
LP29

LP29 Line Printer

Maintenance Guide

Order Number: EK–OLP29–MG–002

Prepared by
Computer Special Systems

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Table of Contents

Figures (Cont)

Figures (Cont)

Figures (Cont)

Tables

Preface

The *LP29 Line Printer Maintenance Guide* (EK-OLP29-MG) enables Field Service Engineers to troubleshoot and maintain the LP29 series of line printers to the Field Replaceable Unit (FRU) level.

ORGANIZATION

This maintenance guide is written as follows:

Chapter 1	**INTRODUCTION** - Describes the LP29 Line Printer, provides a list of specifications, describes the controls and indicators, and details how the LP29 is configured.
Chapter 2	**CONFIGURATIONS** - Describes how the power supply in the LP29 Line Printer is configured, and how to set the configuration switches on the interface printed circuit board. Chapter 2 also discusses the variations of the country kits and paper stacker.
Chapter 3	**TROUBLESHOOTING** - Describes the procedures for troubleshooting common hardware problems in the LP29 Line Printer.
Chapter 4	**REMOVAL AND REPLACEMENT** - Describes the removal and replacement procedures for all electrical and mechanical assemblies contained in the LP29 Line Printer and paper stacker.
Chapter 5	**ADJUSTMENTS** - Describes the various adjustments that need to be made to maintain the LP29 Line Printer.
Appendix A	**FIELD REPLACEABLE UNITS** - Lists the part numbers for the recommended spares, character bands, as well as Field Replaceable Units (FRUs) that comprise the LP29 Line Printer and paper stacker.
Appendix B	**CHARACTER BAND PROM INSTALLATION PROCEDURE** - Discusses the procedures for installing the character band PROM.

RELATED DOCUMENTS

Title	Document No.
LP27/LP29 Line Printer Operator's Manual	EK-LP279-OM
LP27/LP29 Line Printer Installation Manual	EK-LP279-IM
LP27 Line Printer Pocket Service Guide	EK-OLP27-SG
LP11/LPV11 Line Printer Controller Installation Manual	EK-LP11-IN

NOTES, CAUTIONS, AND WARNINGS

Where notes, cautions, and warnings are used in this document, they highlight specific types of information as follows:

NOTE Calls attention to information in text that may be of special importance.

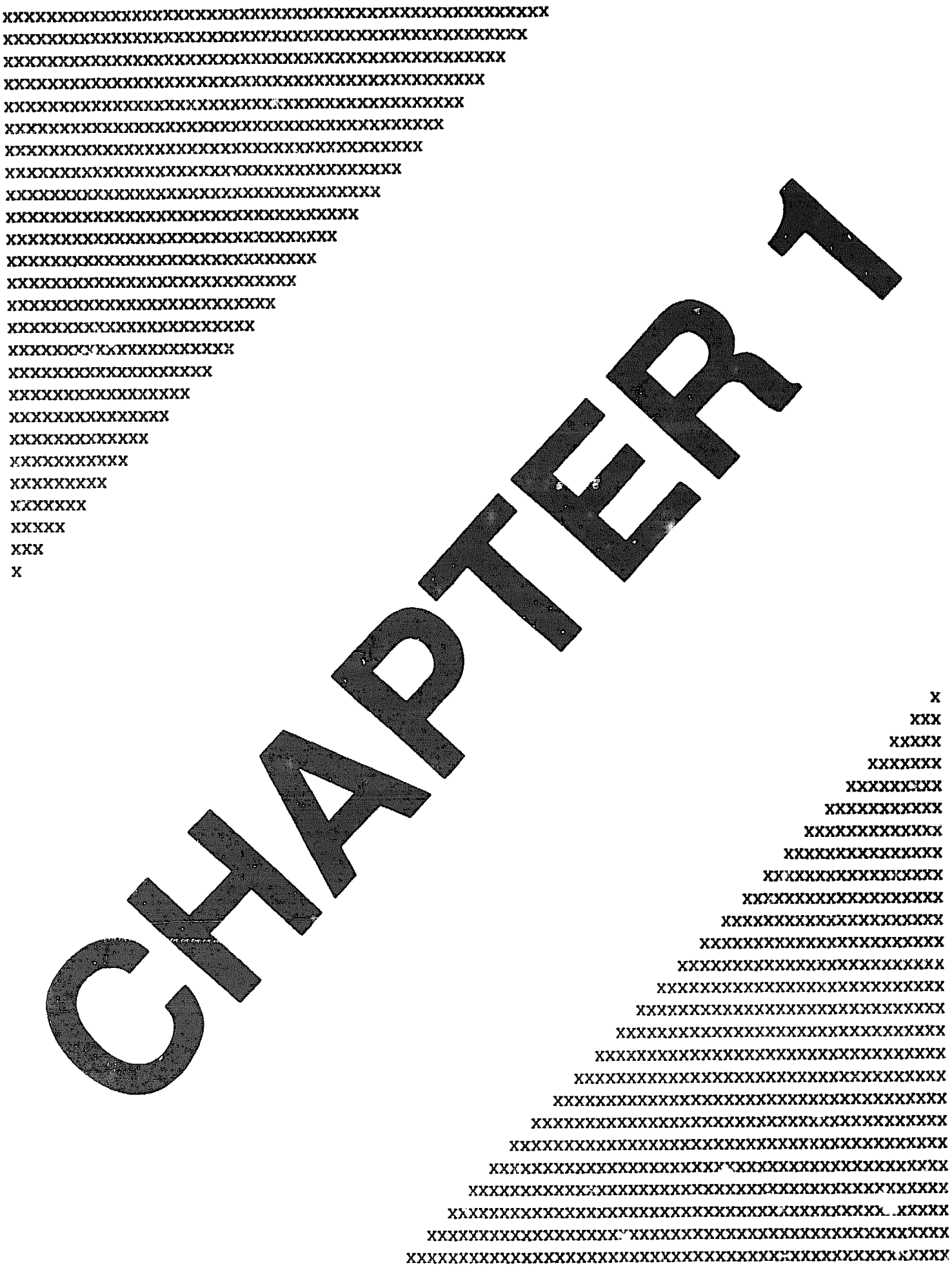
CAUTION Calls attention to information in text essential to avoiding system or equipment damage

WARNING Calls attention to information in text essential to the safety of personnel.

FCC USER STATEMENT

NOTICE:

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference. Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.


CHAPTER 1

CHAPTER 1
INTRODUCTION AND DESCRIPTION

1.1 INTRODUCTION

This chapter gives a general description and a listing of the specifications for the LP29 Line Printer. This chapter also includes a feature summary and a description of the controls and indicators.

1.2 GENERAL DESCRIPTION

The LP29 Line Printer is a general-purpose, 132-column, impact line printer that uses a continuous steel band font carrier (see Figures 1-1 and 1-2). The LP29 prints reliably at up to 2000 Lines Per Minute (LPM) using a 64-character optimized band, 1650 LPM using a standard 64-character band, and 1100 LPM using a 96- character band. The printer's electronics contains a microprocessor that controls the electrical, mechanical, and electronic functions. The printer's electronics also provide diagnostic testing to detect and indicate malfunctions. Additionally, the printer provides operator enabled self-tests with digital status display (see Figure 1-3).

The LP29 uses a variety of digital, analog, and electro-mechanical components to accomplish the following tests:

- Accept data from a DIGITAL™ processor.
- Process the data for a line of print.
- Print the data.
- Move the paper according to a programmed format.

The LP29 Line Printer comes in a short line version that can be up to 30 feet from the host processor. The powered paper stacker is standard with the LP29 Line Printer.

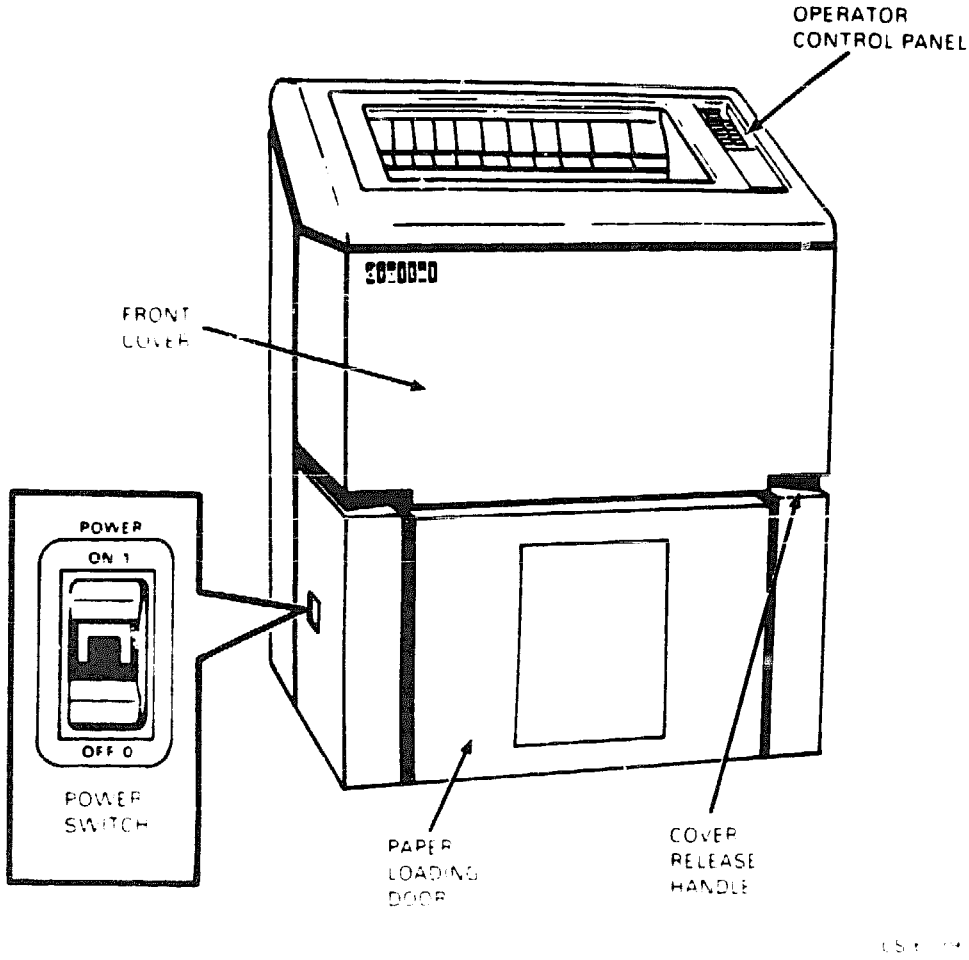


Figure 1-1 LP29 Line Printer (Front View)

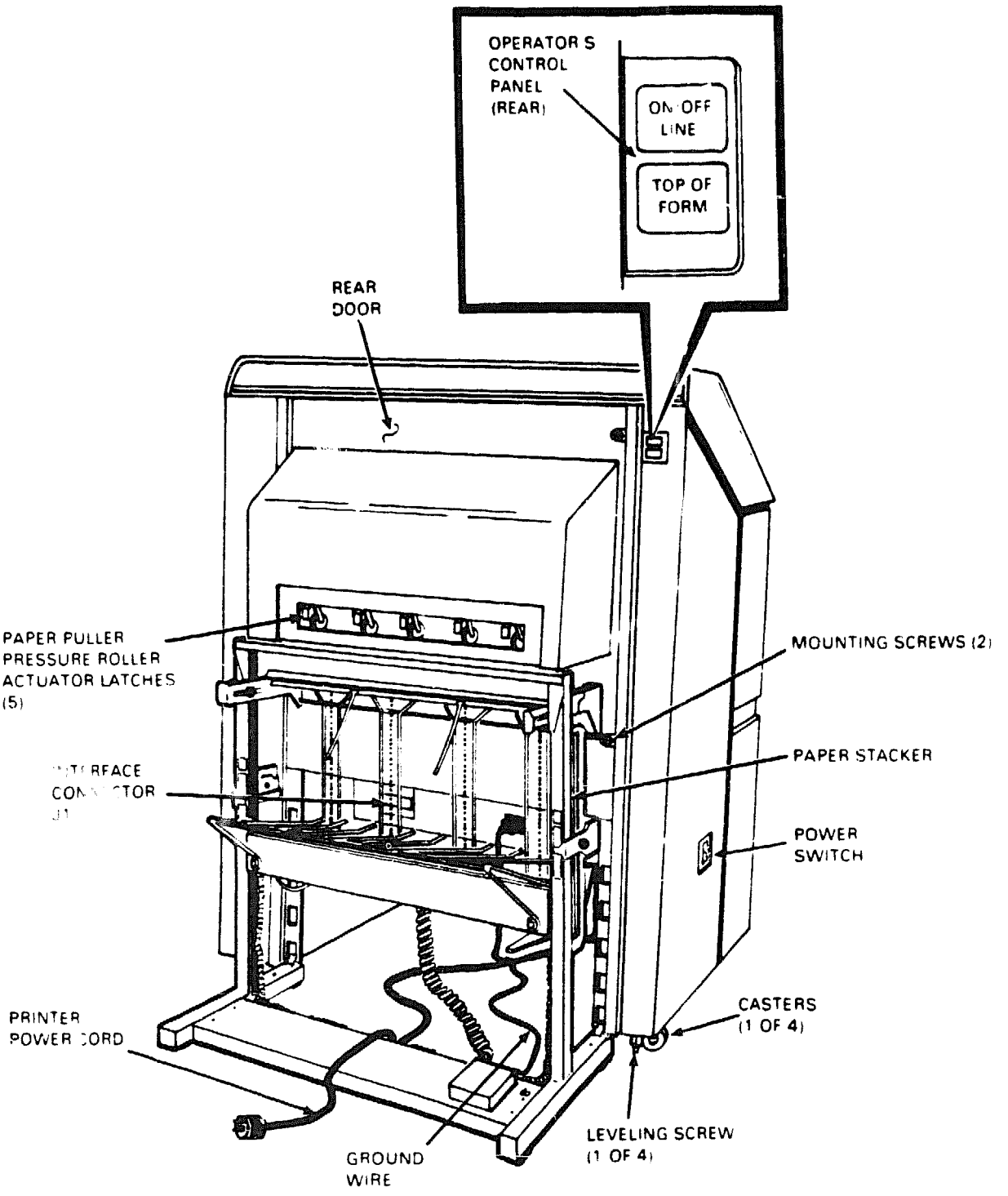


Figure 1-2 LP29 Line Printer (Rear View)

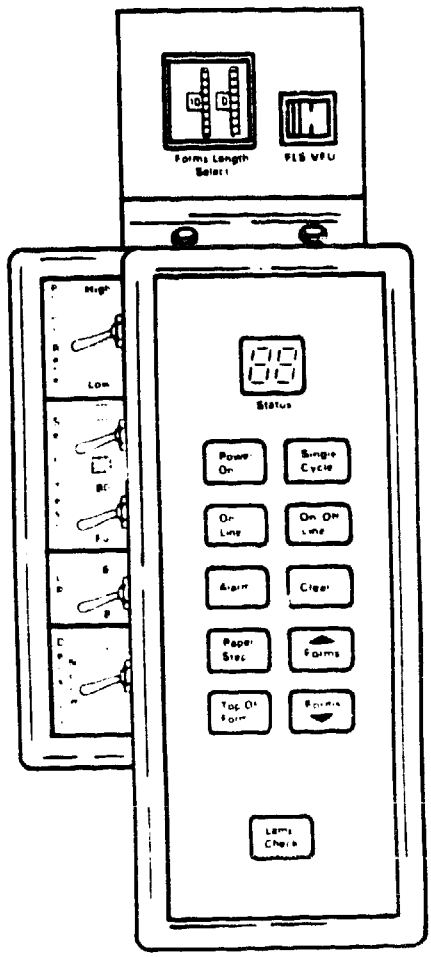


Figure 1-3 Operator Control Panel

1.3 GENERAL SPECIFICATIONS

Table 1-1 lists the specifications for the LP29 Line Printer Table 1-2 lists the dimensions of the paper stacker

Table 1-1 LP29 Line Printer Specifications

Item	Specification	Remarks
Power Supply:		
Input Voltage	100, 120, 127, 220, 230, 240 Vac	(+10%, -15%)
Frequency	47 to 63 Hz	
Power Requirements:	1100 W maximum	
Temperature:		
Operating	10°C to 38°C (50°F to 100°F)	
Storage	-10°C to 50°C (14°F to 122°F)	
Transit	-40°C to 71°C (-40°F to 160°F)	
Humidity:		
Operating	30% to 80% relative humidity	Non-condensing
Storage	10% to 90% relative humidity	10% per hour rate of change
Transit	95% maximum relative humidity	10% per hour rate of change

Table 1-1 LP29 Line Printer Specifications (Cont)

Item	Specification	Remarks
Printer Dimensions:		
Weight	255.0 kg (562.0 lbs)	
Weight (shipping)	309.0 kg (681.0 lbs)	
Height	124.5 cm (49 in.) 197.5 cm (78 in.)	Cover closed Cover open
Width	89.0 cm (35 in.)	
Depth	95.5 cm (38 in.)	Printer only

Table 1-2 Paper Stacker Dimensions

Items	Dimensions
Weight	23.0 Kg (50.0 lbs)
Weight (shipping)	40.0 Kg (88.0 lbs)
Height	72.4 cm (28.5 in.)
Width	67.4 cm (26.5 in.)
Depth	76.5 cm (30.1 in.)

1.4 LP29 FEATURE SUMMARY

Table 1-3 lists the line printer feature summary for the LP29 Line Printer.

Table 1-3 LP29 Line Printer Feature Summary

Item	Specification	Remarks
Print Speed:		
2000 LPM	64-character Band	Optimized
1650 LPM	64-character Band	Standard
1250 LPM	96-character Band	Standard
Printable Columns	132 maximum	
Character Spacing	10 characters 25.4 mm (1 in.)	Horizontal
Line Spacing	6 or 8 lines 25.4 mm (1 in.)	Vertical
Print Method	Impact, ribbon transfer	
Hammer Bank	136 Mark V hammers	Upper and lower hammer banks, each containing 68 Mark V hammers (17 four-hammer modules).
Paper Feed Rate	10 ms maximum 1270 mm (50 in.)	Step Slew
Format Control	LF, FF, CR	Standard form length 279.4 mm (11.0 in.)

1.5 CONTROLS AND INDICATORS

Table 1-4 lists the printer controls and indicators (see Figures 1-1, 1-2, and 1-3 for locations of the controls and indicators).

Table 1-4 Controls and Indicators

Controls and Indicators	Function
POWER Switch	Allows primary ac power to be applied to the printer. Indicates ON/1 or OFF/0.
POWER ON Indicator	Illuminates when power is ON.
ON LINE Indicator	Illuminates when printer is ready and on-line, or in self-test mode.
ALARM Indicator	Illuminates when any fault or not ready condition occurs.
LAMP CHECK Switch	Actuation of this switch lights all control panel indicators to verify their operation.
CLEAR Switch	When actuated, this switch clears the ALARM indicator and printer logic, leaving the VFU buffer and paper position control intact.
ON/OFF LINE Switch (Front and Rear Panel)	When actuated and the printer is ready, places the printer in an on-line condition, illuminating the ON LINE indicator. If a self-test mode is selected, actuation of the ON/OFF LINE switch alternately starts and stops self-test, illuminating the ON LINE indicator when in the self-test mode.
SINGLE CYCLE Switch	When actuated, prints one line of data.
TOP-OF-FORM Switch (Front and Rear Panel)	When actuated, this momentary switch advances paper to the next top-of-form position. This switch is disabled when the printer is on-line, in the self-test mode, or during a VFU load operation.
PAPER STEP Switch	When actuated, this momentary switch advances paper one line. This switch is disabled when the printer is on-line, in the self-test mode, or during a VFU load operation.

Table 1-4 Controls and Indicators (Cont)

Controls and Indicators	Function
FORMS ▲	When actuated, this momentary switch moves the form upward 0.035 cm (0.014 in.) to aid in positioning it relative to the line of print. If this switch is pressed for more than one second, the form will advance continuously at approximately 100 steps per second. If the switch is pressed and held while ON LINE, and printing, the form will reposition itself 0.035 cm (0.0140 in.) every eight lines.
FORMS ▼	When actuated, this momentary switch moves the form downward 0.035 cm (0.014 in.) to aid in positioning it relative to the line of print. If this switch is pressed for more than one second, the form will advance continuously at approximately 100 steps per second. If the switch is pressed and held while ON LINE, and printing, the form will reposition itself 0.035 cm (0.0140 in.) every eight lines.
STATUS Indicator	This digital readout indicates which printer function was being performed or which fault had occurred when the printer halted.
SELF TEST Switch	A three-position switch that allows exercising of the self-test function. Pressing the ON/OFF LINE switch with the SELF TEST switch in the up or down position places the printer in the self-test mode. With the switch in the down position, pressing the ON/OFF LINE switch will cause the printing of a sliding pattern. Placing the switch in the up position will cause the printing of a fixed character pattern. After printing in the self-test mode in either the sliding or fixed pattern position, the switch may be moved to its center position. The printer will remain in the self-test mode, printing full lines of each character and changing the characters for each line printed, reproducing the entire character set. To exit the self-test mode of operation, the ON/OFF LINE switch is pressed with the SELF TEST switch in its center position.

Table 1-4 Controls and Indicators (Cont)

Controls and Indicators	Function
PRINT RATE Switch	An optional two-position switch that selects either the normally high print speed, or a low print rate for increased quality. A print speed change (for example, high to low) will not occur if the switch is pressed while the band motor is still operating.
6/8 Lines-Per-Inch	Allows selection of either six or eight lines-per-inch spacing. TOP-OF-FORM switch must be reset after changing the 6/8 LPI setting
DENSITY	A three-position control that allows the hammer energy level to be adjusted for maximum print and ribbon life. Used to compensate for differences in ribbon inking to maintain uniform print density.
80/FULL	When switch is set to 80, each line of print will terminate at 80 characters. In the FULL position, a 132-character line will be printed. This switch is operable only while in the self-test mode of operation.
FLS/VFU	A two-position switch that selects either the FORMS LENGTH switch or the VFU mode for forms control. In the VFU mode, the VFU memory is loaded directly from the user system. The VFU mode in the LP29 supports Direct Access Vertical Formatting (DAVFU). To meet the needs of users requiring the DAVFU function, Digital offers a software layered product supporting that function. The product is a software utility called VAX Vertical Forms Printing for VMS The utility simplifies the interfacing between the user and printer by enabling the user to create printer independent files. These files contain printer specific page formatting commands for programming the printer electronic VFU. The utility may be obtained using Order Number QA-VZEAA-H* (*represents a character that varies depending on the media type). For more information on this utility, call 1-800-832-6277. For information on how to set up the LP29 Line Printer for use with the utility, refer to the VAX Vertical Forms Printing for VMS Reference Guide EK-LNVFU-RM.
FORMS LENGTH	Two thumbwheel switches select the SELECT Switch desired length of the forms to be printed

1.6 ELECTRONIC SUBASSEMBLIES

The LP29 Line Printer system consists of several major electronic subassemblies. Figure 1-4 shows a block diagram of the LP29 Line Printer system. The printed circuit boards are shown in their respective motherboard locations in Figure 1-5. The band gate board, which is mounted on the band gate frame, is not shown.

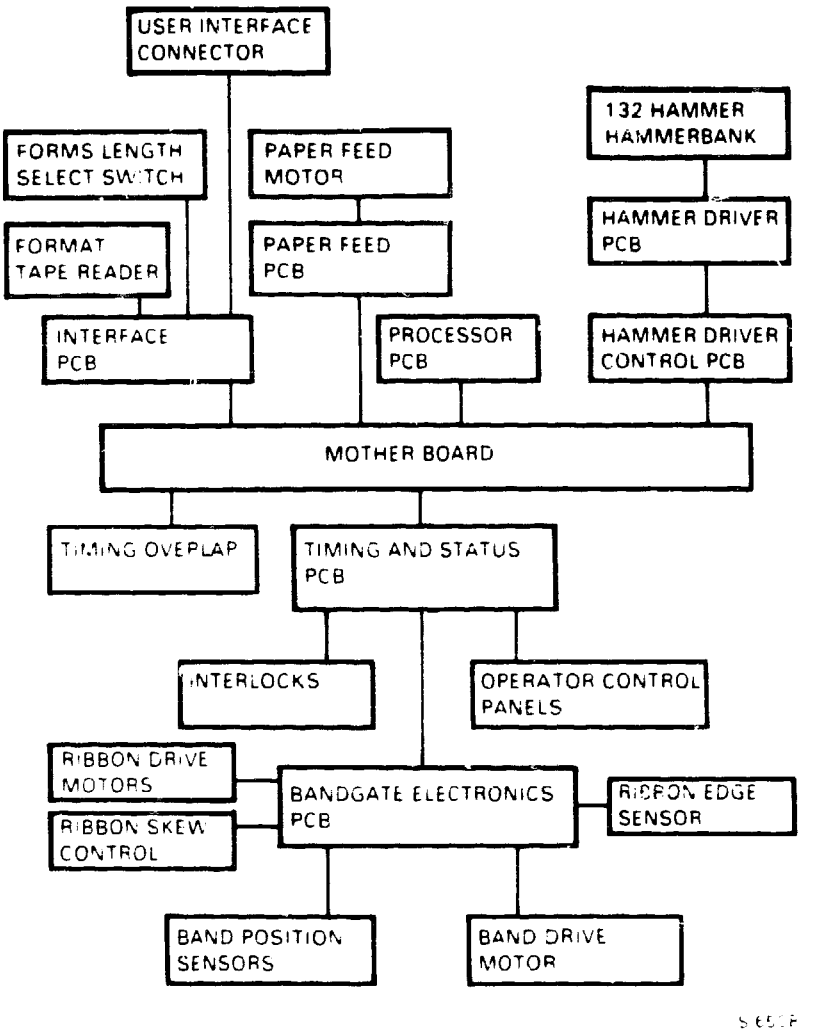


Figure 1-4 LP29 Line Printer System Block Diagram

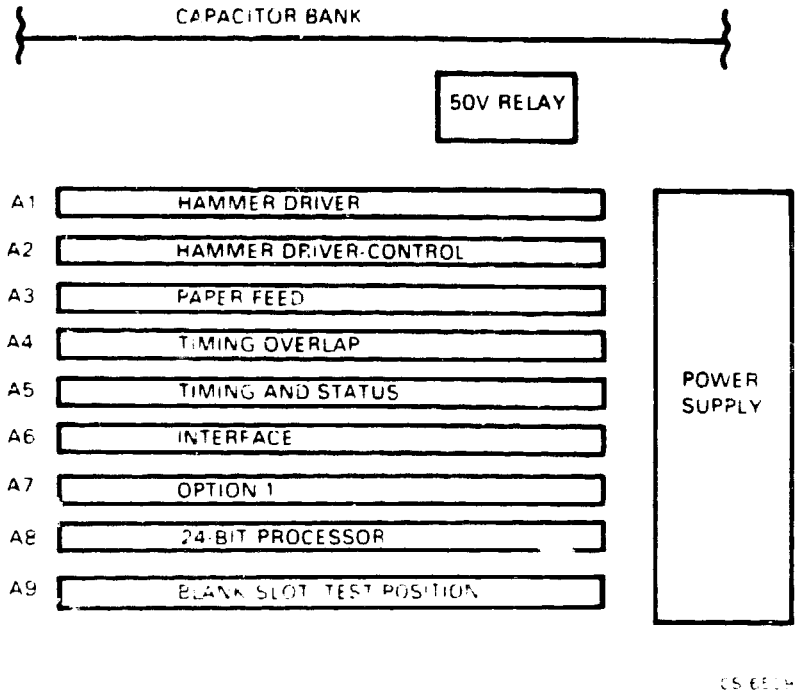
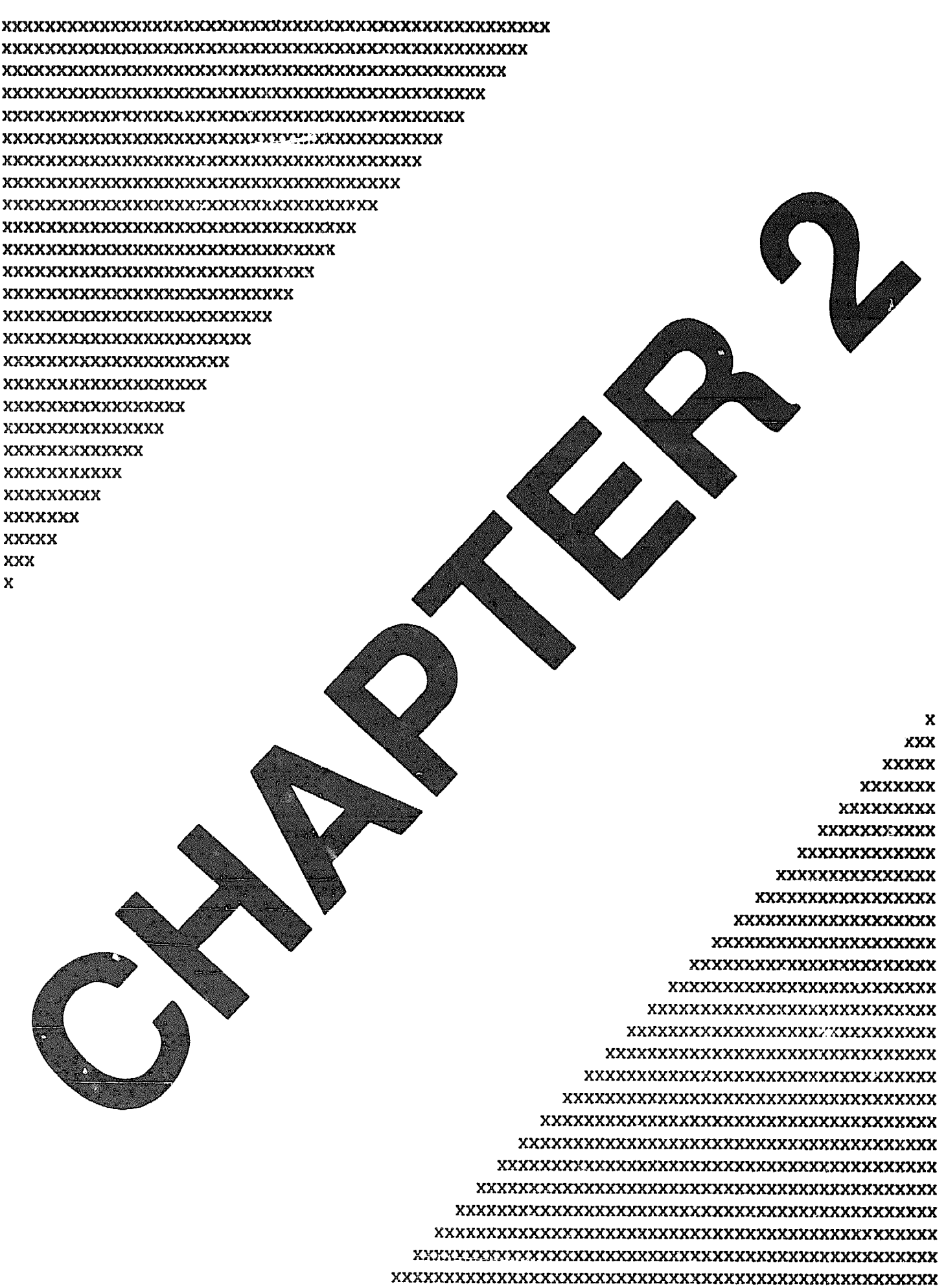


Figure 1-5 Printed Circuit Board Locations


CHAPTER 2

CHAPTER 2
CONFIGURATIONS

This chapter contains information on the variations of the LP29 Line Printer, power paper stacker and country kits. This chapter also contains information on the configurations of the domestic and international power supplies for the LP29 Line Printer, and setting the configuration switches on the interface printed circuit board.

2.1 LP29 LINE PRINTER VARIATIONS

This section contains information on the various models of the LP29 Line Printer, power paper stacker and country kits. Table 2-1 lists the LP29 Line Printer model variations. Table 2-2 lists the power paper stacker variations, and Table 2-3 lists the country kits that are available.

Table 2-1 LP29 Line Printer Model Variations

Printer Model	Description
LP29SA	LP29AA, 2000 LPM Band Printer (120 V) LP29P-AA, Power Paper Stacker (120 V) LPV11-SB, Controller Module BC27L-30 Cable
LP29S3	LP29A3, 2000 LPM Band Printer (240 V) LP29P-AB, Power Paper Stacker (240 V) LPV11-SB, Controller Module BC27L-30 Cable
LP29UA	LP29AA, 2000 LPM Band Printer (120 V) LP29P-AA, Power Paper Stacker (120 V) LP11 Controller Cable and Bulkhead Kit 70-18953-01
LP29U3	LP29A3, 2000 LPM Band Printer (240 V) LP29P-AB, Power Paper Stacker (240 V) LP11 Controller Cable and Bulkhead Kit 70-18953-01
LP29VA	LP29AA, 2000 LPM Band Printer (120 V) LP29P-AA, Power Paper Stacker (120 V) BC27A-30 Cable
LP29V3	LP29A3, 2000 LPM Band Printer (240 V) LP29P-AB, Power Paper Stacker (240 V) BC27A-30 Cable

Table 2-2 Power Paper Stacker Variations

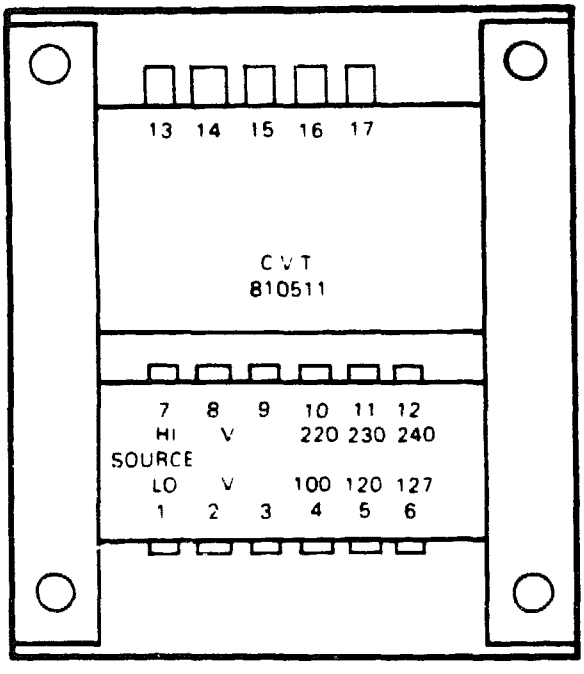
Stacker Model	Description
LP29P-AA	Power Paper Stacker (120 V)
LP29P-AB	Power Paper Stacker (240 V)

Table 2-3 LP29 Line Printer Country Kits

Part Number	Country
LP29-KD	Denmark
LP29-KE	United Kingdom
LP29-KG	Germany
LP29-KI	Italy
LP29-KM	Sweden
LP29-KP	France
LP29-KS	Spain
LP29-KV	Portugal
LP29-KJ	Japan

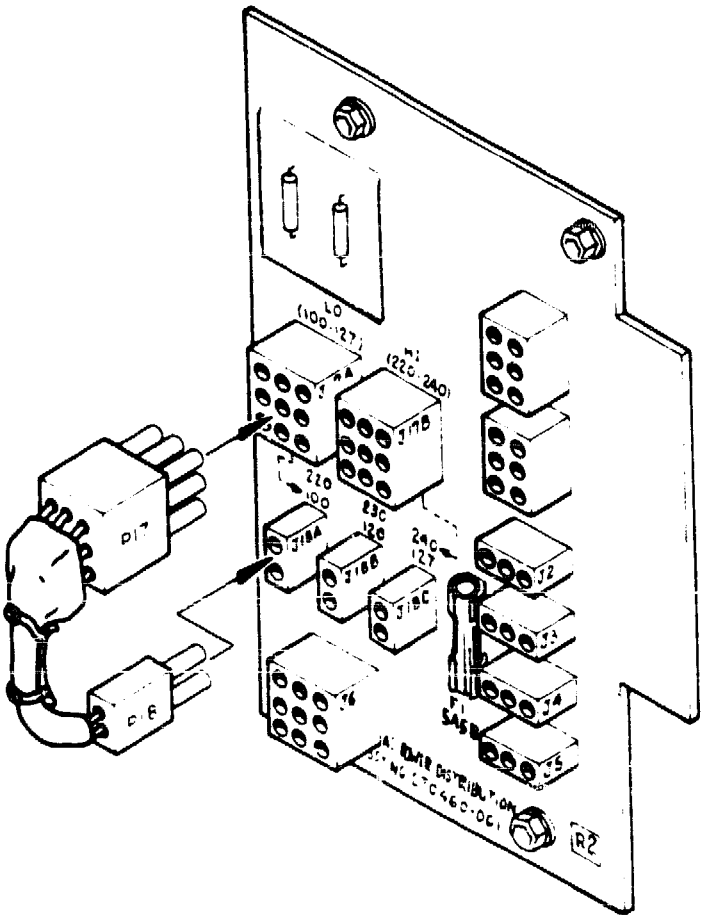
2.2 POWER SUPPLIES

The power supplies for the LP29 Line Printers must be configured for the proper operating voltage. The correct voltage for the domestic LP29 Line Printer is selected by installing a jumper between the pins (see Figure 2-1). The correct voltage for the international LP29 Line Printer is selected by connecting a short wiring harness between the proper connectors on the power supply Printed Circuit Board (PCB) (see Figure 2-2). Table 2-4 lists the voltages, tolerances, and maximum current for the power supply.



INPUT VOLTAGE	FROM PIN	TO PIN
100	(LOV) 3	4 (100V)
120	(LOV) 3	5 (120V)
127	(LOV) 3	6 (127V)
220	(HIV) 9	10 (220V)
230	(HIV) 9	11 (230V)
240	(HIV) 9	12 (240V)

Figure 2-1 Domestic Voltage Configuration



INPUT VOLTAGE	CONNECT HARNESS P17	CONNECT HARNESS P18
100	J17-A	J18-A
120	J17-A	J18-B
127	J17-A	J18-C
220	J17-B	J18-A
230	J17-B	J18-B
240	J17-B	J18-C

CS 6385

Figure 2-2 International Voltage Configuration

Table 2-4 Output Voltages

Non-printing Voltage/Nominal	Tolerance (Worst Case)	Maximum Current
5 V	0.15 V	15 A
13.8 V	0.7 V -0.8 V	2 A
-14.1 V	1.4 V -1.6 V	2 A
50.5 V	3 V	12 A (100 A peak)
120 Vac	+12% -17%	5 A

2.2.1 Domestic Power Supply Voltages

The constant voltage transformer assembly on the domestic power supply comes configured for 120 Vac with a voltage tolerance of +10% to -15%. The input frequency range is 47 Hz to 63 Hz

The domestic power supply generates four DC voltages: 50 V, 14 V, -14 V, and 9 V. The source for the 5 V supply is the 9 V supply. An integrated auto-transformer winding provides 120 Vac output

2.2.2 International Power Supply Voltages

The constant voltage transformer assembly on the international power supply comes configured for 240 Vac with a voltage tolerance of +10% to -15%. The input frequency range is 47 Hz to 63 Hz

The international power supply generates four voltages: 50 V, 14 V, -14 V, and 9 V. The source for the 5 V supply is the 9 V. An integrated auto-transformer winding provides 220 Vac output

2.3 CONFIGURATION SWITCHES

Configuration (binary) switches S4 through S8 on the short-line interface PCB (see Figure 2-3) determine the configuration of the printer. The switch settings and functions are listed and described in Table 2-5.

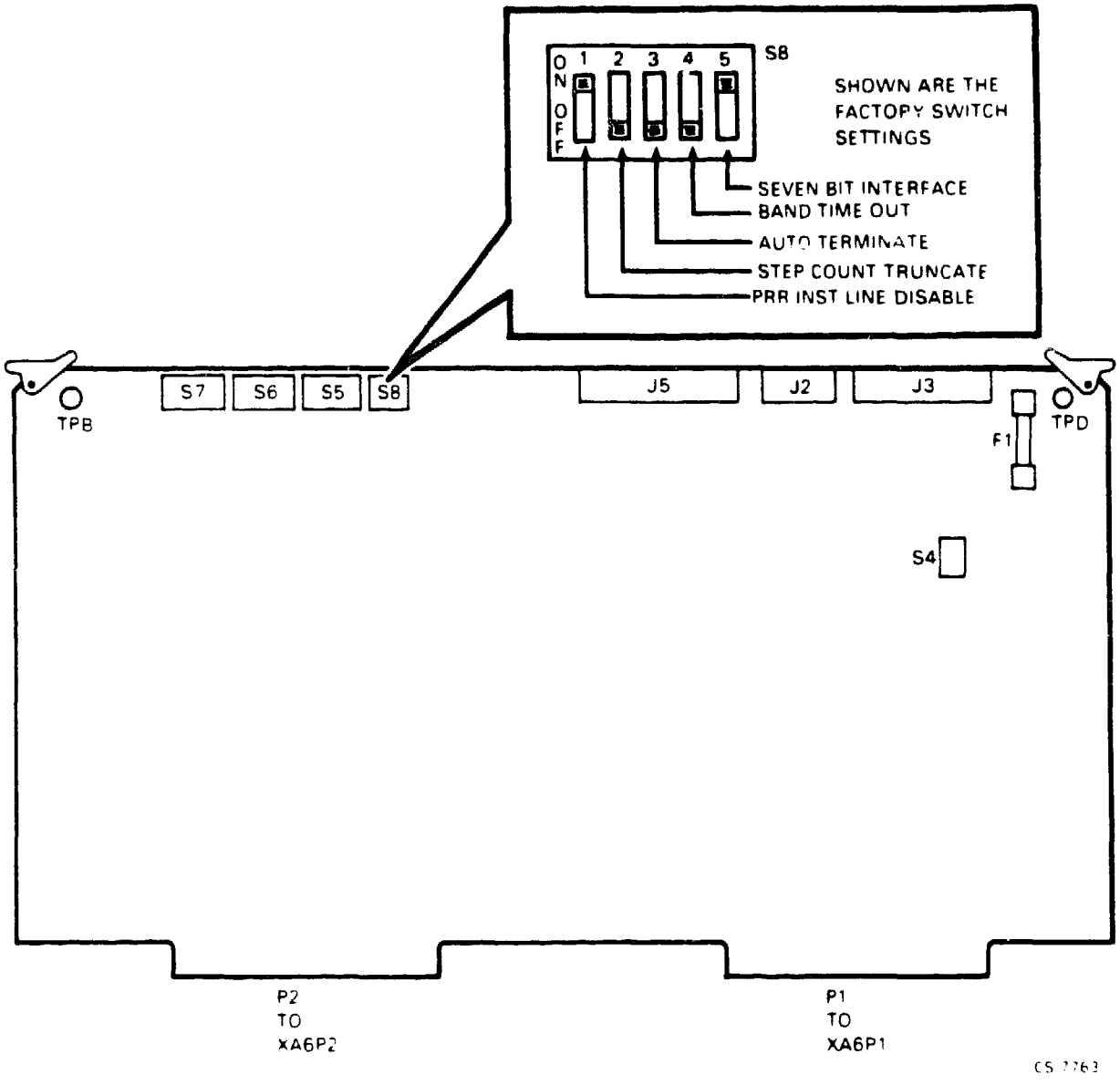


Figure 2-3 Short Line PCB, Configuration Switch Locations (S4-S8)

Table 2-5 Configuration Switch Selection

Switch	Position	Definition
S4-1 LOW TRUE INTERFACE	ON	All I/O lines, except BUFFER CLR and NOT VFU, are set to active low signals.
	OFF	All I/O lines are set to active high signals.
S4-2 PARITY ENABLE	ON	Parity checking circuitry is disabled.
	OFF	Parity checking circuitry disabled.
S4-3 PARITY WITH DATA 8	ON	Parity is checked on DATA 1 through 8 and the PARITY BIT
	OFF	The eighth input is open or as determined by S4-4
S4-4 DAVFR LOAD ERROR WITH NO TOP	ON	Parity is checked on DATA 1 through 7, PR INST, and PARITY BIT
	OFF	The eighth bit (PPR INST) is open, or as determined by S4-3

CAUTION

S4-3 and S4-4 should never be on at the same time.

S4-5 LOW TRUE BUFFER CLEAR	ON	BUFFER CLEAR is recognized as a low true signal.
	OFF	BUFFER CLEAR is recognized as a high true signal

Table 2-5 Configuration Switch Selection (Cont)

Switch	Position	Definition
S5-1	ON	DAVFU stop code positions the VFU memory pointer toTOP-OF-FORM (TOF).
	OFF	DAVFU stop code positions the VFU memory pointer tothe first line of the previously loaded VFU image.
S5-2	ON	DAVFU load received without a Channel 1 stop positionwill cause a status 12 fault condition to be displayed.
	OFF	The fault will be displayed
S6-1 1403 FORMAT MODE	ON	Enables 1403 compatibility. If a tape channel command is received from the user system to advance the next channel stop in a specific channel, the paper does not advance if the channel specified, and no print data was transmitted.
	OFF	Disables 1403 compatibility.
S6-2 HAMMER VERIFY	ON	Hammer verify is disabled
	OFF	Hammer verify is enabled.
S6-3 S6-4 PERF SKIPOVER		These switches allow forms perforation skipover when operating from the FORMS LENGTH SWITCH or without the PERF VFU loaded

S6-3	S6-4	Skip No. of Lines
OFF	OFF	4
OFF	ON	6
ON	OFF	0
ON	ON	3

Table 2-5 Configuration Switch Selection (Cont)

Switch	Position	Definition
S6-5 DEFAULT FORMS LENGTH SELECT	ON	Forms length is set to 30.48 cm (12.00 in.) when in the VFU mode, and VFU memory is not loaded.
	OFF	Forms length is 27.94 cm (11.00 in.).
S6-6 VFU SKIPOVER	ON	VFU SKIPOVER is enabled. When in the VFU mode of operation, any command to move paper that would normally stop between BOTTOM OF FORM (BOF) and TOP-OF-FORM (TOF) continues to the TOF.
	OFF	VFU SKIPOVER is disabled.
S6-7 S6-8 BUFF TAPE CHANNEL SELECT	-	These switches allow selection of the tape channel that is to be defined as BOF.

S6-7	S6-8	BOF Tape Channel
OFF	OFF	12
OFF	ON	11
ON	OFF	8
ON	ON	2

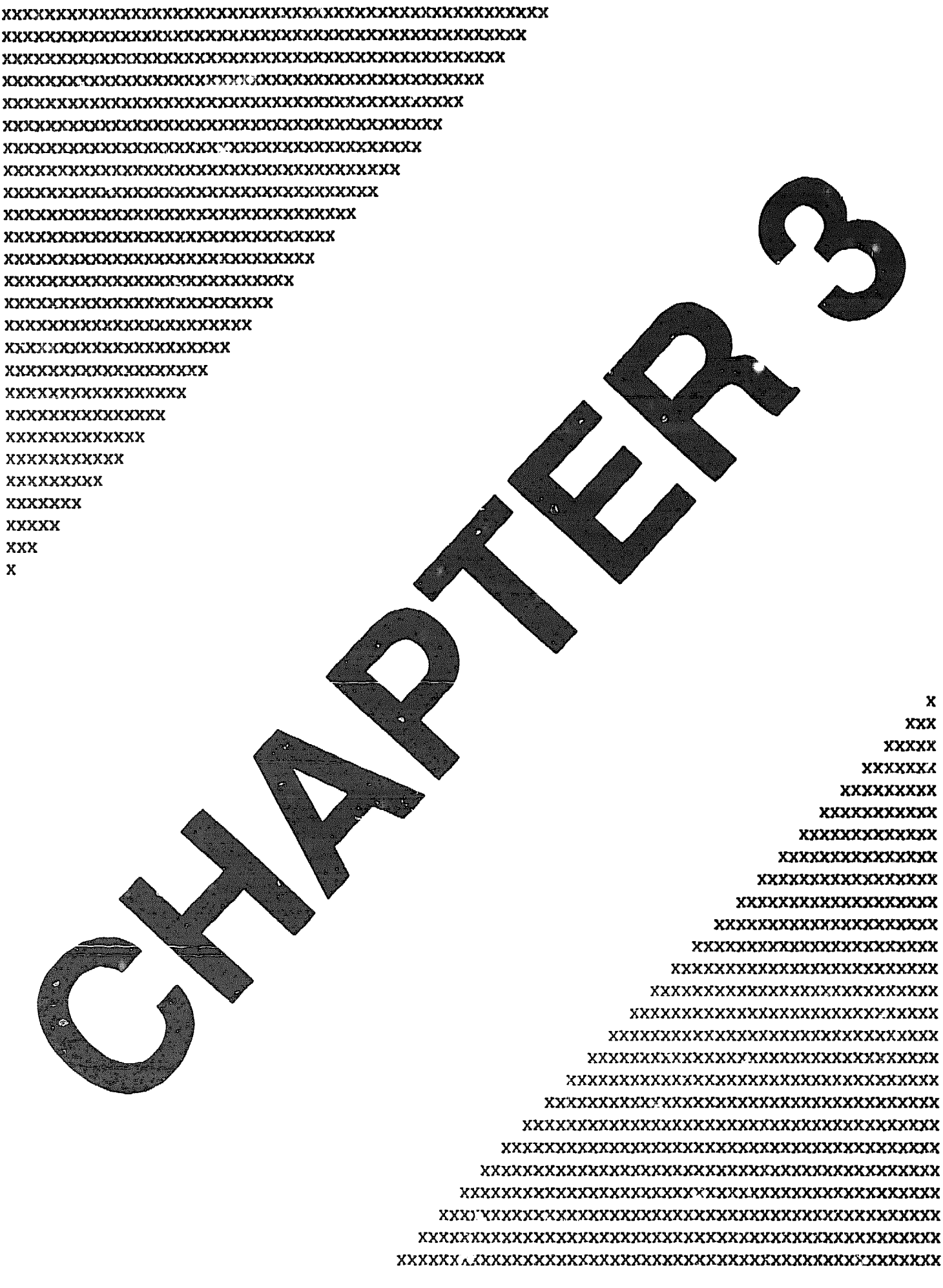
S7-1 AUTO LINE FEED	ON	The carriage return code is interpreted as a carriage return and line feed operation.
	OFF	The carriage return code is interpreted as a carriage return only.
S7-2 PRINT TO BOF	ON	The printer continues printing after a paper low condition has been sensed until the BOF position has been positioned.
	OFF	The printer halts operation when a paper low condition has been sensed. Printing the form in the single cycle mode is accomplished by actuation of the ON LINE or SINGLE CYCLE button.

Table 2-5 Configuration Switch Selection (Cont)

Switch	Position	Definition
S7-3 S7-4 PPRMVG LINE OUTPUT OPTIONS		These switch setting combinations allow either Paper Moving, Tape Channel 9, or VFU Ready information to be transmitted on the PPRMVG status line.
		S7-3 / S7-4 / Status OFF / X / Paper Moving ON / OFF / VFU Ready ON / ON / Tape Channel 9
S7-5 TOF LINE OUTPUT	ON	Tape Channel 9 status is placed on the TOF output line
	OFF	Tape Channel 1 status is placed on the TOF output line
S7-6 PPR INST CONTROL BIT	ON	DATA 7 line is used as the control bit to select tape channel or step count commands
	OFF	Control is returned to the DATA 5 line
S7-7 CONTROL BIT POLARITY	ON	The interpretation of DATA 5 or DATA 7 (if S7-6 is enabled) is inverted for the selection of tape channel codes and step count commands
	OFF	CONTROL BIT POLARITY is standard
S7-8 STEP COUNT EXPANSION	ON	A STEP COUNT Command can move forms up to a maximum of 63 lines
	OFF	A STEP COUNT Command can move forms up to a maximum of 15 lines

Table 2-5 Configuration Switch Selection (Cont)

Switch	Position	Definition
S8-1 PPR INST LINE DISABLE	ON	Paper instruction line is disabled.
	OFF	Paper instruction is enabled.
S8-2 STEP COUNT TRUNCATE	ON	Paper feed commands that normally pass a TOF position, halt at the TOF TRUNCATE position.
	OFF	The STEP COUNT TRUNCATE feature is disabled
S8-3 AUTO TERMINATE	ON	Data transmission is terminated after receipt of 133 or 137 characters. Format control is automatically set to a carriage return
	OFF	AUTO TERMINATE feature is disabled.
S8-4 BAND TIMEOUT	ON	The character band stops running 30 seconds after the last transmission of data.
	OFF	The character band stops running three seconds after the last transmission of data.
S8-5 SEVEN BIT INTERFACE	ON	The eighth data bit is disabled. In this mode the printer is configured for a 7-bit interface
	OFF	The printer is configured for an 8-bit interface


CHAPTER 3

CHAPTER 3
TROUBLESHOOTING

This chapter contains information for troubleshooting the LP29 Line Printer with a fault indicator status readout. The status display indicator, located on the control panel (refer to Chapter 1, Figure 1-3), shows most printer faults.

Problem areas like print quality should also be considered. Most print quality problems can be solved by proper cleaning, using the correct paper and ribbon, ensuring adjustments are correct, and by following maintenance procedures.

3.1 LP29 LINE PRINTER TROUBLESHOOTING

Table 3-1 lists the LP29 Line Printer status display indications, the fault definitions, the probable causes, and possible corrective action to be taken.

The status indicators are enabled by the 5 V supply. If the 5 V supply goes dead, the status indicators will all be OFF. To aid in troubleshooting, a fault lamp (DS2) on the domestic power supply Printed Circuit Board (PCB), and DS4 on the international power supply printed circuit board, will be lit to indicate a failure in one or more of the output voltages. See Figure 3-1 for the domestic power supply printed circuit board, and Figure 3-2 for the international power supply printed circuit board.

Figure 3-3 is a basic flowchart for the printer power-up sequence, and should be referred to for problems in this area. Figure 3-4 is a flowchart for the printer band drive operation. Figure 3-5 is a flowchart for proper band tracking operation.

Table 3-1 LP29 Line Printers System Troubleshooting Guide

Status Display	Definition	Action	Probable Cause	Remedy
Blank	Undefined	3	• Clock fault	• Replace Processor PCB.
			• 5 V failure	• Check power supply fuse.
01	Paper supply low	2	• Out of paper	• Install paper.
			• Paper low sensor defective	• Replace paper low sensor.
			• Timing and Status PCB defective	• Replace Timing and Status PCB.
02	Paper motion fault	1, 2	• Paper jam, improper forms thickness setting, tractors improperly aligned	• Clear paper jam, check forms thickness adjustments, check tractor alignment.
			• Loose paper holes in sensor	• Clean sensor.
			• Defective paper motion sensor	• Replace paper motion sensor.
			• Defective timing and Status PCB	• Replace timing and Status PCB.
			• Defective Paper Feed PCB	• Replace Paper Feed PCB.
03	Band Cover not locked	2	• Band cover not closed	• Close band cover.
			• Band cover sensor defective	• Replace band cover sensor.
			• Defective Timing and Status PCB	• Replace Timing and Status PCB.
			• Defective Band Gate PCB	• Replace Band Gate PCB.
04	Band gate not closed	2	• Band gate open or not properly latched	• Close and latch band gate.
			• Band gate switch out of adjustment or defective	• Adjust or replace band gate switch if defective.

[1] Press ALARM/CLEAR switch.
[2] Correct fault
[3] Turn power OFF and ON

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
05	Undefined band loaded	1,2	• Band presently installed does not have matching PROM	• Change band type or install proper PROM. • Replace Processor PCB or Band Gate PCB. • Check transducer adjustment.
06	Ribbon fault	2	• Ribbon jammed or torn • Ribbon motor inoperative, too much load or no load • Defective Band Gate PCB	• Replace ribbon • Check and replace ribbon motor if defective • Replace Band Gate PCB.
07	Hammer verify fault	1	• Hammer failed to fire or fired when it was not selected • Hammer coil open • Defective Motherboard PCB	• Replace associated Hammer Driver PCB. • Replace defective hammer. • Replace defective Motherboard PCB.
08	Undefined forms length selected	2	• 6/8 LPI switch or FLS switch not set correctly or defective	• Set 6/8 LPI switch or FLS switch to correct setting. Replace switch or switches if defective. • Check FLS switch continuity with an ohmmeter between common contacts. • Sequence through each operating position.

[1] Press ALARM/CLEAR switch
[2] Correct fault

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
09	No tape in reader	1,2	• No tape in reader during tape load operation	• Install valid tape.
10	VFU memory not loaded	1	• Load operation not performed	• Load VFU memory.
16	Paper low/ single step mode	2	• Paper low but may be stepped to the end of form • Defective paper low sensor • Defective Timing and Status PCB	• Single step to bottom of form and/or install paper. • Replace paper low sensor. • Replace Timing and Status PCB.
17	Loss of sync in print	1	• Hammer trigger not in sync with sub-scans	• Replace Timing and Status PCB. • Replace Band Gate PCB.
18	VFU not selected	1	• FLS/VFU switch incorrectly set	• Set FLS/VFU switch to proper position.
19	Improper throat or density setting for flight time	2	• Thickness control and/or density control improperly set • Density control switch defective	• Set thickness control for single part paper and density control at center position. • Replace density control switch
20	Hung with unprintable data	3	• Processor failure	• Replace Processor PCB.
21	Print inhibit	2	• Print inhibit switch ON	• Place print inhibit switch to the OFF position.

[1] Press ALARM/CLEAR switch.
[2] Correct fault
[3] Turn power OFF and ON

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
22	Interlock cable error	2	• Interlock cable not connected	• Connect interlock cable.
23	I/O parity error, data load	1	• Illegal character from user • Substitute character or space sent	• Cleared by user sending a buffer clear signal. • Validate data.
25	Format code not recognized	1	• Illegal format code received from user, system or VFU tape Channel 12 • Defective Interface PCB	• Transmit correct format code. Validate VFU data input • Replace Interface PCB
26	DAVFU stop code error	1	• DAVFU load incorrect	• Check that the user system stop code is on an even byte. • Reload DAVFU
27	DAVFU image too long	1	• Data transfer exceeded 286 characters	• Correct user system and reload DAVFU
29	I O parity error DAVFU load	1	• Parity error in DAVFU data	• Validate input data and transmit a DAVFU start code or buffer clear signal
31	Missing index	1	• Extraneous or missing index pulses	• Check band tracking adjustment • Replace Timing and Status PCB or Band Gate PCB
32	Missing HPRES	1	• Extraneous or missing HPRES pulses	• Check band tracking adjustment. • Replace Timing and Status PCB or Band Gate PCB
33	Paper feed command error	1	• Paper feed not accepting commands	• Replace Paper Feed PCB or Processor PCB

[1] Press ALARM CLEAR switch
[2] Correct fault

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
34	Band position fault	3	• Band drive tilt mechanism failure	• Power down and up, readjust tilt mechanism, replace Band Gate PCB if defective. • Check tilt motor and connections. • Adjust transducer outputs or transducer to band gap.
35	Band ID = 0	1	• Failure to read band ID code • Defective Timing and Status PCB • Defective Band Gate PCB	• Check band transducer output and/or band positioning. • Replace Timing and Status PCB • Replace Band Gate PCB.
36	5 V fault	3	• 5 V power supply out of tolerance	• Power supply fuse F5 open • Replace Power Supply PCB.
37	14 V fault	3	• 14 V power supply out of tolerance	• Power supply fuse F1 or F4 open. • Replace Power Supply PCB
38	-14 V fault	3	• -14 V power supply out of tolerance	• Power supply fuse F2 open. • Replace Power Supply PCB
39	50 V fault	3	• 50 V power supply out of tolerance	• Power supply fuse F3 open. • Replace Power Supply PCB.

[1] Press ALARM/CLEAR switch
[3] Turn power OFF and ON.

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
40	Band speed fault	1	• Excess band drag or incorrect forms thickness adjustment • Defective Timing and Status PCB • Defective Band Gate PCB	• Clean band, set form thickness adjustment to proper setting. • Replace Timing and Status PCB. • Replace Band Gate PCB.
41	Paper drive system	3	• Paper feed motor connector not properly connected • Paper feed PCB fuse F1 open • Paper Feed PCB connector J12 not connected or open cable • Paper Feed Driver PCB or paper feed motor defective	• Check paper feed motor connections. • Replace paper feed fuse F1 if open. • Connect feed driver PCB connector J12 or check for open cable. • Replace paper feed motor if defective.
42	Hammer protect fault	3	• Shorted hammer driver or open hammer coil	• Replace defective Hammer Driver PCB or defective hammer.
46	VCL fault	3	• VCL voltage level incorrect	• Replace Timing and Status PCB.
49	Band current fault	3	• Excessive band drag	• Clean band. • Check cause of mechanical overload
51	Position band		• Normal indication during 15 second band	
52	Missing HPRES during print	3	• No hammer pulse reset pulses	• Check if band is operative. • Replace Timing and Status PCB

[1] Press ALARM/CLEAR.
[2] Turn power OFF and ON.

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
53	Waiting for paper, not moving	1	• READY PRINT signal at a high level	• Replace Paper Feed PCB.
54	Print routine waiting for hammer trigger	1	• No hammer trigger pulse	• Replace Timing and Status PCB.
55	Loss of Sync in print	1	• Band position counter incorrect	• Replace Timing and Status PCB. Replace Band Gate PCB
56	Band ID routine		• Normal indication	
57	TCVFU load routine		• Normal indication	
58	TOP-OF-FORM switch pressed		• Normal indication when switch is pressed and routine is complete	• Release switch.
59	PAPER STEP switch pressed		• Normal indication when switch is pressed and routine is complete	• Release switch
60	FORMS ADJUST switch pressed		• Normal indication when switch is pressed and routine is complete	• Release switch
61	Tape load attempted with VFU not selected		• FLS/VFU switch not set to correct position	• Set FLS/VFU switch to the VFU position
62	ON/OFF LINE switch pressed		• Normal indication when switch is pressed and routine is complete • Occurs in the on-line to off-line mode	• Release switch

[1] Press ALARM/CLEAR

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
64	6/8 LPI switch setting not initialized	2	• 6/8 LPI switch activated in off-line mode when not at top-of-form position	• Place switch at desired setting and press TOP-OF-FORM switch.
65	FLS/VFU switch setting not initialized	2	• FLS/VFU switch activated in off-line mode when not at top-of-form position	• Place switch at desired setting and press TOP-OF-FORM switch.
66	Self-test mode Print Inhibit	2	• TEST and Print Inhibit switches ON	• Place TEST and Print Inhibit switches to OFF
67	Self-test mode	2	• TEST switch in test position	• Place switch to OFF position
68	DAVFU load routine	2	• Normal indication If it remains on, a DAVFU stop code has not been received	• Check for DAVFU stop code being received
			• Defective Interface PCB	• Replace Interface PCB.
69	Form length setting not initialized	2	• Switch not set properly	• Place switch at desired setting and press TOP-OF-FORM switch
75	On-line buffer clear active	3	• Buffer clear always active	• Power down
			• Interface PCB switch S4-5 not set correctly or defective	• Set Interface PCB switch S4-5 correctly.
			• Defective Interface PCB	• Replace Interface PCB.
76	On-line mode Print Inhibit	2	• Print Inhibit switch ON	• Place switch to OFF position
77	On-line mode		• Waiting for data	• Data source not connected or not ready to transfer data

[2] Correct fault
[3] Turn power OFF and ON

Table 3-1 LP29 Line Printers System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
78	On-line mode data in buffer	2	• Data in buffer but line not terminated	• Send carriage control character.
84	Hammer bank plenum disconnected	2	• Hammer bank plenum not connected at hammer bank assembly	• Connect plenum. • Check plenum interface switch.
87	On-line ready and VFU buffer not loaded		• VFU mode selected but VFU buffer not loaded. Printer will operate until a VFU command - a status code 10 will be displayed	• Load the VFU buffer.
88	Off-line - ready			
89	Paper tensioner knob engaged			• Disengage paper tensioner knob from lower tractor shaft
90	RAM test - Memory 0	1	• Bad RAM or Processor PCB	• Power down and retry • Replace Processor PCB.
91	RAM test - Memory 1	3	• Bad RAM or Processor PCB	• Power down and retry. • Replace Processor PCB
92	RAM test - Memory 2	3	• Bad RAM or Processor PCB	• Power down and retry • Replace Processor PCB
93	RAM test - Memory 3	3	• Bad RAM or Processor PCB	• Power down and retry. • Replace Processor PCB.
94	Illegal RAM test	3	• Defective illegal table RAM	• Replace Processor PCB
95	Hammer verify memory test	1	• Hammer driver chip defective	• Replace defective Hammer Driver PCB

[1] Press ALARM/CLEAR switch
[2] Correct fault
[3] Turn power OFF and ON

Table 3-1 LP29 Line P. inters System Troubleshooting Guide (Cont)

Status Display	Definition	Action	Probable Cause	Remedy
P	Power reset	3	• Normal indication on power up and power down. Defect i.i power reset circuitry if on continually (does not indicate a power failure)	• Replace Timing and Status PCB.
C	Clock fault	3	• System clock failure	• Replace Processor PCB or Timing and Status PCB.
H	Temperature fault	3	• Temperature exceeded limits	• Check for proper air flow. • Check thermister assembly. • Replace thermister assembly if def..tive

[3] Turn power OFF and ON

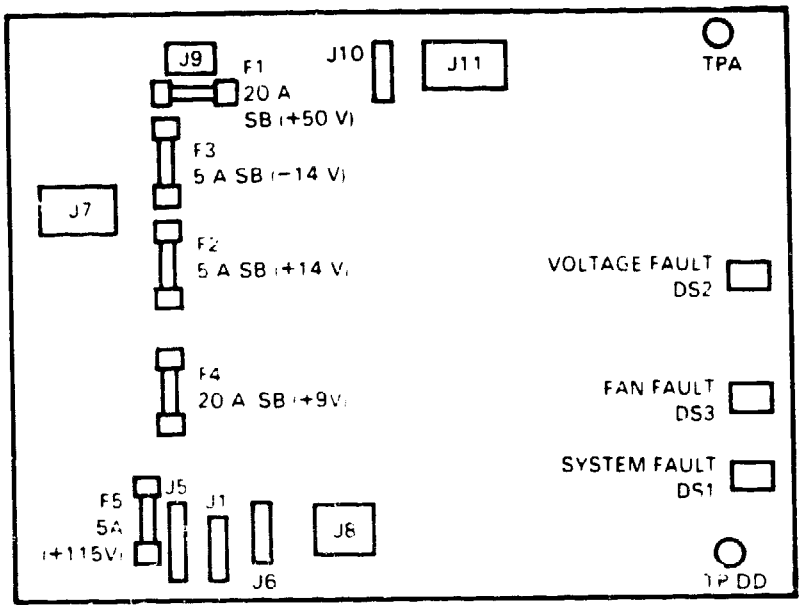


Figure 3-1 Domestic Power Supply Printed Circuit Board

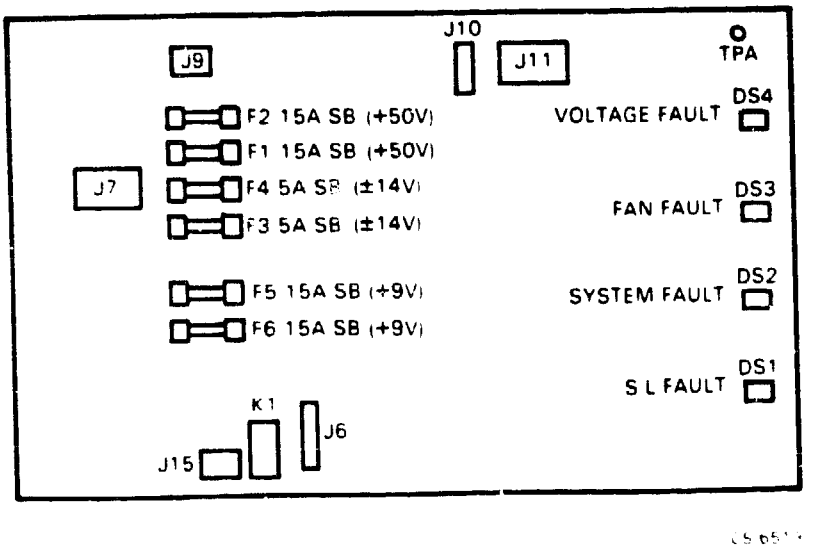


Figure 3-2 International Power Supply Printed Circuit Board

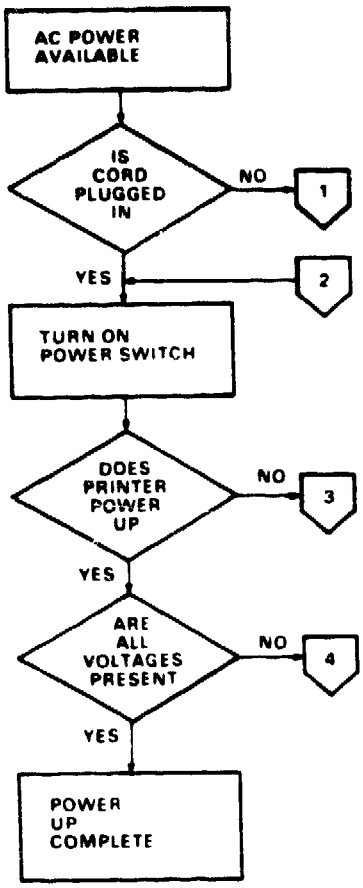


Figure 3-3 Power-up Flowchart (Sheet 1 of 2)

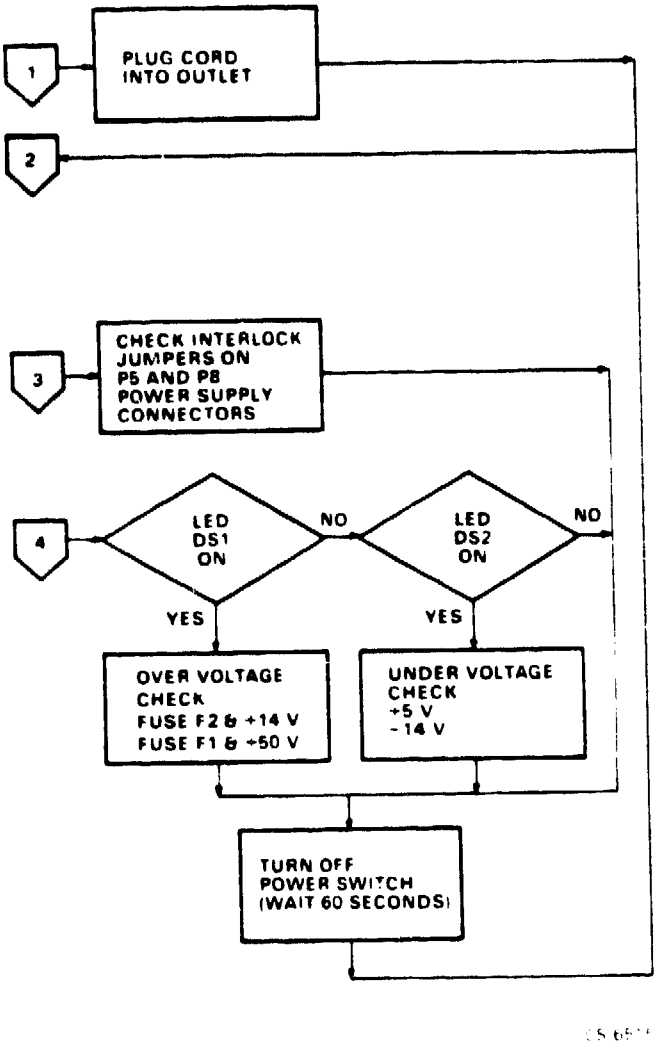


Figure 3-3 Power-up Flowchart (Sheet 2 of 2)

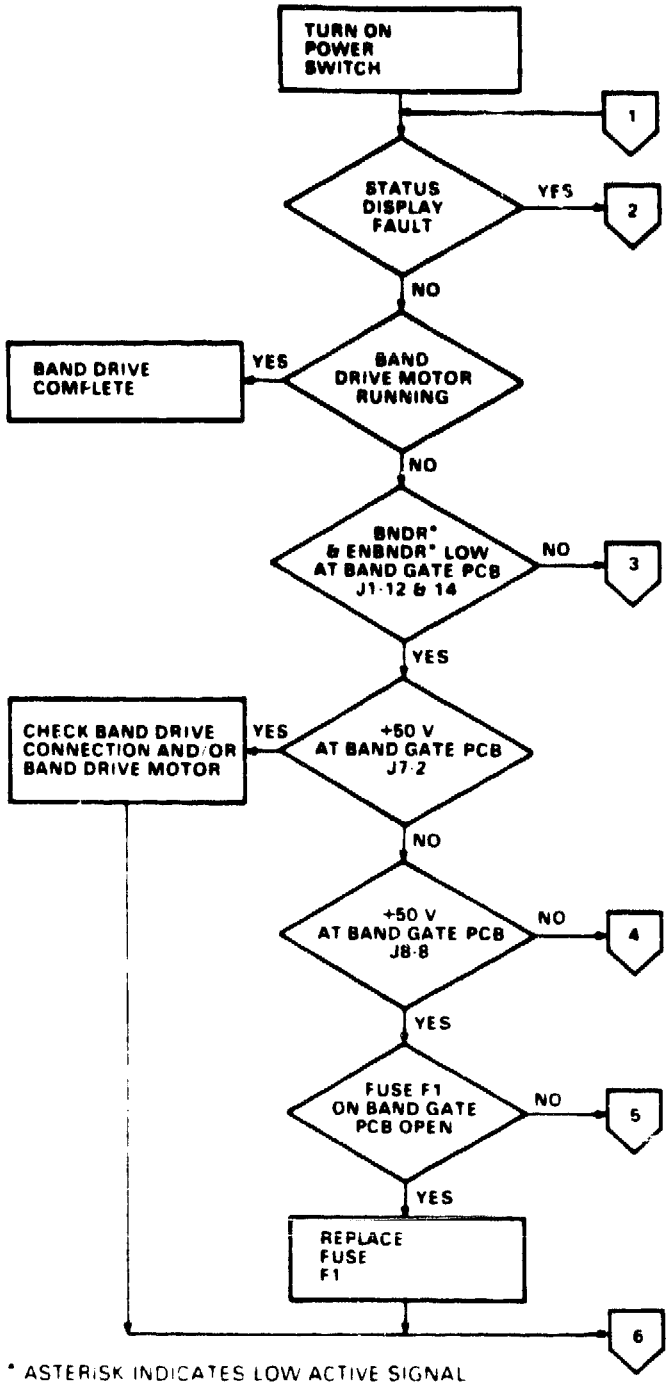


Figure 3-4 Band Drive Flowchart (Sheet 1 of 2)

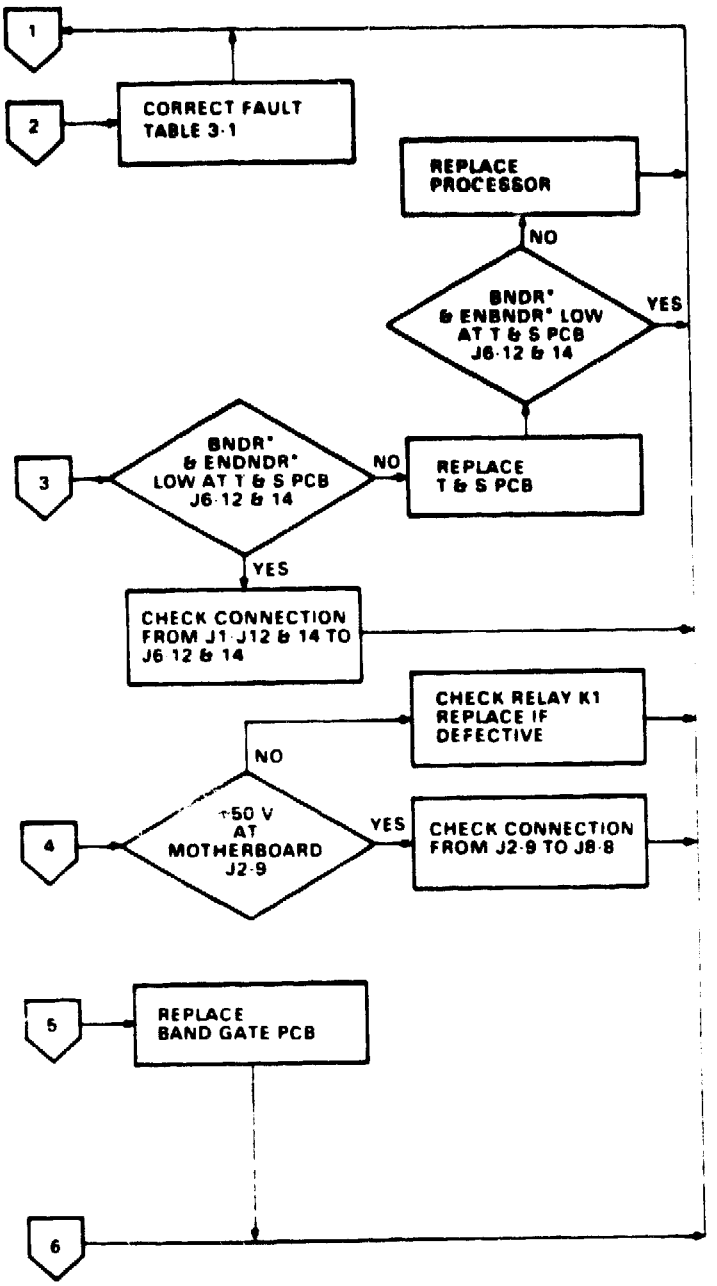


Figure 3-4 Band Drive Flowchart (Sheet 2 of 2)

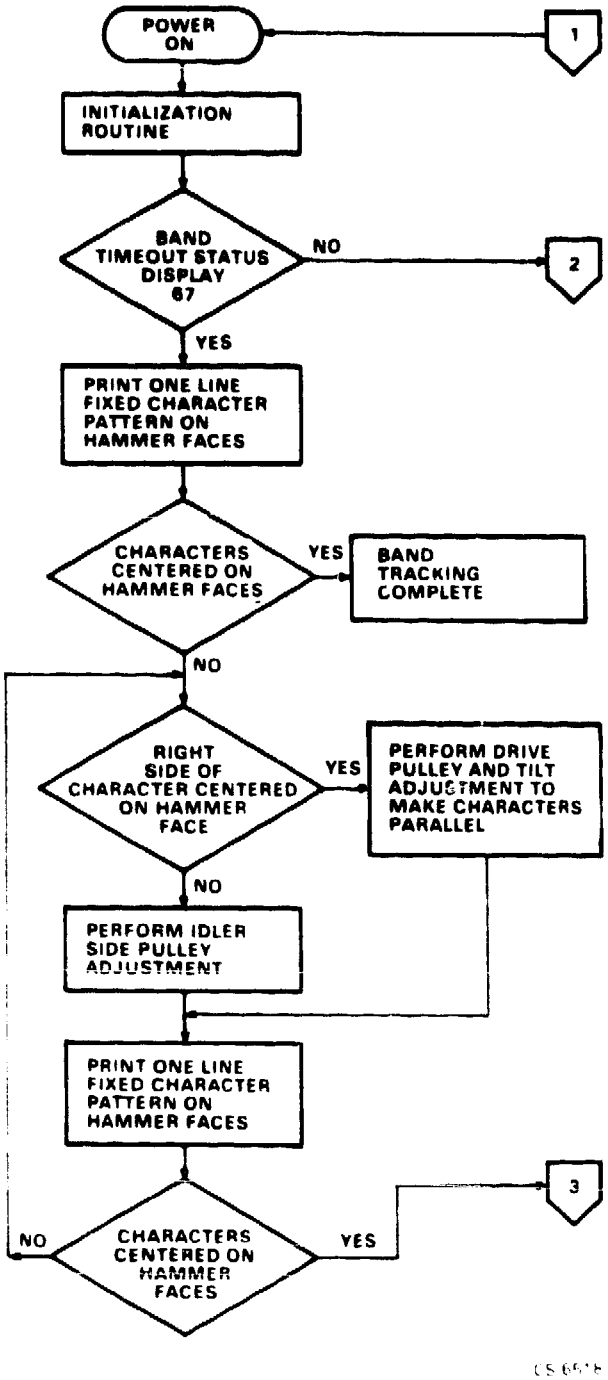


Figure 3-5 Band Tracking Flowchart (Sheet 1 of 2)

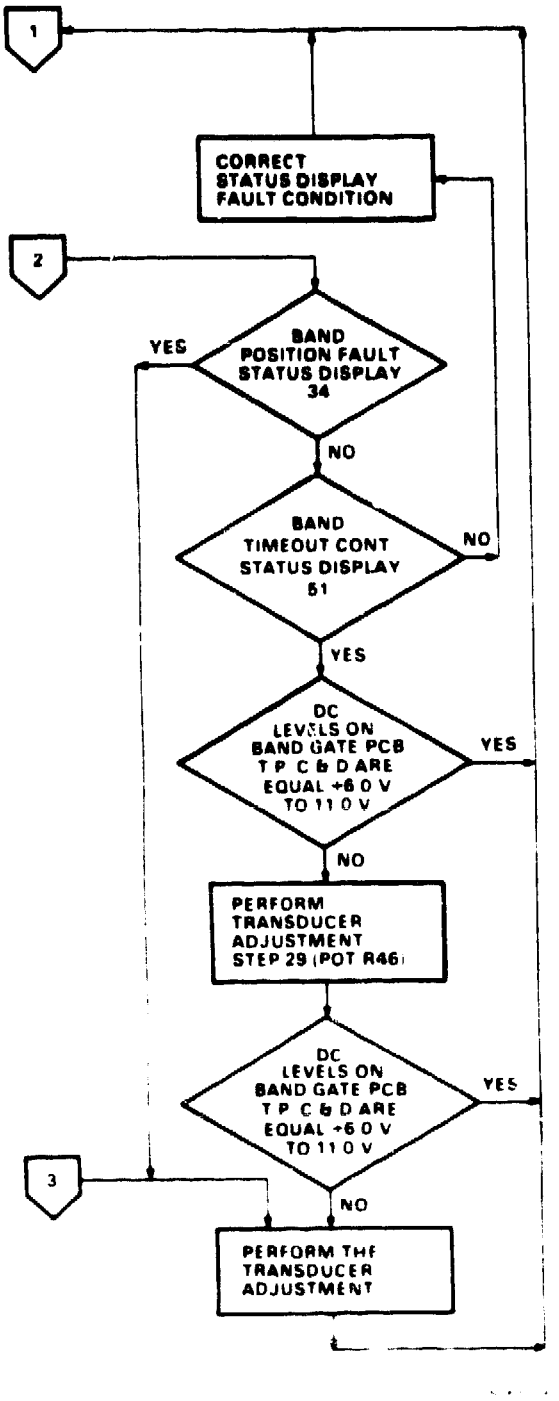


Figure 3-5 Band Tracking Flowchart (Sheet 2 of 2)

3.2 FUSE IDENTIFICATION

Table 3-2 lists the protective devices and their ratings and locations within the LP29 Line Printer. Figures 3-6 through 3-10 show the fuse locations of the various printed circuit boards.

Table 3-2 Fuse Identification

Fuse	Location	Fuse Type
F1	Band Gate PCB* (Figure 3-6)	10 A Slo-blo
F1	Paper Feed PCB (Figure 3-7)	5 A Slo-blo
F1	Short Line Interface PCB (Figure 3-8)	2 A
F1,F2	Timing and Status PCB (Figure 3-9)	2 A, 0.5 A
	Domestic Power Supply	
F1	Power Supply PCB (Figure 3-1)	20 A Slo-blo
F2	Power Supply PCB (Figure 3-1)	5 A Slo-blo
F3	Power Supply PCB (Figure 3-1)	5 A Slo-blo
F4	Power Supply PCB (Figure 3-1)	20 A Slo-blo
F5	Power Supply PCB (Figure 3-1)	5 A Slo-blo
	International Power Supply	
F1	Power Supply PCB (Figure 3-2)	15 A Slo-blo
F2	Power Supply PCB (Figure 3-2)	15 A Slo-blo
F3	Power Supply PCB (Figure 3-2)	5 A Slo-blo
F4	Power Supply PCB (Figure 3-2)	5 A Slo-blo
F5	Power Supply PCB (Figure 3-2)	15 A Slo-blo
F6	Power Supply PCB (Figure 3-2)	15 A Slo-blo
CB1	Power Supply	20 A
F1	Top Cover Pedestal Latch Assembly (Figure 3-10)	1 A

* PCB (Printed Circuit Board)

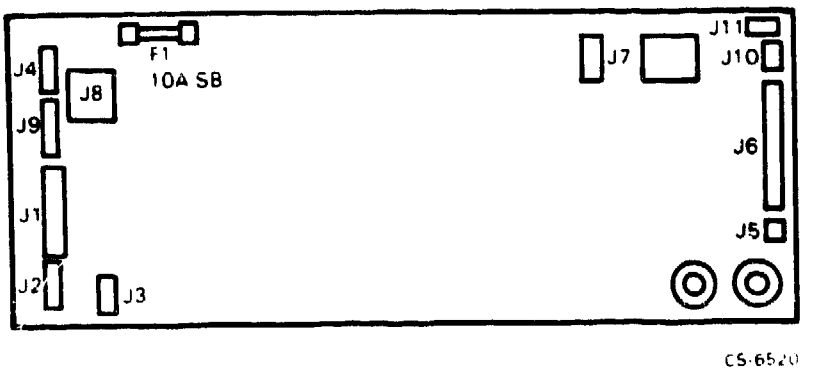


Figure 3-6 Band Gate Printed Circuit Board

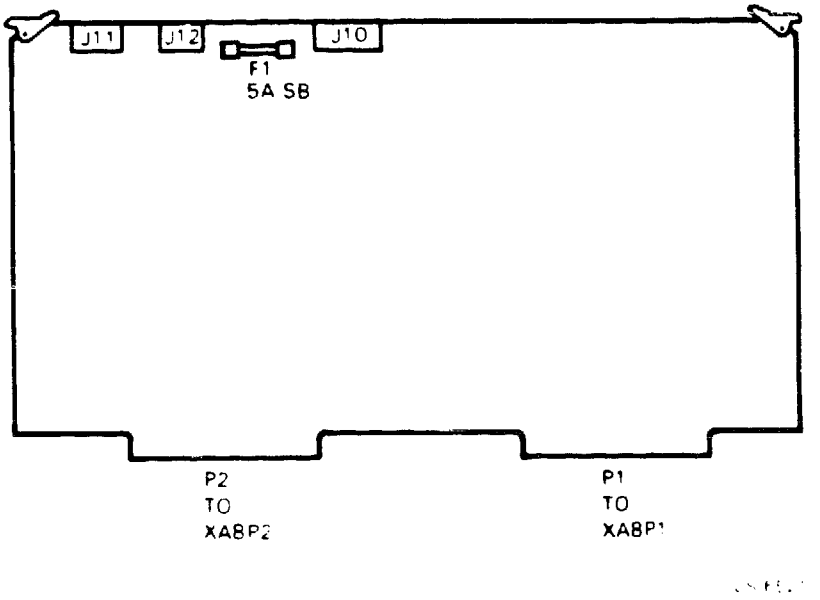


Figure 3-7 Paper Feed Printed Circuit Board

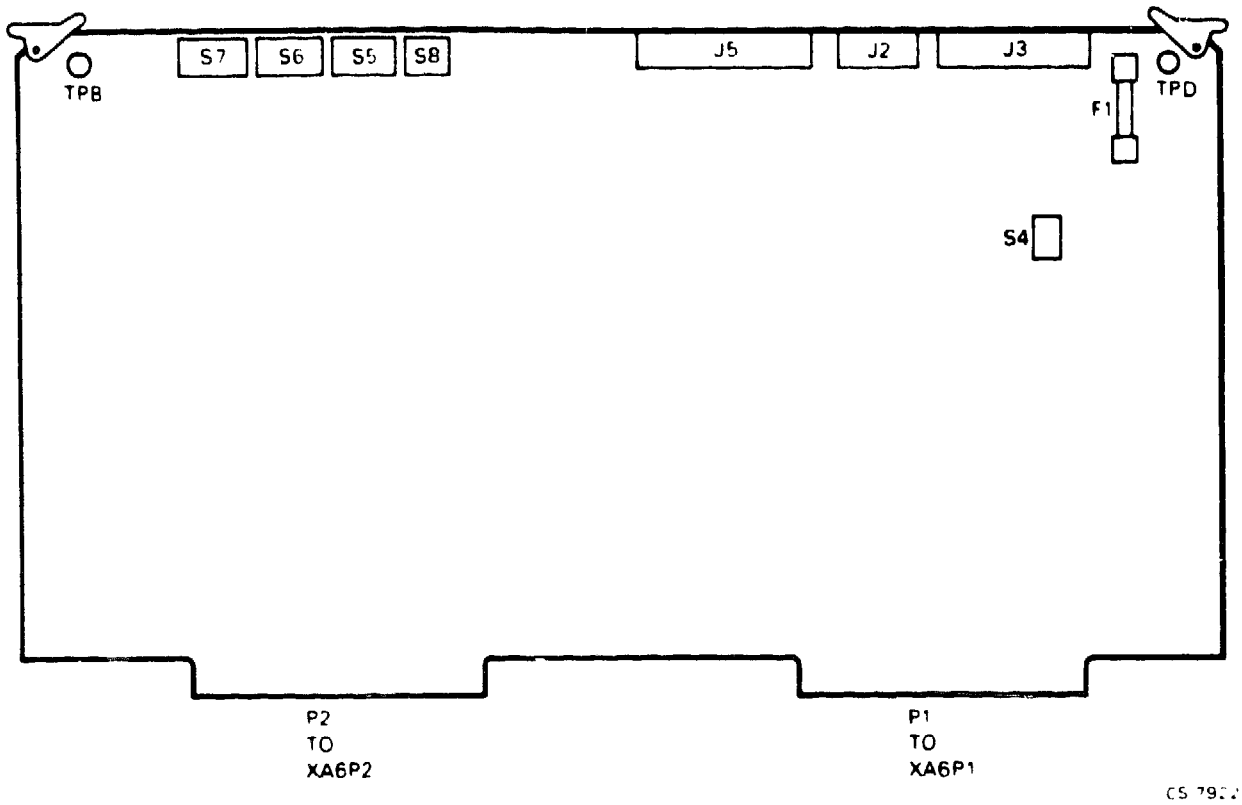


Figure 3-8 Short Line Interface Printed Circuit Board

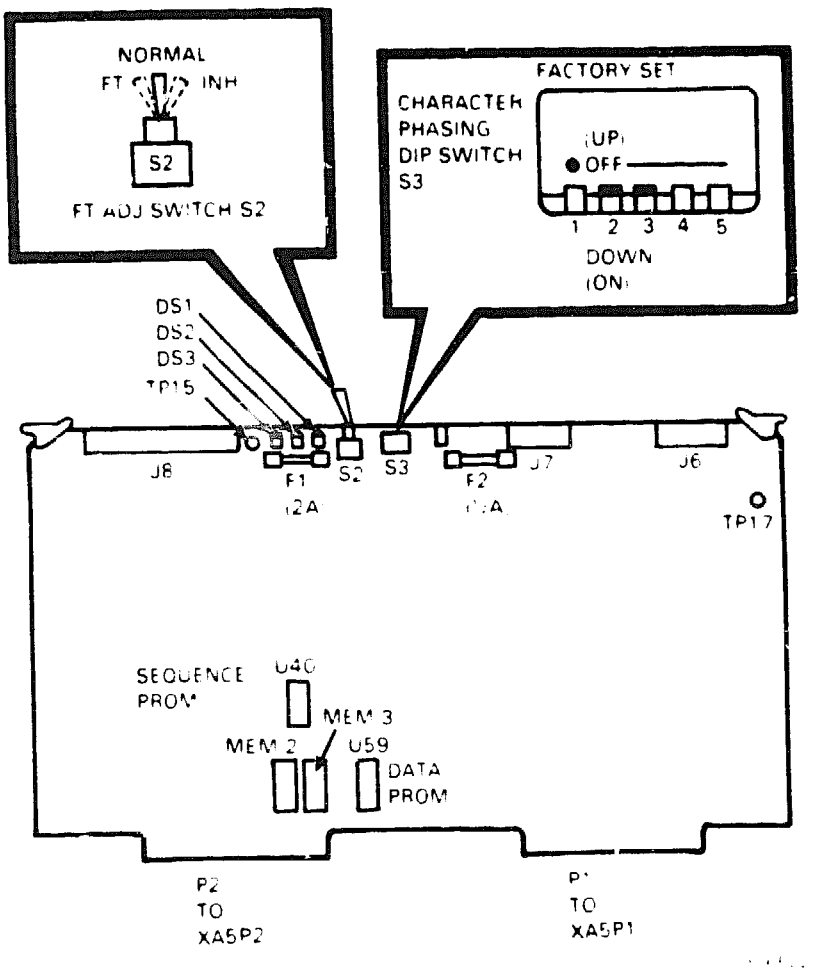


Figure 3-9 Timing and Status Printed Circuit Board

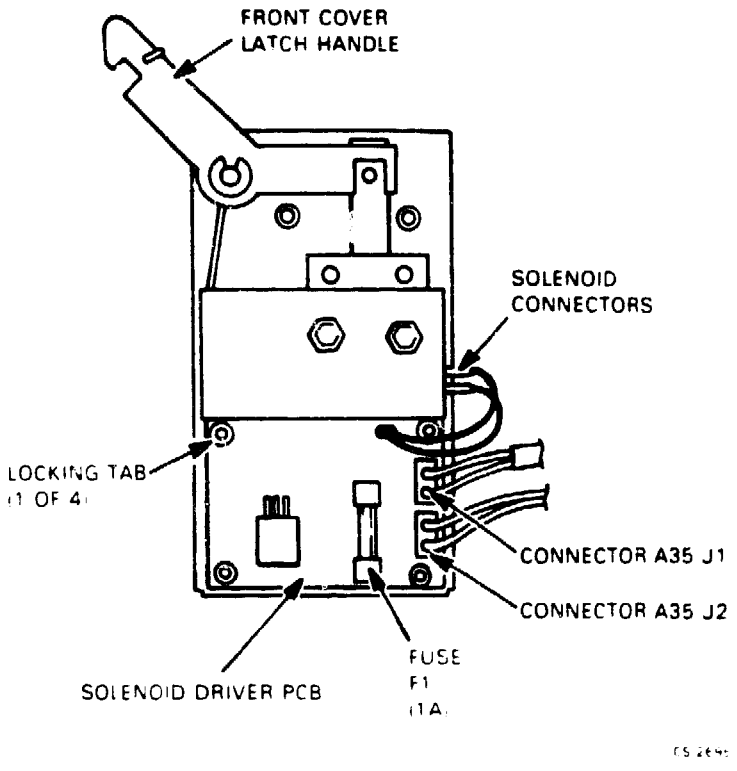
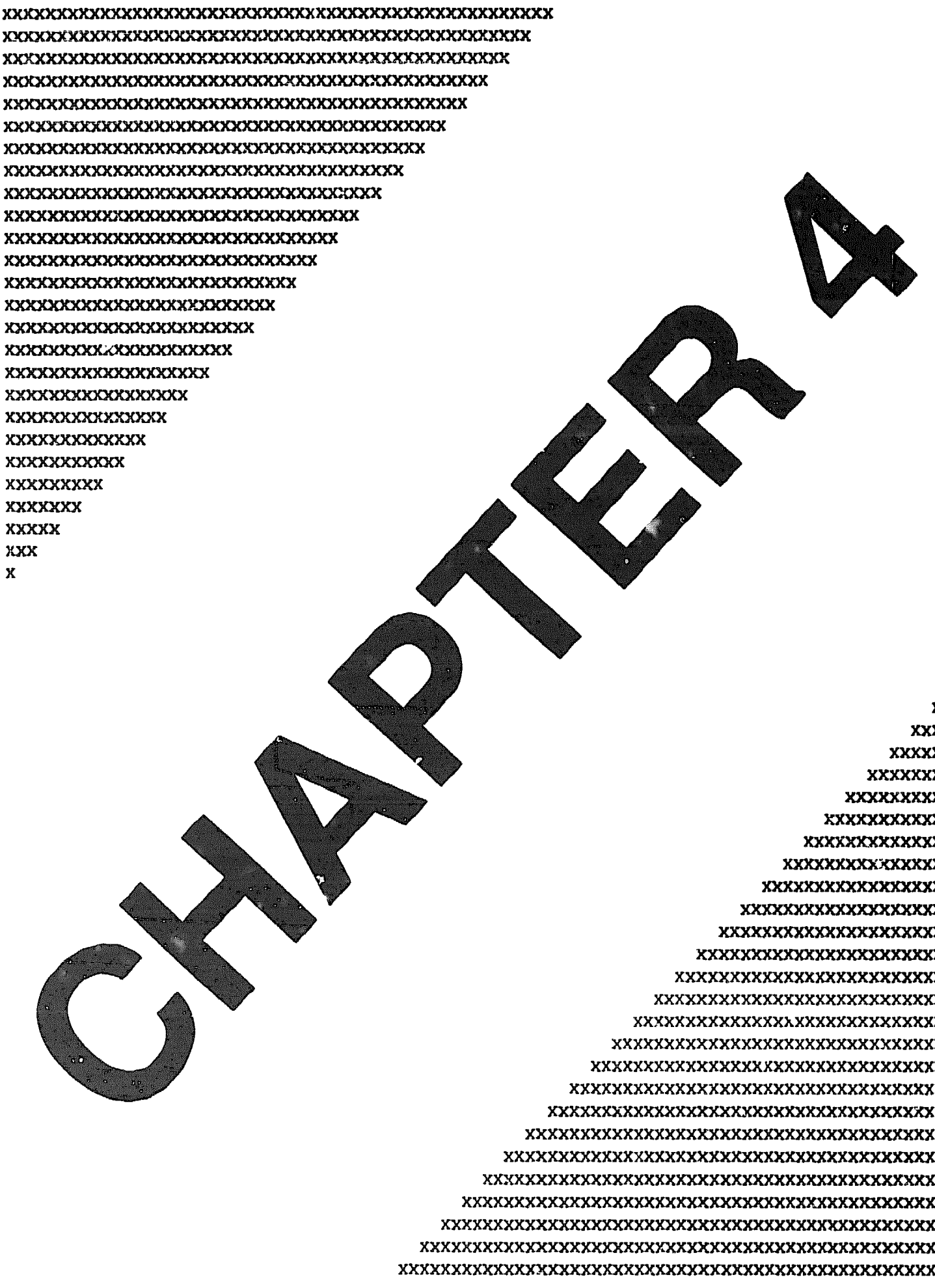


Figure 3-10 Top Cover Pedestal Latch Assembly Showing the Solenoid Driver Printed Circuit Board


CHAPTER 4

CHAPTER 4
REMOVAL AND REPLACEMENT

This chapter contains the removal/replacement procedures necessary to support the LP29 Line Printer and paper stacker down to the Field Replaceable Unit (FRU) level. Refer to Appendix A for a listing of Field Replaceable Units and related part numbers.

4.1 TOOLS AND EQUIPMENT

The following tools and equipment are required to maintain the LP29 Line Printer.

- Metric nut drivers, 4-13 mm
- Metric Allen wrenches, 2-8 mm (0.050 in. - 0.187 in.)
- Screwdrivers, standard and Phillips
- Metric box/open-end wrenches, 4-18 mm
- Diagonal cutters
- Torque screwdriver, 4.8 - 5 in./lbs
- Socket and ratchet, 9/16 in.
- Open end wrench, 3/4 in.
- Retainer ring pliers, external
- Feeler gauges 0.025 - 0.75 mm (0.001 - 0.030 in.)
- Spring gauge
- Straight edge
- Machinist square
- Inspection mirror
- DIGITAL™ voltmeter
- Oscilloscope, Tektronix™ 535 or equivalent
- Soldering iron (20 Watt)
- Antistatic wrist strap

Tektronix™ is a trademark of Tektronix, Inc.

4.2 CHARACTER BAND ASSEMBLIES

4.2.1 Band Cover Sensor

See Figure 4-1

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1 Turn off printer power.

2 Unlatch and raise the printer cover.

3 Open the band gate and raise the ribbon cover.

WARNING

Rotating parts. Keep clear until the character band stops moving.

4 Raise the ribbon mask assembly.

5 Remove the ribbon.

6 Raise the character band cover.

7 Disconnect the leads to the band cover sensor, marking the leads for correct replacement later.

8 Using a Phillips screwdriver, remove the screw and washer securing the sensor to the sensor bracket. Remove sensor.

Replacement:

Replace the band sensor by reversing steps 1 through 8.

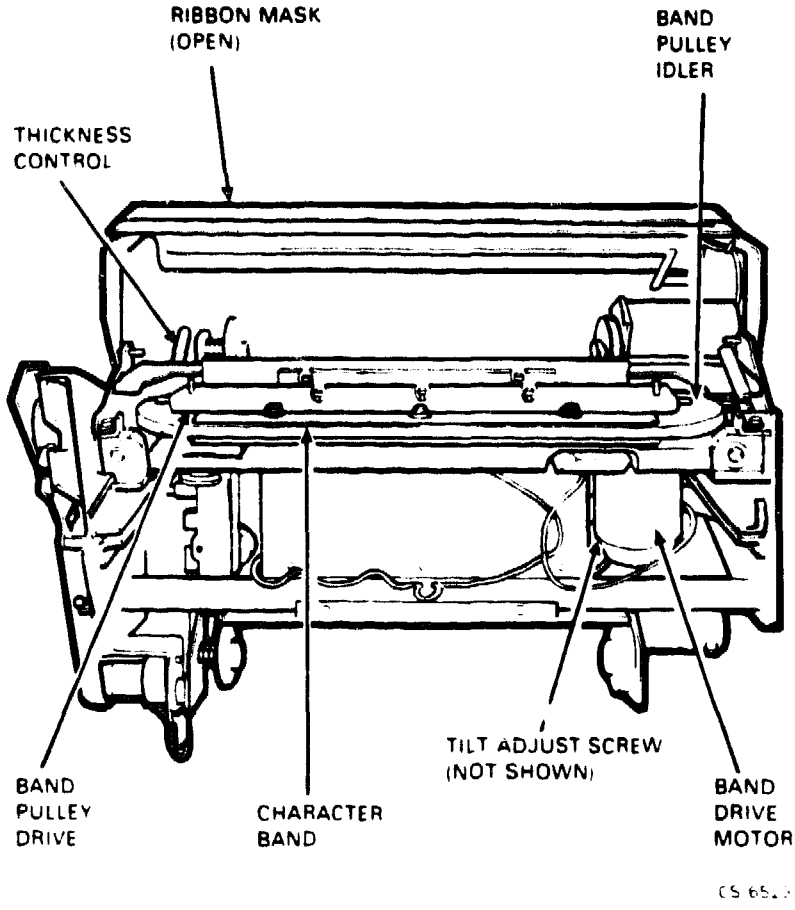


Figure 4-1 Band Gate Assembly

4.2.2 Band Drive Pulley and Motor

See Figures 4-2, 4-3, 4-4, and 4-5.

WARNING

Before performing any removal or replacement procedure, make sure that the LP20 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and open the printer cover.
2. Loosen the screws securing the band gate cover, and remove the cover.
3. Unlatch and open the band gate assembly.

WARNING

Rotating parts. Keep clear until the character band stops moving.

4. Raise the ribbon cover and raise the ribbon mask assembly.
5. Remove the ribbon.
6. Remove the two bolts and inserts at each end of the character band cover, and remove the cover.
7. Raise the band tension handle. Remove the character band.
8. Remove the capacitors and wires from the band casting and ribbon shorting bars.
9. Remove the Allen screws mounting the top ribbon shorting bar, and remove the assembly.
10. Remove the bolts securing the top ribbon guide, and remove the guide.
11. Loosen the two drive pulley-to-clamp mounting screws.
12. Loosen the pulley clamp-to-motor shaft screw.
13. Remove the pulley from the character band motor shaft.

NOTE

If only the drive pulley is removed, perform steps 11 through 24 of the replacement procedure.

14. Unplug the character band motor connector A2617 at the Band Gate PCB.
15. Cut the tie wraps as required to allow motor removal.
16. Remove the four bolts on the underside of the band casting that secures the motor mounting plate to the band gate casting.

NOTE

Check for shims and their proper location and removal. Do not remove or loosen the tilt adjustment screw.

17. Remove the motor and attached mounting plate through the top of the band casting.

18. Remove the four bolts that secure the band motor to the band motor mounting plate.

Replacement:

1. Secure the band motor to the band motor mounting plate with the four bolts installed finger-tight.

2. Insert the band motor into place on the band casting and install the four bolts finger-tight.

3. Pull the motor assembly towards the idler pulley and tighten the two outside motor mounting plate bolts (furthest from the idler pulley).

4. Tighten the two mounting bolts evenly until the plate just starts to deflect against the tilt adjustment screw.

5. Install the pulley so that it is centered with the platen.

6. Turn the two pulley-to-clamp mounting screws finger-tight and the pulley clamp-to-motor shaft screws tight enough to hold it in position.

7. Place a straight edge against and extending past the platen face (see Figure 4-5), and pivot the motor on its mounting plate for a gap of 0.20 mm + 0.000 mm, - 0.05 mm (0.008 in + 0.000 in to - 0.002 in.) from the center crown of the pulley to the platen face.

8. Tighten the three accessible screws on the motor mounting plates.

9. Loosen the pulley-to-motor shaft screw and remove the pulley.

10. Tighten all four motor-to-mounting plate bolts.

11. Install the pulley and center the pulley with the platen face (clearance of 0.381 cm (0.150 in.) between the pulley and the lower ribbon guide). Tighten the pulley clamp-to-motor shaft screw.

12. Tighten the pulley-to-clamp screws.

13. Install the top ribbon guide with its three mounting screws, and adjust (refer to Chapter 5, Section 5.8).

14. Install the ribbon shorting bar and tighten the ribbon shorting bar mounting screws.

15. Install the capacitors and wires from the casting to the ribbon shorting bars.

16 Install the character band, and lower the band release handle.

17 Rotate the drive pulley by hand and check that the band is centered on the drive and idler pulleys. If the band is not centered, refer to Chapter 5, Section 5.2 for the Band Tracking Adjustment Procedure.

Continue this replacement procedure by reversing the removal steps 1 through 6.

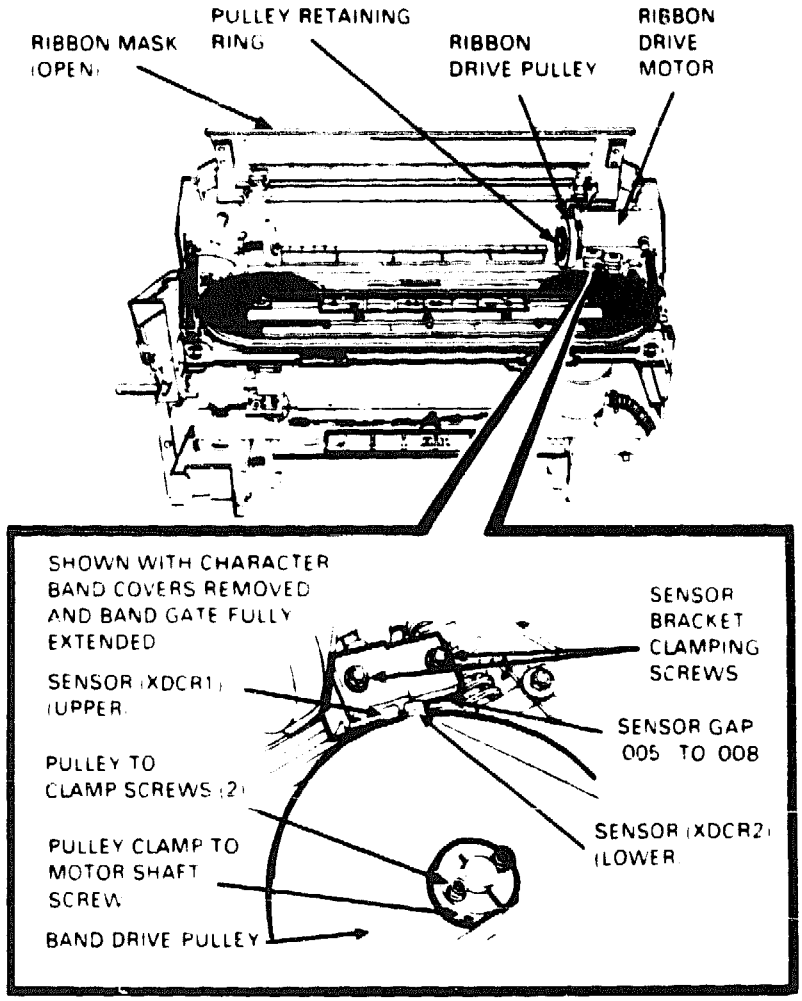


Figure 4-2 Sensor/Drive Pulley Assembly

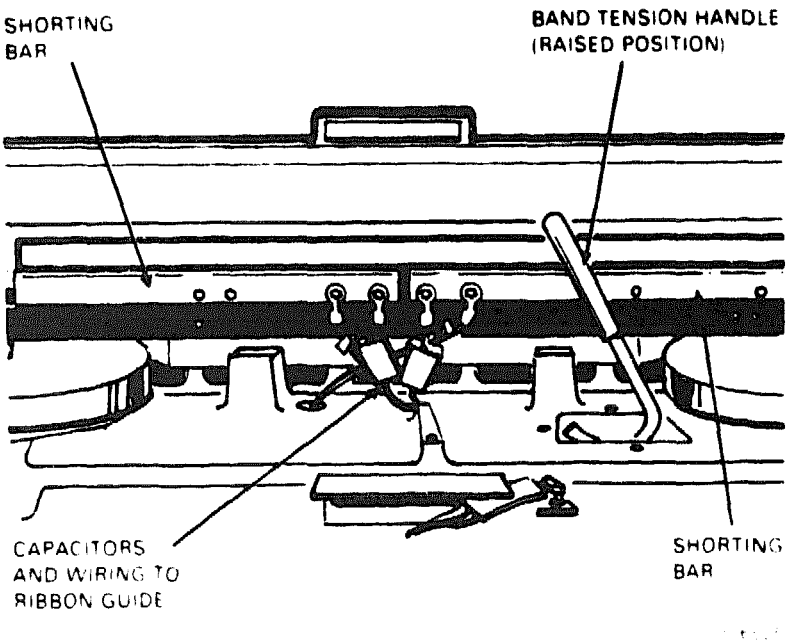


Figure 4-3 Ribbon Shorting Bar Wiring

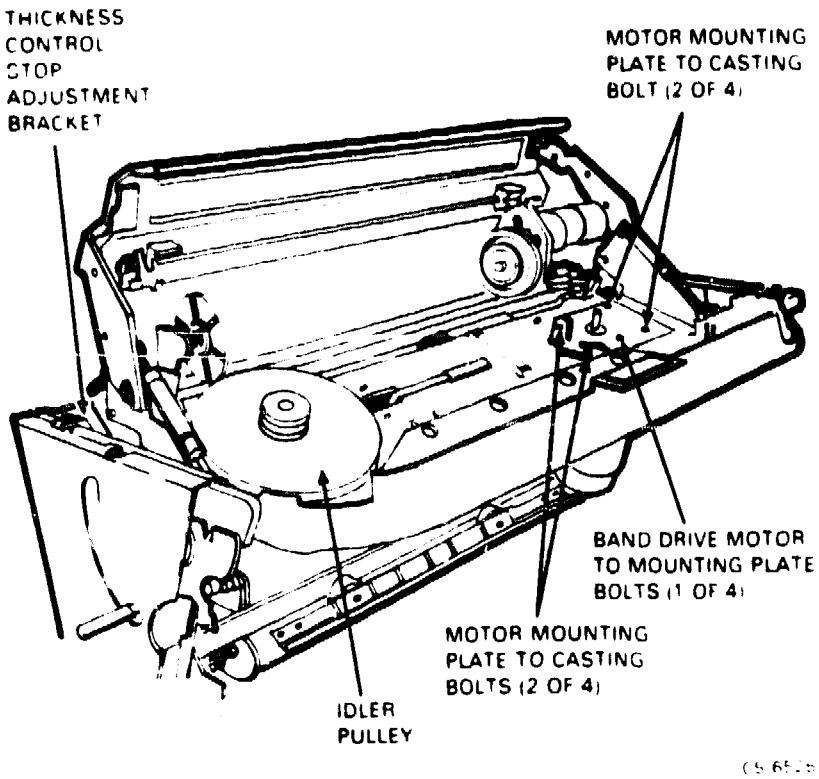


Figure 4-4 Band Drive Motor Adjustment

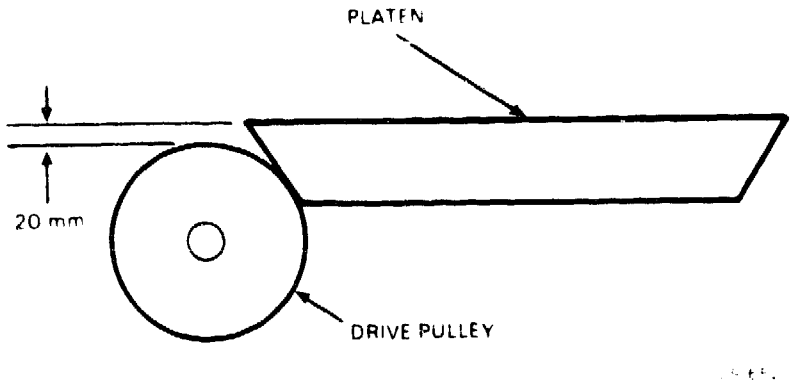


Figure 4-5 Drive Pulley and Platen Alignment

4.2.3 Band Gate Printed Circuit Board

See Figures 4-6 and 4-7

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise front printer cover.
2. Loosen mounting screws and remove the band gate board cover
3. Unplug all connectors from the band gate PCB
4. Starting at one end of the band gate PCB, press in the protruding portion of the locking tab and raise board to clear the tab. Continue around the board until all six tabs are free.
5. Raise the board from the six tabs and remove the board from the printer

Replacement:

Replace the band gate PCB by reversing steps 1 through 5

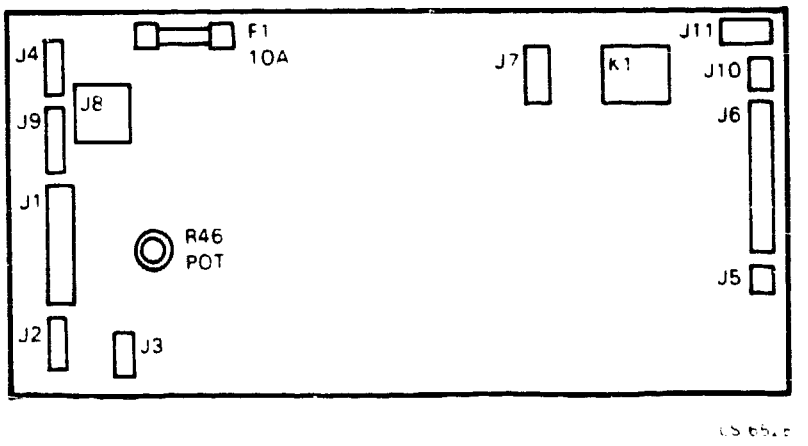


Figure 4-6 Band Gate Printed Circuit Board

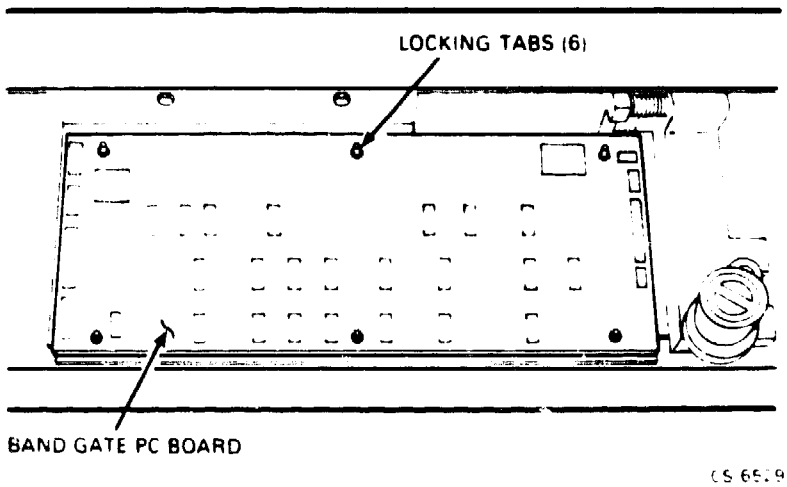


Figure 4-7 Band Gate Printed Circuit Board Locking Tabs

4.2.4 Band Gate Latch Switch

See Figures 4-8 and 4-9.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Turn off printer power
2. Unlatch and raise the front printer cover
3. Unlatch and open the band gate assembly

WARNING

Rotating parts. Keep clear until the character band stops moving.

4 Remove the spring cover from the paper tensioning spring assembly.

5 Remove the two bolts securing the paper tensioning spring assembly. Remove the spring assembly

6 Remove the three bolts securing the paper feed drive belt cover. Remove the cover

7 Tag and disconnect the two leads connected to the band gate latch switch (located behind the band drive belt).

8 Remove the two screws securing the switch to its mounting bracket and remove the switch

Replacement:

1 Install the band gate latch switch with its two mounting screws finger-tight.

2 Connect the two leads previously removed back on to the switch, and remove tags

3 With the band gate closed and latched, position the switch actuator lever against the band latch handle (almost fully pressed against the switch)

NOTE

Ensure that the switch actuator lever and wire terminals are clear of the paper feed drive belt.

4 Tighten the two screws securing the switch

5 Install and secure the paper feed drive belt cover with its two washers and nuts

6 Close and latch the printer cover

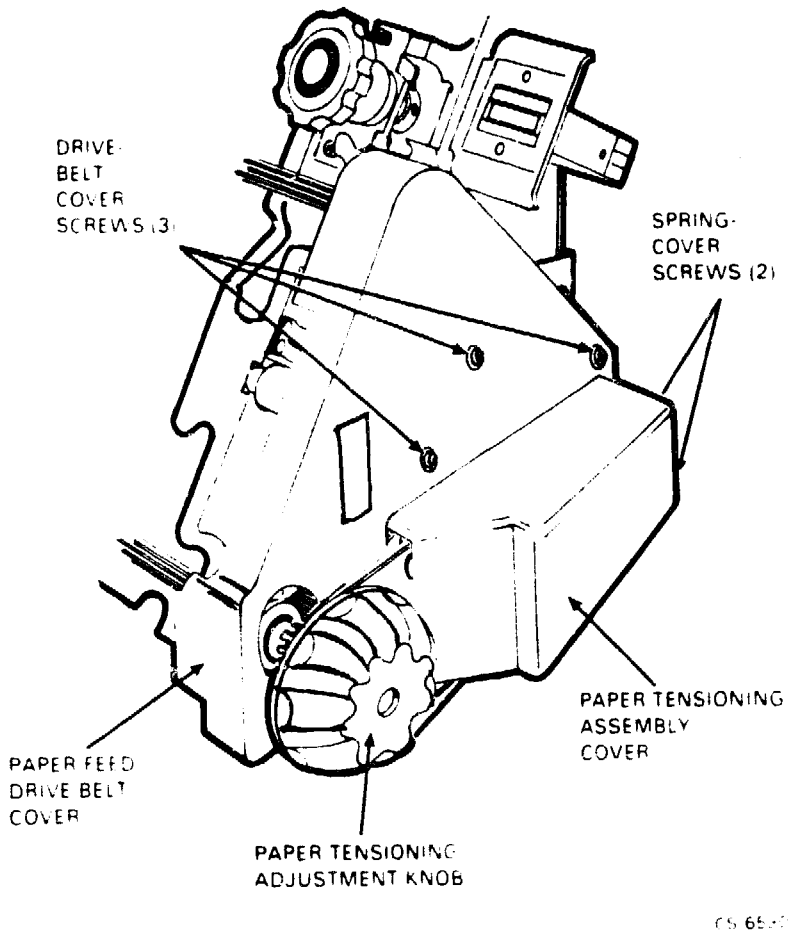


Figure 4-8 Paper Feed Drive Belt Cover

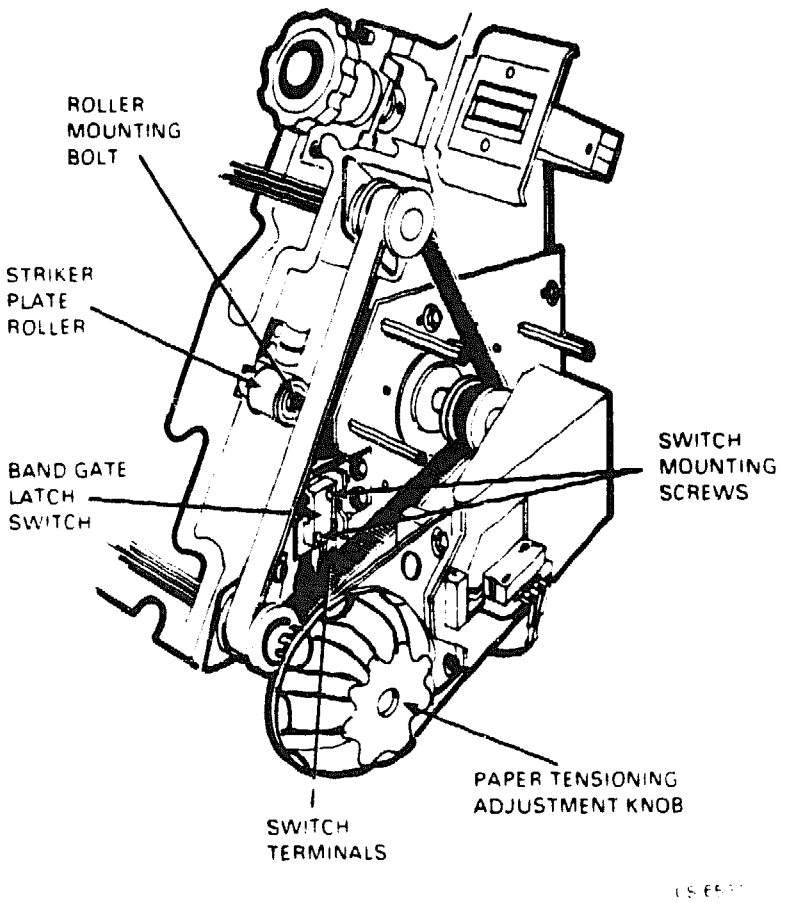


Figure 4-9 Band Gate Latch Switch

4.3 CAPACITOR PACK

See Figures 4-10, 4-11, 4-12, and 4-13.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Allow at least a two-minute delay before disconnecting any capacitor pack connectors to allow the capacitors to fully discharge.

Removal:

1. Unlatch and raise the printer cover.
2. Unlatch and open the band gate

WARNING

Rotating parts. Keep clear until the character band stops moving.

3. Remove paper, if installed.
4. Position the left and right tractors at their furthest positions
5. Remove the two front bolts and the two rear bolts from the underside of the base that secures the capacitor pack standoffs to the printer frame.
6. Open the printer rear door
7. Remove the top printed circuit module assembly cover. Remove the P12 plug from the paper feed printed circuit module, and cut the tie wraps as required
8. Remove all printed circuit modules.
9. Remove the two outside screws, and loosen the inside screw that secures the power supply cover. Slide the cover out and remove the cover.
10. Remove the two hex bolts from the underside of the printer base that mounts the transformer assembly. Slide the assembly out and remove it.
11. Remove plug P9 at the power supply PCB.
12. Remove plug P13 from E1 and E2 of the motherboard.

NOTE

Be sure to mark the leads to E1 and E2 correctly for proper replacement later.

13 Remove the right side printer cover (refer to Section 4.6.1).

14. Remove plug P2 at the cover release solenoid driver PCB.

15 Remove the fan air duct from the inside left of the printer.

16 Loosen the air hose clamp and detach the air hose from the hammer bank plenum.

17. Remove the capacitor pack assembly and attached cables through the rear of the printer.

Replacement:

Replace the capacitor pack by reversing steps 1 through 17 above.

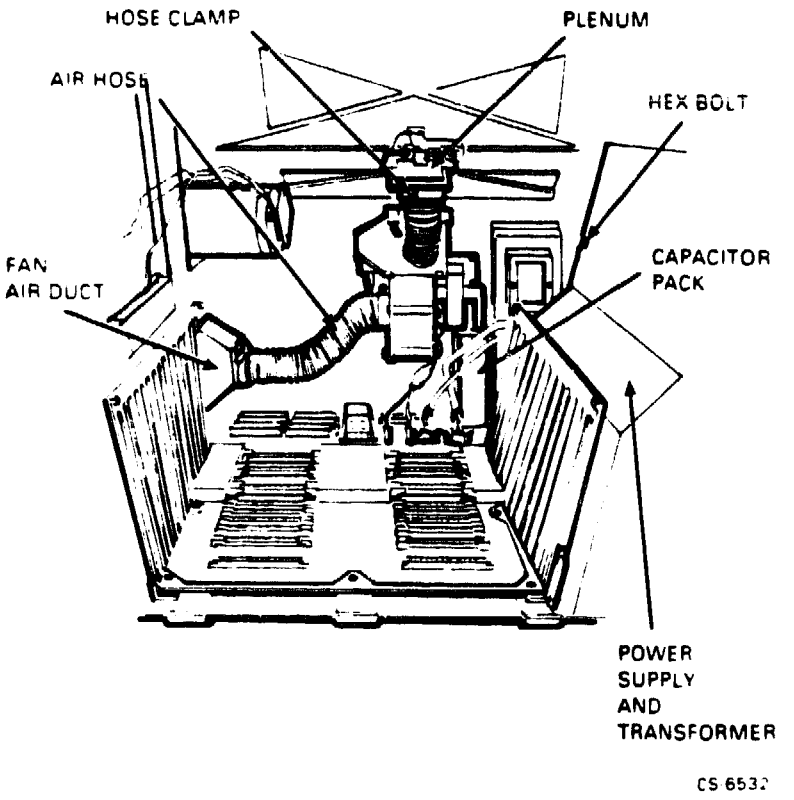


Figure 4-10 Capacitor Pack Removal and Replacement

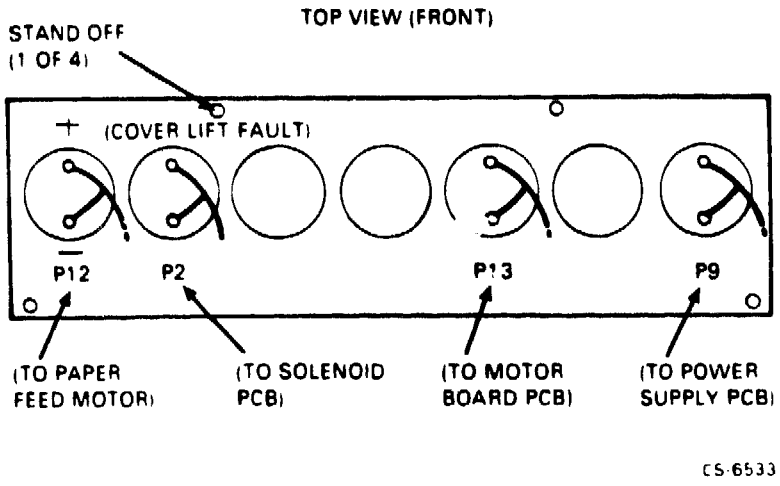


Figure 4-11 Capacitor Pack Assembly

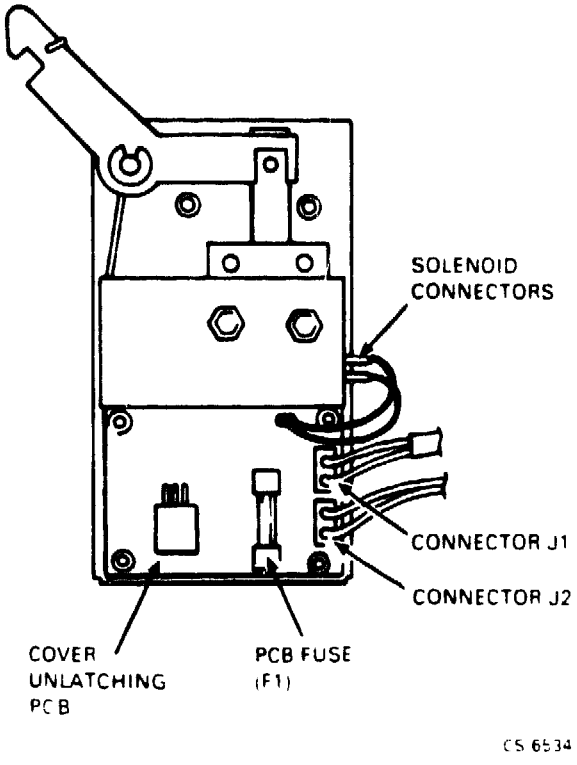


Figure 4-12 Cover Unlatching Assembly

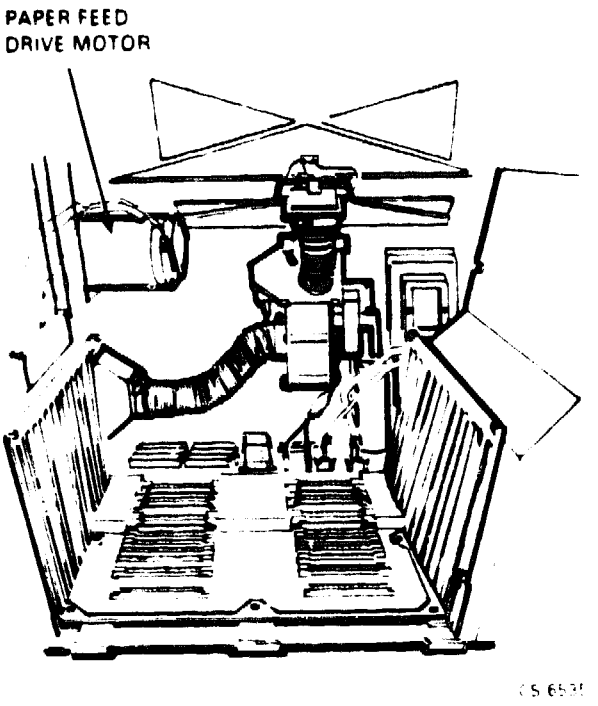


Figure 4-13 Motherboard Assembly

4.4 PRINTED CIRCUIT MODULES

See Figures 4-14 and 4-15

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1 Open the rear printer door

2 Loosen the two printed circuit module cover locking screws and remove the cover

3 Remove any connectors plugged into the printed circuit module to be removed

4 Lift up on the two module extractors to unseat the printed circuit module

5 Lift the printed circuit module up and out of the printer

Replacement:

1 Install the printed circuit module into its socket and press down until the module locks into position

2 Continue the replacement by reversing steps 1 through 3 in the removal section

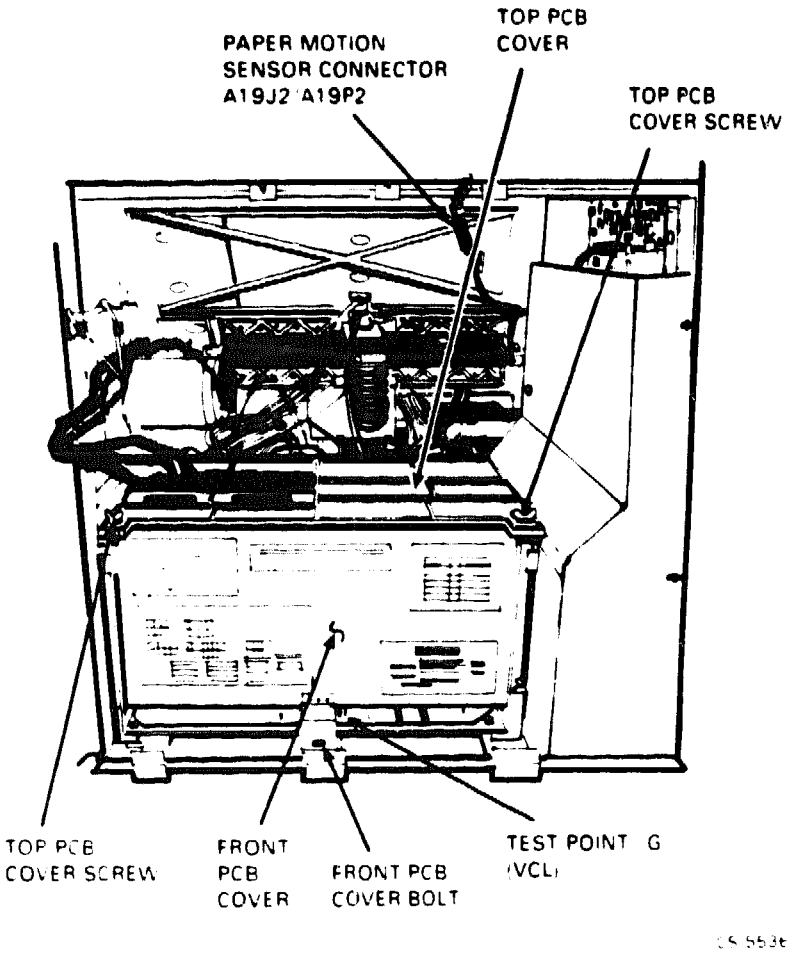


Figure 4-14 Printed Circuit Module Card Cage Cover

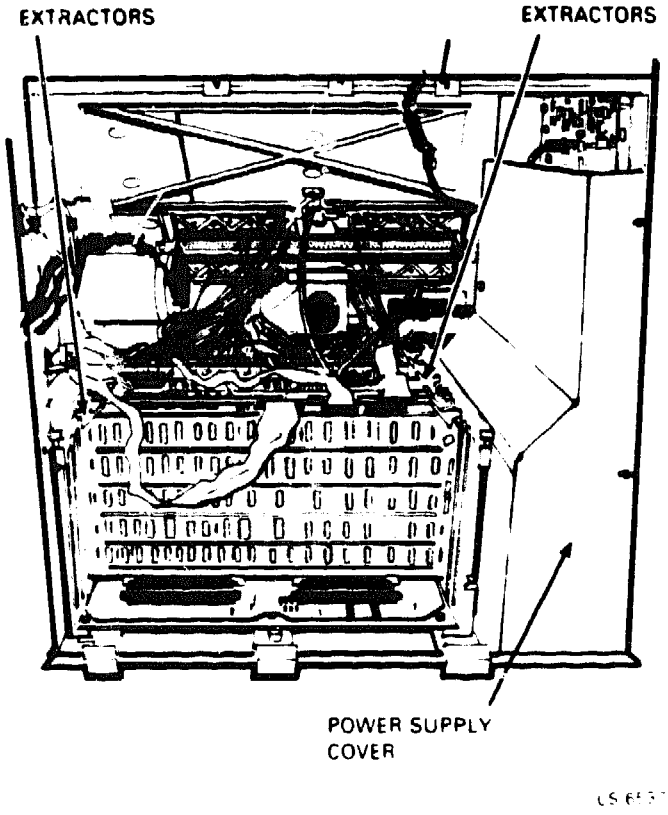


Figure 4-15 Printed Circuit Module Extractors

4.5 CONTROL PANEL ASSEMBLIES

4.5.1 Control Panel

See Figures 4-16 and 4-17

WARNING

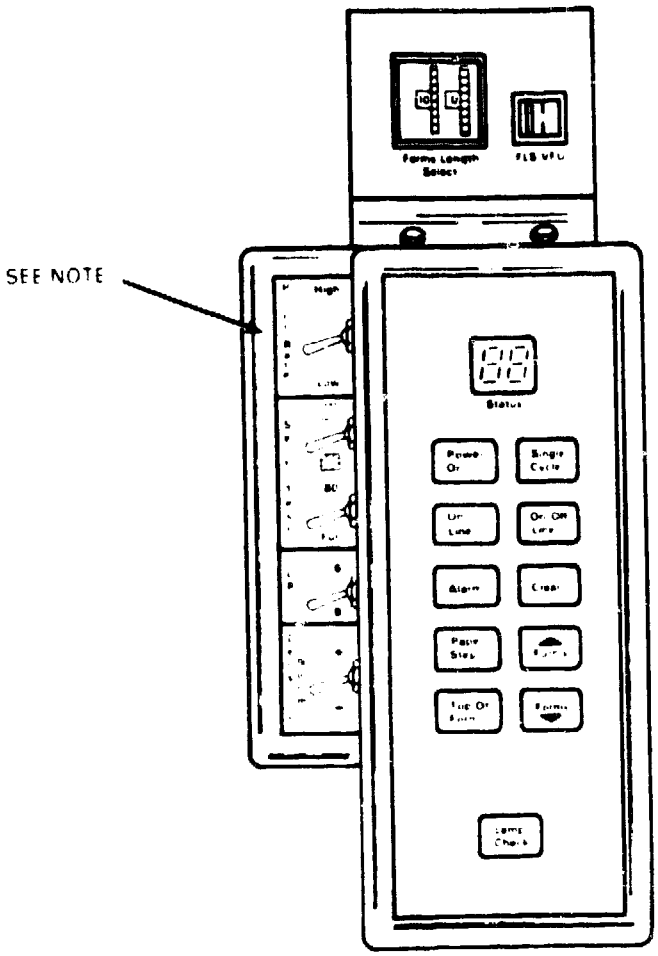
Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise the printer cover.
2. Pull out the control panel locking bar, then lift the control panel cover upward and release the two upper cover latching tabs from the control panel housing assembly. Remove the cover.
3. Lift the control panel up slightly from the housing assembly.

Replacement:

Replace the control panel by reversing steps 1 through 3 in the removal section.



NOTE
PRINT RATE SWITCH AVAILABLE ON LP29 LINE PRINTERS ONLY

CS 6038

Figure 4-16 Control Panel and FLS/VFU Assembly

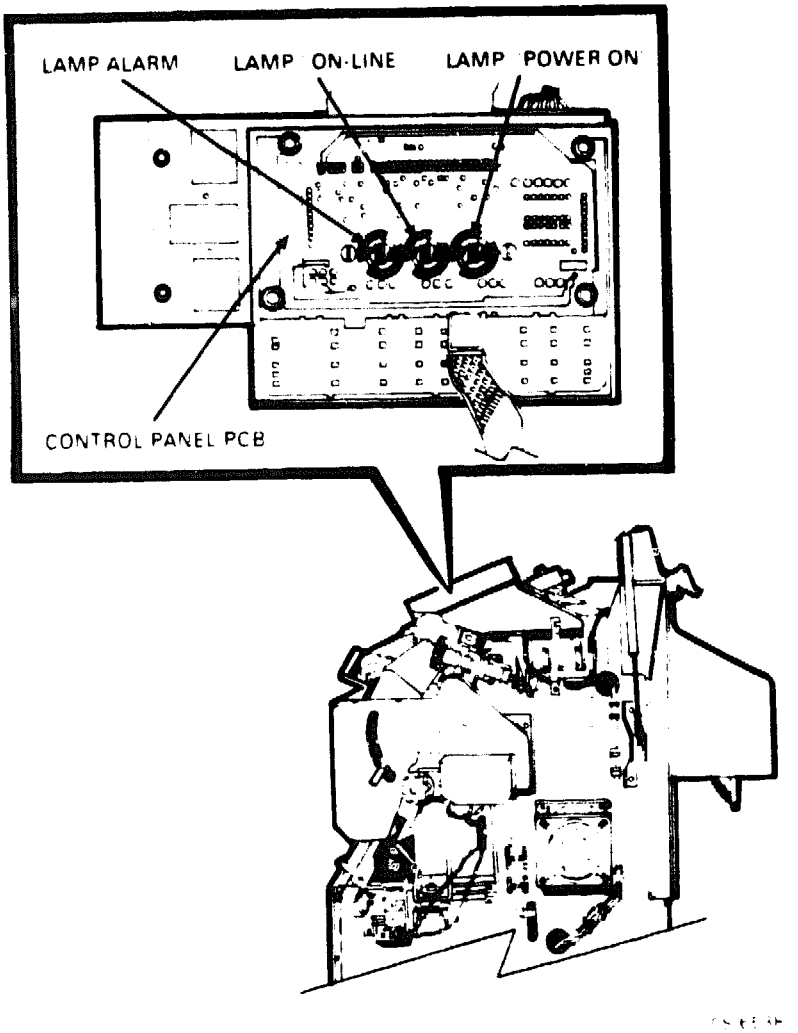


Figure 4-17 Location of Control Panel Lamps

4.5.2 Control Panel Lamp

See Figure 4-17

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the control panel (refer to Section 4.5.1).
2. From the underside of the control panel PCB, turn the lamp approximately 1/8th of a turn counterclockwise, and remove the lamp.

Replacement:

Replace the control panel lamp by reversing steps 1 through 2 in the removal section.

4.5.3 Control Panel FLS/VFU

See Figure 4-18

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise the printer cover.
2. Unplug connector P2 at the FLS/VFU PCB assembly.
3. Loosen the two bolts mounting the PCB assembly to the bracket, and slide the assembly out.
4. Remove the four bolts securing the assembly to the standoffs and the top cover assembly. Remove the assembly.
5. Unsolder the connectors to the FLS/VFU switch at the PCB assembly. Remove the FLS/VFU switch.

Replacement:

To replace the control panel FLS/VFU switch, reverse steps 1 through 5 in the removal section.

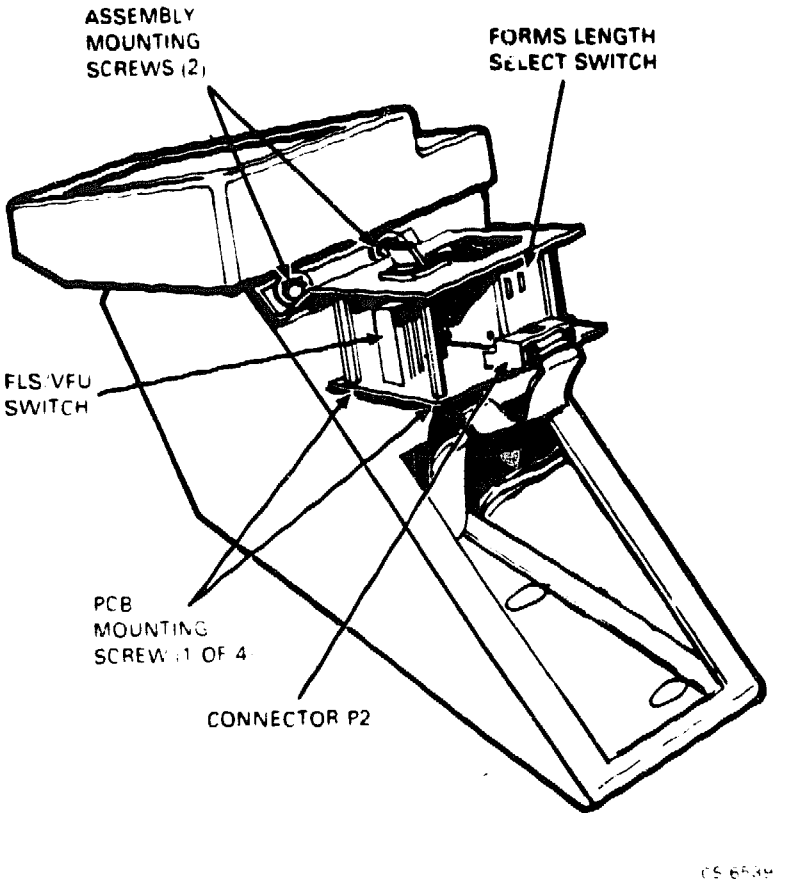


Figure 4-18 FLS/VFU Switch Assembly

4.6 COVERS ASSEMBLIES

4.6.1 Left and Right Side Covers

See Figures 4-19 and 4-20.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Open the printer top cover, paper loading door, and the rear printer cover.

NOTE

To open the rear printer cover, first remove the power paper stacker. Refer to the *LP27/LP29 Line Printer Installation Manual* (EK-LP279-IM)

2. Remove the two front side cover bolts that are accessible with the front paper loading door open

NOTE

For the left side cover removal, one of the bolts is accessible through a hole provided in the left inside door panel.

3. Remove the three bolts at the inside rear of the printer that secure the side cover.
4. Remove the bolt at the top center and remove the side cover.

NOTE

When removing the left side cover, be careful to clear the POWER ON/OFF switch.

Replacement:

To replace the left and right side cover, reverse steps 1 through 4 in the removal section.

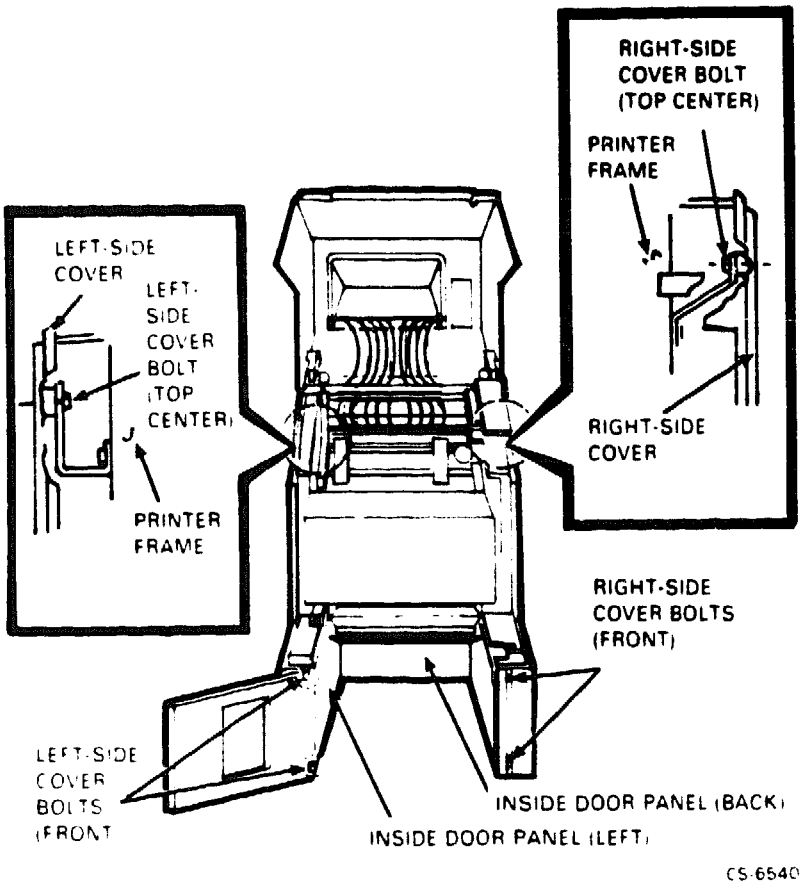


Figure 4-19 Removal and Replacement of the Side Covers (Front View)

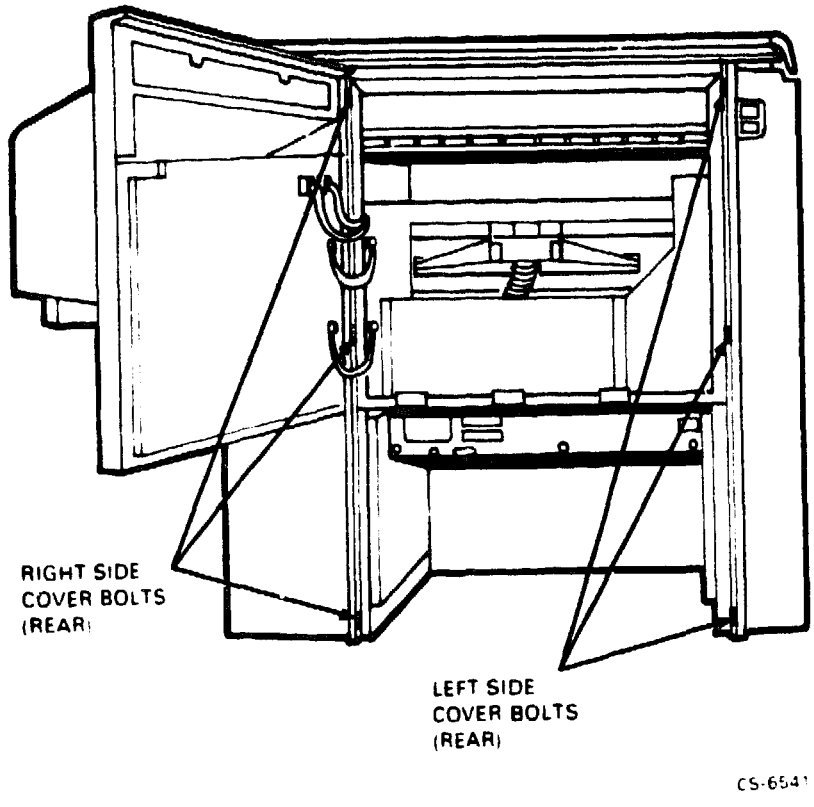


Figure 4-20 Removal and Replacement of the Side Covers (Rear View)

4.6.2 Cover Gas Cylinder

See Figure 4-21

WARNING

The top cover must be held open securely in the open position. Remove only one cylinder at a time.

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and fully raise the printer cover.
2. Perform the printer side cover removal procedure for the corresponding side of the cylinder to be removed (refer to Section 4.6.1).
3. Unsnap the safety clips from around the cylinders at the top and bottom, and slide it out of its cylinder hole.
4. Push the cylinder free of the upper and lower ball joint fitting. Remove the cylinder.

CAUTION

Be certain that the top cover is in the fully open position.

Replacement:

To replace the gas cylinder cover, reverse steps 1 through 4 in the removal section.

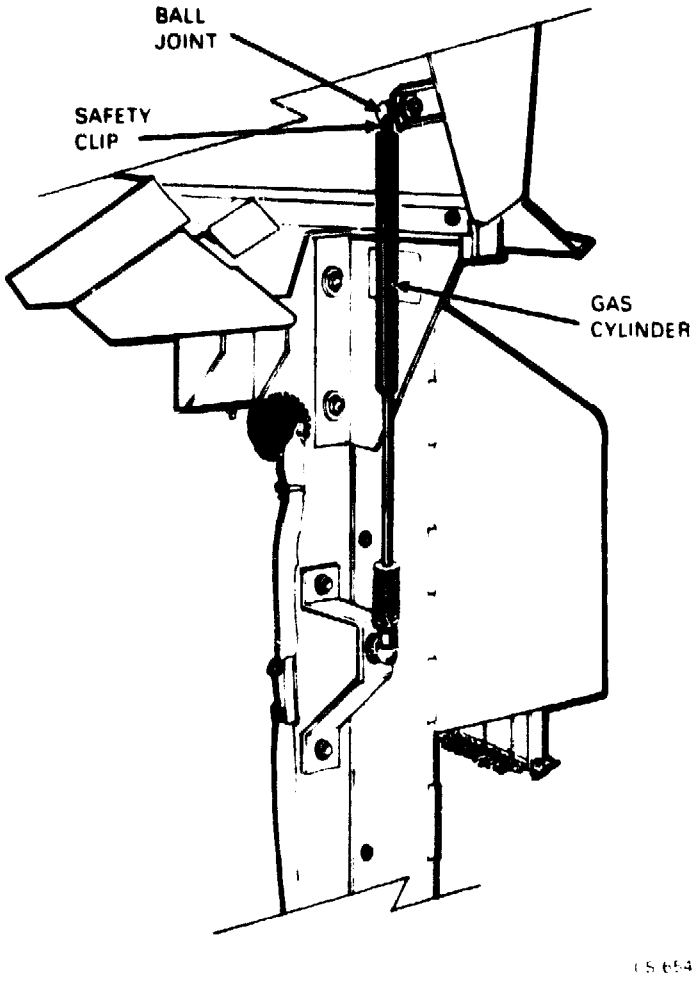


Figure 4-21 Cover Gas Cylinder

4.6.3 Cover Unlatching Printed Circuit Board and Fuse

See Figure 4-22.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the right side cover assembly (refer to Section 4.6.1).

NOTE

If only the fuse is to be replaced, remove and replace the fuse. Then replace the right side cover (refer to Section 4.6.1).

2. Remove the two connectors at the cover solenoid that come from the cover unlatching PCB.
3. Unplug connectors J1 and J2 at the cover unlatching PCB.
4. Press in the protruding portion of each locking tab and raise the cover unlatching PCB clear of the tabs (four).
5. Remove the cover unlatching PCB.

Replacement:

To replace the cover unlatching PCB, reverse steps 1 through 5 in the removal section.

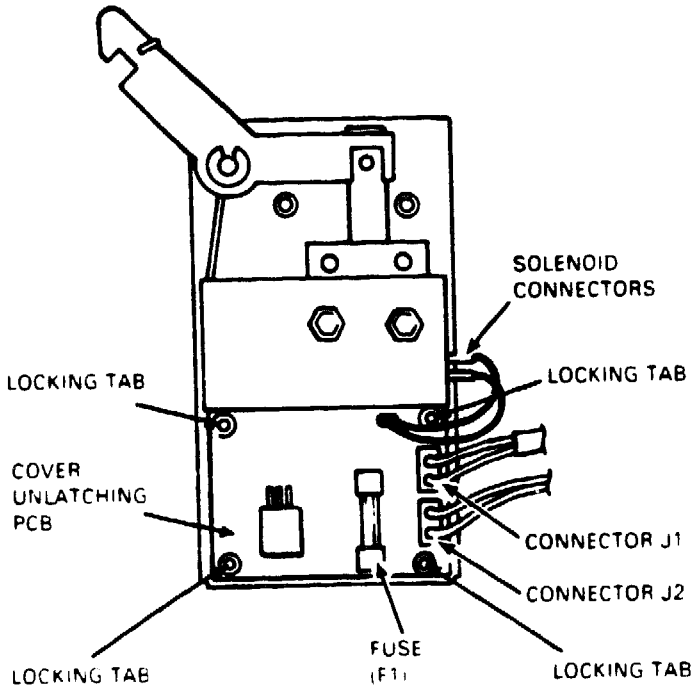


Figure 4-22 Cover Unlatching Printed Circuit Board

4.7 HAMMER BANK ASSEMBLIES

4.7.1 Hammer Bank

See Figures 4-23 and 4-24

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1 Open the printer rear door

2 Loosen the two top PCB cover locking screws and remove the cover.

3 Disconnect the hammer bank air plenum.

4 Unplug all of the hammer module connectors at the hammer driver PCBs.

5 Open the printer front cover

6 Unlatch and open the band gate assembly

WARNING

Rotating parts. Keep clear until the character band stops moving.

7 Remove printer paper if installed

8 Adjust the upper and lower tractor assemblies to their outermost positions to allow for easier hammer bank removal

9 Loosen the side screws and remove the hammer bank mask.

10 Remove the four bolts securing the hammer bank assembly to the printer frame.

11 Pull the hammer bank assembly forward off the two locator pins and out from the printer carefully, to ensure that all hammer module cables come out freely

Replacement:

To replace the hammer bank assembly, reverse steps 4 through 11 in the removal section Perform the hammer flight time and phasing adjustment procedures as needed (refer to Chapter 5, Section 5 6) Continue by reversing steps 1 through 3 in the removal section

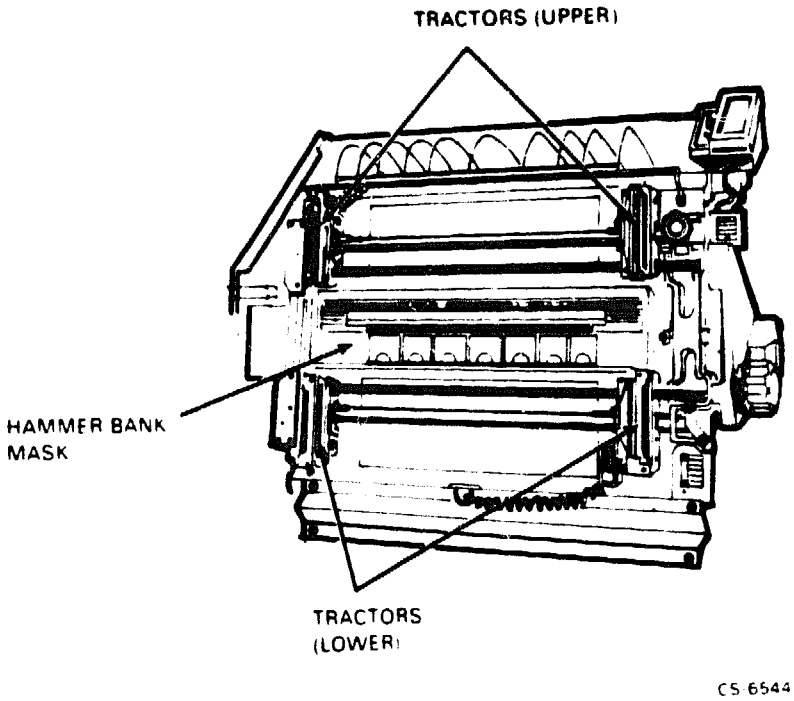


Figure 4-23 Hammer Bank Mask

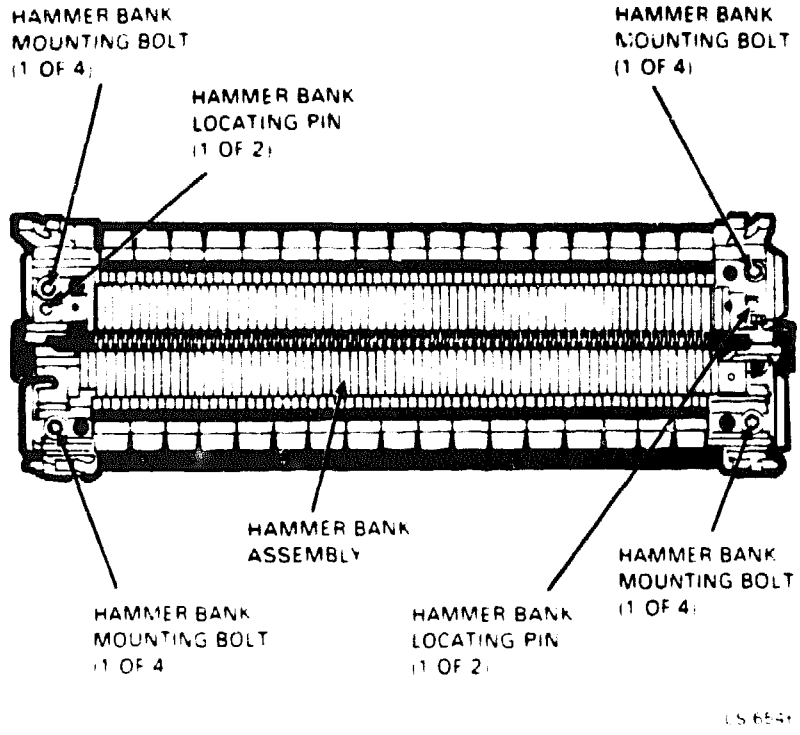


Figure 4-24 Hammer Bank Assembly

4.7.2 Hammer Module

See Figures 4-23 and 4-24

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise the printer cover
2. Unlatch and swing open the band gate assembly
3. Remove paper if installed
4. Loosen the two side screws and remove the hammer bank mask
5. Unlatch and open the rear printer cover
6. Disconnect the air plenum from the rear of the hammer bank assembly by pressing downward
7. Unlatch and remove the PCB top cover
8. Unplug the connector associated with the hammer to be replaced at the hammer driver PCB
9. To remove the hammer, remove the associated hammer module mounting screw
10. Remove the hammer module from the front of the hammer bank

Replacement:

1. Insert the hammer module into position from the front of hammer bank
2. Secure the hammer module mounting screw finger tight
3. Using a torque screwdriver preset to 4.8 to 5 inch-pounds, tighten the hammer module mounting screw
4. Reverse steps 1 through 8 in the removal section

4.8 MOTHERBOARD PRINTED CIRCUIT BOARD

See Figure 4-25.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Open the rear printer door.
2. Loosen the two top PCB cover locking screws and remove the cover.
3. Remove the tab holding the front PCB cover and lift the front PCB cover up and out.
4. Remove all PCBs and associated connectors (refer to Section 4.4).
5. Remove the power connectors on the motherboard PCB.
6. Remove the eight screws that secure the motherboard PCB to the printer frame.
7. Remove the motherboard PCB from the printer frame.

Replacement:

Replace the motherboard PCB by reversing steps 1 through 7 in the removal section

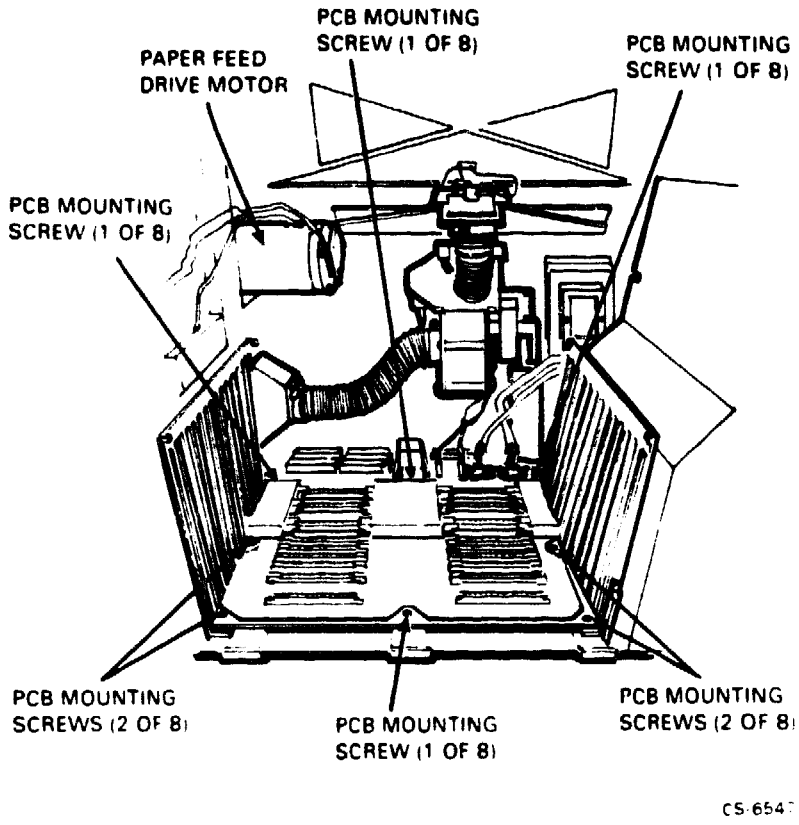


Figure 4-25 Motherboard Printed Circuit Board

4.9 PAPER MECHANISMS

4.9.1 Paper Feed Drive Belt

See Figures 4-8 and 4-26

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise the printer cover.
2. Unlatch and open the band gate.
3. Remove the hardware that secures the paper feed drive belt cover, and remove the cover.
4. Loosen the three bolts that mount the paper feed motor assembly.
5. Slide the paper feed motor assembly toward the front of the printer to remove belt tension.
6. Remove paper feed drive belt.
7. Open the rear printer cover.
8. Unplug connector P13A11 from the paper feed PCB.
9. Cut the three tie wraps that secure the two motor cables at the inside left frame assembly.
10. Remove the four bolts that secure the motor to the motor mounting plate assembly from the inside, and remove the motor.

Replacement:

To replace the paper feed drive belt, reverse steps 6 through 10 in the removal section. Slide the paper feed motor assembly plate toward the rear of the printer to adjust the belt tension, and tighten the three mounting bolts. Adjust belt tension for .68 kg (1.5 lbs) with a belt deflection of 4.5 mm (.177 in.). Reverse steps 1 through 5 in the removal section to complete replacement of the paper feed drive belt/motor.

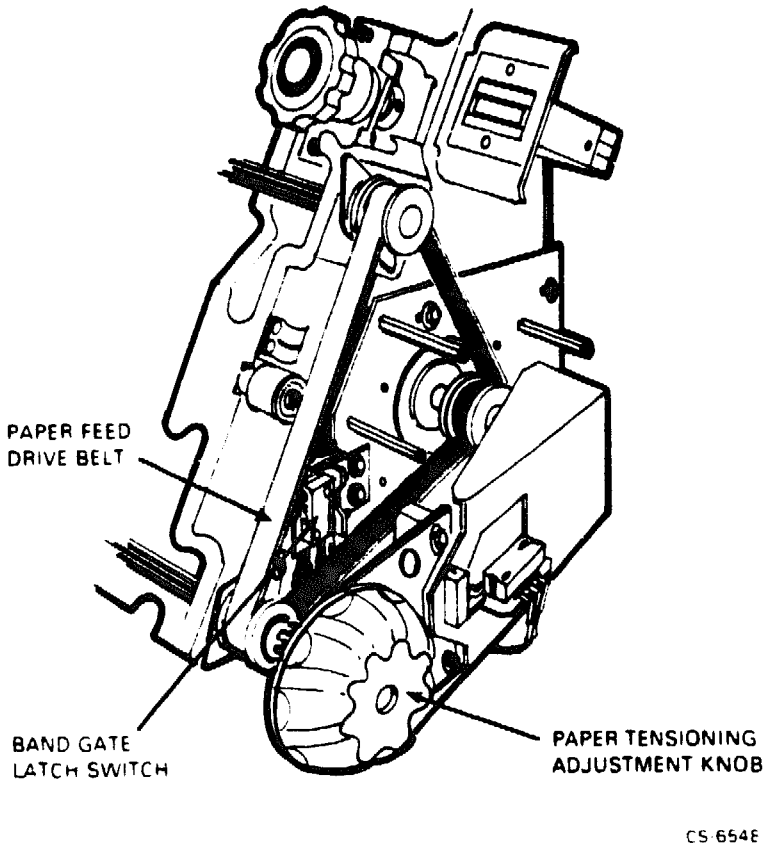


Figure 4 26 Paper Feed Drive Belt Routing

4.9.2 Paper Motion Sensor

See Figure 4-27

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise the printer cover.
2. Unlatch and open the band gate assembly.

WARNING

Rotating parts. Keep clear until the character band stops moving.

3. Remove printer paper, if installed.
4. Rotate the forms adjustment control knob to position the left side tractor towards the center of the printer.
5. Open the printer rear door.
6. Cut the tie wrap that secures the connector A19J2 from the paper motion sensor to A19P2, and unplug the connectors.
7. Remove the bolt that mounts the sensor cable clamp at the top upper left tractor assembly.
8. Remove the bolt that mounts the sensor at the left side of the upper left tractor assembly.
9. Remove the paper motion sensor, while bringing the attached cable up through the slot in the top cover plate.

Replacement:

Replace the paper motion sensor by reversing steps 1 through 9 in the removal section.

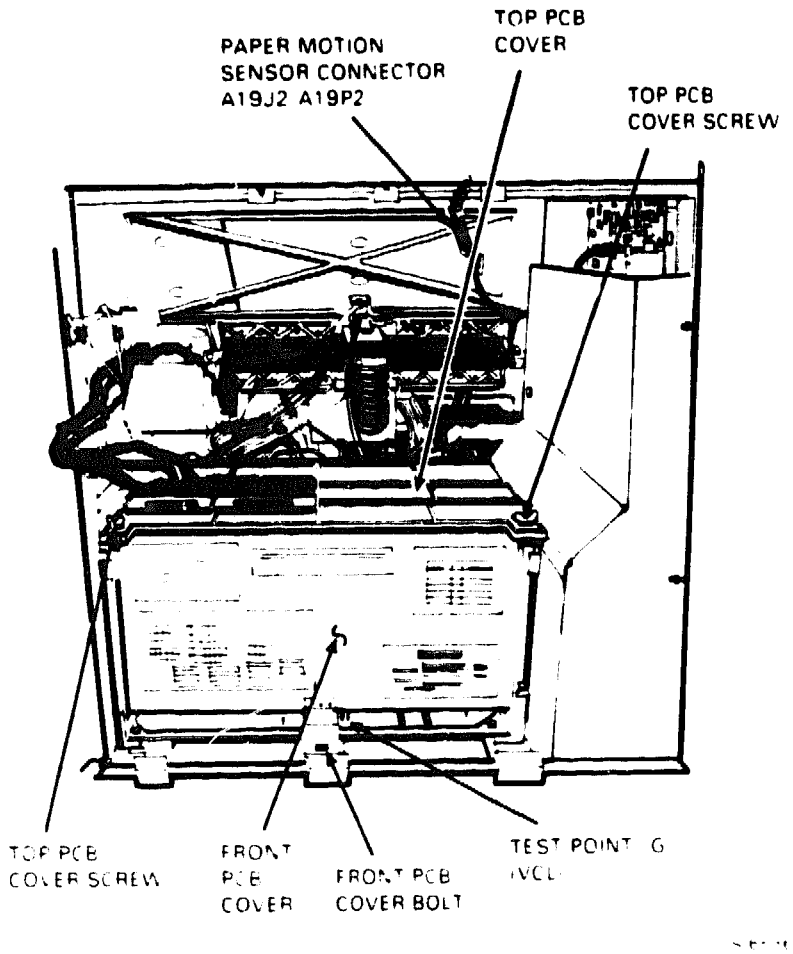


Figure 4-27 Paper Motion Sensor

4.9.3 Paper Puller Cover/Guide

See Figures 4-28 and 4-29

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Open the rear printer door.

CAUTION

Do not open the rear door excessively so as to overstress the door hinge.

2. Lift up and remove the door stop chain from the chain slot.
3. Remove the three bolts that secure the upper plate on the inside of the rear door and remove the plate.
4. Remove the two bolts securing the paper puller cover at the inside rear door latching side, and the two center bolts.
5. While supporting the paper puller cover, remove the three remaining bolts at the hinge side that still secure the cover assembly, and remove the paper pulley cover.

NOTE

Do not remove the bolts that secure the rear printer door assembly.

6. Remove the four bolts that hold the paper guide cover, and remove the cover.
7. Remove the four bolts (two each side) that secure the pressure roller assembly, and remove the assembly.
8. Loosen the two Allen screws that hold the drive roller pulley collar.
9. Remove the drive belt and pulley.

10 Remove the four bolts (two each side) that hold the drive shaft roller cover plate and remove the cover by clearing the lower paper guide assembly bar.

11 Remove the two bolts that secure the paper guide assembly to the frame, and remove the paper guide assembly.

Replacement:

Replace the paper puller cover and paper guide by reversing steps 1 through 11 in the removal section.

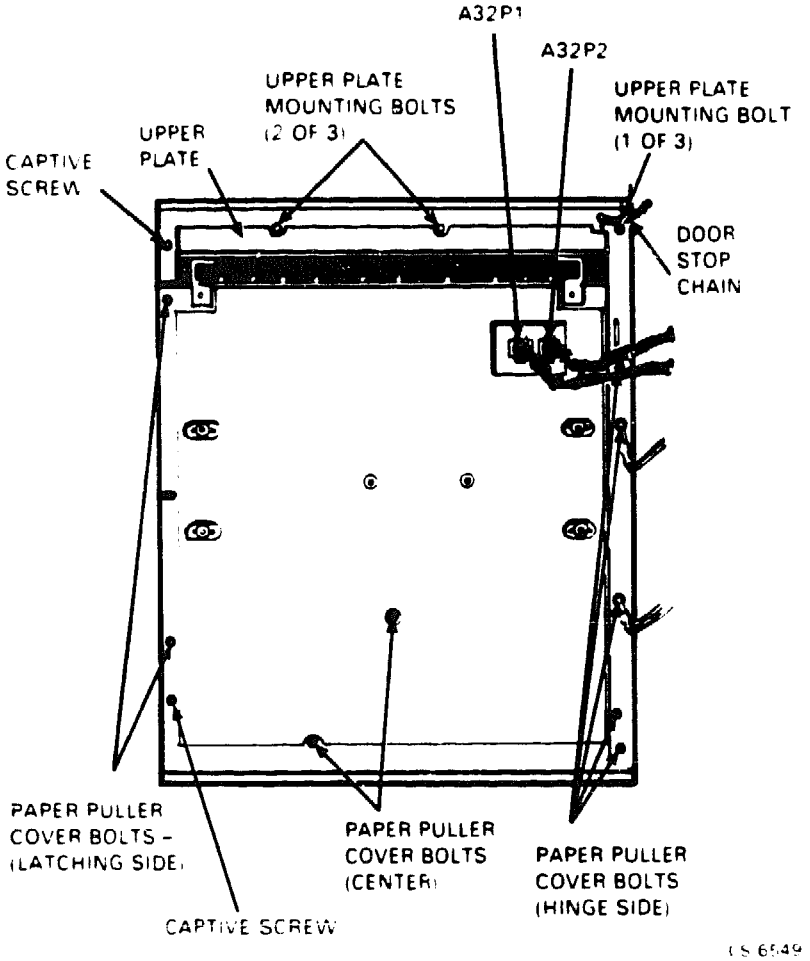


Figure 4-28 Inside Rear Printer Door

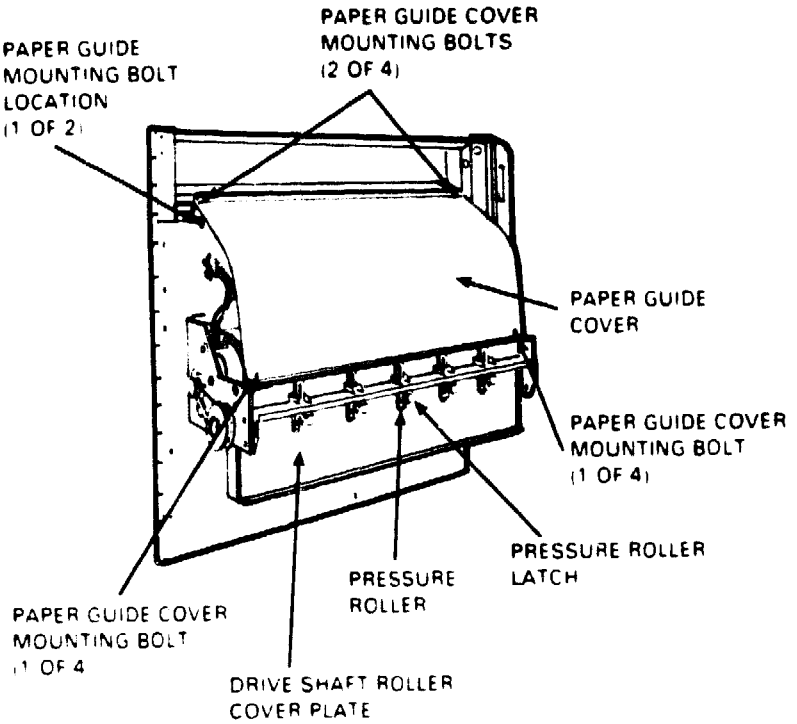


Figure 4-29 Paper Puller

4.9.4 Paper Puller Drive Roller/Sleeve

See Figures 4-30 and 4-31

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Perform the paper puller cover/paper guide removal procedure (refer to Section 4.9.3, steps 1 through 11).
2. Loosen the Allen screw holding the drive roller pulley, and remove the belt and pulley.
3. Loosen the Allen screws, one at each end of the retaining collar, at each end of the drive roller shaft.
4. Remove the shaft at one end of the housing, then remove the other end of the shaft assembly.
5. For drive roller sleeve removal, stretch the sleeve off the roller and off the shaft.
6. To remove the drive roller, remove the clip that secures the roller to the shaft, and slide the roller off the shaft. To remove the inside drive roller, the outside drive roller must first be removed.

Replacement:

Replace the drive roller/sleeve by reversing steps 1 through 6 in the removal section.

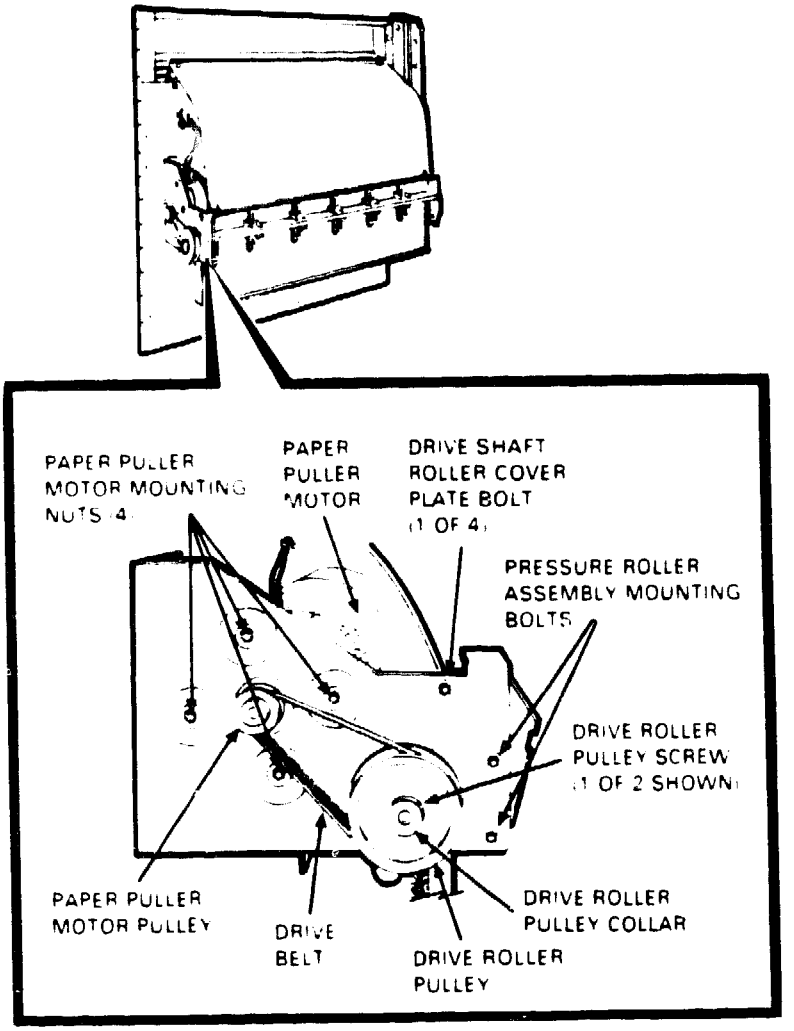


Figure 4-30 Paper Puller Motor

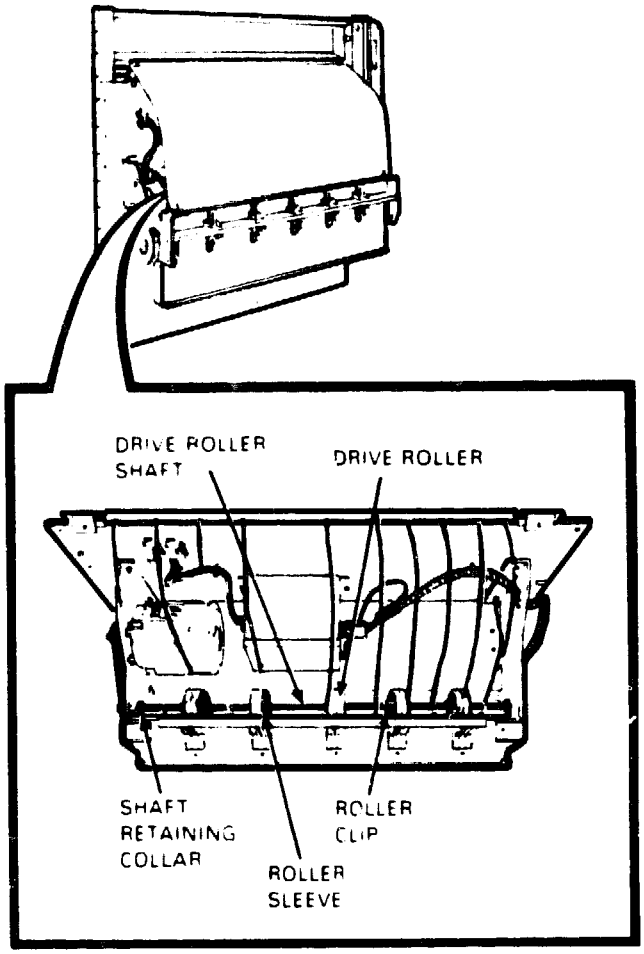


Figure 4-31 Paper Drive Rollers

4.9.5 Paper Puller Motor

See Figures 4-30 and 4-31.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Perform the paper puller cover/paper guide removal procedure.
2. Unplug connector A32P2 to the paper puller motor connector at the inside of the rear door.
3. Remove the motor cable plug A32J2 from the door frame by pressing in the two retaining prongs and removing the plug.
4. While holding the motor, remove the four motor mounting nuts and associated washers, disengage the drive belt and remove the motor.

Replacement:

Replace the paper puller motor by reversing steps 1 through 4 in the removal section.

4.9.6 Paper Puller Motor Drive Belt

See Figure 4-30.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Perform the Paper Puller Cover/Guide Removal Procedure (refer to Section 4.9.3, steps 1 through 6).
2. Loosen the two set screws in each collar that mount the paper puller motor pulley and drive roller pulley.
3. Remove both pulleys and drive belt.

Replacement:

Replace the paper puller motor drive belt by reversing steps 1 through 3 in the removal section.

4.10 PLENUM INTERLOCK SWITCH

See Figure 4-32

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Open the printer rear door.
2. Disconnect the air hose from the plenum assembly.
3. Unplug the two leads from the two plenum interlock switches making sure that they are marked for correct replacement later.
4. Squeeze both sets of switch locking tabs inward, and push the switches down and out of the plenum.

Replacement:

Replace the plenum interlock switches by reversing steps 1 through 4 in the removal section

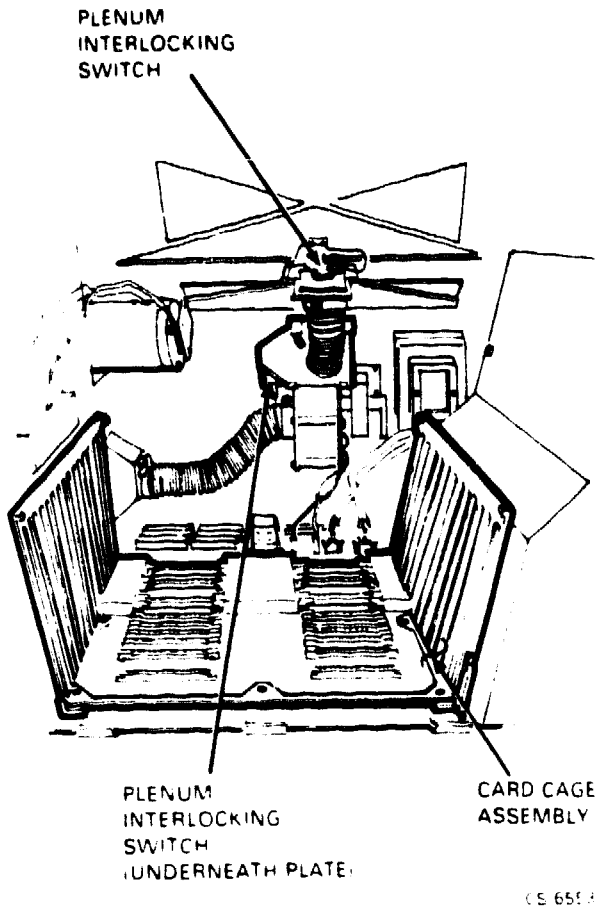


Figure 4-32 Plenum Interlock Switches Located above the Card Cage at the Rear of the Printer

4.11 POWER SUPPLY ASSEMBLIES

4.11.1 Power Supply PCBs (Domestic and International)

See Figures 4-33, 4-34 and 4-35.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

NOTE

This procedure is for both the domestic (see Figure 4-34) and international (see Figure 4-35) versions of the power supply PCBs.

Removal:

1. Open the printer rear door.
2. Remove the two outside screws and loosen the inside screw that mounts the power supply cover. Slide out and remove the cover.
3. Unplug all connectors at the power supply PCB.
4. Unscrew the two captive screws (located at the rear of the PCB frame base) that mount the PCB chassis.
5. Slide the PCB chassis out of the rear of the printer.
7. Remove the six screws that mount the PCB to the standoffs.
8. Remove the power supply PCB.

Replacement:

Replace the power supply PCB by reversing steps 1 through 8 in the removal section.

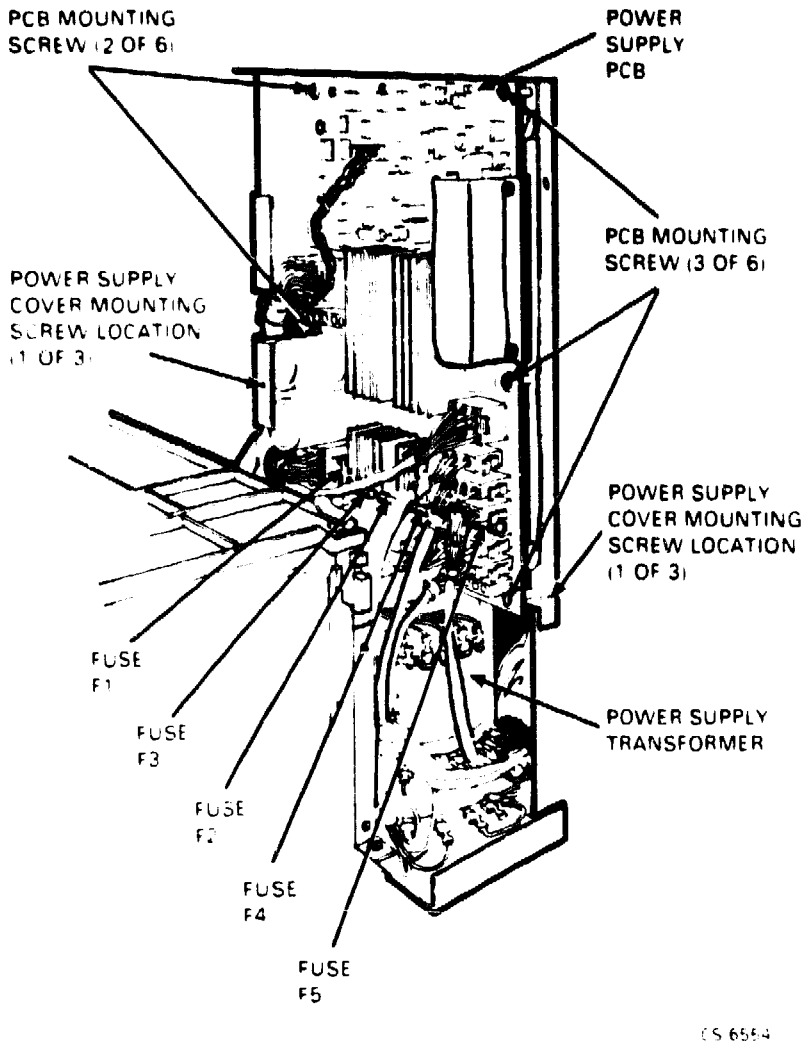


Figure 4-33 Power Supply Components

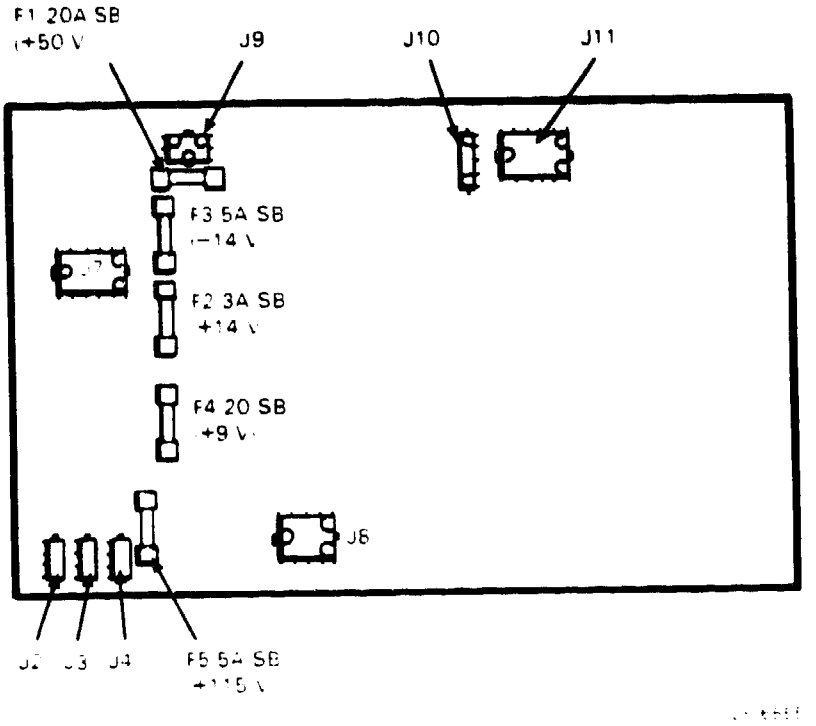


Figure 4-34 Domestic Power Supply Printed Circuit Board

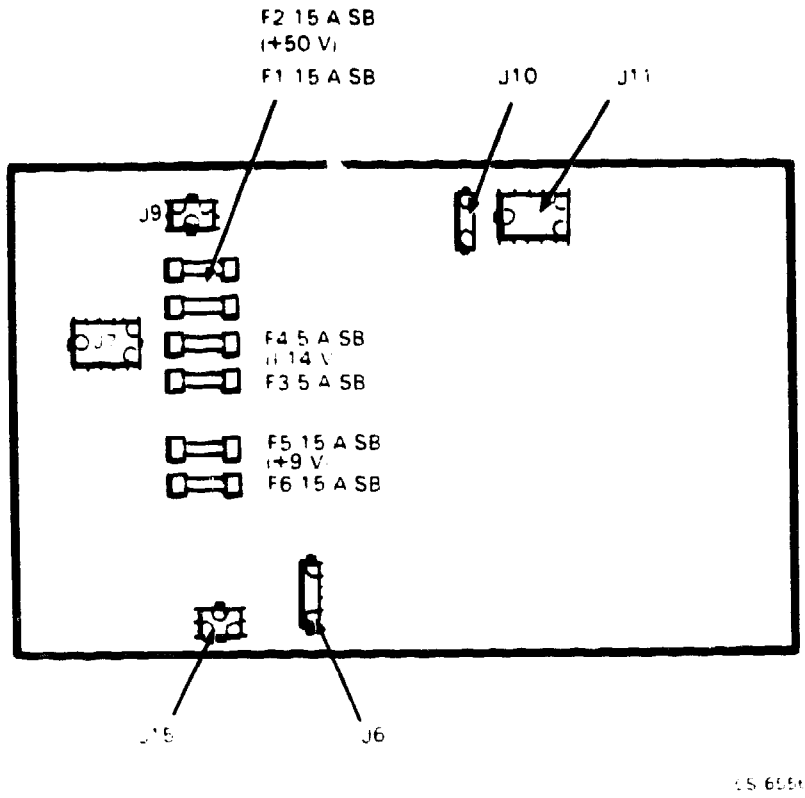


Figure 4-35 International Power Supply Printed Circuit Board

4.11.2 Power Supply PCB Fuses (Domestic and International)

See Figures 4-33, 4-34 and 4-35

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

NOTE

Refer to Chapter 3, Table 3-2 for fuse identification.

Removal:

1 Open the printer rear door.

2 Remove the two outside screws and loosen the inside screw that mounts the power supply cover. Slide out and remove the cover.

3 Unplug the defective fuse.

Replacement:

Replace the power supply PCB fuse by reversing steps 1 through 3 in the removal section.

4.11.3 Power Supply Transformer Assembly

4.11.3.1 Domestic Power Supply Transformer Assembly - See Figure 4-36

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off, and that the power cord is removed from the power source.

Removal:

1. Open the printer rear door.
2. Remove the two outside screws and loosen the inside screw that mounts the power supply cover. Slide out and remove the cover.
3. Unplug all connectors from the transformer assembly to the power supply PCB.
4. Remove the two screws on the underside of the printer base that mount the transformer assembly to the frame and remove the assembly.
5. Individual components may now be removed and replaced as required.

Replacement:

Replace the power supply transformer by reversing steps 1 through 5 in the removal section.

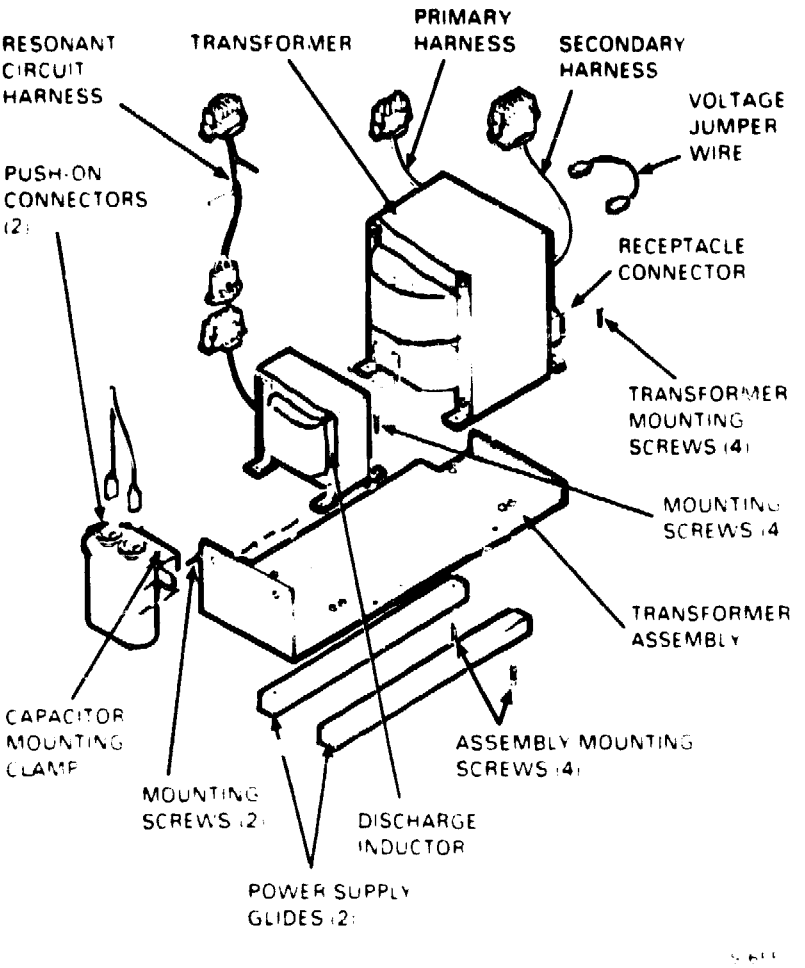


Figure 4-36 Domestic Power Supply Transformer Assembly

4.11.3.2 International Power Supply Transformer Assembly - See Figure 4-37.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off, and that the power cord is removed from the power source.

Removal:

1. Open the printer rear door.
2. Remove the two outside screws and loosen the inside screw that mounts the power supply cover. Slide out and remove the cover.
3. Unplug all connectors from the transformer assembly to the power supply PCB.
4. Remove the four screws on the underside of the printer base that mount the transformer assembly to the frame, and remove the assembly.
5. Individual components may now be removed and replaced as required.

Replacement:

Replace the power supply transformer by reversing steps 1 through 5 in the removal section.

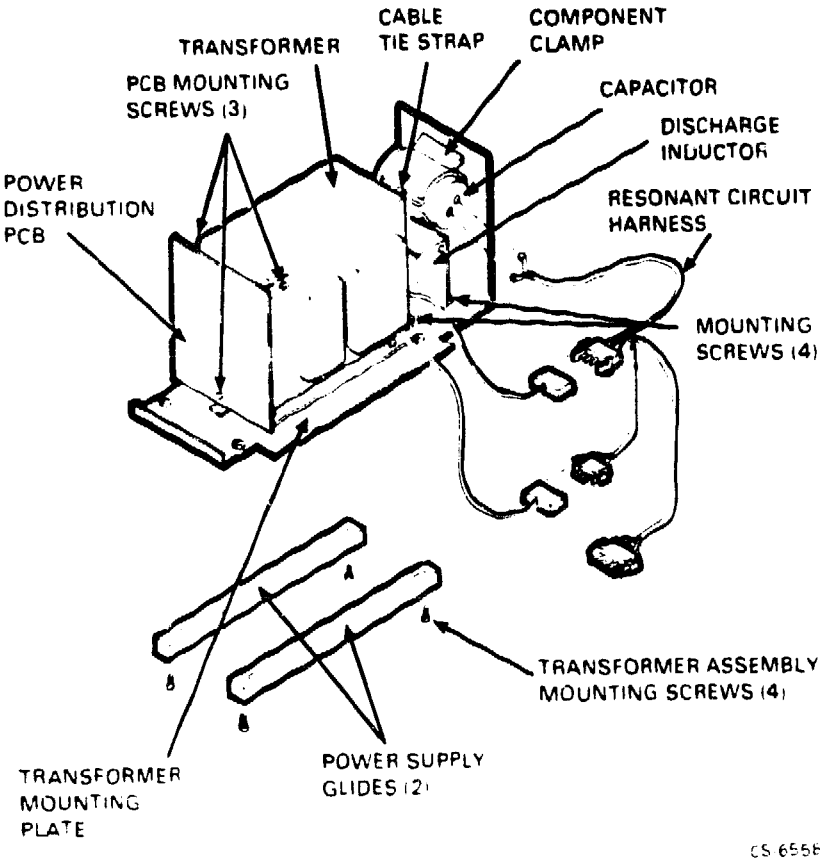


Figure 4-37 International Power Supply Transformer Assembly

4.11.4 Power Supply Transformer

4.11.4.1 Domestic Power Supply Transformer - See Figure 4-36

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the domestic power supply transformer assembly in accordance with the procedures in Section 4.11.3.1.
2. Remove the wire leads to the primary, secondary, and resonant circuit harnesses.
3. Remove the four hex head screws and lock washers mounting the transformer to the transformer assembly. Remove the transformer.

Replacement:

Replace the power supply transformer by reversing steps 1 through 3 in the removal section.

4.11.4.2 International Power Supply Transformer - See Figure 4-37.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the international power supply transformer assembly in accordance with the procedures in Section 4.11.3.2.
2. Remove the three screws mounting the power distribution PCB to the transformer, and remove the circuit board.
3. Remove the connectors to the resonant circuit harnesses.
4. Remove the four screws, lock washers and nuts mounting the transformer to the transformer assembly. Remove the transformer.

Replacement:

Replace the power supply transformer by reversing steps 1 through 4 in the removal section.

4.11.5 Power Supply Discharge Inductors

4.11.5.1 Domestic Power Supply Discharge Inductor - See Figure 4-36

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off, and that the power cord is removed from the power source.

Removal:

1. Remove the domestic power supply transformer assembly in accordance with the procedures in Section 4.11.3.1.
2. Disconnect the resonant circuit harness connector to the discharge inductor.
3. Remove the four screws mounting the discharge inductor to the domestic transformer assembly. Remove the inductor.

Replacement:

Replace the discharge inductor by reversing steps 1 through 3 in the removal section.

4.11.5.2 International Power Supply Discharge Inductor - See Figure 4-37.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the international power supply transformer assembly in accordance with the procedures in Section 4.11.3.2.
2. Disconnect the resonant circuit harness connector to the discharge inductor.
3. Remove the four screws mounting the discharge inductor to the international transformer assembly. Remove the inductor.

Replacement:

Replace the discharge inductor by reversing steps 1 through 3 in the removal section.

4.11.6 Power Supply Capacitors

4.11.6.1 Domestic Power Supply Capacitors - See Figure 4-36

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the domestic power supply transformer assembly in accordance with the procedures in Section 4.11.3.1.
2. Disconnect the two connectors from the resonant circuit harness connector to the capacitor
3. Remove the two screws mounting the capacitor mounting clamp and the capacitor to the domestic transformer assembly, and remove the capacitor.

Replacement:

Replace the capacitor by reversing steps 1 through 3 in the removal section.

4.11.6.2 International Power Supply Capacitors - See Figure 4-37.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the international power supply transformer assembly in accordance with the procedures in Section 4.11.3.2.
2. Disconnect the two connectors from the resonant circuit harness connector to the capacitor
3. Cut and remove the cable tie strap from the capacitor mounting bracket.
4. Remove the capacitor by sliding the capacitor out from the mounting bracket.

Replacement:

Replace the capacitor by reversing steps 1 through 4 in the removal section.

4.12 RIBBON ASSEMBLIES

4.12.1 Ribbon Edge Emitter

See Figures 4-38 and 4-39

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 line Printer is turned off and that the power cord is removed from the power source.

Removal:

1 Unlatch and open the printer cover

2 Loosen the screws mounting the band gate cover, and remove the cover

WARNING

Rotating parts. Keep clear until the character band stops moving.

3 Open the band gate assembly

4 Raise the ribbon mask assembly

5 Unplug the ribbon edge emitter connector P2 for column 1, or P1 for column 136 from the emitter harness

6 Remove the two nuts and washers that mount the emitter assembly to the ribbon mask assembly

7 Remove the emitter assembly

Replacement:

Replace the emitter assembly by reversing steps 1 through 7 in the removal section.

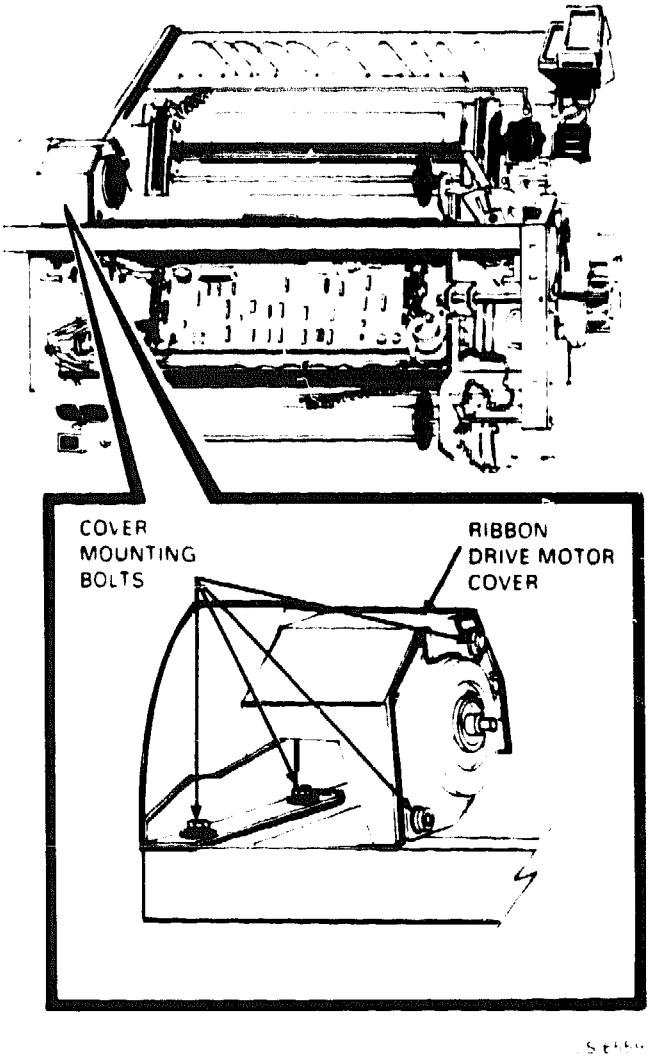


Figure 4-38 Ribbon Motor Cover

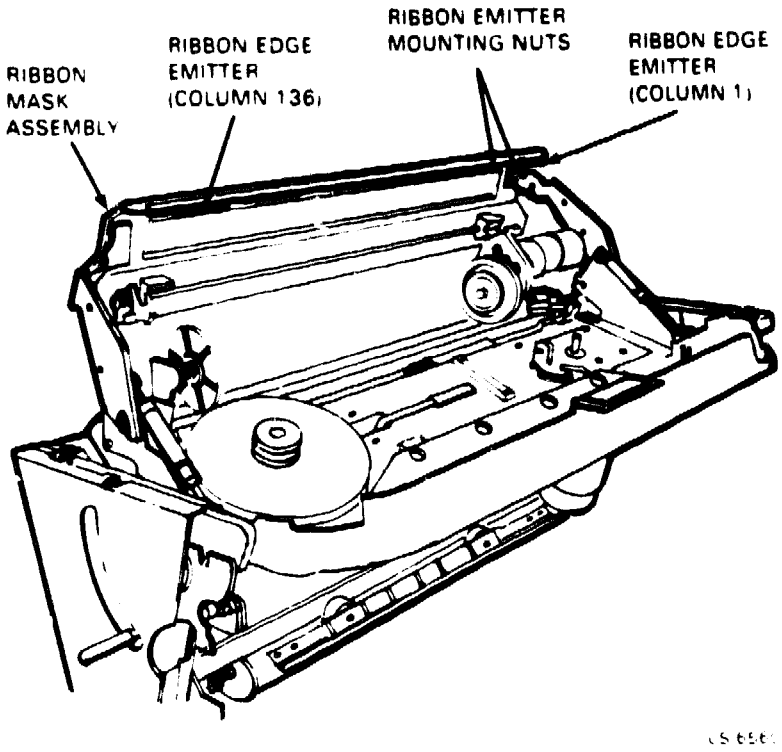


Figure 4-39 Ribbon Edge Emitter

4.12.2 Ribbon Edge Detector

See Figure 4-40

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise the printer cover.
2. Loosen the screw securing the band gate board cover, and remove cover.
3. Unlatch and open band gate assembly.

WARNING

Rotating parts. Keep clear until character band stops moving.

4. Raise ribbon cover and raise ribbon mask assembly.
5. Remove ribbon.
6. Unplug column 1 ribbon edge detector connector J3 or column 136 edge detector from J10 at the band gate PCB.
7. Remove all tie-wraps that secure cable assembly.
8. Remove the two screws that hold the ribbon edge detector assembly to the band gate casting and remove ribbon edge detector assembly.

Replacement:

To replace the ribbon edge detector assembly, reverse steps 1 through 8 in the removal section.

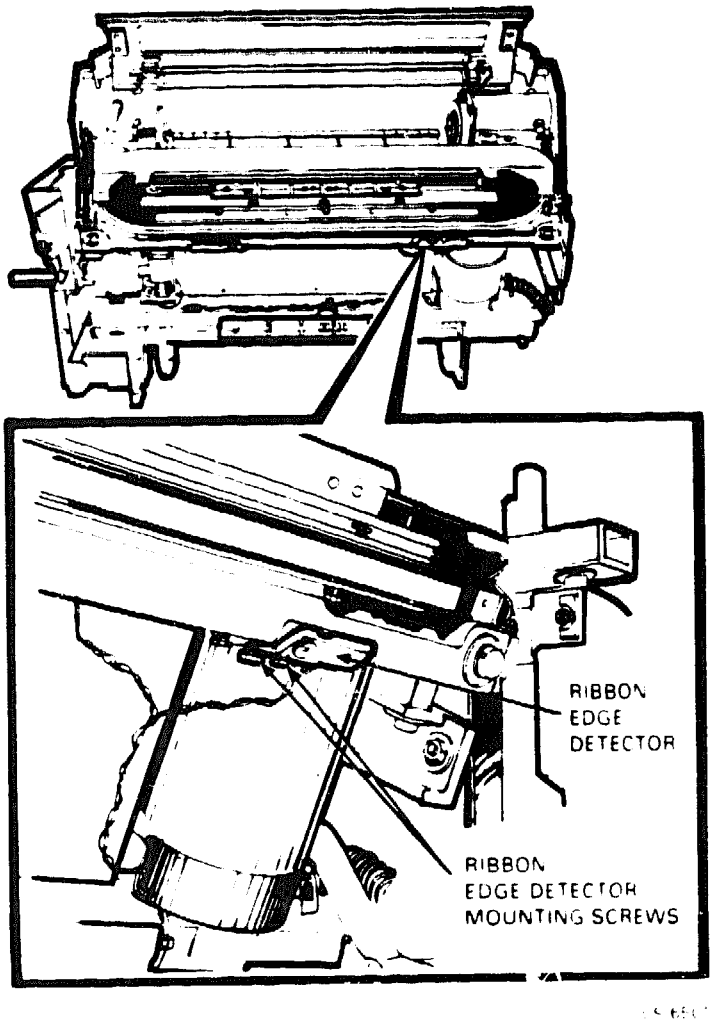


Figure 4-40 Ribbon Edge Detector

4.12.3 Ribbon Motor/Drive Spool

See Figures 4-41 and 4-42

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1 Unlatch and raise the printer cover.

2 Unlatch and open the band gate assembly.

WARNING

Rotating parts. Keep clear until character band stops moving.

3 Remove the three mounting bolts securing the ribbon drive motor cover.

4 Remove the retaining ring that holds the ribbon drive spool onto the drive shaft.

5 Remove drive spool.

6 Unplug the two motor leads.

7 Remove the four bolts securing the ribbon drive motor, and remove the motor.

Replacement:

1 Install the ribbon drive motor in position, and mount loosely with the four bolts.

2 Place the drive spool on the drive spool shaft with the inner teeth of the spool engaged with the drive motor gear.

3 Position the ribbon drive motor so that there is minimum backlash and no binding occurs while turning the ribbon drive spool.

4 Tighten the two upper ribbon motor mounting screws.

5 Remove the ribbon drive spool.

6 Tighten the two lower ribbon motor mounting screws.

7 Install the two push-on motor leads (white wire to the motor red terminal, and black wire to the motor black terminal).

8 Continue installation by reversing steps 1 through 5 in the removal section.

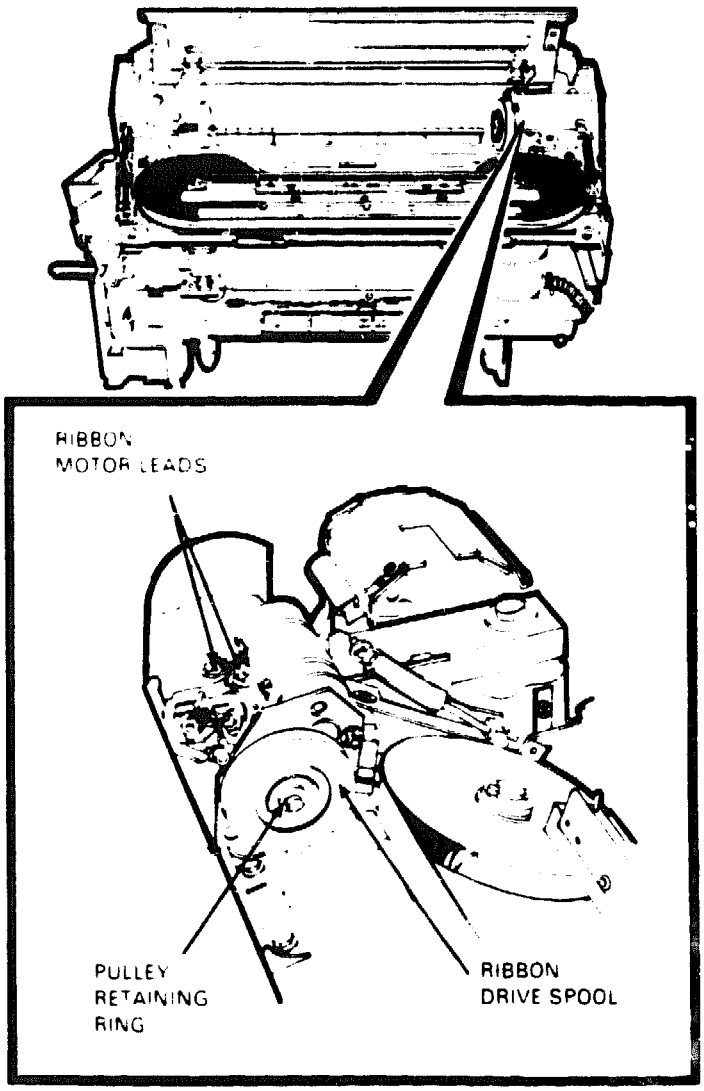


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Figure 4-41 Ribbon Drive Spool

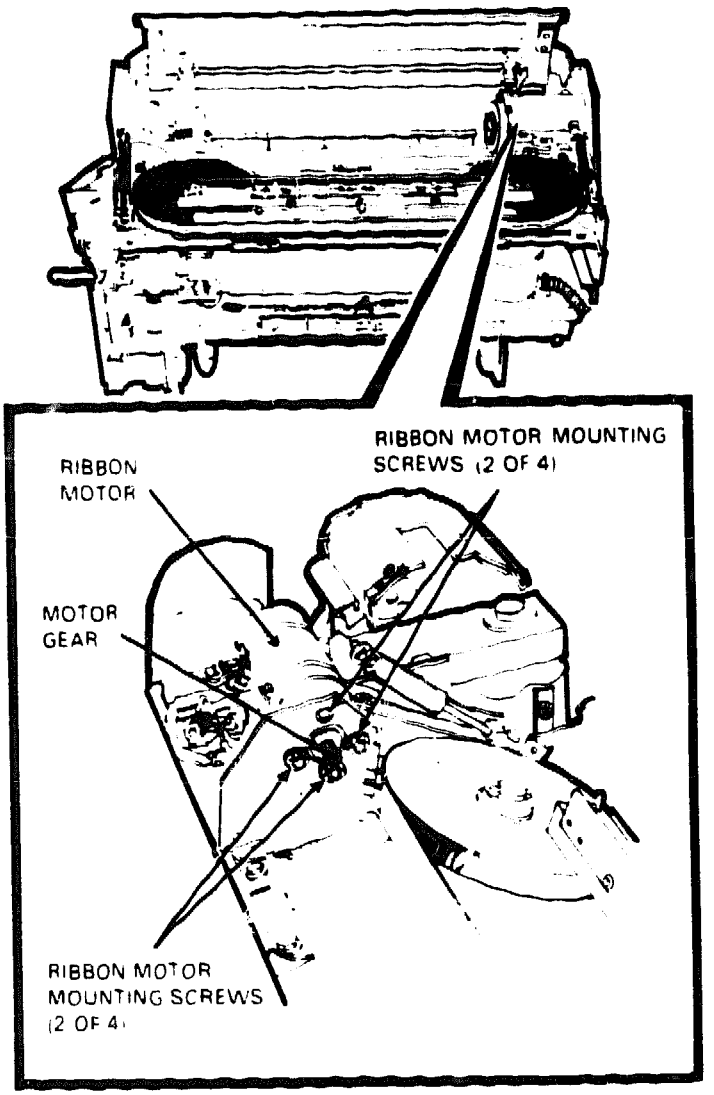


Figure 4-42 Ribbon Motor

4.13 SENSORS

See Figures 4-2 and 4-6.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and raise printer front cover.
2. Unlatch and open the band gate.

WARNING

Rotating parts. Keep clear until the character band stops moving.

3. Raise the ribbon cover and raise up the ribbon mask assembly.
4. Remove the ribbon from the printer.
5. Open the band gate cover.
6. Loosen the screw mounting the band gate PCB cover, and remove cover.
7. Loosen the sensor bracket clamping screws.
8. Cut the tie wraps securing the sensor cabling.
9. Unplug the sensor connector J2 at the band gate PCB.
10. Remove the bolt mounting the sensor cable ground leads at the band gate frame.
11. Slide the sensors out of their mounting bracket.

Replacement:

Replace the sensors by reversing steps 1 through 11 in the removal section.

4.14 STATIC ELIMINATOR WAND/TRANSFORMER

4.14.1 Static Eliminator Wand

See Figure 4-43.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Perform the Paper Puller Cover/Guide Removal Procedure (refer to Section 4.9.3, steps 1 through 7).
2. Unscrew the wand connection at the transformer, and lift the cable out of the transformer.
3. Cut the tie wrap holding the cable to the frame.
4. Remove the nut holding the ground lead at the transformer.
5. Unsnap the wand from the two holding clips.
6. Remove the static eliminator wand and cable assembly.

Replacement:

Replace the static eliminator wand by reversing steps 1 through 6 in the removal section.

4.14.2 Static Eliminator Transformer

See Figure 4-43

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Perform the Paper Puller Cover/Guide Removal Procedure (refer to Section 4.9.3, steps 1 through 7).
2. Unplug connector A32J1 coming from the static eliminator transformer.
3. Remove the nut holding the static eliminator wand ground lead, and remove the lead
4. Unscrew the wand connection at the transformer, and lift the cable out.
5. Remove one screw and nut holding the transformer to the frame, and then loosen the second screw.
6. Remove the transformer assembly

Replacement:

Replace the static eliminator transformer by reversing steps 1 through 6 in the removal section

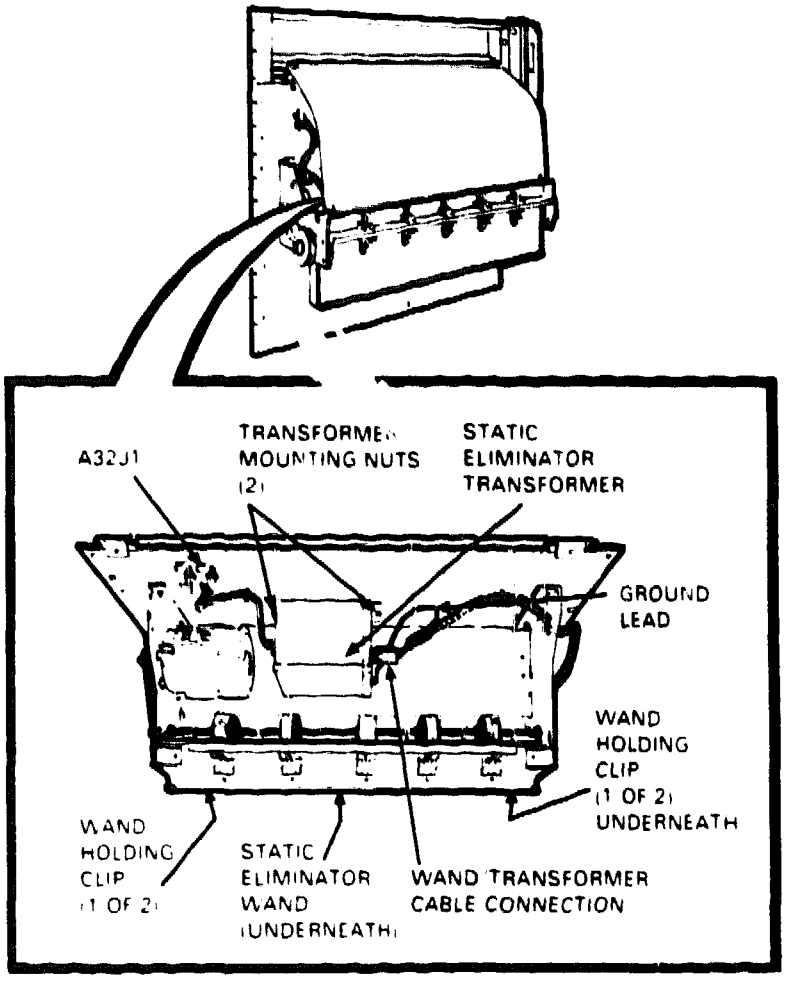


Figure 4-43 Static Eliminator Wand and Transformer

4.15 THERMISTOR ASSEMBLY AIRFLOW DETECTOR

See Figure 4-44

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the fan assembly.
2. Unplug thermistor assembly at connector P2.

Replacement:

Replace the thermistor assembly by reversing steps 1 and 2 in the removal section.

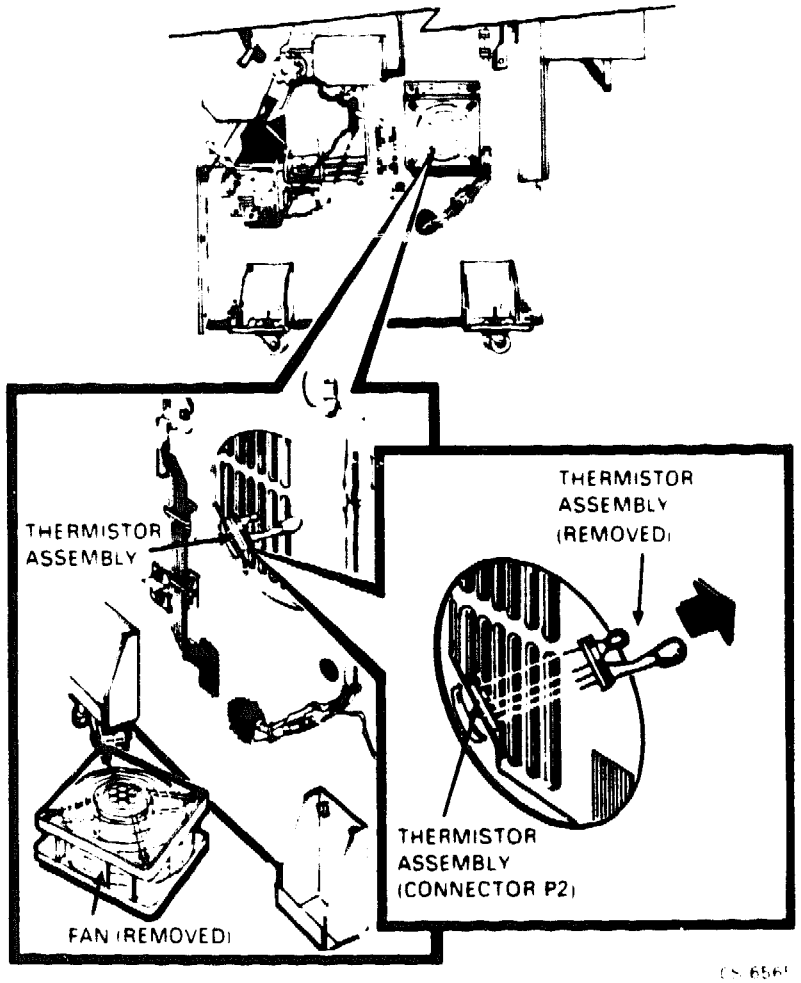


Figure 4-44 Thermistor Assembly

4.16 TRACTOR ASSEMBLIES

4.16.1 Tractors

See Figures 4-45, 4-46, and 4-47

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1 Unlatch and raise the printer cover.

2 Unlatch and open the band gate.

WARNING

Rotating parts. Keep clear until the character band stops moving.

3 Remove the paper if installed.

4 Remove the cables from the tractor assembly being removed (refer to Section 4.16.2).

CAUTION

Be certain that the support block locating guide is pressed firmly against the support block before removal for correct alignment during replacement.

5 Remove the two bolts that secure the upper and lower left hand block supporting the paper feed drive spline and support shafts, depending on the tractor assembly being removed.

6. Remove the tractor assembly by sliding it to the left and off the shaft.

NOTE

The paper motion sensor assembly on the left upper tractor, or the wires to the PAPER OUT switch assembly on the lower right tractor should be disconnected before removing either of these two tractors.

7. To replace the tractor belt, remove the two screws from the tractor stabilizer, and separate the tractor sides.

Replacement:

1. If the tractor has been taken apart for belt replacement, place the tractor assemblies together and secure with the two screws removed.
2. Perform the tractor eccentric adjustment procedure.
3. Slide the tractor assembly onto the support and spline shafts, while aligning the white tractor pins for correct phasing.
4. Reconnect the PAPER OUT switch wires and the paper motion sensor assembly.
5. Install the support and spline shaft block, being certain that the block is placed securely against the locating guide on the printer casting.
6. Continue replacement of the tractors by reversing steps 1 through 5 in the removal section.

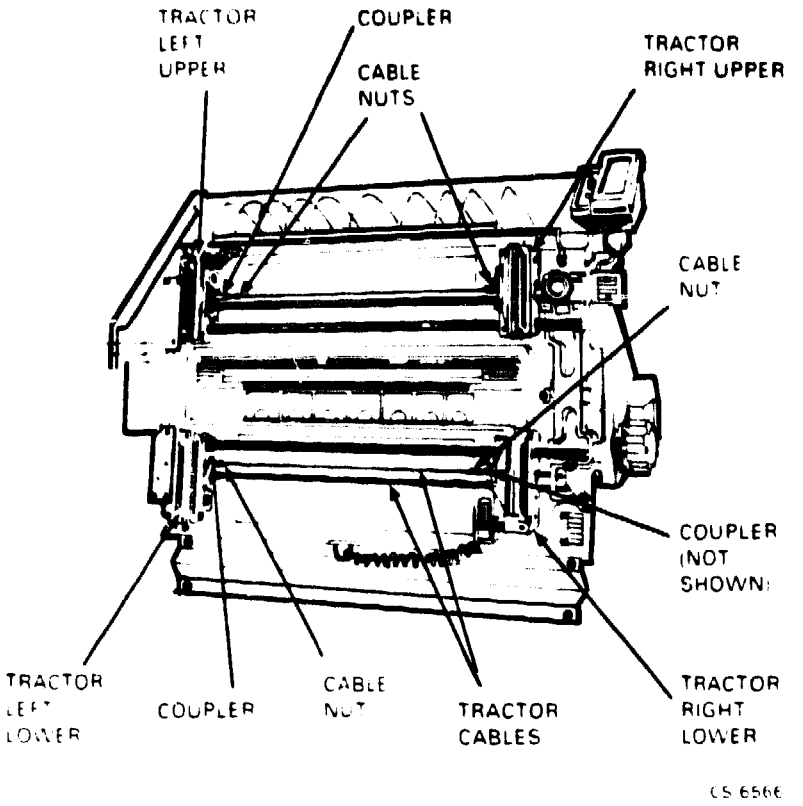


Figure 4-45 Tractor Cables and Paper Feed Assembly (Sheet 1 of 2)

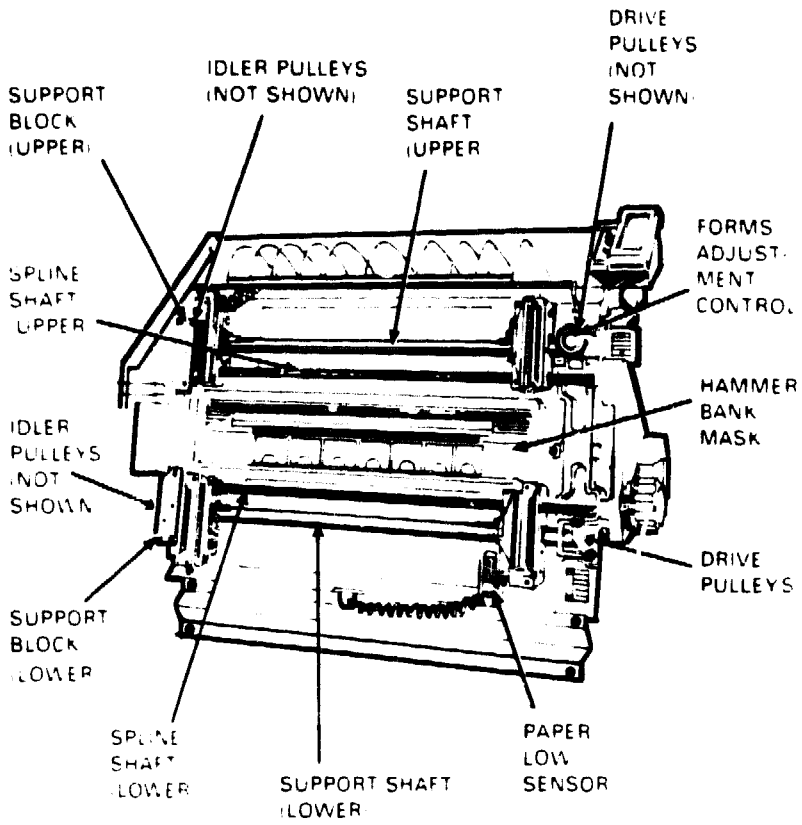


Figure 4-45 Tractor Cables and Paper Feed Assembly (Sheet 2 of 2)

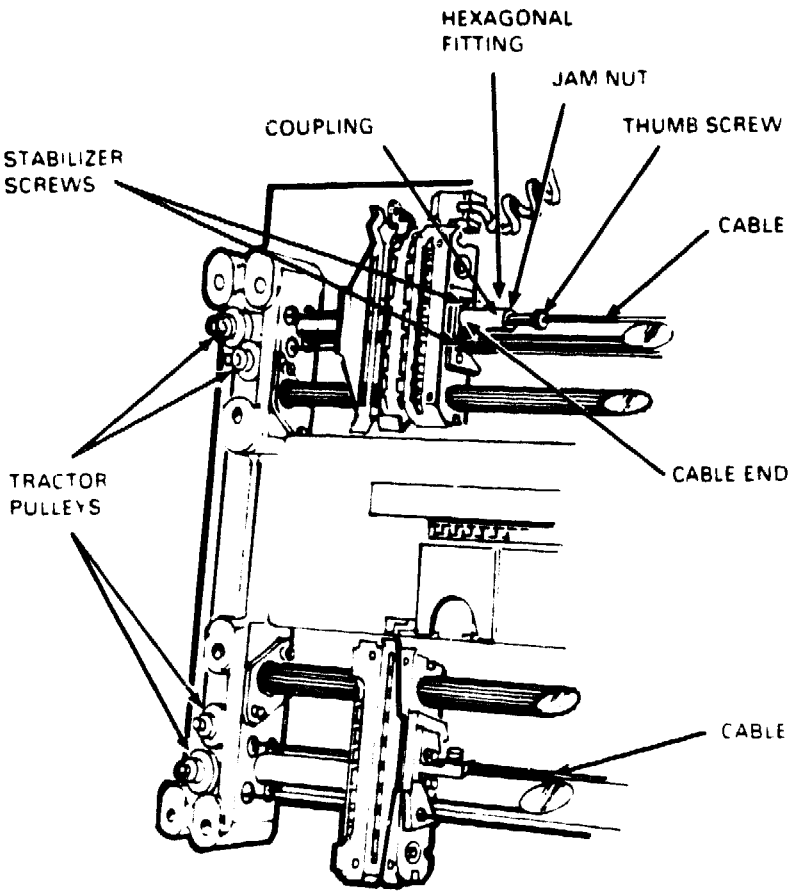


Figure 4-46 Tractor Cable System

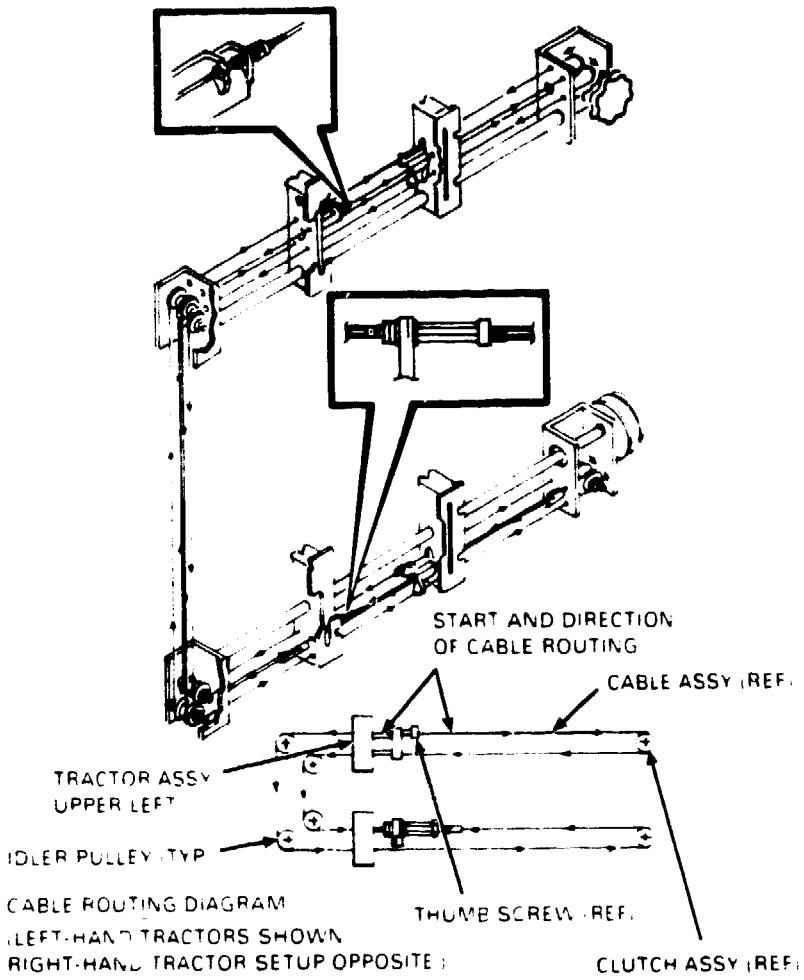


Figure 4-47 Two Cable Tractor Cable System

4.16.2 Tractor Cables

See Figures 4-46 and 4-47.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unlatch and open the printer cover.
2. Unlatch and open the band gate assembly.

WARNING

Rotating parts. Keep clear until the character band stops moving.

3. Remove paper, if installed.
4. Remove the jam nut from the thumbscrew. Unthread the cable thumbscrew at the tractor assembly for the cable to be removed, so that it is free of the tractor shaft stabilizer assembly, and the tractor cable threads.
5. Loosen the nut at the other end of the tractor cable and unthread the coupling first from one cable end, and then from the other cable end. Retain the coupling and associated washers.
6. Remove the cable nut.
7. Remove the tractor cable from around the pulleys, and unthread the jam nut and cable thumbscrew from its associated cable end. Retain the thumbscrew and jam nut.
8. Unscrew the two screws that mount the tractor stabilizer to the tractor assembly at the center hexagonal fitting end, and separate the stabilizer and tractor.
9. Lift the cable assembly from its tractor stabilizer support area. Remove assembly.

Replacement:

1. Install the cable end through the removed stabilizer opening, and thread through the thumbscrew and jam nut.
2. Insert the other end of the cable through the tractor housing. The center hexagonal fitting on the cable should be positioned in its notch on the stabilizer.
3. Install the stabilizer onto the tractor assembly and secure with its two mounting screws. Ensure that the tractor slides freely on the tractor shafts.
4. Route the cable ends through the tractors and around the pulleys.
5. Install the nut on the cable end, and feed the cable through the tractor stabilizer.
6. Insert one cable end into the coupling and thread it on the coupling for approximately one thread.
7. Insert the other cable end into the coupling, and thread the coupling to adjust the cable to a tension of 3.6 to 4.5 Kg (8 to 10 lbs). Place the tractor toward the center of the printer. Push on the tractor stabilizer and check for no movement until 3.6 to 4.5 Kg (8 to 10 lbs) of pressure applied.
8. Tighten the locking nut.
9. Slide the tractor assembly so that the center hexagonal fitting is positioned half way into the stabilizer slot.
10. Thread the thumbwheel onto the cable and into the tractor stabilizer.
11. Install paper into the upper and lower tractor assemblies, and adjust the thumbwheel for correct vertical tractor alignment.
12. Tighten the thumbscrew jam nut.
13. Close and latch the band gate.
14. Close and latch the printer cover.

4.17 PAPER STACKER

4.17.1 Bead Chain and Spring

See Figure 4-48

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unhook the bead chain from the bead chain hook on the paper compressor eccentric crankshaft.
2. Remove the other end of the bead chain eyelet from the loop on the spring.
3. If the spring is to be removed, release the coiled end of the spring from the rear support compressor assembly.

Replacement:

To replace the bead chain and spring assembly, reverse steps 1 through 3 in the removal section.

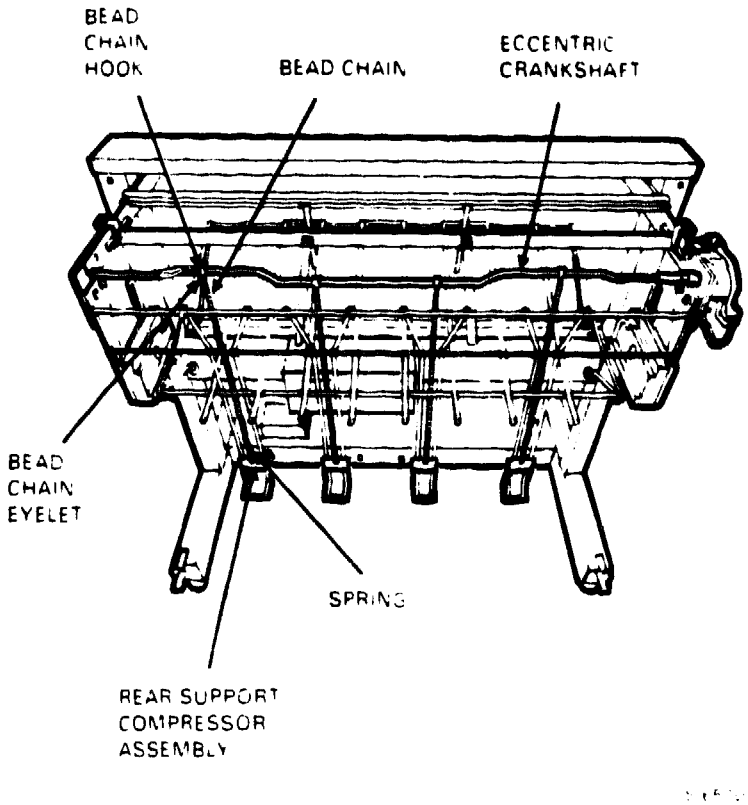


Figure 4-48 Paper Stacker Bead Chain and Spring

4.17.2 Shelf Support Cable

See Figures 4-49, 4-50, 4-51, and 4-52.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the four screws that secure the base cover assembly (see Figures 4-49A and 4-49B).
2. Remove the nut that secures the paper compressor motor cable ground lead to the stacker frame, and remove the lead (see Figure 4-49B).
3. Unplug the white and black wires from the paper compressor motor at terminals 2 and 4 of the transformer (See Figure 4-49C).
4. Cut and remove the four tie wraps securing the motor cable in the stacker base, and remove the two cable clamps that secure the cable on the outside of the frame.
5. Squeeze the motor cable retaining clamp together and push the clamp out of the hole in the stacker base. Remove the clamp.
6. Remove the paper compressor motor cable through the opening in the base.
7. Remove the four bolts (two each at the front and back) securing the top stacker frame cover.
8. Remove the top stacker frame cover and paper compressor assembly.
9. Remove the four bolts and washers, the two screws and washers, and the cut-off switch lever securing the paper shelf. Remove the paper shelf.
10. Remove the two lower screws and washers from the pulley cover. Remove the cover (see Figure 4-50).
11. Place the crossbar assembly at the lowest position by pressing the brake release mechanism with an insulated tool inserted through the opening in the shelf-lowering motor cover.
12. From the underside of the stacker base, stretch the cable springs and unhook the springs from the cables (see Figure 4-50C).
13. Remove the bolts, washers, and nuts on each side frame post that mount the cables (see Figure 4-50D).
14. Raise the crossbar assembly up and out from the stacker side frames (the shelf motor cable will still be attached).
15. Remove the two screws that mount each large idler pulley assembly. Remove the pulley assembly (see Figure 4-50E).
16. Remove the C-clip holding the idler pulley shaft.
17. Remove the pulley shaft, pulley, and cable.

Replacement:

1. Install the cables around the idler pulleys.
2. Mount the idler pulley assemblies, and secure with their mounting screws.
3. Install the idler pulley, shaft, and C-clip.
4. Place the cables that go to the upper side frame posts at approximately 63.2 cm (24.4 in.) from the idler pulley.
5. Wrap the inside cable and outside cable respectively around the drive motor pulley (see Figure 4-51), and hold in place with masking tape on the drive pulley assembly (see Figure 4-50B/E).
6. Place the cables in proper position around the idler pulleys (see Figure 4-51).
7. Place the crossbar assembly into position at the top of the stacker frame with the cable ends for the stacker base downward, and the upper cable ends upward (see Figure 4-52).
8. Slowly lower the crossbar assembly to the bottom position in the stacker frame.
9. Mount the cables with the bolts, washers, and nuts at both upper side frame posts.
10. Hold the crossbar assembly firmly in the lowest position, and tilt the stacker so that the bottom cable springs are accessible.
11. Place each lower cable around the cable stationary guide pin, and attach the spring to the pulley cable.
12. Release the crossbar assembly and place the stacker in the upright position, and remove the masking tape on the drive pulley assembly.
13. Install the pulley cover, shelf and cut-off switch lever with their four bolts, four screws, and washers.
14. Install the stacker frame cover and paper compressor assembly, and secure with four mounting bolts.
15. Install the paper compressor assembly, and secure with four mounting bolts.
16. Place the motor cable through the cable hole in the stacker base. Snap in the cable strain relief.
17. Connect the compressor motor leads on terminals 2 and 4 of the transformer.
18. Secure the motor cable by installing the two frame cable clamps and four base tie wraps.
19. Attach the motor ground lead to the stacker frame with the ground lead mounting nut.
20. Install the transformer safety cover and the base cover, and secure with the four mounting screws.

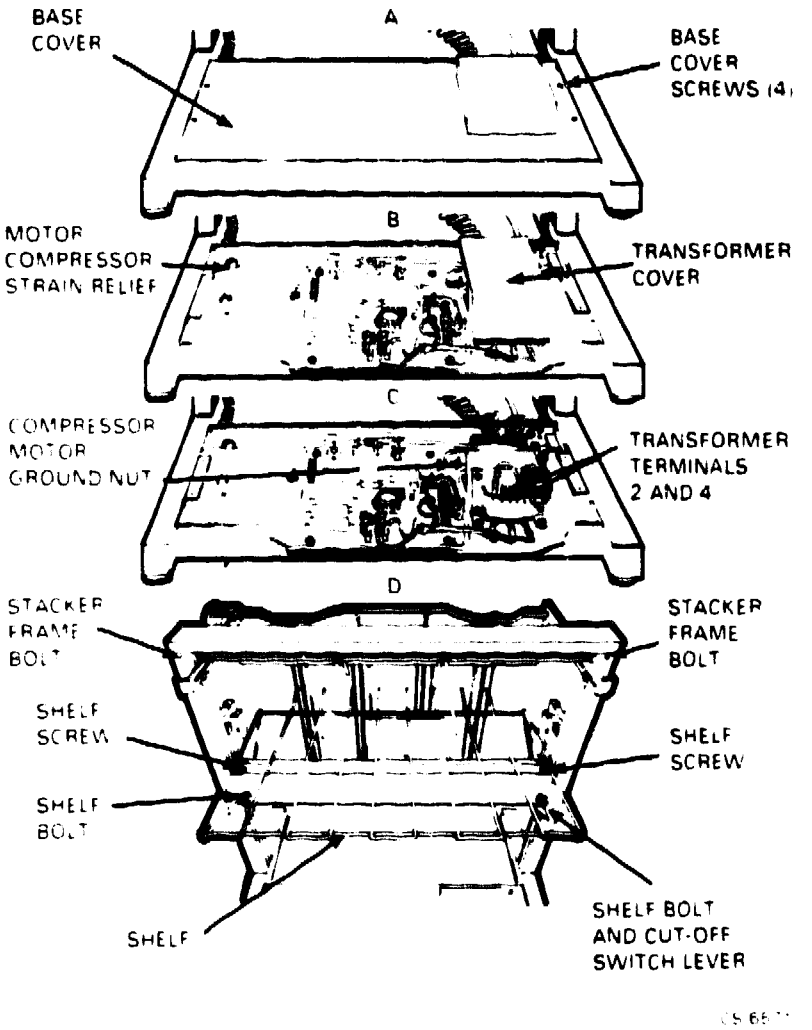


Figure 4-49 Paper Stacker Motor Cable Removal

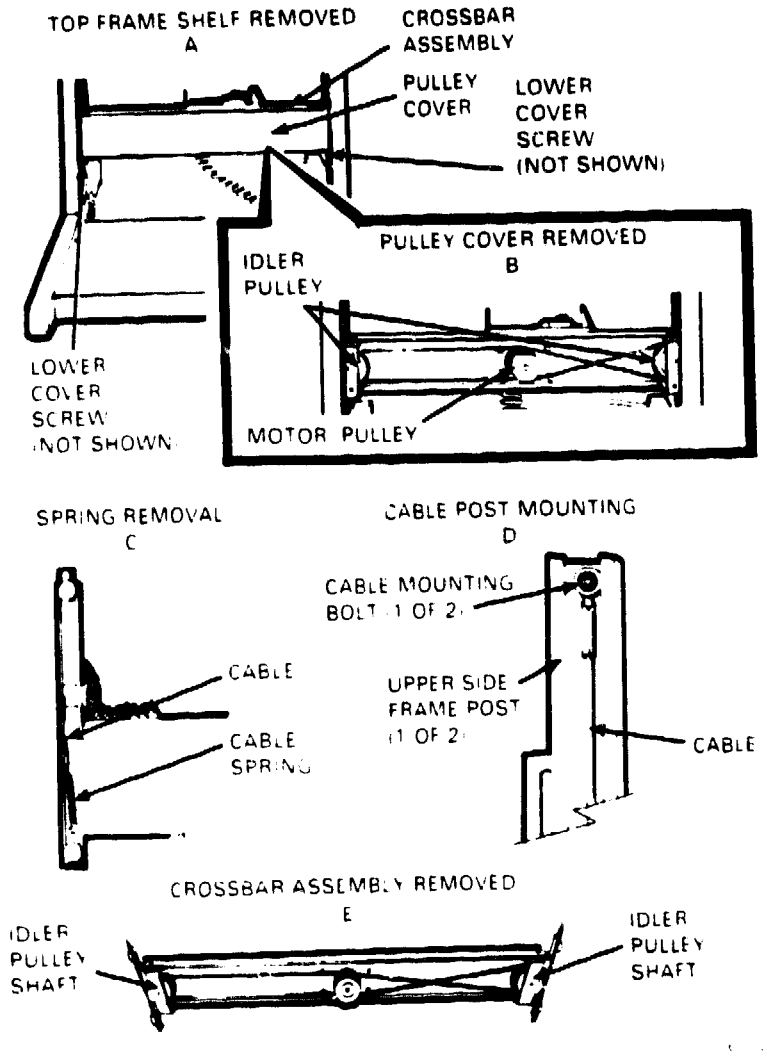


Figure 4-50 Paper Stacker Pulley Removal and Cable Post Mounting

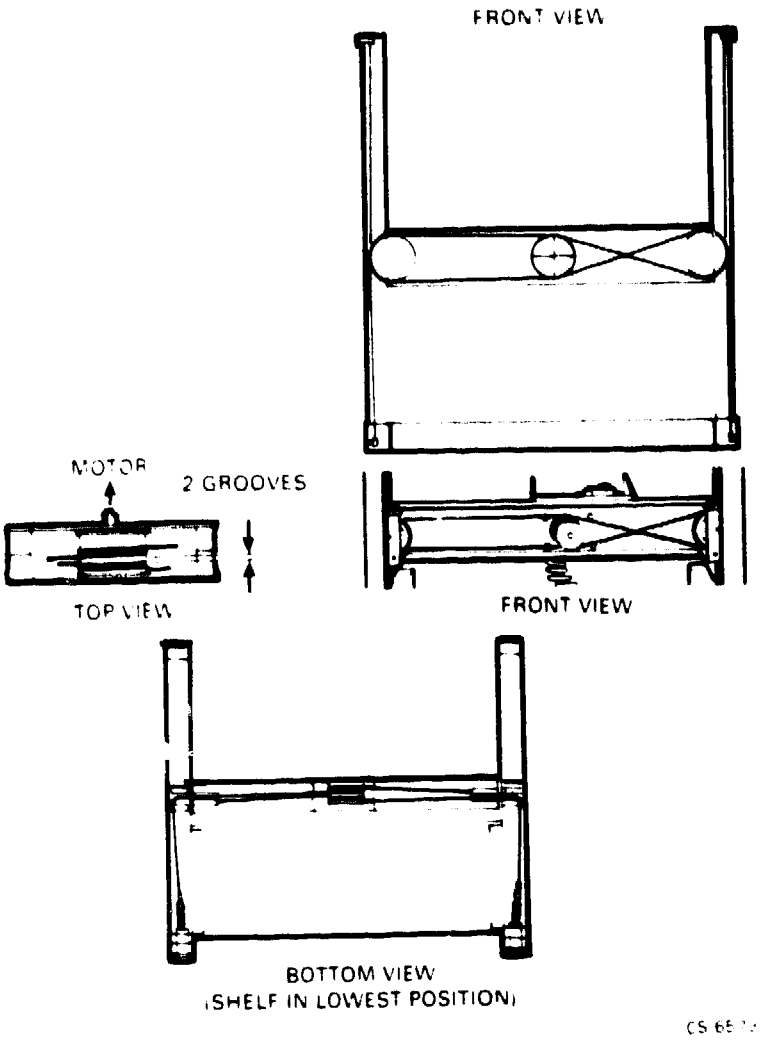


Figure 4-51 Paper Stacker Cable Installation

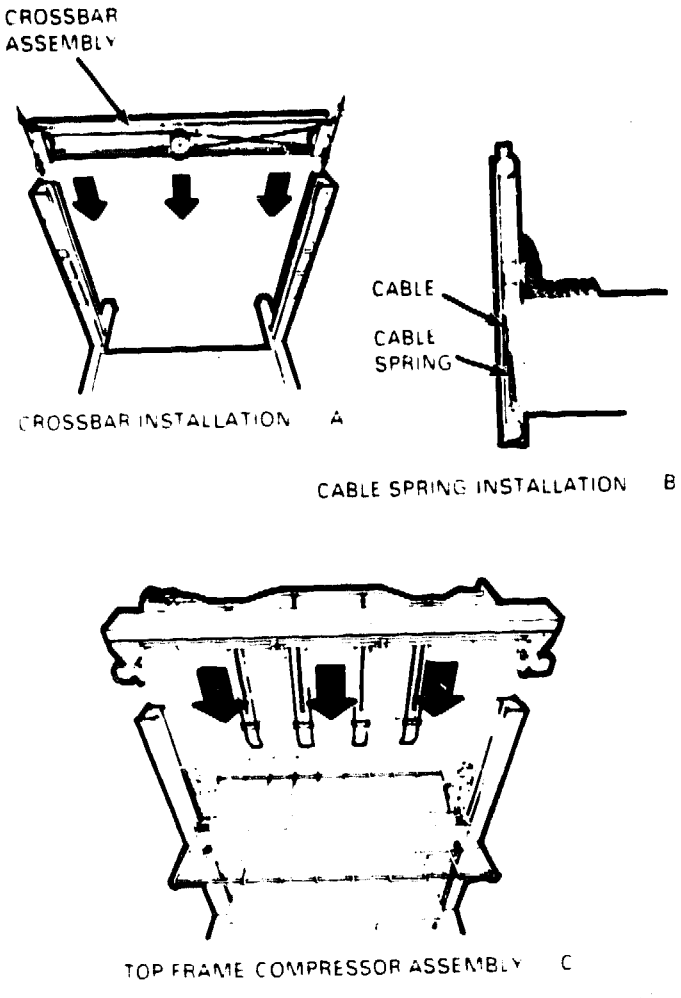


Figure 4-5.2 Paper Stacker Shelf Support Cable

4.17.3 Motor Cutoff Switch

See Figures 4-49 and 4-53

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the four screws and washers securing the base cover assembly. Remove the cover (see Figure 4-49A).
2. Remove the two plug-on wire connectors on switch S1.
3. Press the two locking tabs on the switch assembly (one on each side), and push the switch up and out of the base panel assembly.

Replacement:

Install the motor cutoff switch, S1, by reversing steps 1 through 3 in the removal section.

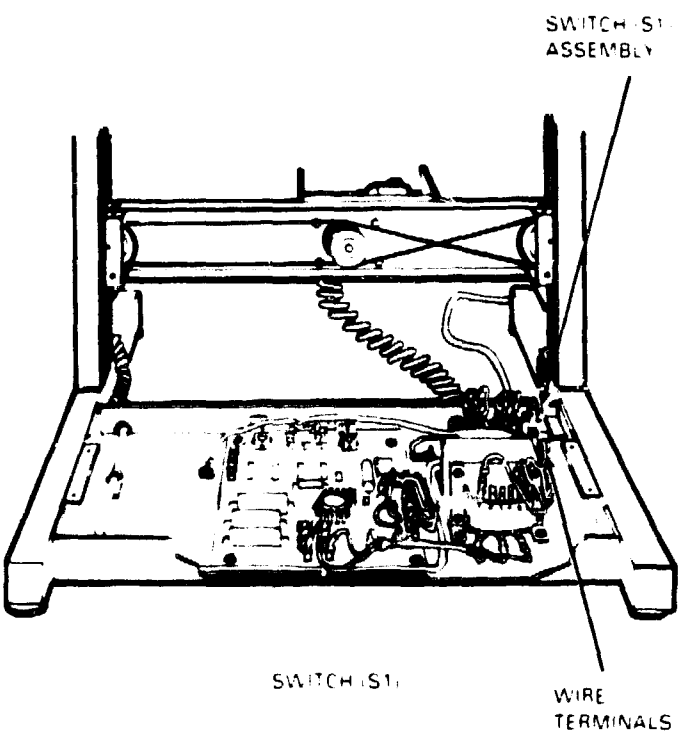


Figure 4-53 Motor Cutoff Switch

4.17.4 Paper Compressor Eccentric Shaft and Bead Chain Hook

See Figures 4-48B and 4-54

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Unhook the four bead chain eyelets from the hooks on the eccentric shaft.
2. Loosen the eccentric shaft locking screw in the paper compressor motor coupling
3. Slide the eccentric shaft out of the coupling, and then the other end of the shaft out of the bushing in the paper compressor side frame
4. Slide the bead chain hooks off the eccentric shaft.

Replacement:

1. Place the four bead chain hooks on the eccentric shaft with the open hook end toward the inside of the stacker, and the flat end of the shaft towards the motor coupling
2. Install the round end of the shaft in the shaft bushing.
3. Place the flat edge of the shaft into the motor coupling with the other end of the shaft flush with the outside of the bushing.
4. Tighten the coupling lock screw onto the flat side of the shaft.
5. Connect the four bead chain eyelets on their respective bead chain hooks, and line the chains up in the proper position

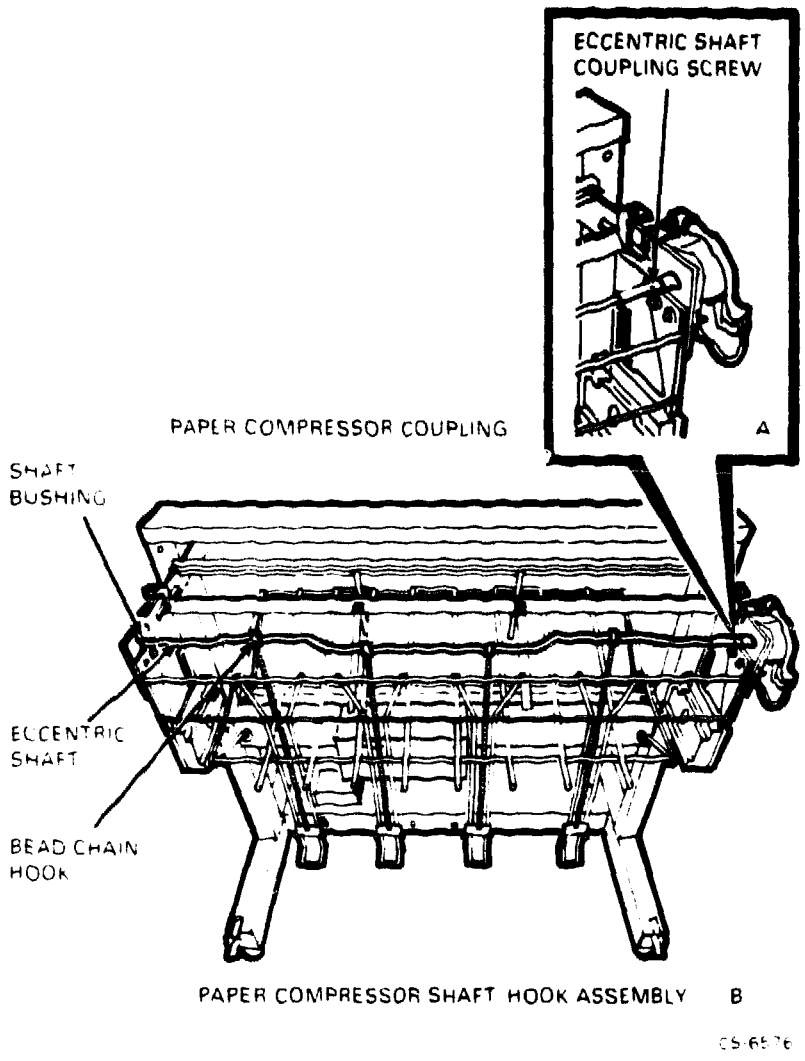


Figure 4-54 Paper Compressor and Bead Chain Hooks

4.17.5 Paper Compressor Motor

See Figures 4-49 and 4-55.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. remove the four screws and washers securing the base cover assembly. Remove the cover (see Figure 4-49A).
2. Lift off the transformer safety cover.
3. Remove the nut that holds the motor cable ground lead to the stacker frame. Remove the lead
4. Unplug the white and black wires of the motor cable at terminals 2 and 4 of the transformer (see Figure 4-49).
5. Cut and remove the four tie wraps that secure the motor cable in the stacker base, and remove the two cable clamps that secure the cable on the outside frame
6. Squeeze the motor cable strain relief together and push the clamp out of the hole in the stacker base Remove the clamp.
7. Remove the paper compressor motor cable through the opening in the base.
8. Remove the four bead chain eyelets off the hooks on the eccentric shaft.
9. Loosen the locking screw that holds the eccentric crankshaft coupling to the compressor motor shaft.
10. Remove the nut holding the motor ground lead at the upper paper compressor assembly bracket. Remove the ground lead.
11. Remove the two screws that secure the motor to the compressor assembly frame, and remove the motor and the attached power cable.

Replacement:

Replace the paper compressor motor by reversing steps 1 through 11 in the removal section.

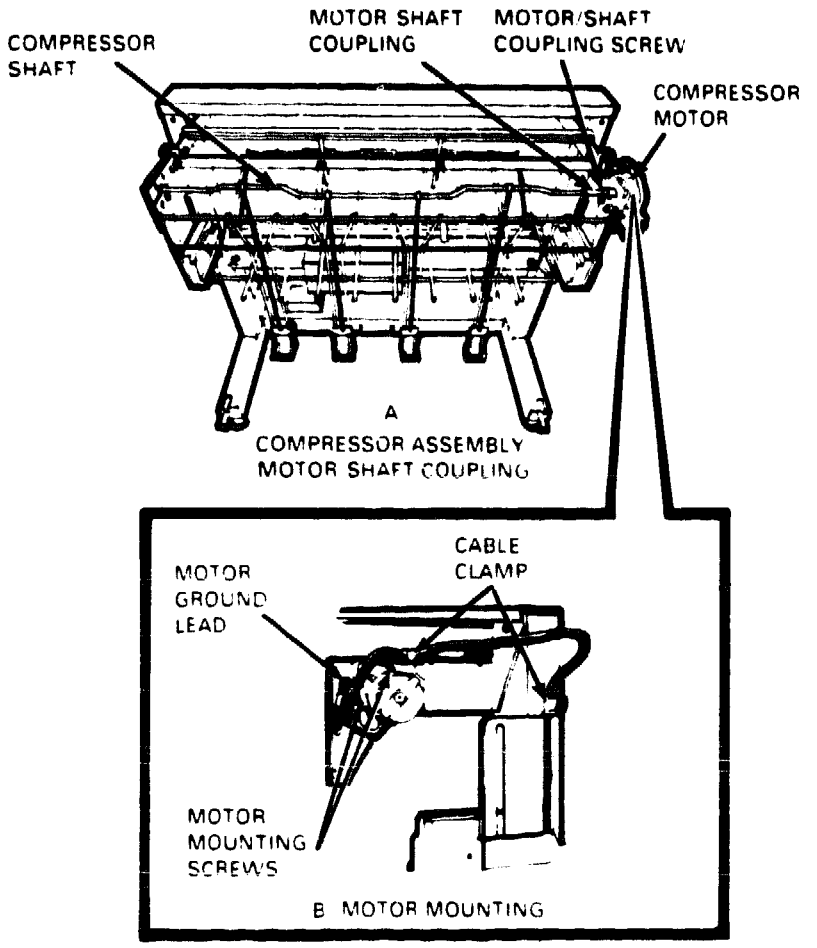


Figure 4-55 Paper Compressor Motor

4.17.6 Power Supply and Logic PCB

See Figure 4-56.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the four screws that secure the base cover assembly. Remove the cover.
2. Unplug J1 and J2 sensor cable connectors at the power supply PCB.
3. Remove the plug-on wire connectors at PCB connectors E1 through E15. Make sure that the connectors are marked properly for later replacement.
4. Remove the four screws and washers that mount the PCB to the base. Remove the PCB.

Replacement:

Replace the PCB by reversing steps 1 through 4 in the removal section.

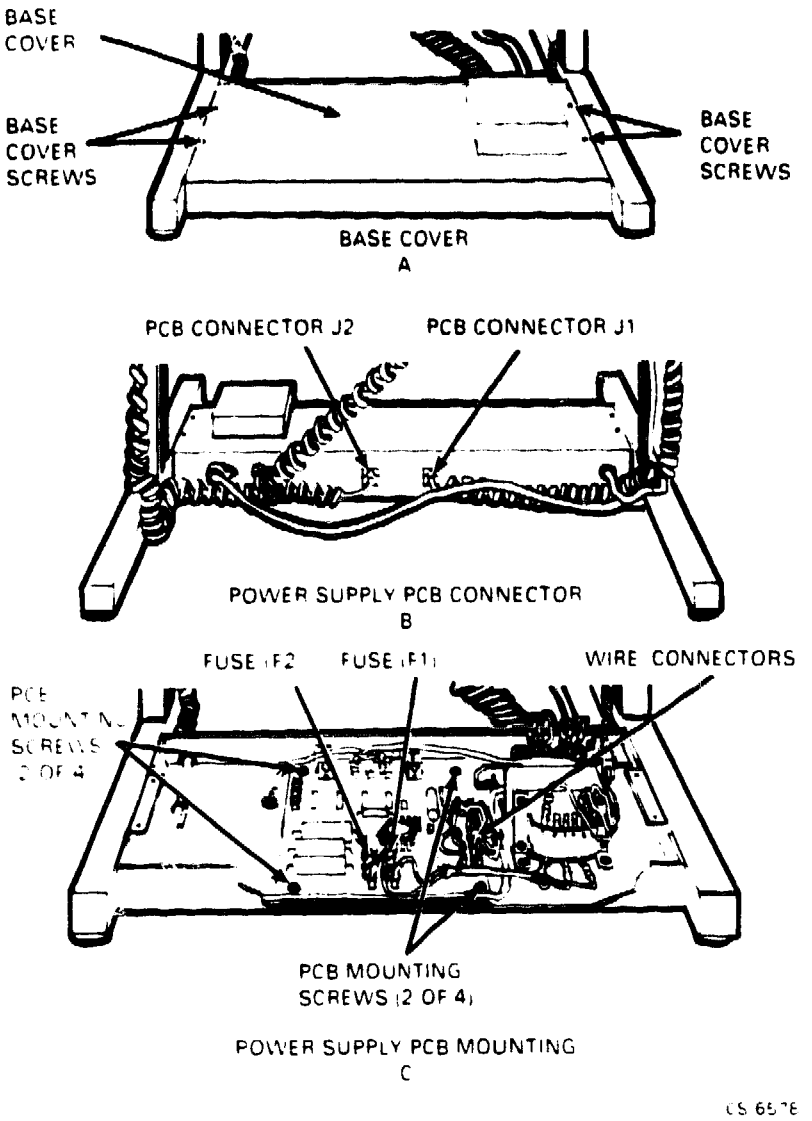


Figure 4-56 Power Supply and Logic Printed Circuit Board

4.17.7 Power Transformer

See Figure 4-57.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the four screws that secure the base cover assembly. Remove the cover.
2. Lift off the transformer safety cover.
3. Remove all the push-on wire connectors at the transformer terminals, noting their correct location for later replacement.
4. Remove the four nuts and washers mounting the transformer to the stacker base. Remove the transformer.

Replacement:

Replace the transformer by reversing steps 1 through 4 in the removal section.

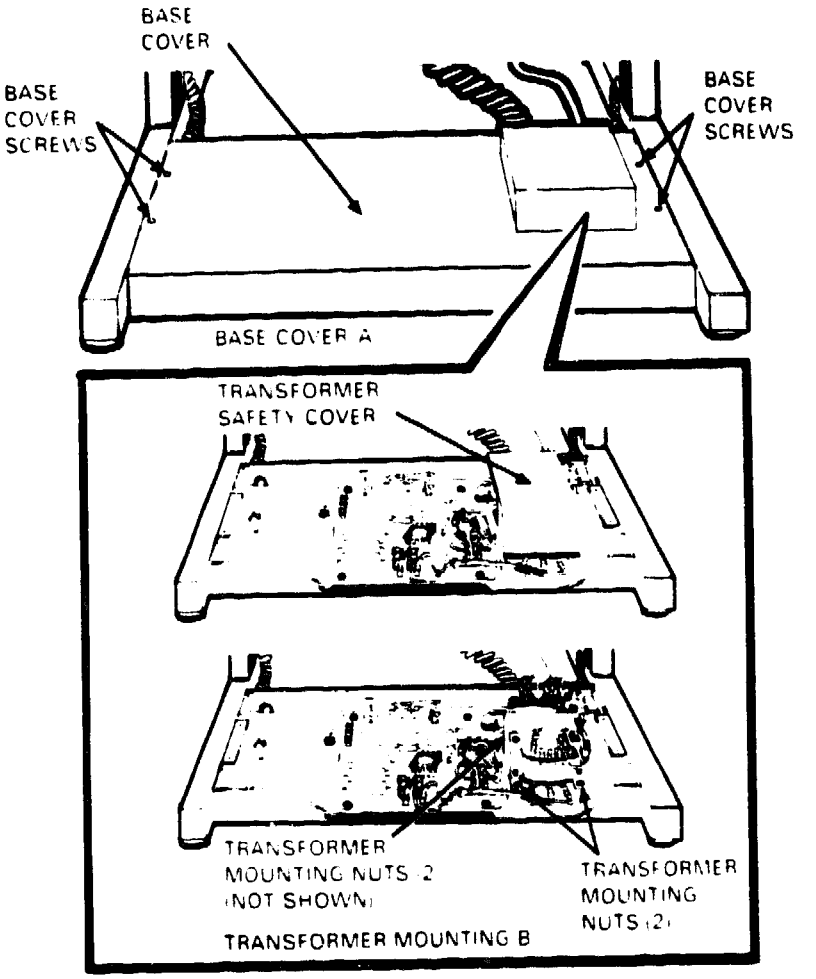


Figure 4-57 Transformer Mounting

4.17.8 Sensor Cable

See Figure 4-58.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Press the cable connector locking tab at the sensor connector. Remove the cable.
2. Press the corresponding cable connector locking tab at the power supply and logic PCB. Remove the cable connector.
3. Cut and remove the three tie wraps securing the cable to the stacker frame. Remove the sensor cable.

Replacement:

Replace the sensor cable by reversing steps 1 through 3 in the removal section.

4.17.9 Sensor PCB

See Figure 4-58.

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Press the cable connector locking tab at the sensor connector. Remove the cable
2. While holding the sensor assembly, remove the adjustment knob and indicator. Remove the sensor assembly.
3. Remove the bolt holding the front and rear sensor housing together.
4. Separate the housing and remove the sensor PCB.

NOTE

On the photo pickup PCB, lift off the paper shelf lowering switch button before removing the PCB.

Replacement:

1. Insert and seat the sensor PCB into the sensor housing
2. Attach and secure the front housing assembly with the mounting bolt

NOTE

On the photo pickup PCB, press the paper shelf lowering button.

3. Install the sensor assembly and the pointer on the frame and secure with the adjustment knob.
4. Install the sensor cable securely

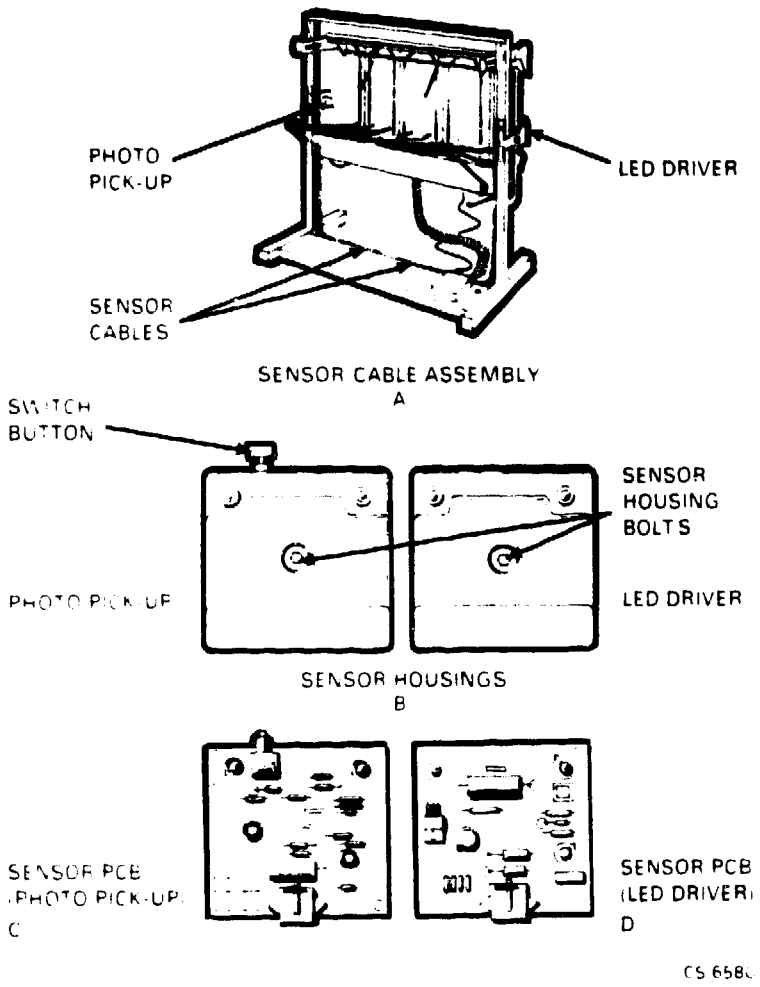


Figure 4-58 PCB Assembly Sensors

4.17.10 Shelf Motor

See Figures 4-49 and 4-59

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

Removal:

1. Remove the four bolts and washers, the cut-off switch lever, and the two screws and washers mounting the paper shelf. Remove the paper shelf.
2. Remove the two screws and washers that secure the motor cover. Remove the motor cover
3. Remove the two lower screws and washers that secure the pulley cover. Remove the shelf
4. Place the crossbar assembly at the lowest position
5. Unplug the two power cable connectors at the motor terminals
6. From the underside of the stacker base, stretch the springs sufficiently to allow removal of the two cables from the springs
7. Remove the outside spacer retaining the pulley on the motor shaft.
8. Remove the four bolts holding the motor, while holding the motor and the motor mounting plate and the pulley. Remove the motor.

Replacement:

Replace the shelf motor by reversing steps 1 through 8 in the removal section

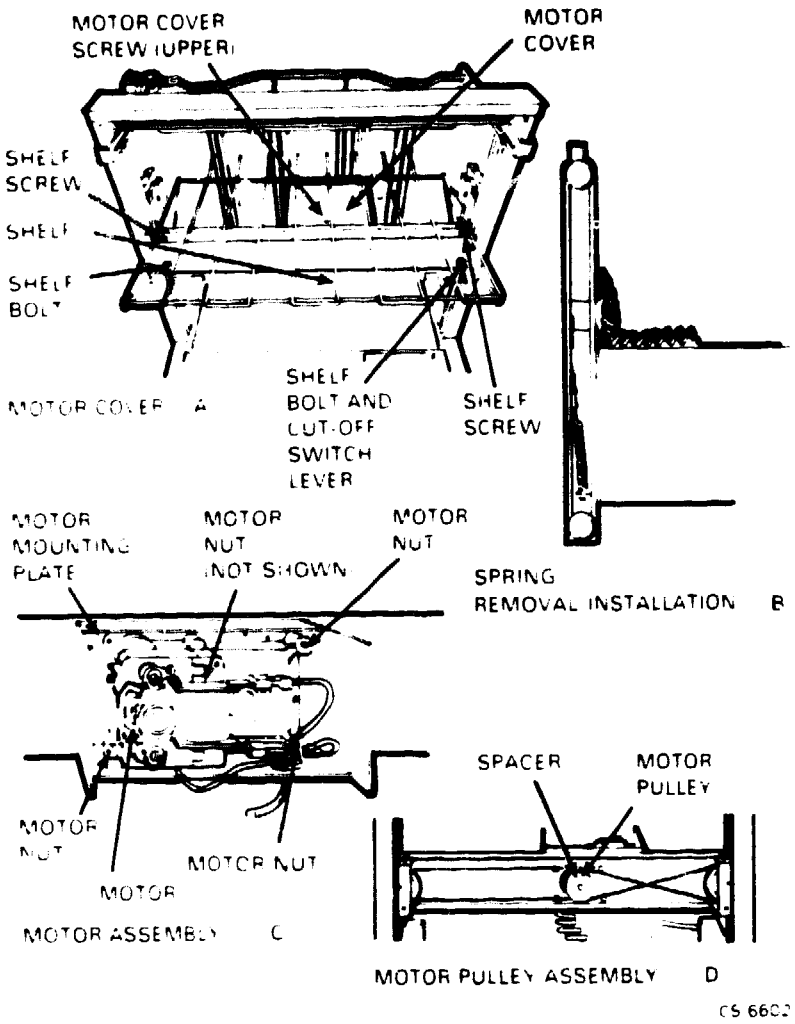
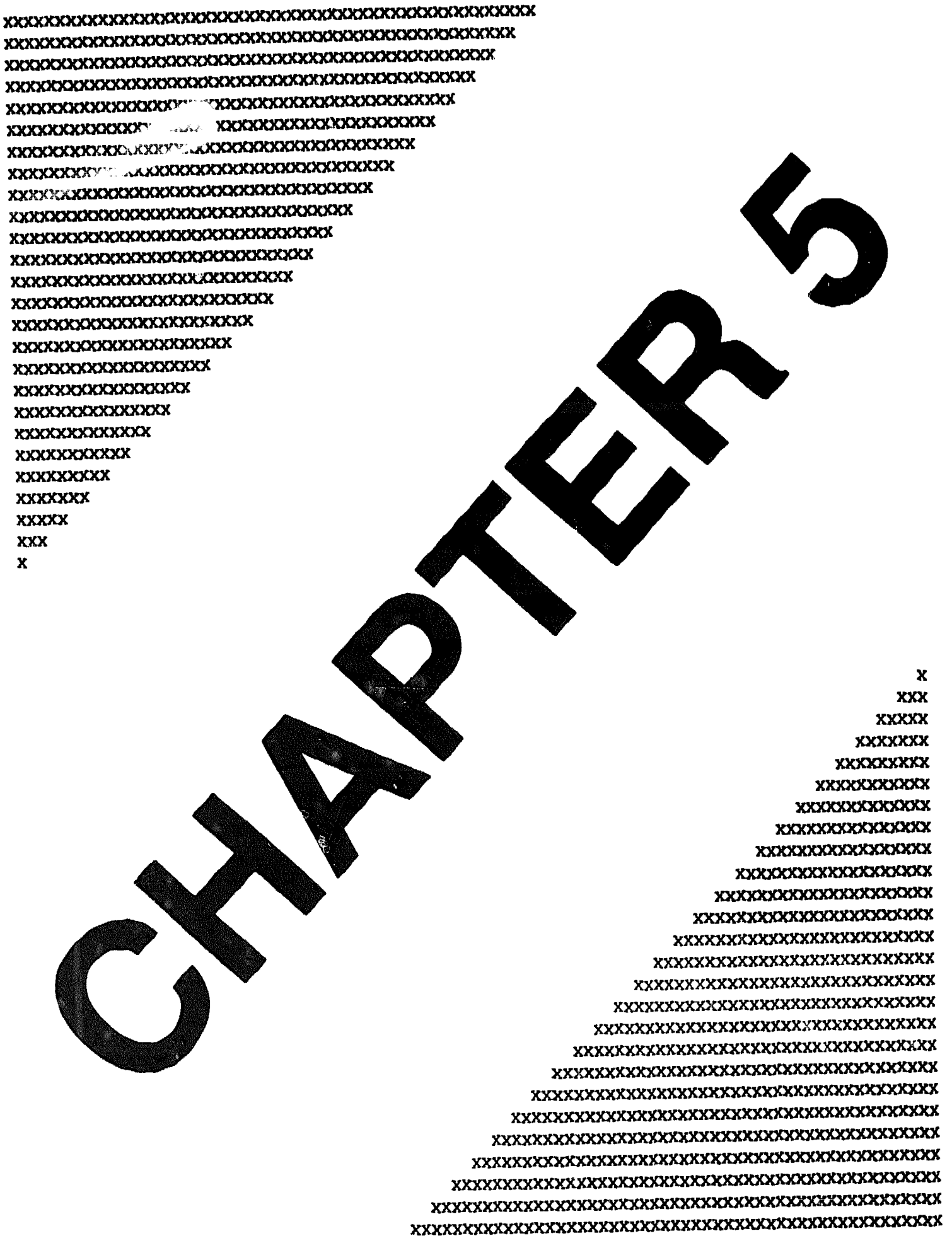


Figure 4-59 Shelf Motor


CHAPTER 5

CHAPTER 5
ADJUSTMENT PROCEDURES

This chapter describes all necessary alignment and adjustment procedures needed to support the LP29 Line Printer.

WARNING

Do not attempt to perform any of the following adjustment procedures with the LP29 Line Printer power plug connected to the power source unless necessary for performance of a specific procedure.

5.1 BAND GATE LATCH SWITCH ADJUSTMENT

See Figures 5-1 and 5-2.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Unlatch and raise the printer cover.
2. Unlatch and open the band gate assembly.
3. Remove the two nuts and washers securing the paper feed drive belt cover.
4. Remove the belt cover.
5. Loosen the two screws securing the switch to its mounting bracket.

6. With the band gate closed and latched, position the switch actuator lever so that it is against the band latch handle, and almost fully pressed against the switch. Be sure that the switch actuator lever and wire terminals are clear of the paper feed drive belt.

7. Tighten the two screws securing the switch.

8. Install the paper feed drive belt cover and secure with the two washers and nuts.

9. Close and latch the printer cover.

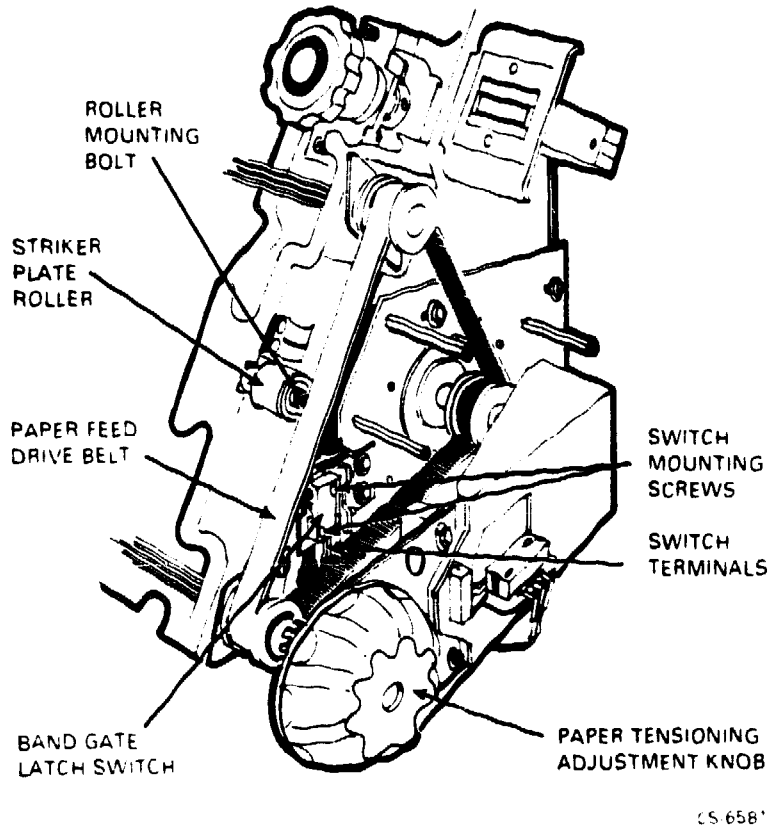


Figure 5-1 Band Gate Latch Switch/Striker Plate Roller

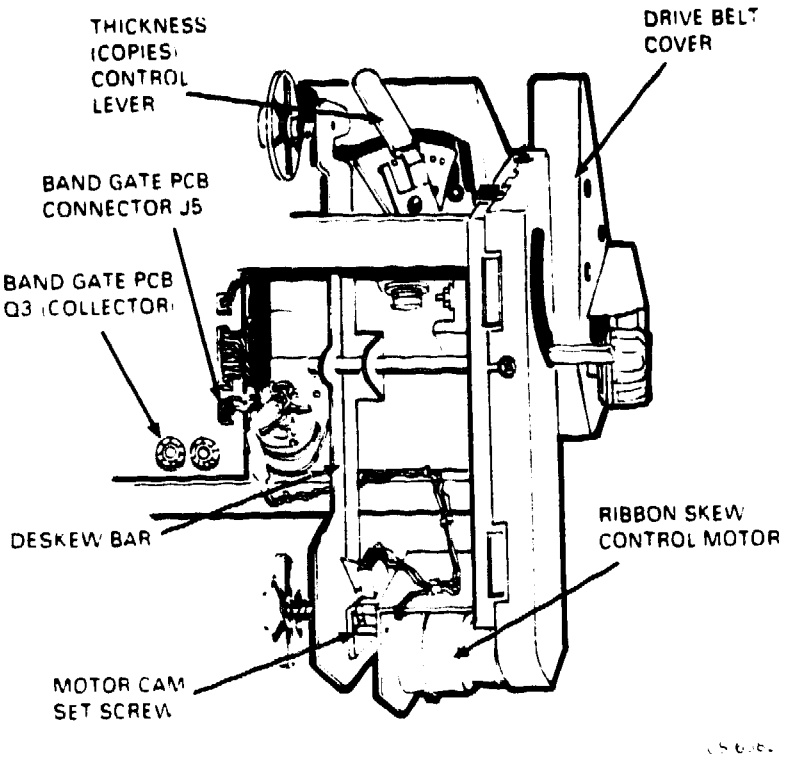


Figure 5-2 Ribbon Skew Control Bar Assembly Adjustment

5.2 BAND TRACKING ADJUSTMENT

See Figures 5-3, 5-4, 5-5, 5-6, and 5-7.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

The band tracking system controls the position of the band relative to the hammer bank.

1. Unlatch and raise the printer cover.
2. Unlatch and open the band gate.

WARNING

Rotating parts. Keep clear until the character band stops moving.

3. Loosen the screw mounting the band gate printed circuit board (PCB) cover and remove the cover.
4. Lift the ribbon mask assembly on the top of the band gate.

CAUTION

Plug P5 must be disconnected from the band gate PCB and the tilt motor must be centered when performing this procedure.

5. Disconnect P5 (pins 1 and 2) from the band gate PCB. Reconnect only its ground pin (pin 2) to connector J5 on the band gate PCB leaving the positive voltage lead on plug P5 (pin 1) disconnected.
6. Turn the POWER switch to ON.
7. Connect a jumper lead from the Q3 collector to P5 (pin 1) to rotate the tilt motor cam until the cam setscrew is pointing straight down, or within 15° tolerance (see Figure 5-3).
8. Disconnect the jumper lead.
9. Place a separate sheet of paper in the lower tractor assembly, leaving the hammer faces exposed.
10. Close and latch the band gate.
11. Place the self-test switch in the fixed character position.
12. Press the SINGLE CYCLE switch on the control panel to print one line.

13. Open the band gate latch and check that the printed characters are centered vertically on the hammer faces.

14 Perform the Tilt Adjustment Procedure if the characters are not centered vertically. If the characters are centered vertically, the procedure is now complete.

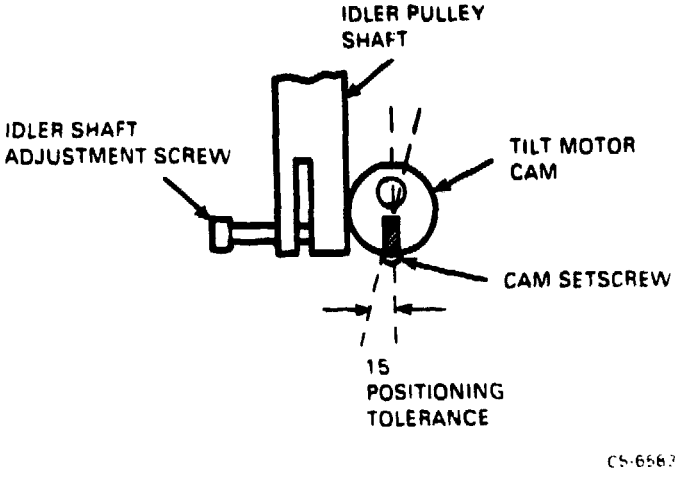


Figure 5-3 Tilt Motor Cam Adjustment

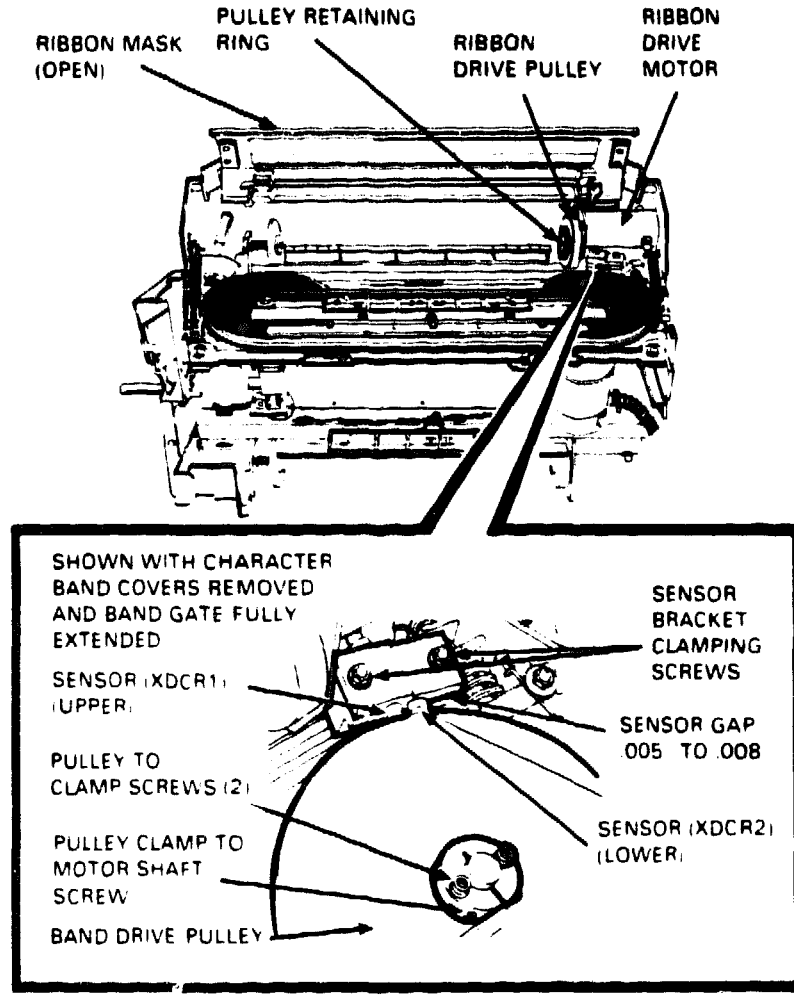


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Figure 5-4 Band Drive Pulley Assembly

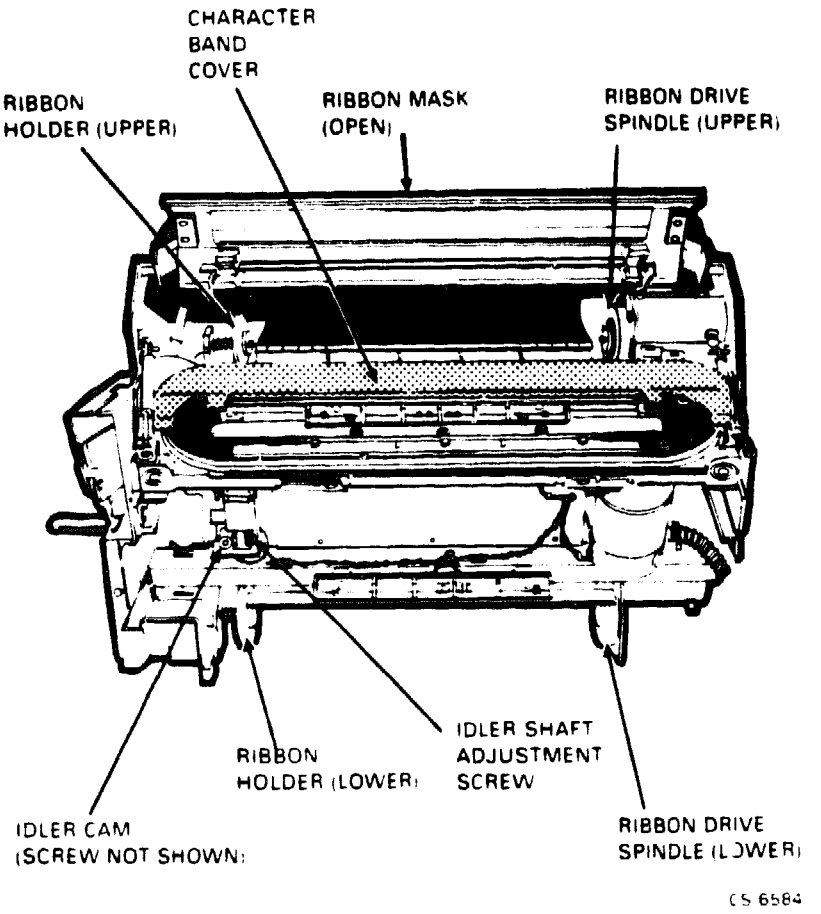
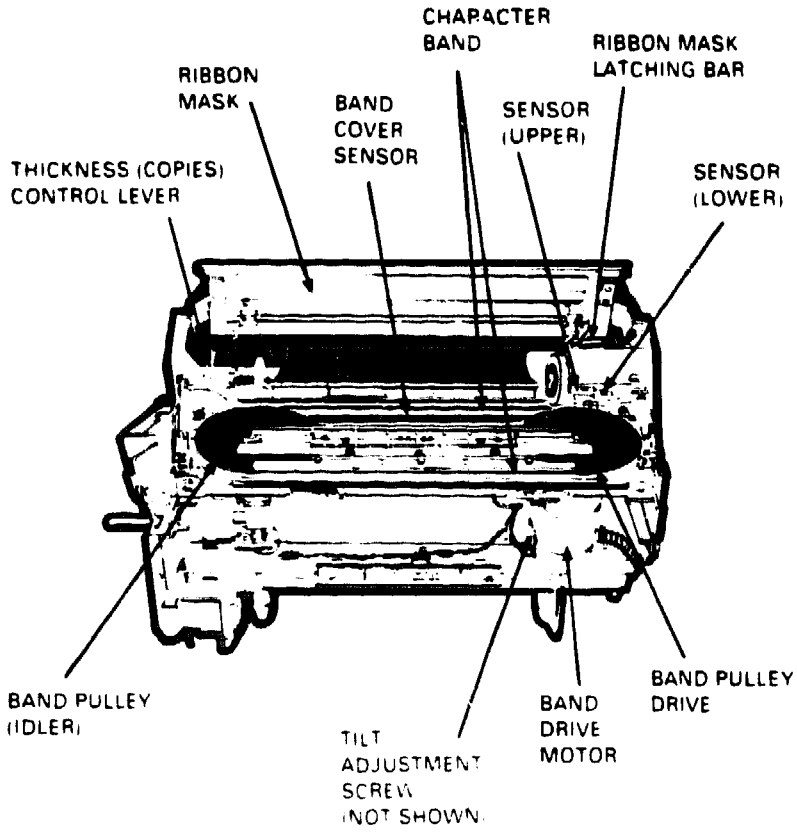


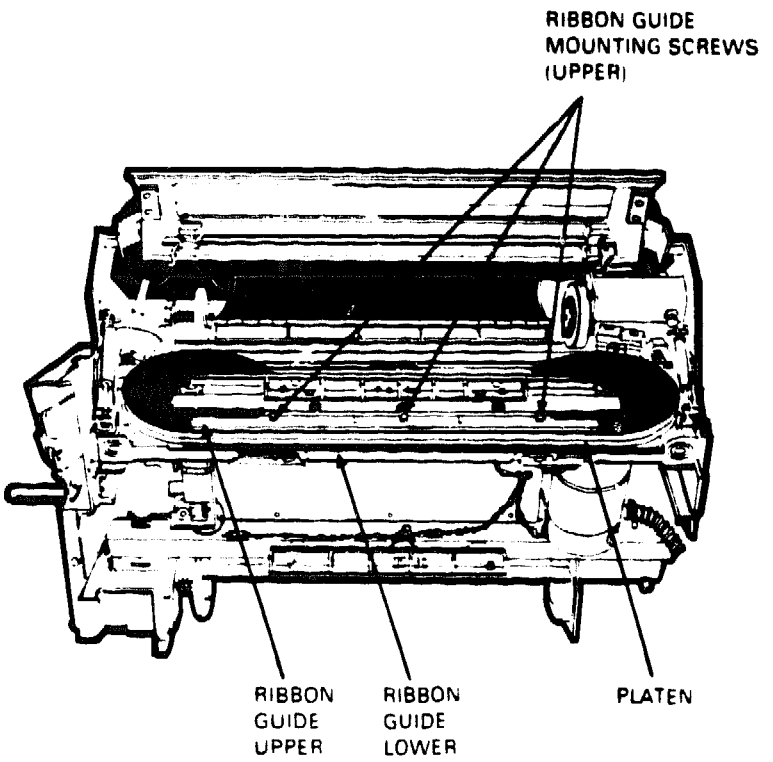
Figure 5-5 Idler Pulley Adjustment



NOTE RIBBON COVER AND CHARACTER BAND COVER NOT SHOWN

S 65E5

Figure 5-6 Band Gate Assembly



NOTE RIBBON COVER AND CHARACTER BAND COVER NOT SHOWN

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Figure 5-7 Ribbon Guide

5.3 TILT ADJUSTMENT

NOTE

It may be necessary to perform a Sensor Amplifier Gain Adjustment. To change STATUS 51 on the control panel, refer to Section 5.4, Sensor Amplitude/Block Position Adjustment, steps 2 through 6. Status 51 may appear after completion of the Band Tracking Adjustment.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Determine which band pulley needs adjustment by observing the relative vertical position of the printed characters to the hammer faces.
2. If the characters on the column 1 side of the hammer bank appear too high, perform the motor side pulley adjustment (refer to Section 5.3.2).
3. If the characters on the column 132 side of the hammer bank appear too high, perform the idler side pulley adjustment (refer to Section 5.3.3).
4. Check that the drive pulley is centered 3.81 mm ± 0.03 mm (0.150 ± 0.15 in.) above and below the ribbon guides. If this measurement cannot be achieved, perform the Drive Pulley Height Adjustment (refer to Section 5.3.1).

5.3.1 Drive Pulley Height Adjustment

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Loosen the two drive pulley-to-clamp mounting screws.
2. Loosen the pulley clamp-to-motor shaft screw.
3. Secure the pulley-to-clamp screws finger tight.
4. Align the drive pulley so that it is centered with the platen (3.81 mm ± 0.03 mm) (0.150 ± 0.15 in.) clearance above and below the ribbon guides.
5. Tighten the pulley clamp-to-motor shaft screw.
6. Tighten the pulley-to-clamp screws securely.
7. Install the character band

5.3.2 Motor Side Pulley Adjustment

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Loosen the two inside screws securing the motor mounting plate
2. Turn the tilt adjust screw in a clockwise direction to lower the band riding position, and in a counterclockwise direction to raise the band riding position.

NOTE

The tilt adjust screw is correctly set when the band rides in the center of the pulley.

3. Tighten the two inside screws securing the motor mounting plates.

5.3.3 Idler Side Pulley Adjustment

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. To lower the band riding position, tighten the idler shaft adjustment screw.
2. To raise the band riding position, loosen the idler shaft adjustment screw.

NOTE

It may be necessary to press in on the idler pulley from its outboard side to restore the split idler shaft when performing this adjustment.

3. Close the character band cover.
4. Perform the Ribbon Installation Procedure given in the *LP27/LP29 Line Printer Operator's Manual* (EK-LP279-OM).
5. Close the ribbon mask assembly and the ribbon cover.
6. Close and latch the band gate.
7. Close and latch the printer cover.
8. Connect power cord and turn on printer power.
9. Check that the band characters are centered vertically on the hammer faces by printing the test pattern in SINGLE CYCLE mode.

5.4 SENSOR AMPLITUDE/BLOCK POSITION ADJUSTMENT

CAUTION

The Band Tracking Adjustment (refer to Section 5.2) must be completed before performing this adjustment.

This adjustment procedure ensures correct sensor amplitudes and relative sensor block position in relation to the character band. It is recommended that these steps be performed when the band drive motor or drive pulley has been replaced.

If the band gate PCB has been replaced, perform the Sensor Amplifier Gain Adjustment (refer to Section 5.4.4).

1. Unplug P5 at the band gate PCB.
2. Center the tilt motor cam so that it points directly down (refer to Section 5.2, Band Tracking Adjustment, steps 5 through 9).
3. If a printer with a two-speed option is used, set the two-speed print rate toggle switch on the front operator control panel to HIGH.
4. Press the CLEAR switch on the control panel and check that the character band is revolving at top speed.

5.4.1 Sensor 1 Amplitude Adjustment

See Figure 5-8.

1. Check that sensor 1 is positioned in front of the middle portion of a character band timing mark. If it is not, loosen the mounting screws on the rear of the sensor mounting block and reposition sensor 1.

CAUTION

Moving the sensor too far toward the character band may damage the sensor.

2. Monitor J2, pin 1 of the band gate PCB with an oscilloscope. Loosen the sensor clamping screw for sensor 1. Move sensor 1 slightly toward or away from the character band to obtain a 1.5 V p-p signal.
3. Tighten the sensor clamping screws and check that the 1.5 V p-p signal has remained constant. If the signal decreases, loosen the clamping screws and repeat the procedure.

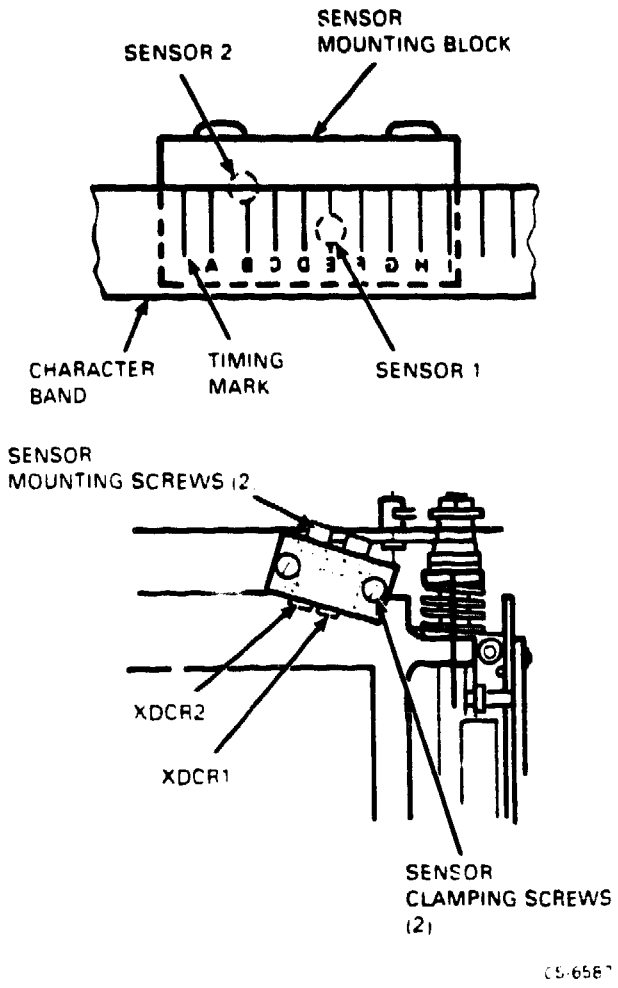

Figure 5-8 Sensor 1 Amplitude Adjustment

5.4.2 Sensor 2 Amplitude Adjustment

See Figure 5-8.

1. Loosen the sensor block mounting screws and position sensor 2 directly in front of the middle position of a character band timing mark.
2. Monitor J2, pin 4 of the band gate PCB with an oscilloscope. Loosen the sensor clamping screw for sensor 2. Move sensor 2 slightly toward or away from the character band to obtain a 1.5 V p-p signal.
3. Tighten the sensor clamping screws and check that the 1.5 V p-p signal has remained constant. If the signal decreases, loosen the clamping screws and repeat the procedure.

5.4.3 Sensor Block Adjustment

See Figure 5-8.

1. Loosen the sensor block mounting screws so that the block may be positioned vertically.
2. Monitor J2, pin 4 (sensor 2 output) while moving the sensor block upward. Adjust until the signal on the oscilloscope has dropped from 1.5 V p-p to 1.2 V p-p. Sensor 2 is now correctly positioned on the edge of the timing marks.
3. Tighten the sensor block mounting screws and check that the 1.2 V p-p signal has remained constant. If the signal has changed, loosen the sensor block mounting screws and repeat the procedure.

5.4.4 Sensor Amplifier Gain Adjustment

See Figure 5-9.

1. Measure the output of sensor 1 at test point D of the band gate PCB. The measured voltage should be between 8.00 V and 11.00 V.

NOTE
Use a DIGITAL™ voltmeter (DVM) to measure voltage.

2. Measure the output of sensor 2 at test point C of the band gate PCB.
3. Adjust R46 on the band gate PCB until the measurements are equal.
4. When the measurements at test points C and D are equal, the STATUS indicator, located on the control panel, will display a READY condition (refer to Chapter 3, Table 3-1). The band is now correctly positioned.
5. Turn the POWER switch to OFF.
6. Install plug P5 on the band gate PCB.

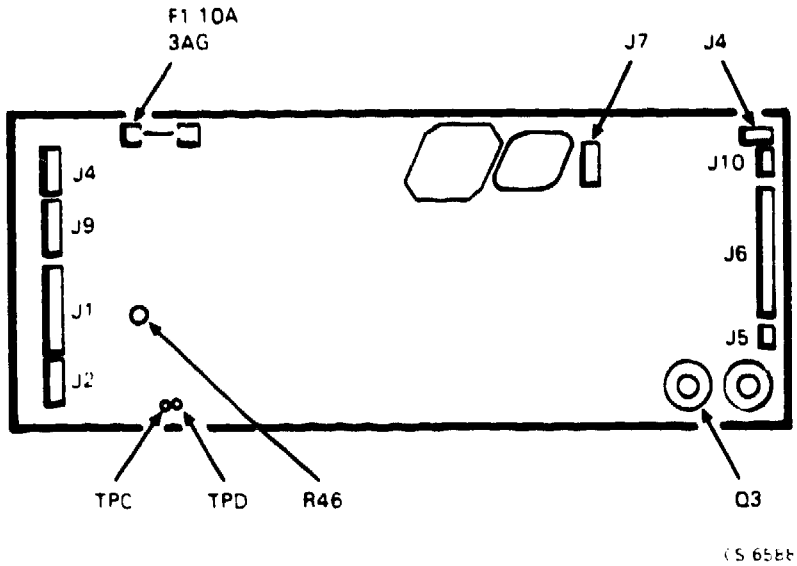

Figure 5-9 Band Gate Printed Circuit Board

5.5 CHARACTER PHASING ADJUSTMENT

See Figures 5-10 and 5-11

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

NOTE

Character phasing should be performed whenever a sensor adjustment is done or if a Voltage Clamp (VCL) adjustment is performed.

1. Unlatch and raise the printer cover.
2. Place the printer in the self-test and SINGLE CYCLE mode.
3. Install paper in the printer.
4. Open the rear printer door.
5. Unlatch and remove the top PCB cover.
6. Turn all switches on the phasing switch S3 (1-5) (located on the timing and status PCB) to the OFF position.
7. Set the least significant switch position S3-1 to ON, and then set each switch to a binary count mode. Print a few lines at each switch setting.
8. Set the switches at the setting that produces optimum even density for the printed character "H" without any clipping.
9. Remove printer paper from the upper tractors, leaving paper in the lower tractors with the hammer faces exposed.
10. Press the SINGLE CYCLE switch on the control panel to print one line.
11. Open the band gate and check that the printed characters are horizontally centered on the hammer faces. If the characters are not centered, perform a fine adjustment of the phasing switch. (Clean the hammer faces between print tests with a lint-free cloth and isopropyl alcohol.)

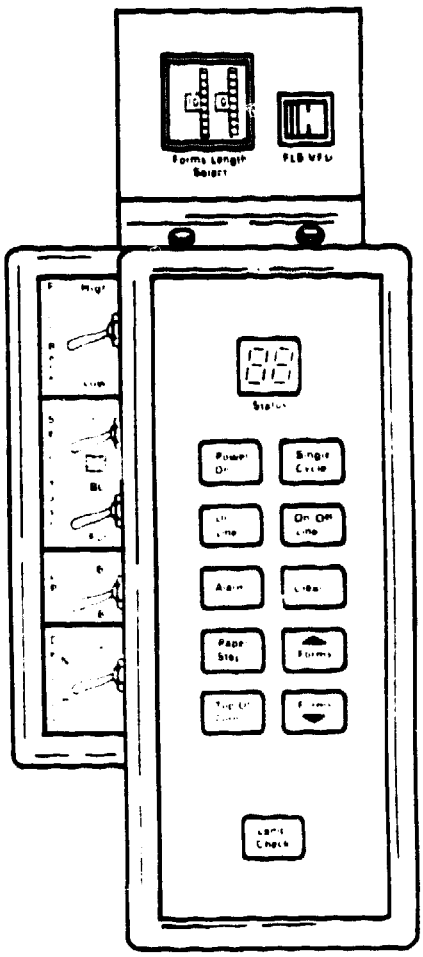

Figure 5-10 Operator's Control Panel

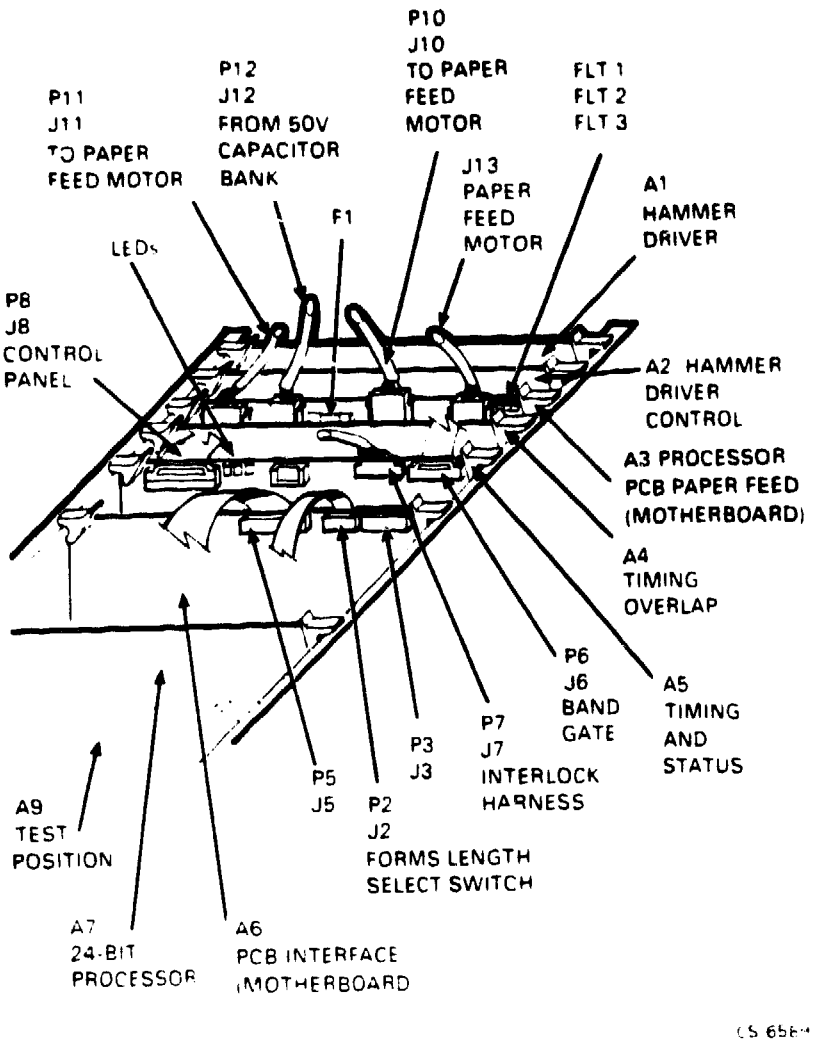

Figure 5-11 Printed Circuit Board Cable Connections

5.6 HAMMER FLIGHT TIME ADJUSTMENT

See Figures 5-12, 5-13, and 5-14

1. Perform the Voltage Clamp (VCL) Adjustment Procedure (refer to Section 5.12).

WARNING

Before performing the rest of the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

2. Loosen the locking screws for the rear printer cover assembly and swing the cover and attached paper pulley assembly open.
3. Disconnect the air plenum from the rear of the hammer bank assembly to allow access to the flight time adjustment screws.

NOTE

If the flight time column display test board is not being used, omit steps 4 through 7, and steps 19 through 22.

4. Unlatch and remove the top PCB cover.
5. Unplug connector J8 on the timing and status PCB.
6. Insert the flight time column display test board into connector J8 of the timing and status PCB.
7. Plug the connector previously unplugged from J8 of the timing and status PCB into the flight time column display test board connector.
8. Unlatch and raise the printer cover.
9. Set the thickness control adjustment to one part paper setting.
10. Set the density control to its center position.
11. Load the printer with single part, 20 pound forms of sufficient width to cover all printable columns.
12. Close and latch the printer cover.
13. Turn the printer power on, but leave the printer off-line.
14. Place switch S1, on the timing and status PCB, to the flight time position.

    The printer system will sequentially check the flight time of each hammer, starting with column one, and will indicate on the control panel display and the flight time column display test board the column currently being tested. Three LEDs on the timing and status PCB, two red, indicating short and long, and one green, indicating OKAY, show the status of the hammer being tested.

There are two modes of operation of the hammer flight time adjusting system: the SCAN and ADJUST modes.

While in the SCAN mode, each column position is checked ten times, and if the average time of all the impacts is found to be within +2% of the optimum flight-time, the system will sequence to the next column. During the SCAN mode, the three LEDs will not illuminate unless the test is not passed. If this occurs, the system will illuminate one of the red LEDs and will automatically cycle into the ADJUST mode.

In the ADJUST mode, the column position is checked on each impact, and if found to be within +0.6% of the optimum flight time, the green OK LED illuminates. The system remains in the ADJUST mode on the same print column unless manually placed into the SCAN mode.

To manually increment the column being tested, and place the system in ADJUST mode, press the ON/OFF line switch. To decrement the column being tested and place the system in SCAN mode, press the TOP-OF-FORM switch. If either switch is pressed and held, the system will continue to sequence through the hammer positions until released.

15. Hammer adjustment is performed by inserting a 5/64-inch hex key into the appropriate flight time adjustment screw for the position being tested. Turning the screw in a clockwise direction will shorten the flight time, and in a counterclockwise direction will lengthen the flight time. Hammer flight time is set to 1.80 + 0.05 ms.

16. Following correct setting of the flight time, manually decrement to the previous sequential position. When the last printable column is reached, the system will reverse and automatically decrement itself.

17. After all columns have been tested, set switch S2 on the timing and status PCB to OFF (center position).

NOTE

A fine adjustment of individual hammers may be needed for optimum print quality.

18. Turn the printer OFF.

19. Remove the connector from the flight time column display test board.

20. Remove the flight time column display test board from connector J8 of the timing status PCB.

21. Plug the connector removed in step 5 from the flight time column display test board into J8 on the timing and status PCB.

22. Check print registration (refer to the *LP27/LP29 Line Printer Operator's Manual* (EK-LP279-OM).

23. Check print quality and adjust individual hammers as required.

24. Replace and latch the circuit card assembly top cover.

25 Reconnect the air plenum to the rear of the hammer bank assembly.

26 Close and latch the rear printer cover assembly.

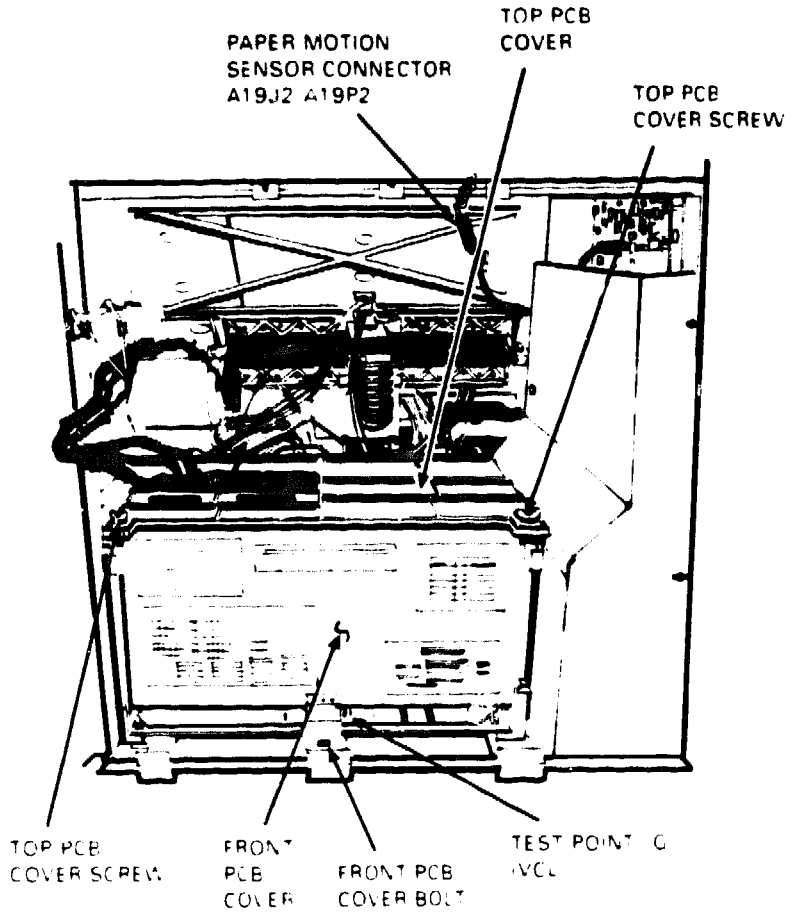

Figure 5-12 Printed Circuit Board Assembly Cover

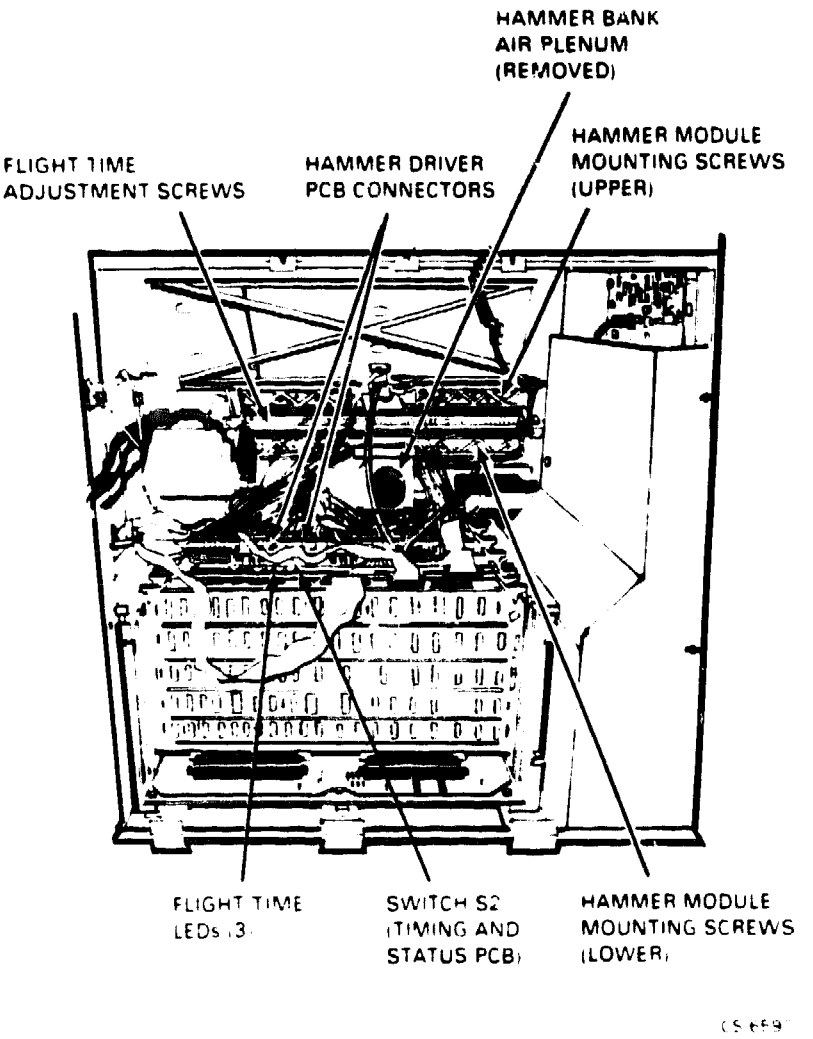

Figure 5-13 Hammer Adjustment

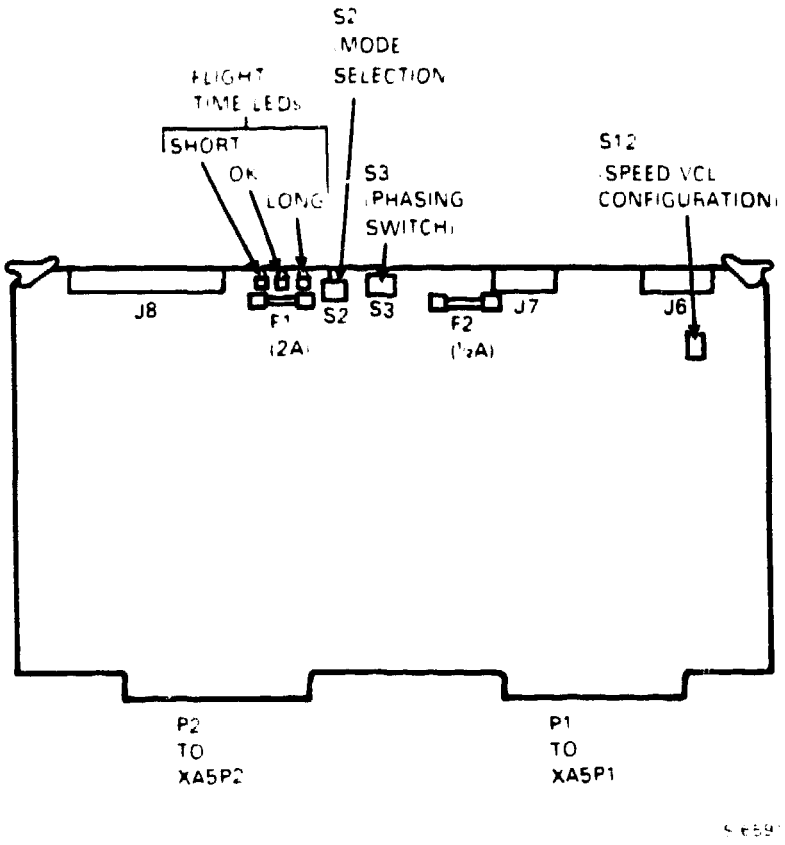

Figure 5-14 Timing and Status Printed Circuit Board

See Table 5-1 for switch S12 configurations on the timing and status PCB.

Table 5-1 Switch S12 Timing and Status PCB Switch Configurations

Switch Description	ON	OFF	Comments
S12-1 Tensioner Interlock Switch	NO	YES	
S12-2 Memory 1 Present (Clock PROM)	NO	YES	Required for all two-speed configurations.
S12-3 Memory 3 Present	NO	YES	Required for all two-speed configurations.
S12-4 Paper Out Switch (Std)	YES	NO	Paper out function.
S12-5	N/A	N/A	Not used

5.7 PAPER FEED ADJUSTMENT

See Figures 5-15, 5-16, 5-17, and 5-18.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

NOTE

Resistors R115 and R116 are factory adjusted and should not be attempted in the field.

1. Unlatch and raise the printer cover.
2. Place the 6/8 LPI switch, located on the operator control panel, to the 6 LPI position.
3. Open the band gate and remove the paper from the printer. Close the tractor doors.
4. Close the band gate.
5. Loosen the two screws securing the rear printer door and open the rear door.
6. Unlatch and remove the card cage PCB cover from the electronics cage.
7. Place switch S2 on the timing and status PCB to the print inhibit position.
8. Turn on printer power.
9. Using a DIGITAL voltmeter (DVM), place the probe at TP14 on the paper feed PCB. Verify that the 6 V regulated signal is 6.00 V ± 0.01 V. Use TP1 as the reference ground. Adjust R4 as required.
10. Turn off printer power.
11. Wait at least one minute for the capacitor to drain off charge, then disconnect J12 from the paper feed PCB (see Figure 5-18).
12. Using the DVM, monitor the current limit signal at TP5 and TP6. Use TP1 as the ground reference. Verify that it is 9.6 V ± 0.1 V.
13. If the two points are not equal, adjust the higher signal to the required level.

NOTE

The signal can only be checked during the first two seconds after power up.

14. Adjust resistor R17 to 9.6 V. Power up and down several times to ensure correct adjustment.
15. Turn off printer power and wait at least one minute before reconnecting J12 on the paper feed PCB.
16. Turn on printer power.
17. Place the printer ON LINE and in the self-test mode.

18. Connect channel 1 of the oscilloscope to the TP9 (TACH signal) and channel 2 to TP13 (CH A). Trigger the oscilloscope on channel 1. Set the function dials to indicate internal and control.

19. Adjust resistor R147 (Damping Offset) to correct for minimum or maximum amounts of overshoot.

20. Connect channel 1 of the oscilloscope to TP11 (Velmode) to synchronize to a positive level.

21. Adjust resistor R60 to reflect a pulse duration between 9.5 and 10 milliseconds.

22. Recheck and adjust the interactive signals in steps 20 through 22 until both waveforms are optimum.

23. Repeat steps 17 through 23 with single part paper in the printer (optional).

24. Repeat steps 17 through 23 with six part paper in the printer (mandatory).

25. Place switch S2 on the timing and status PCB to the center (OFF) position.

26. Install the card cage PCB cover and secure the latches.

27. Close the rear printer door and tighten the two screws.

28. Close and latch the printer cover.

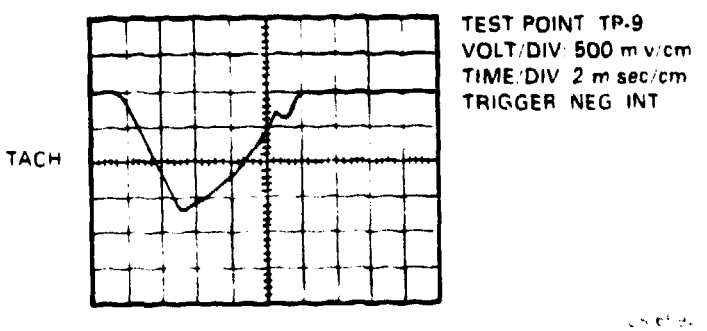

Figure 5-15 Paper Feed Adjustment (Reference)

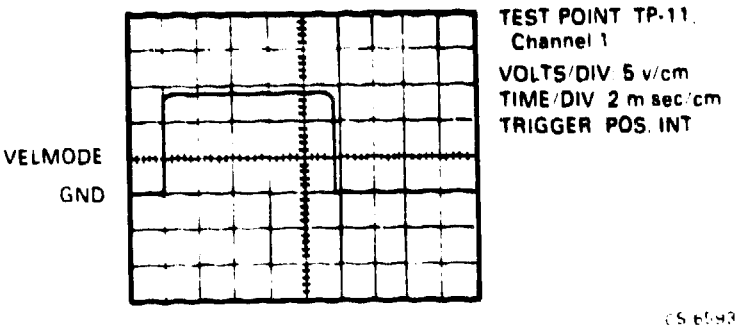

Figure 5-16 R60 Tach Gain Adjustment

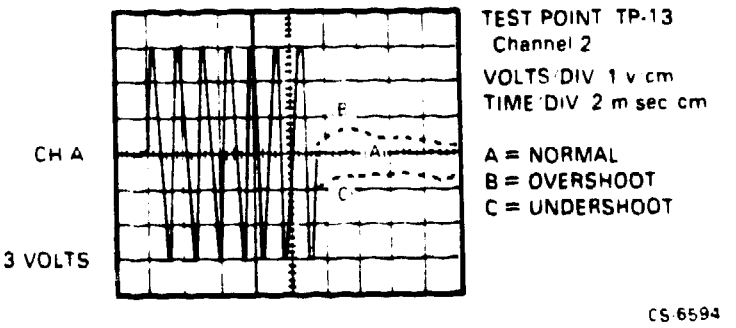

Figure 5-17 R147 Damping Offset Adjustment

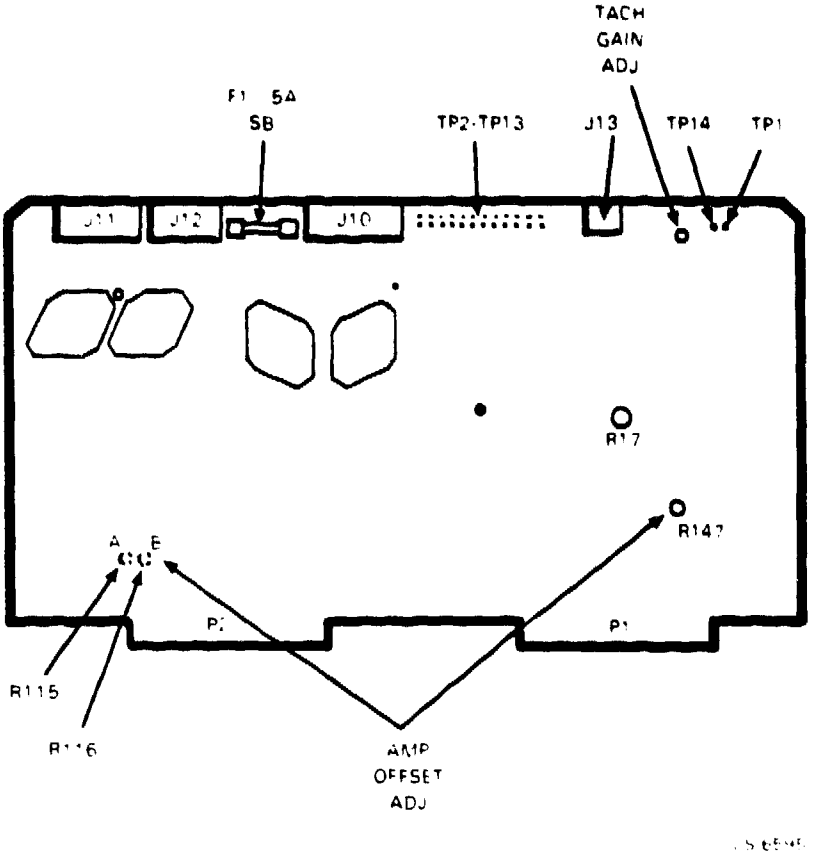

Figure 5-18 Paper Feed Printed Circuit Board

5.8 RIBBON GUIDE ADJUSTMENT

See Figure 5-7.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Unlatch and fully raise the printer cover.
2. Unlatch and open the band gate assembly, and raise the ribbon cover.

WARNING

Rotating parts. Keep clear until character band stops moving.

3. Raise the ribbon mask assembly to full open position.
4. Remove the ribbon from the printer. See the Ribbon Removal Procedure in the *LP27 29 Line Printer Operator's Manual* (EK-LP279-OM).
5. Open the character band cover.
6. Unlatch and remove the character band.
7. Using a machinist square with a sliding scale or a straight edge, set the projection as required, so that the ribbon guide extends the required distance beyond the platen.
8. Check the ribbon guides by setting the square's projection to 0.43 mm + 0.5 mm (0.17 in. + 0.019 in. - 0.000 in.). Measure if a straight edge is used.
9. Set the square or straight edge across the ribbon guides and check for a proper gap in three different locations on the platen.
10. Adjust the gap, if necessary, by loosening the three screws that secure the ribbon guides, adjusting the guides, and retightening the screws.
11. Install the character band per the Character Band Installation Procedure found in the operator's manual, and close the character band cover.
12. Reinstall the ribbon. Perform the Ribbon Installation Procedure given in the operator's manual.
13. Close the ribbon mask assembly.
14. Close and latch the band gate assembly.
15. Close and latch the printer cover.

5.9 RIBBON MASK ADJUSTMENT

See Figure 5-19.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Unlatch and raise the printer cover.
2. Unlatch and open the band gate.

WARNING

Rotating parts. Keep clear until character band stops moving.

3. Raise the ribbon cover.
4. Raise the ribbon mask assembly by pressing its handle.
5. Remove the ribbon from the printer (refer to the Ribbon Removal Procedure in the *LP27 LP29 Line Printer Operator's Manual* (EK-LP279-OM).
6. Verify the ribbon guide adjustment (refer to Section 5.6).
7. Lower the ribbon mask assembly and latch in place.
8. Slightly loosen the two screws on each side that mount the ribbon mask assembly to the band gate frame.
9. Loosen the three screws that secure the ribbon mask latching bar assembly through the access holes in the ribbon mask.
10. Position the ribbon mask to a clearance of 0.127 mm (.005 in.) to the upper ribbon guide. Measure the distance from the ribbon guide to the machined outside edge of the ribbon mask.
11. Tighten the two screws on each side that mount the ribbon mask assembly to the band gate frame.
12. Tighten the three screws that secure the ribbon mask latching bar assembly.
13. Raise the ribbon mask assembly by pressing its handle.
14. Install the ribbon (refer to the Ribbon Installation Procedure found in the *LP27/LP29 Line Printer Operator's Manual* (EK-LP279-OM).
15. Close and latch the ribbon mask assembly.
16. Close the ribbon cover.
17. Close and latch the band gate.
18. Close and latch the printer cover.

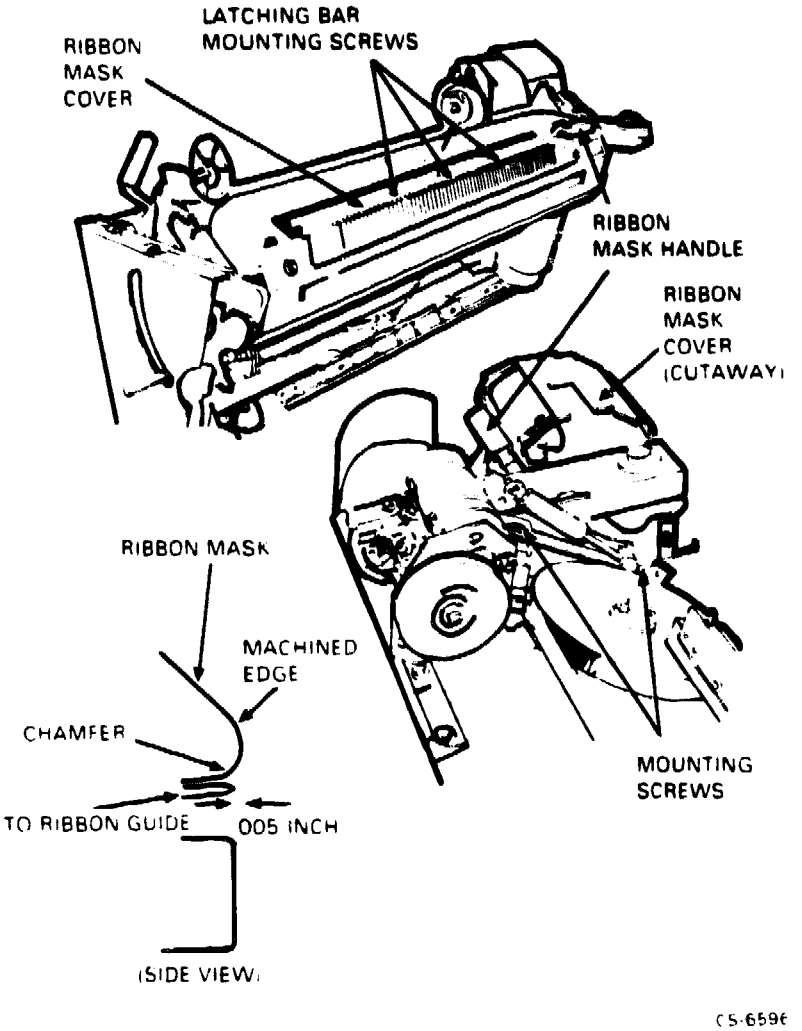

Figure 5-19 Ribbon Mask Adjustment

5.10 RIBBON SKEW CONTROL ADJUSTMENT

See Figures 5-2, 5-20, 5-21, and 5-22.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Open the printer cover.
2. Loosen the two screws mounting the band gate cover, and remove the cover.

WARNING

Rotating parts. Keep clear until character band stops moving.

3. Unplug the positive (+) black wire at the skew control motor A27B1, pin 1. Make sure the terminal does not make contact with any components.
4. Turn the printer ON.
5. Using a jumper lead, apply power from transistor Q3 collector, located on the band gate PCB, to the positive motor terminal connector, to rotate the motor cam until set screw is pointing straight down. This places the cam in center position.
6. Disconnect the jumper lead.
7. Turn off printer power.
8. Loosen the two screws that mount the skew control motor brackets to the frame.
9. Looking down between the ribbon spool and the front band gate frame bar, check that the horizontal gap is equal across its full length (see Figure 5-20).
10. Shift the motor assembly in or out, as necessary, to place the skew control bar in a straight, vertical position, and obtain the proper gap.
11. Tighten the two motor bracket assembly mounting screws.
12. Reinstall the (+) black wire on the skew control motor terminal.
13. Install the band gate PCB cover and tighten its mounting screws.
14. Close the printer cover.

NOTE

If during printing, column 1 does not have ribbon in front of it with the ribbon moving downward, move the skew control motor assembly slightly toward the front of the printer until the condition is corrected. If it occurs with the ribbon moving upward, move the skew control motor assembly toward the rear of the printer.

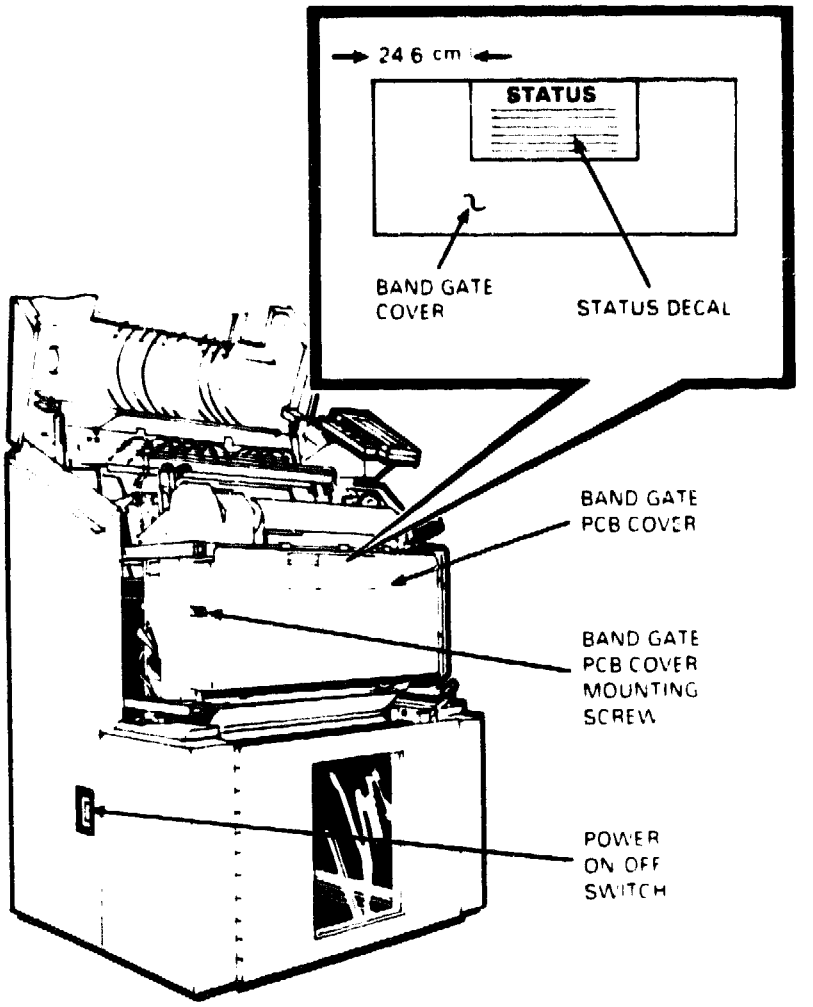

Figure 5-20 Band Gate Printed Circuit Board Cover

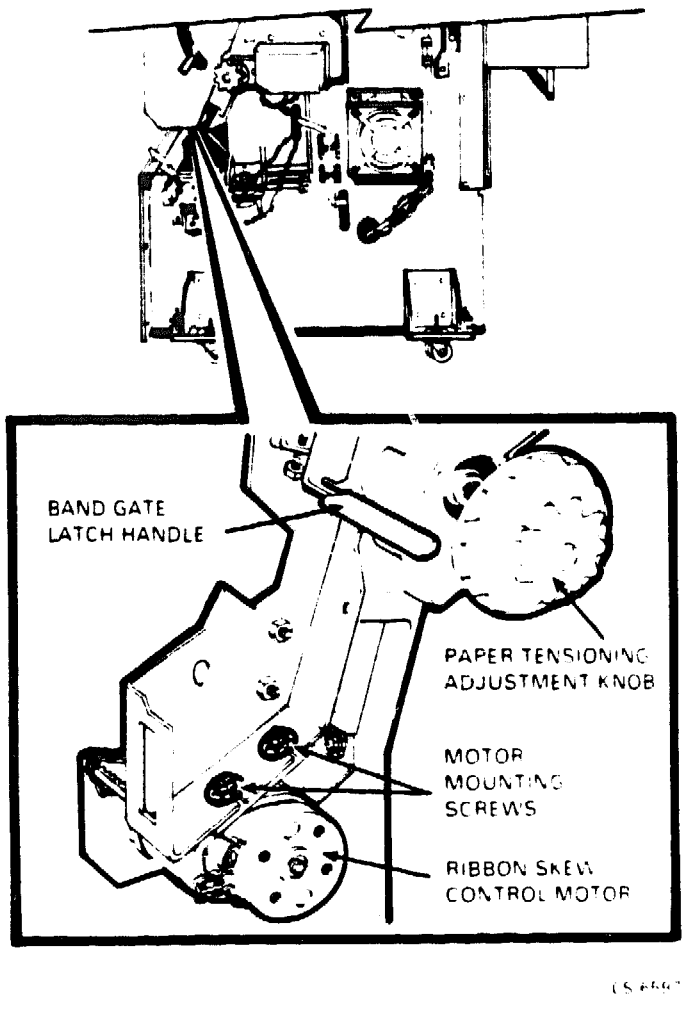

Figure 5-21 Ribbon Skew Control Motor Adjustment

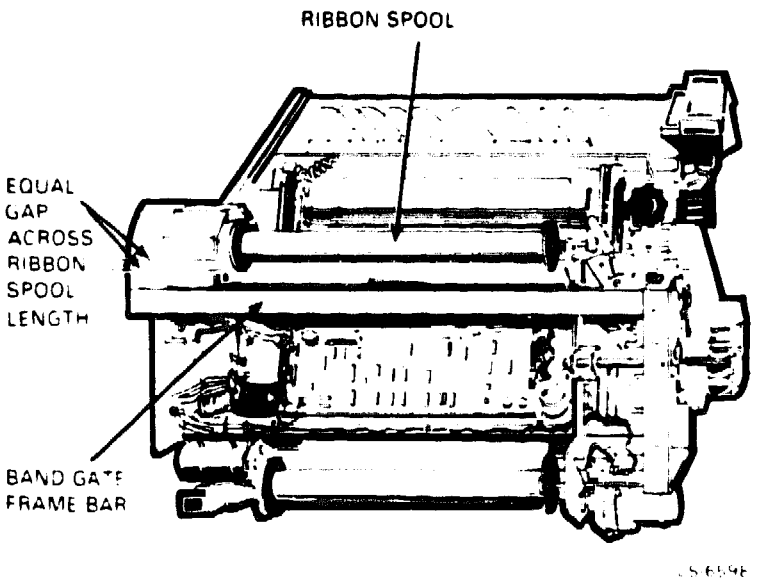

Figure 5-22 Ribbon Skew Adjustment

5.11 TRACTOR ECCENTRIC TENSION ADJUSTMENT

See Figure 5-23

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1 Loosen the Allen screw and nut securing the eccentric adjustment clamp.

2 Turn the eccentric adjustment clamp so that the tractor belt deflection of 4 mm ± 0.5 mm from the tractor face occurs with a 50 gram (1.75 oz) load between the two center tractor pins. Turning the eccentric adjustment clamp in the direction of its embossed arrow increases belt tension.

3 Tighten the Allen screw and nut to secure the clamp against the eccentric.

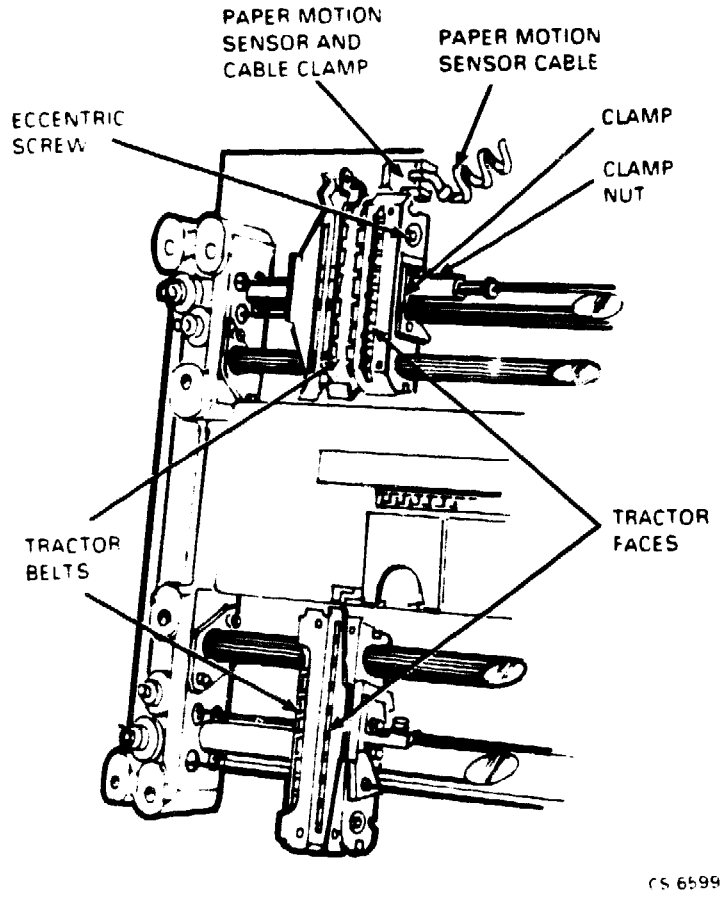

Figure 5-23 Tractor Eccentric Adjustment

5.12 VCL ADJUSTMENT

See Figure 5-24.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Open the printer cover.
2. Set the FORMS THICKNESS CONTROL lever to 1, and set the stop bracket to maintain this setting.
3. Verify that the DENSITY switch is in its normal (center) position.
4. Unlatch and open the rear printer door.
5. Turn on printer power.
6. Check the voltage at test point (TP) G of the motherboard PCB. The correct VCL reading is + 1.10 ± 0.02 VDC.
7. If the VCL reading is incorrect, set the thickness control lever to the four part position. Connect the DVM to test point TP2 at the top center of the timing and status PCB (see Figure 5-14).
8. Without moving the FORMS THICKNESS CONTROL lever, loosen the set screw that secures the copies potentiometer to the thickness control linkage.
9. Rotate the copies potentiometer, A27R1, to obtain 2.19 + 0.1 VDC. Tighten the set screw.
10. Move the FORMS THICKNESS CONTROL lever so that the indicator is at the 1 setting. Check the voltage at test point G on the motherboard PCB. If the reading is incorrect, repeat the procedure.
11. Turn off printer power.
12. Close and latch the rear printer door.
13. Close and latch the front printer cover.

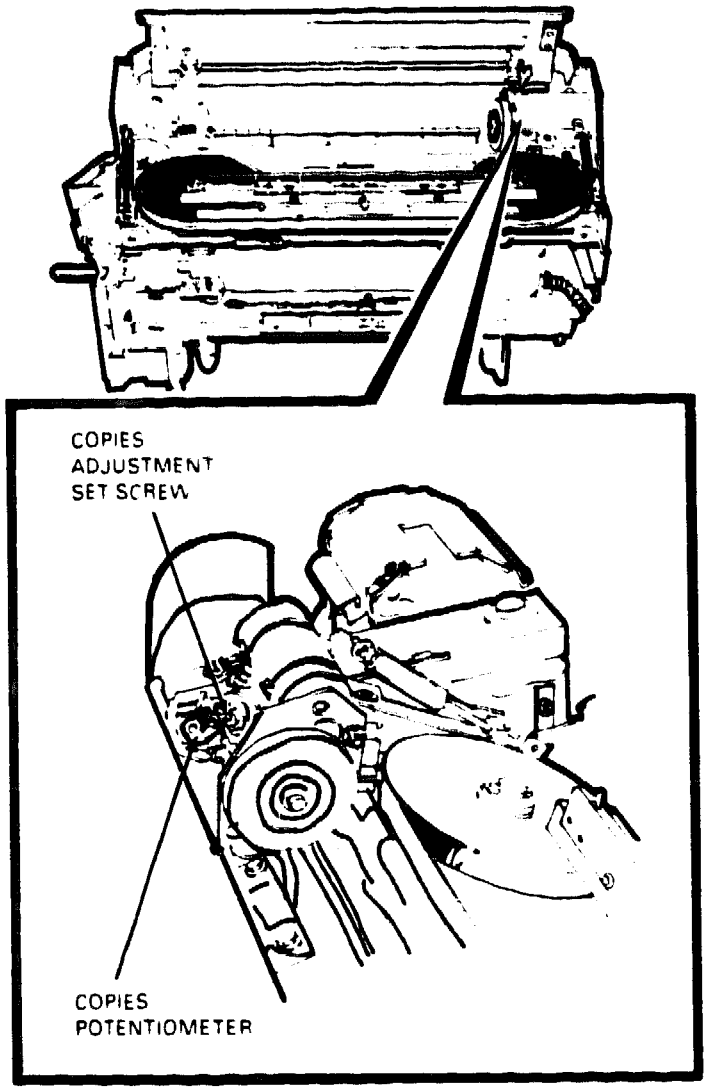

Figure 5-24 Copies Potentiometer Adjustment

5.13 VERTICAL PAPER TENSIONING ASSEMBLY ADJUSTMENT

See Figure 5-25.

WARNING

Before performing the following procedure, make sure that the LP29 Line Printer is turned off and that the power cord is removed from the power source.

1. Unlatch and raise the printer cover to fully open position.
2. Remove the black spring assembly cover on the right side of the printer. The cover may be removed by sliding the cover back so that the front insertion notches detach from the frame. Pivot the cover forward to lift out the rear tabs.
3. Loosen the two rear hex bolts securing the vertical paper tensioning assembly to the paper feed motor pulley plate.
4. Align the paper tensioning adjustment knob (tensioner gear) to the lower drive shaft assembly. Ensure that the knob rides freely on the drive shaft.
5. Tighten the two rear hex bolts securing the vertical paper tensioning assembly to the paper feed motor pulley plate.
6. Replace the black spring assembly cover on the right side of the printer.

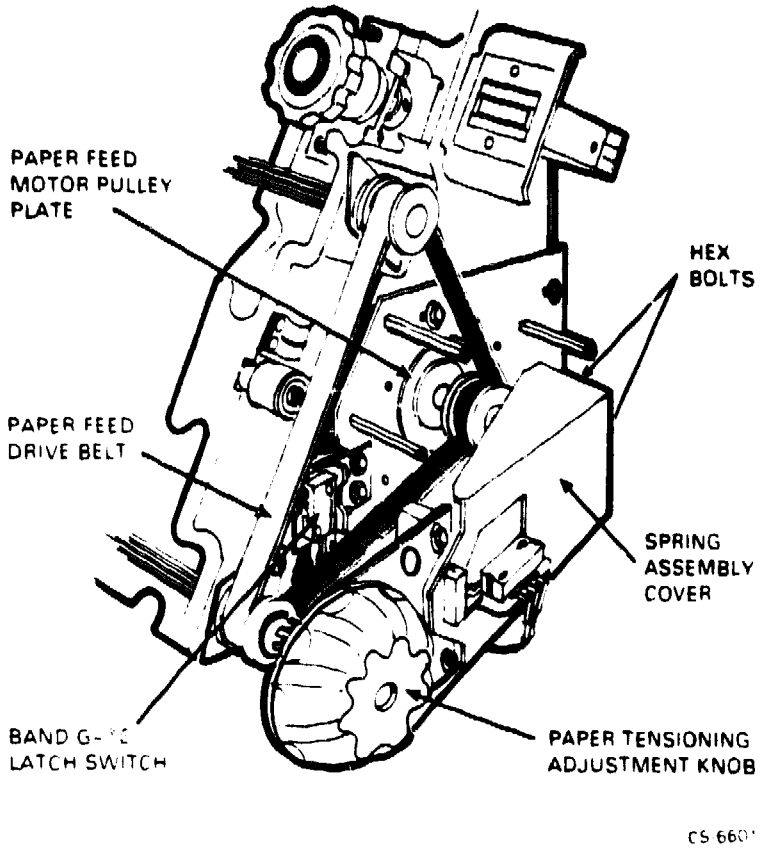

Figure 5-25 Vertical Paper Tensioning Assembly


APPENDIX A

APPENDIX A
LP29 LINE PRINTER AND PAPER STACKER RECOMMENDED SPARES AND FIELD REPLACEABLE UNITS

Appendix A lists the recommended speres and Field Replaceable Units (FRUs) for the LP29 Line Printer, paper stacker and character bands.

A.1 LP29 LINE PRINTER SPARE PARTS AND FIELD REPLACEABLE UNITS

The LP29 Line Printer recommended spares and Field Replaceable Units (FRUs) are listed in Table A-1.

Table A-1 LP29 Line Printer Recommended Spares and Field Replaceable Units

DIGITAL™ Part Number	Description
M8086-YA	BA200 Printer Controller
29-23610-00	Backstop Screw
29-26860-00	Bearing, Bronze, Tractor, Flanged
29-23024-00	Bearing, Paper Puller
29-26823-00	Belt and Link Assembly
29-26853-00	Belt, Paper Feed
29-24288-00	Belt, Paper Puller
29-26828-00	Blower, Band Drive Motor
29-26814-00	Blower, Hammer Bank
BC27L-30	Cable, Printer Controller
BC05L-10	Cable, Printer Controller
BC27A-30	Cable, Printer Interface
29-81384-00	Cable Assembly, Interface (AM) Harness
29-26824-00	Cable, Tractor
29-26831-00	Capacitor Pack Assembly
29-26852-00	Capacitor, 100K UF, 60V
29-25173-00	Capacitor, Transformer, 15UFD, 660V
29-25174-00	Circuit Breaker
29-25179-00	Circuit Breaker (VDE only)
29-24318-00	Clutch Assembly, Paper Puller
29-26830-00	Clutch Assembly, Horizontal Paper Adjustment
29-26802-00	Decal, Lower Control Panel
29-25617-00	Decal, Rear Control Panel
29-26849-00	Decal, Control Panel, Danish
29-26844-00	Decal, Control Panel, French
29-26843-00	Decal, Control Panel, German

Table A-1 LP29 Line Printer Recommended Spares and Field Replaceable Units (Cont)

DIGITAL Part Number	Description
29-26845-00	Decal, Control Panel, Italian
29-26848-00	Decal, Control Panel, Portuguese
29-26847-00	Decal, Control Panel, Spanish
29-26846-00	Decal, Control Panel, Swedish
29-26842-00	Decal Control Panel US/UK
29-24306-00	Fan Assembly
29-24291-00	Fuse, 2A, Fast, 3AG
29-24292-00	Fuse, 5A, Slow, Power Supply
29-26850-00	Fuse, 5A, Fast, 3AG
29-24293-00	Fuse, 10A, Slow, Band Gate
29-24295-00	Fuse 20A, Slow, Power Supply
29-24296-00	Hammer Module Kit
29-25175-00	Inductor Assembly, Discharge
29-24629-00	Inductor Assembly (VDE only)
29-24297-00	Lamp, Control Panel
29-25158-00	Line, Counter Kit
M7258-00	LP11 Printer Controller
29-26812-00	Motor Assembly, Paper Feed
29-26818-00	Motor, Band Drive
29-24309-00	Motor, Band Positioning
29-24319-00	Motor, ac Paper Puller
29-24320-00	Motor, Ribbon Deskew
29-24321-00	Motor, Ribbon Drive
29-24298-00	Paper Motion Sensor Assembly
29-26817-00	Paper Tensioner Assembly
29-26813-00	PCB, Band Gate Electronic Configuration Kit
29-24328-00	PCB, Hammer Control, 132 columns
29-24329-00	PCB, Hammer Driver, 132 columns
29-26841-00	PCB, Interface
29-25169-00	PCB, Motherboard
29-26804-00	PCB, Paper Feed
29-24324-00	PCB, Power Supply
29-24325-00	PCB, Processor (Less PROMS)
29-25156-00	PCB, Solenoid Release
29-26810-00	PCB, Switch Array, Control Panel
29-26815-00	PCB, Timing Overlap
29-26827-00	PCB, Timing and Status
29-26822-00	Pins, Tractor
29-25176-00	Platen Assembly
29-25177-00	Potentiometer, Copies Control
29-24627-00	Power Distribution (VDE only)
29-25035-00	Power Supply, Static Eliminator
29-26826-00	Power Supply (VDE Only)
29-26839-00	PROM, 64-Character Danish
29-26835-00	PROM, 64-Character French

Table A-1 LP29 Line Printer Recommended Spares and Field Replaceable Units (Cont)

DIGITAL Part Number	Description
29-26834-00	PROM, 64-Character German
29-26836-00	PROM, 64-Character Italian
29-26837-00	PROM, 64-Character Swedish
29-26838-00	PROM, 64-Character Spanish
29-26805-00	PROM, 64-Character Standard US/UK
29-26820-00	PROM, Timing and Speed, Speed-165
29-26821-00	PROM, Timing and Status-Clock
29-26819-00	PROM, Timing and Status-Speed
29-26833-00	PROM 64 OPT US/UK
29-26840-00	PROM Kit, Processor
29-24588-00	PROM 96-character
29-25164-00	Pulley Assembly, Band Idler
29-25165-00	Pulley, Band Drive
29-25166-00	Pulley, Idler
29-25168-00	Pulley, Puller (Large)
29-25159-00	Pulley, Puller (Small)
29-25160-00	Relay, Ribbon Reversing
29-24299-00	Relay, 55 Volts
29-24739-00	Ribbon Edge Sensor, Emitter
29-24300-00	Ribbon Edge Sensor
29-24302-00	Ribbon Shield (Consumable)
29-24585-00	Screw/Nut/Washer Pack
29-25157-00	Solenoid
29-24738-00	Spool, Ribbon Drive
29-24586-00	Spring Kit
29-24313-00	Static Eliminator Bar
29-25161-00	Switch, Band Gate Interlock
29-25162-00	Switch, Paper Out (5SS16)
29-25163-00	Switch, Plenum Interlock
29-24304-00	Switch, Deskew
29-25154-00	Switch, Touch Type
29-26806-00	Tractor Assembly, Upper Left
29-26807-00	Tractor Assembly, Upper Right
29-26808-00	Tractor Assembly, Lower Left
29-26809-00	Tractor Assembly, Lower Right (Without Switch)
29-26825-00	Transducer Assembly
29-24630-00	Transformer (VDE only)
29-25155-00	Transformer, CVT

A.2 PAPER STACKER SPARE PARTS AND FIELD REPLACEABLE UNITS

The paper stacker Recommended Spares and Field Replaceable Units (FRUs) are listed in Table A-2

Table A-2 Paper Stacker Recommended Spares and Field Replaceable Units

DIGITAL Part Number	Description
29-26854-00	Cable, Shelf, Stacker
29-26855-00	Cable, Sensor, Stacker
29-26829-00	Cable, Pulley, Stacker
29-26851-00	Fuse, 1A, Stacker, Power and Logic
29-26859-00	Fuse, Stacker
29-26857-00	Motor, Stacker
29-26816-00	Motor, ac, Geared, Stacker
29-26801-00	PCB, LED Driver, Stacker
29-26832-00	PCB, Photo Pick-up Stacker
29-26811-00	PCB, Power and Logic
29-26803-00	Pulley Assembly, Motor, Stacker
29-26858-00	Switch, Cutoff, Stacker
29-26856-00	Transformer, Stacker

A.3 CHARACTER BAND PART NUMBERS

The character bands listed in Table A-3 are available for the LP29 line printer.

NOTE

Those bands ordered with PROMS will require DIGITAL Field Service installation.

Table A-3 LP29 Character Bands

DIGITAL Part Number	Description
LP29X-AA	American 64-character band
LP29X-AB	American 64-character band and PROM
LP29X-AC	American 64-character optimized band
LP29X-AD	American 96-character band
LP29X-DA	Denmark 64-character optimized band
LP29X-DB	Denmark 64-character optimized band and PROM
LP29X-DC	Denmark 96-character band
LP29X-EA	United Kingdom 64-character optimized band
LP29X-EB	United Kingdom 64-character optimized band and PROM
LP29X-EC	United Kingdom 96-character band
LP29X-GA	German 64-character optimized band
LP29X-GB	German 64-character optimized band and PROM
LP29X-GC	German 96-character band
LP29X-IA	Italian 64-character optimized band
LP29X-IB	Italian 64-character optimized band and PROM
LP29X-IC	Italian 96-character band
LP29X-JA	Japanese Katakana standard band
LP29X-JB	Japanese Katakana standard band and PROM
LP29X-MA	Sweden 64-character optimized band
LP29X-MB	Sweden 64-character optimized band and PROM
LP29X-MC	Sweden 96-character band
LP29X-PA	French 64-character optimized band
LP29X-PB	French 64-character optimized band and PROM
LP29X-PC	French 96-character band
LP29X-SA	Spanish 64-character optimized band
LP29X-SB	Spanish 64-character optimized band and PROM
LP29X-SC	Spanish 96-character band
LP29X-VA	Portuguese 64-character optimized band
LP29X-VB	Portuguese 64-character optimized band and PROM
LP29X-VC	Portuguese 96-character band
LP29X-AE	OCR-B American 96-character band
LP29X-AF	OCR-B American 64-character band

APPENDIX B

APPENDIX B
CHARACTER BAND PROM INSTALLATION PROCEDURE

B.1 INTRODUCTION

This appendix discusses the procedures for installing the character band PROM.

CAUTION

Only qualified service personnel should remove or install modules.

B.2 24-BIT PROCESSOR PCB REMOVAL

NOTE

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off, and that the power cord is removed from the power source.

1. Open the rear door of the LP29 Line Printer.
2. Carefully disconnect the three paper feed board connectors that pass through the PCB card cage cover.
3. Loosen the two top PCB card cage cover locking screws, and remove the cover.

CAUTION

To protect the PCB and PROM from static damage, wear a grounded antistatic strap when performing this procedure.

4. Remove the 24-bit processor PCB (P/N 29-24325-00) from slot A8 of the card cage by lifting up on the two PCB unlocking tabs to unseat the PCB.
5. Lift the PCB up and out from the printer.

B.3 PROM INSTALLATION

WARNING

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off, and that the power cord is removed from the power source.

1. Remove the country specific character PROM from the band box located in the country kit.
2. Locate socket "MEM 16" on the 24-bit processor PCB (see Figure B-1).
3. Align pin 1 of the PROM to pin 1 of the socket. Verify PROM pins line up with the socket holes. Press the PROM into the "MEM 16" socket with firm pressure. Verify that all PROM pins are seated in the socket and that none of the pins are bent or broken.

B.4 24-BIT PROCESSOR PCB REPLACEMENT

NOTE

Before performing any removal or replacement procedure, make sure that the LP29 Line Printer is turned off, and that the power cord is removed from the power source.

1 Install the 24-bit processor PCB into the correct slot in the card cage, and press down on the locking tabs to seat the PCB into the connectors.

2 Continue by reversing steps 1 through 3 in Section B.2 of this appendix.

NOTE

The LP29 Line Printer has the capability of recognizing up to four different character band sets of varying lengths or sequences (multiple band sensing). PROM placement is not critical, any empty (MEM 13 - 16) socket may be used. The LP29 Line Printer normally comes with the 24-bit processor PCB configured with the character PROMs listed in Table B-1.

Table B-1 Standard PROM Configuration

Socket	PROM Installed
MEM 13	US/UK 64-character Optimized
MEM 14	US/UK 64-character Standard
MEM 15	All 96-character Standard
MEM 16	Empty

Character PROM identification and Part Numbers are listed in Appendix A, Table A-3.

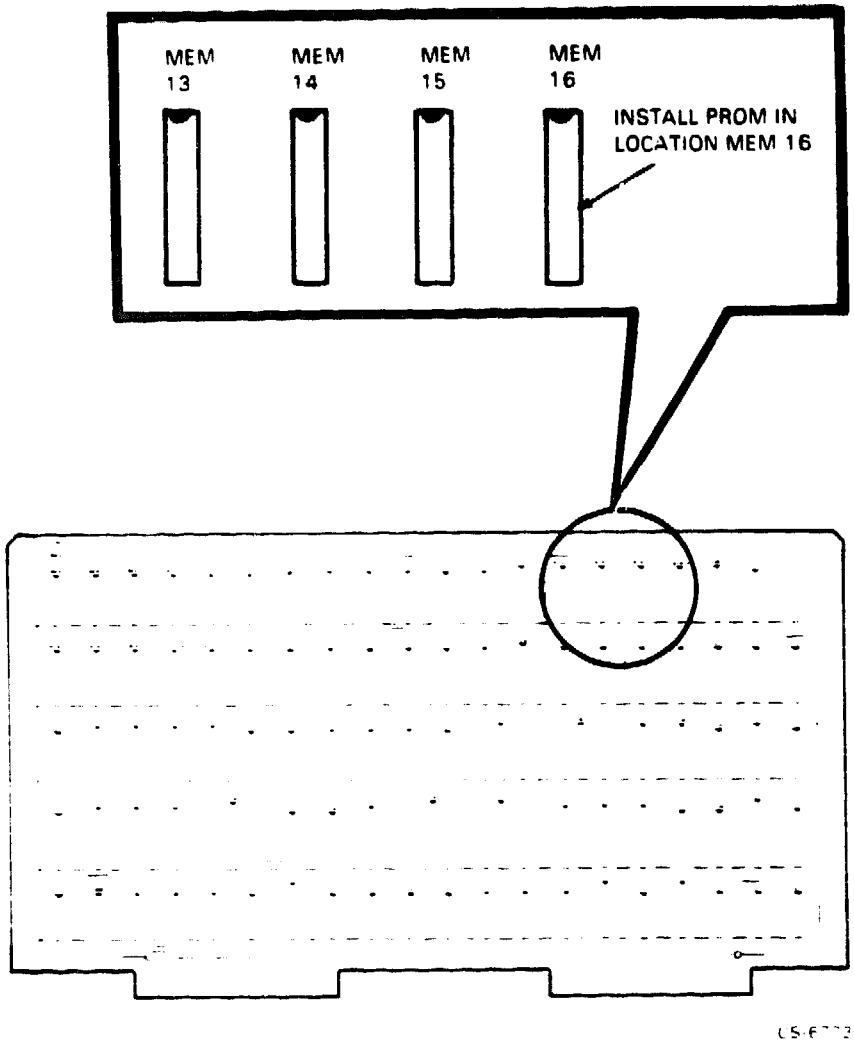

Figure B-1 24-Bit Processor PCB Assembly