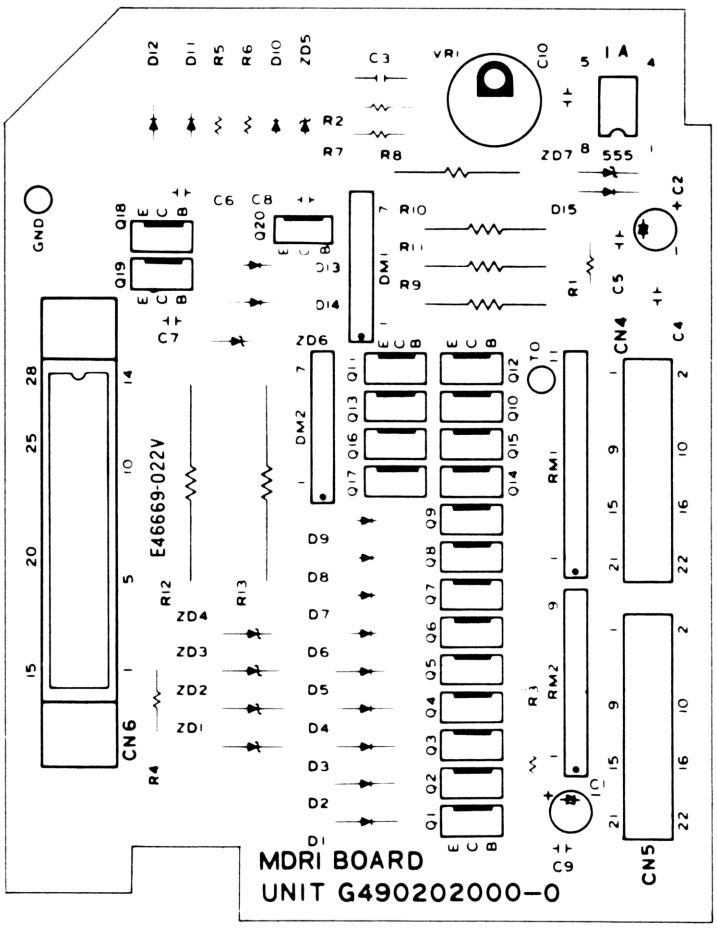


Figure 7-6. Driver PCA Component Location Diagram

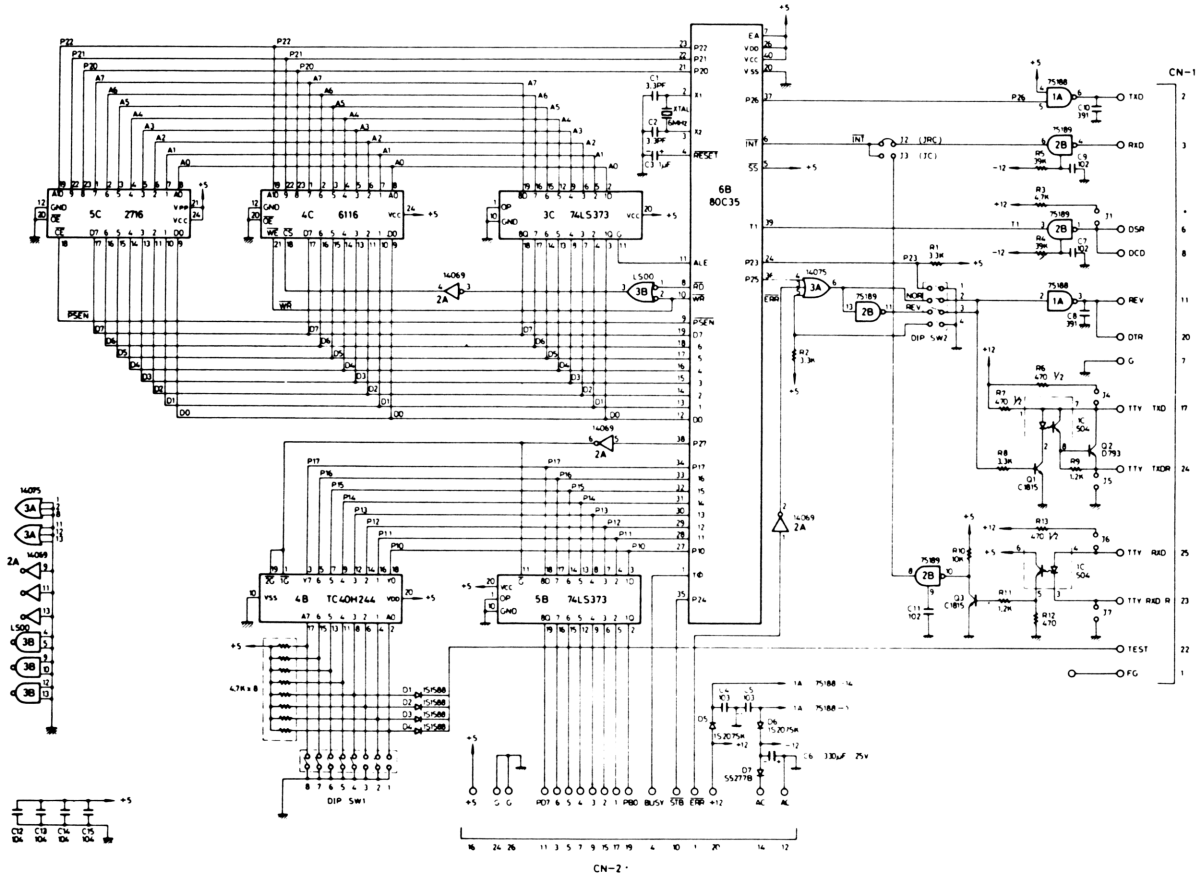


Figure 7-7. Serial (RS232) Interface PCA Schematic

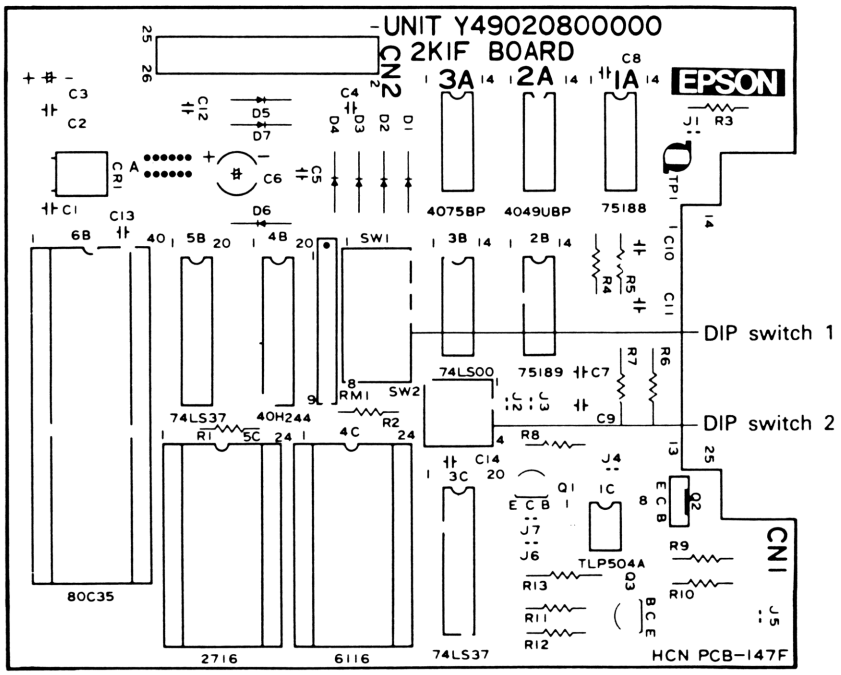


Figure 7-8. Serial Interface PCA Component Location Diagram

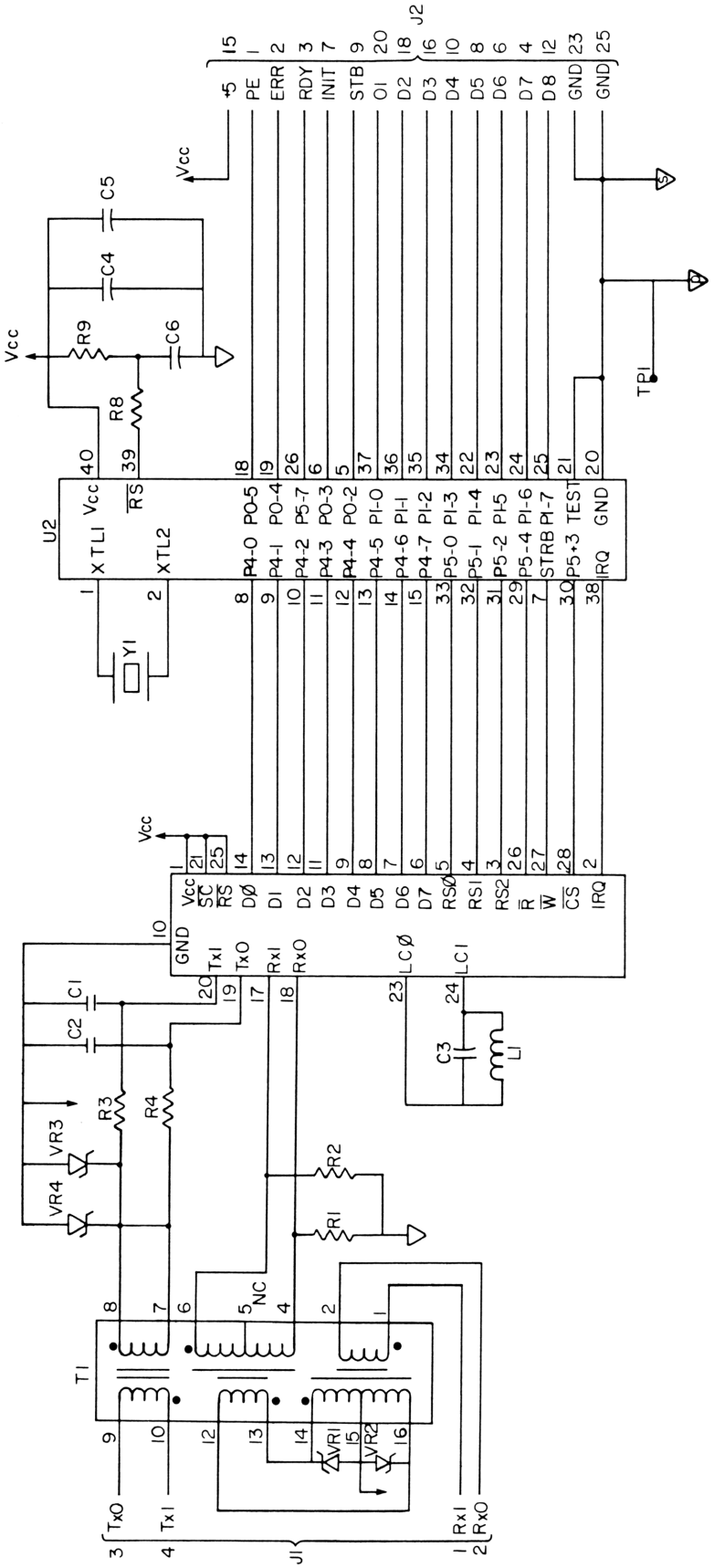


Figure 7-9. HP-IL Interface PCA Schematic

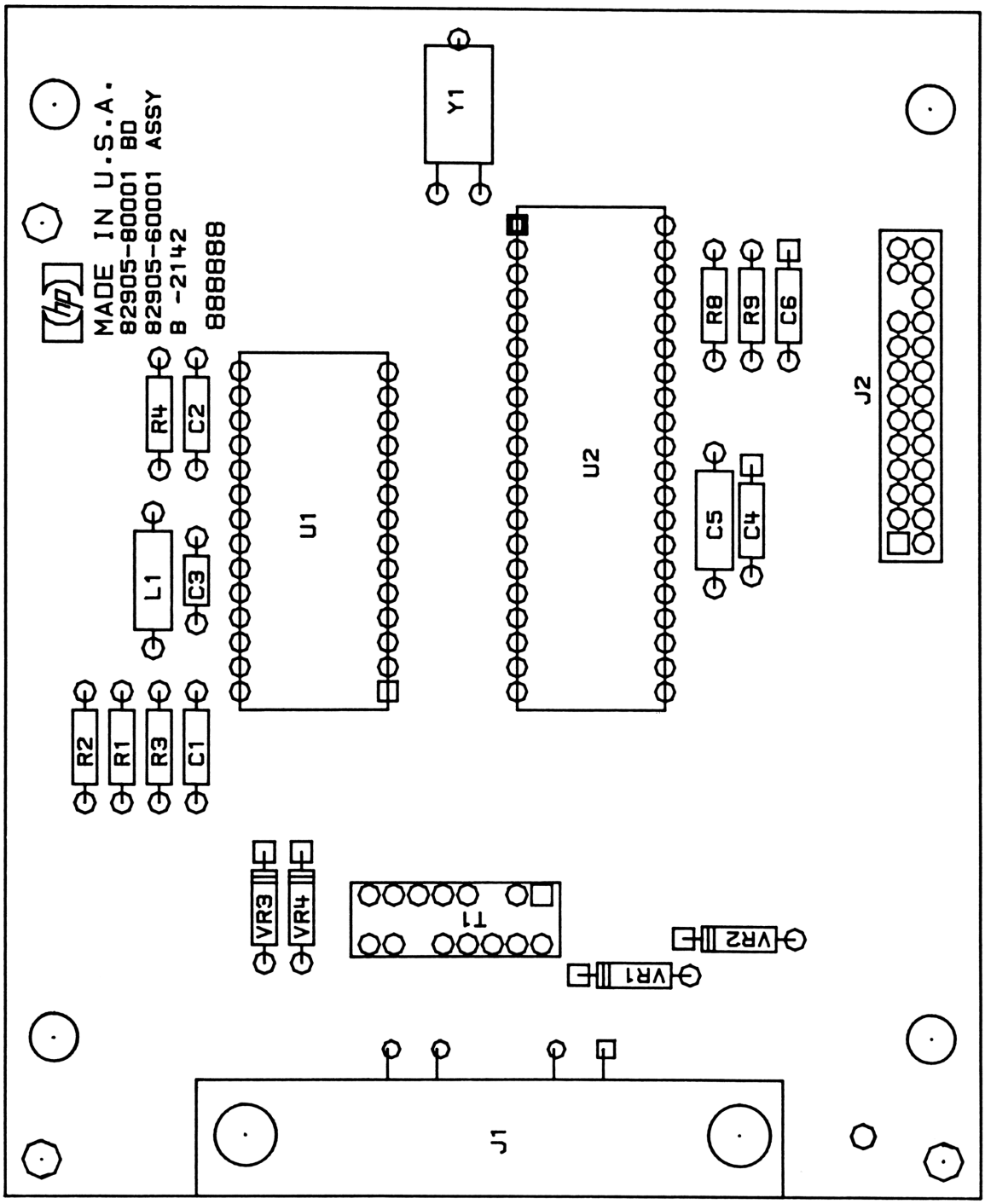


Figure 7-10. HP-IL Interface PCA Component Location Diagram

Table A-1. Parallel Interface Connector, CN1

SIGNAL PIN NO.	RETURN PIN NO.	SIGNAL NAME	DIR-ECTION	DESCRIPTION
1	19	STROBE	IN	Strobe pulse to read data in. Active low.
2	20	DATA 1	IN	These are the information bits of the parallel interface; positive true.
3	21	DATA 2	IN	
4	22	DATA 3	IN	
5	23	DATA 4	IN	
6	24	DATA 5	IN	
7	25	DATA 6	IN	
8	26	DATA 7	IN	
9	27	DATA 8	IN	
10	28	ACKNLG	OUT	About 5 us pulse indicating the printer received data.
11	29	BUSY	OUT	When HIGH, indicates that the printer is busy.
12	30	PE	OUT	When HIGH, indicates that the printer is out of paper.
13	--	SLCT	OUT	Indicates that the printer is in the selected state.
14	--	AUTO-FEED XT	IN	When this signal is LOW, the printer performs automatic line feed after printing.
15	--	NC	--	Not used.
16	--	0V	--	Logic Ground.
17	--	GND	--	Chassis Ground. In the printer, the chassis and logic grounds are isolated.
18	--	NC	--	Not used.
19-30	--	GND	--	Twisted-pair return signal Ground level.

Table A-1. Parallel Interface Connector (cont.)

SIGNAL PIN NO.	RETURN PIN NO.	SIGNAL NAME	DIR-ECTION	DESCRIPTION
31	--	INIT	IN	When this goes LOW, causes a reset to the printer.
32		ERROR	OUT	This goes low for any of the following conditions: Paper End, Off-Line, or any other error state.
33		GND		Same as with pins 9-30 above.
34		NC		Not used.
35				Pull up to 5V through 4.7 k resistance.
36		SLCT IN	IN	Data entry to the printer is possible only when this signal is LOW.

Notes:
1. Direction refers to direction from point of view of printer.
2. Return refers to twisted pair return, and is used as a signal ground.
3. All interface conditions are based on TTL signals, with rise and fall times less than .2 us.
4. Data transfer must not be carried out during ACKNLG or BUSY.

Figure A-2. Transformer Secondaries, CN2

PIN NUMBER	SIGNAL NAME	COLOR OF LEAD	DESCRIPTION
1 2	12V AC	GRAY GRAY	For optional interfaces, such as HP-IB.
3 4	25V AC	ORANGE	For stepper motors.
5 6	9V AC	RED	For logic circuits.
7 8	10V AC	BLUE	For stepper motors.

Figure A-3. Interface PCA Connector, CN3

PIN NUMBER	SIGNAL NAME	DESCRIPTION OF SIGNAL	DIRECTION
1	ERR	Error.	OUT
2	PE	Paper end.	OUT
3	D7	Data Bit 7.	IN
4	RDY	Ready.	OUT
5	D6	Data Bit 6.	IN
6	ACK	Acknowledge.	OUT
7	D5/PAR	Data Bit 5, Parity Disable.	IN
8	INIT	Initialize.	IN
9	D4/O/E	Data Bit 4, Odd/Even Parity.	IN
10	STROBE	Strobe	IN
11	D8/SI	Data Bit 8, Serial Signal Input.	IN
12	+12	+12V AC.	OUT
13	R	RESET.	OUT
14	+12	+12V AC.	OUT
15	D3/B2	Data Bit 3, Bit Rate Select.	IN
16	+5	+5V DC.	OUT
17	D2/B1	Data Bit 2, Bit Rate Select.	IN
18	+24	+24V DC.	OUT
19	D1/8/7	Data Bit 1; 8-Bit/7-Bit Select.	IN
20	+12	+12V DC.	OUT
21	P/S	Parallel Select/ Serial Select.	IN
23	SELIN	Select In.	IN
24	GL	Ground Low.	--
25	PET TRS	PET/TRS Select.	IN
26	GL	Ground.	--

Table A-4. Control/Driver PCA Connector, CN4

PIN NUMBER	SIGNAL NAME	DESCRIPTION OF SIGNAL	DIRECTION
1	GP	Ground level.	--
2	GP	Ground level.	--
3	--	--	--
4	--	--	--
5	GP	Ground level.	--
6	GP	Ground level.	--
7	H8	Head Solenoid Drive Signal.	OUT
8	H7	Head Solenoid Drive Signal.	OUT
9	H6	Head Solenoid Drive Signal.	OUT
10	H5	Head Solenoid Drive Signal.	OUT
11	H4	Head Solenoid Drive Signal.	OUT
12	H3	Head Solenoid Drive Signal.	OUT
13	H2	Head Solenoid Drive Signal.	OUT
14	H1	Head Solenoid Drive Signal.	OUT
15	H9	Head Solenoid Drive Signal.	OUT
16	(555Q)	--	IN
17	R	Reset.	IN
18	PE	Paper End.	IN
19	CRB	Phase B for Carriage Motor Drive	OUT
20	(132 Columns)	--	OUT
21	(FP)	--	OUT
22	CRA	Phase A for Carriage Motor Drive	OUT

Figure A-5. Control/Driver PCA Connector 2, CN5

PIN NUMBER	SIGNAL NAME	DESCRIPTION OF SIGNAL	DIRECTION
1	CRD	Phase D for Carriage Motor	IN
2	LFB	Phase B for Paper Feed Motor	IN
3	SLF	Line Feed Activate.	IN
4	CRC	Phase C for Carriage Motor	IN
5	(80 Columns)	--	OUT
6	LFC	Phase C for Paper Feed Motor	IN
7	Head Trigger	Timer Triggering Signal.	IN
8	LFA	Phase A for Paper Feed Motor	IN
9	RS	Home Position Sensor.	OUT
10	LFD	Phase D for Paper Feed Motor.	IN
11	PTS	Clock Input.	OUT
12	GL	Ground.	--
13	GL	Ground.	--
14	+24	+24V DC	IN
15	+24	+24V DC	IN
16	+24	+24V DC	IN
17	+24	+24V DC	IN
18	+5	+5V DC	IN
19	--	--	--
20	--	--	--
21	Vx	Power Failure Detection.	IN
22	+14	+14V DC	IN

Table A-4. Printer Mechanism/Driver PCA Connector, CN6

PIN NUMBER	SIGNAL NAME	DESCRIPTION OF SIGNAL	DIRECTION
1	H1	Head Driving Signal.	IN
2	H2	Head Driving Signal.	IN
3	H3	Head Driving Signal.	IN
4	H4	Head Driving Signal.	IN
5	H5	Head Driving Signal.	IN
6	H6	Head Driving Signal.	IN
7	H7	Head Driving Signal.	IN
8	H8	Head Driving Signal.	IN
9	H9	Head Driving Signal.	IN
10	SOL	Solenoid Common Line (+24V)	IN
11	SOL	Solenoid Common Line (+24V)	IN
12	V+5	+5V	IN
13	SCR	Carriage Motor Limiting Signal.	IN
14	SLF	Paper Feed Motor Limit Signal.	IN
15	GLED	Ground level.	--
16	GPE	Ground level.	--
17	GR	Ground level.	--
18	PE	Paper End from printer mech.	OUT
19	PTS	Timing signal from printer mech.	OUT
20	RS	Reset Signal from printer mech.	OUT
21,22	CRA,B	Carriage Motor Drive Signals.	IN
23,24	CRC,D	Carriage Motor Drive Signals.	IN
25,26	LFA,B	Paper Feed Motor Drive Signals.	IN
27,28	LFC,D	Paper Feed Motor Drive Signals.	IN

Personal Computer Division
1010 N.E. Circle Blvd., Corvallis, OR 97330, U.S.A.

Reorder Number
82905-90063

Printed in U.S.A. 1/83
82905-90064