GEH 2185

SERVICE MANUAL

TermiNet®

300 PRINTER

ServiNet

GENERAL ELECTRIC

The information contained herein does not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to General Electric Company, USA.

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TermiNet DATA COMMUNICATION PRODUCTS

TermiNet 300 Printer

Service Manual - GEH-2185B

Printed October, 1973 (2500)

PREFACE

This manual provides basic service information for the "C" Model TermiNet 300 Printer. For convenience, reference to the TermiNet 300 Printer, in most cases, is "Printer".

All information contained in Addendum 1A to GEH-2185A is superseded by this manual.

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CHAPTER I
INTRODUCTION

GENERAL DESCRIPTION

The TermiNet 300 Printer is a quiet, compact, high speed Printer designed for printing or sending information from or to computer systems or other Printers using the ASCII code*. The Printer can send information originating from its own keyboard or information from a paper punch or other external devices. The Printer can receive and send all 128 ASCII characters at speed rates of 10, 15, and 30 characters per second.

KEYBOARD

Keyboard operation is based on the coupling of a signal with ferrite magnetic cores to the appropriate logic (sense) lines when a key is pressed. When a key is pressed, the ferrite bar makes contact with a ferrite "U" core. The resulting transformer action couples a signal from a built-in oscillator to the selected outgoing sense lines. The sense lines are routed around and through the ferrite "U" cores in such a way as to generate the correct ASCII code for each key pressed. Electronic circuits are used to prevent false codes when more than one key is pressed at the same time.

PRINT MECHANISM

The Printer uses a belt printing concept to achieve its high speed and reliability. A belt carrying print fingers rotates horizontally past a bank of hammers. Each finger has a type character or symbol embossed on the upper end. There are two complete sets of characters (type fonts) on the belt.

Printing takes place by firing a hammer at the correct time to hit the selected print finger to be printed. The print finger is driven against the ribbon and paper to accomplish printing. The print finger and hammer rebound back to their original positions after contacting the platen.

PRINTER SYNCHRONIZATION

Precise synchronization permits the belt printing concept to work. The Printer's electronics compares the positions of the print fingers in front of the hammers. The hammer is fired when the "called for" print finger is in the correct position. Timing and synchronization of the comparison process is maintained by means of timing pulses. Timing pulses are generated as each print finger passes a photocell; thus, the control logic is continuously informed of the position of the print fingers with respect to the hammers.

* American Standard Code for Information Interchange

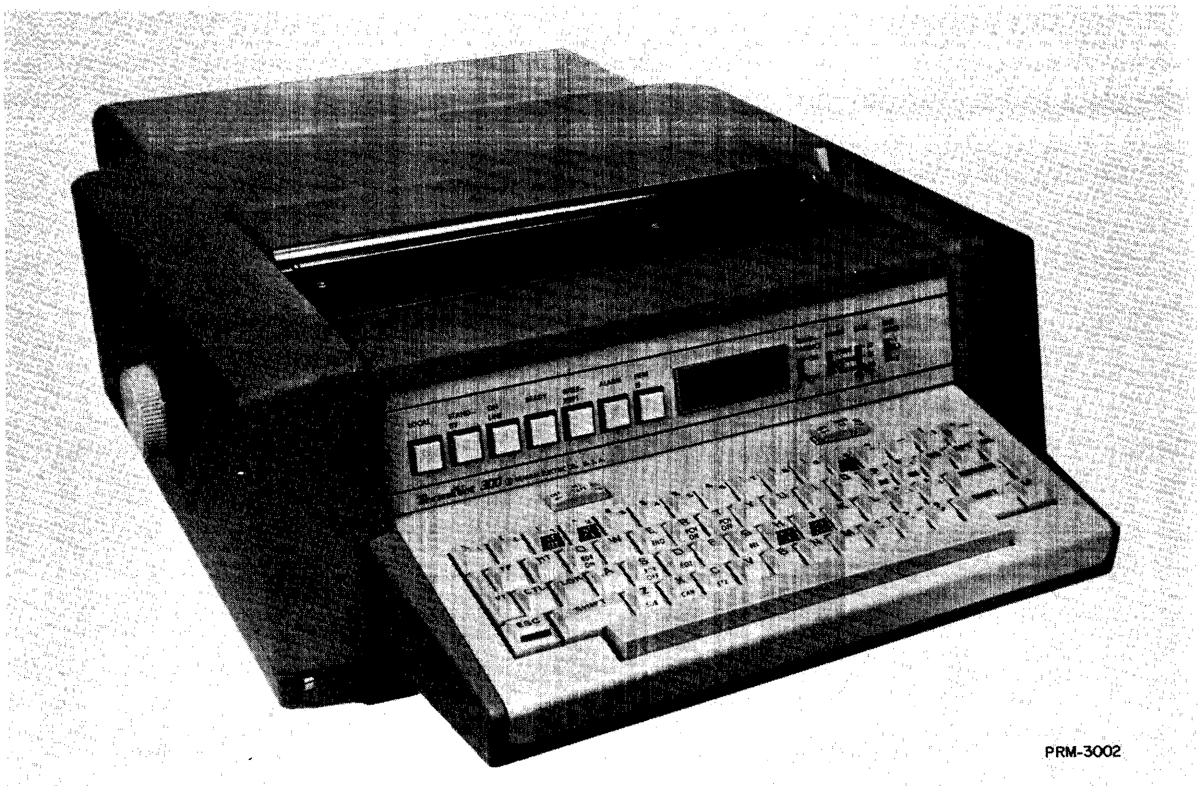


Figure 1-1A. TermiNet KSR 300 Printer

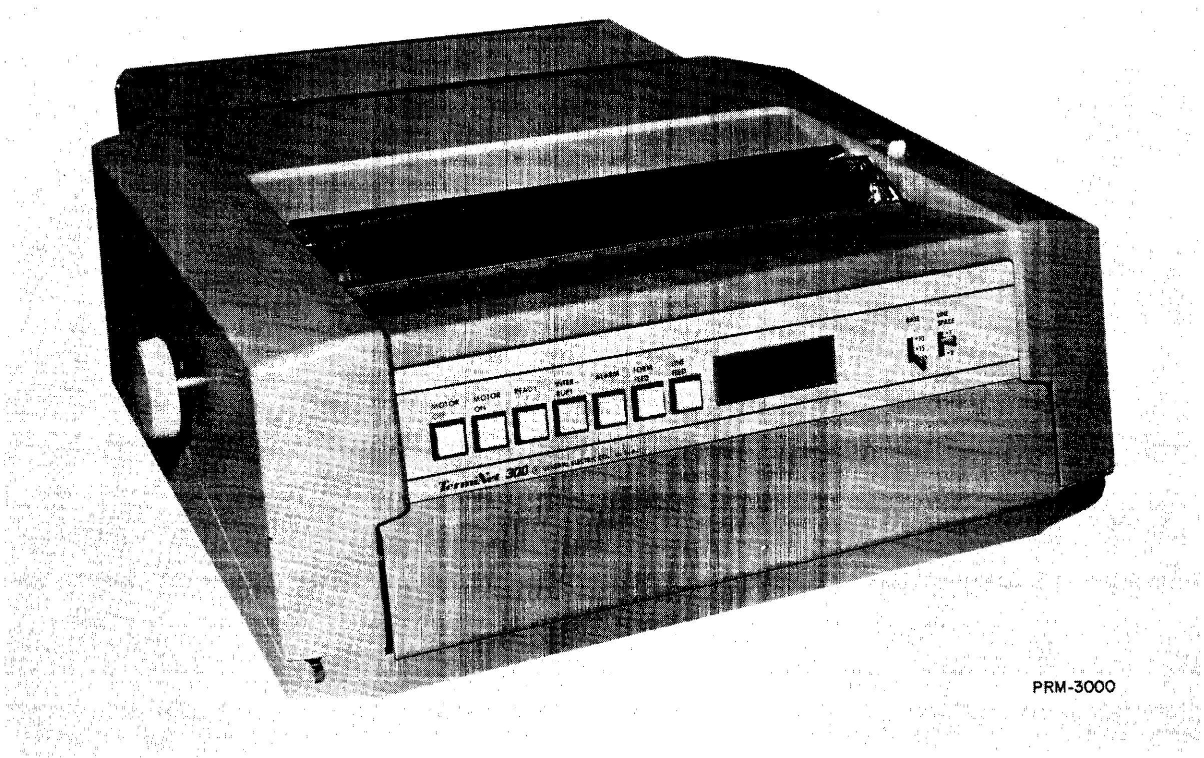


Figure 1-1B. TermiNet RO 300 Printer

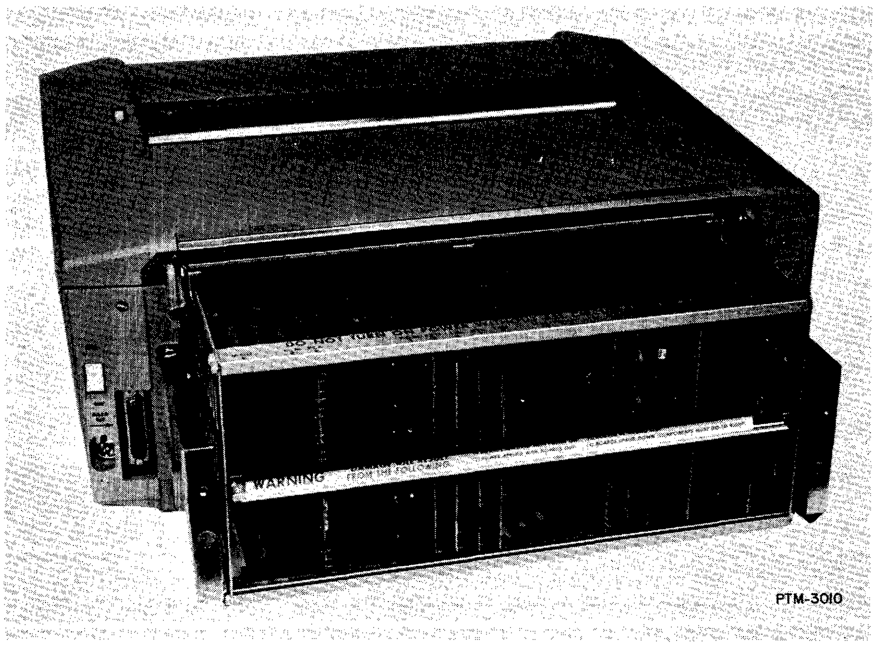


Figure 1-2. Electronic Logic Module (Bustle).

ELECTRONIC LOGIC MODULE

The electronic logic module (bustle) is mounted at the rear of the Printer (see Figure 1-2). The bustle contains large-scale integrated circuits on printed circuit boards to provide the necessary circuits for Printer operation. The printed circuit boards are designed for interchangeability to keep maintenance and service to a minimum. The logic circuits are designed so that most of the basic functions and options are on one printed circuit board and can be replaced or added as needed. Horizontal tabulation, and parity are examples of options that can be added at a later date as needs change. A description of each option is in Chapter 3. Some operations of certain printed circuit boards can be changed by changing jumpers (see Printed Circuit Boards, Chapter 4, Section 3).

SPECIFICATIONS

NOISE

Standby noise is virtually non-existent and operating noise is quiet.

SIZE

Overall dimensions of the TermiNet 300 Printer are approximately 7" (17.8 cm) high (from desk top), 19.75 inches (50.2 cm) wide, and 26.5 inches (67.4 cm) long.

WEIGHT

Approximately 72 pounds (34 kg).

ENVIRONMENT

- Operating Temperatures, 32°F to 110°F (0°C to 43°C).
- Humidity, 0-95 percent relative humidity, both operating and non-operating.

INPUT POWER

105 - 129 volts, 60 Hertz, Single Phase, 1.5 Amps

POWER CABLE

Standard 3 wire grounded 120 volt cable is supplied except on (50 Hz) export models.

PRINT LINE LENGTH

75, 80 or 118 print positions.

COPY

An original and six copies can be obtained from normal weight paper.

PAPER REQUIRED

Continuous rolls or sheets:

Long Roll -3" (7.6 cm) diameter, 12 1/2" (31.8 cm) wide and 7/16" (11 mm) center hole.

Short Roll -5" (12.7 cm) diameter, 8 1/2" (21.6 cm) wide, and 1" (2.5 cm) center hole.

Long Pin Feed - Fan Fold, 12 27/32" (32.6 cm) wide.

Short Pin Feed - Fan Fold, 8 1/2" (21.6 cm) wide.

Variable Pin Feed - Models with the Forms Tractor option can use any width of Fan Fold paper up to 12 27/32" (32.6 cm) wide.

NOTE

Total thickness of multiple form paper should not exceed .025 inches (0.6 mm).

PRINTABLE CHARACTERS

The 94 printable characters in the American Standard Code for Information Interchange (ASCII) are all provided in the TermiNet 300 Printer.

PRINTING SPEED

Ten characters per second. Each character is processed at 110 baud (bits per second). (One start bit, seven information bits, 1 parity bit, and two stop bits).

Fifteen characters per second. Same as 10 characters per second except only one stop bit is used and information is processed at 150 baud.

Thirty characters per second. Same as 15 characters per second except information is processed at 300 baud.

NOTE

Number of stop bits is a strapped option at any speed.

CHARACTER SPACING

Horizontal - 10 characters per inch.

LINE SPACING

Six lines per inch.

RIBBON

Recommended - Underwood, Catalog #210-46 17AAB/ DP Long Life Ribbon.

- Columbia 3202-20005 (Silk Gauze) - #40 inking.
- Curtis Young DUO PAK, Nylon 44, Black Medium #4.
- Underwood Scriptor Duet, Black Medium #430 Nylon.
- Multigraph Buckeye #130-2070-115 Paquette, Black Rec. #5.
- General Ribbon Corp. G. E. TermiNet 300, Silk, Computer Black Heavy.

DATA RECEIVED AND TRANSMITTED

Data Communication Code - American Standard Code for Information Interchange (ASCII)

b_7 b_6 b_5 →					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
Bits b_4 ↓	b_3 ↓	b_2 ↓	b_1 ↓	Column → Row ↓	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	|
1	1	0	1	13	CR	GS	–	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	_	o	DEL

MSC-3002

Figure 1-3. ASCII Code Chart.

3S3043BA155C4
7405-5-61056

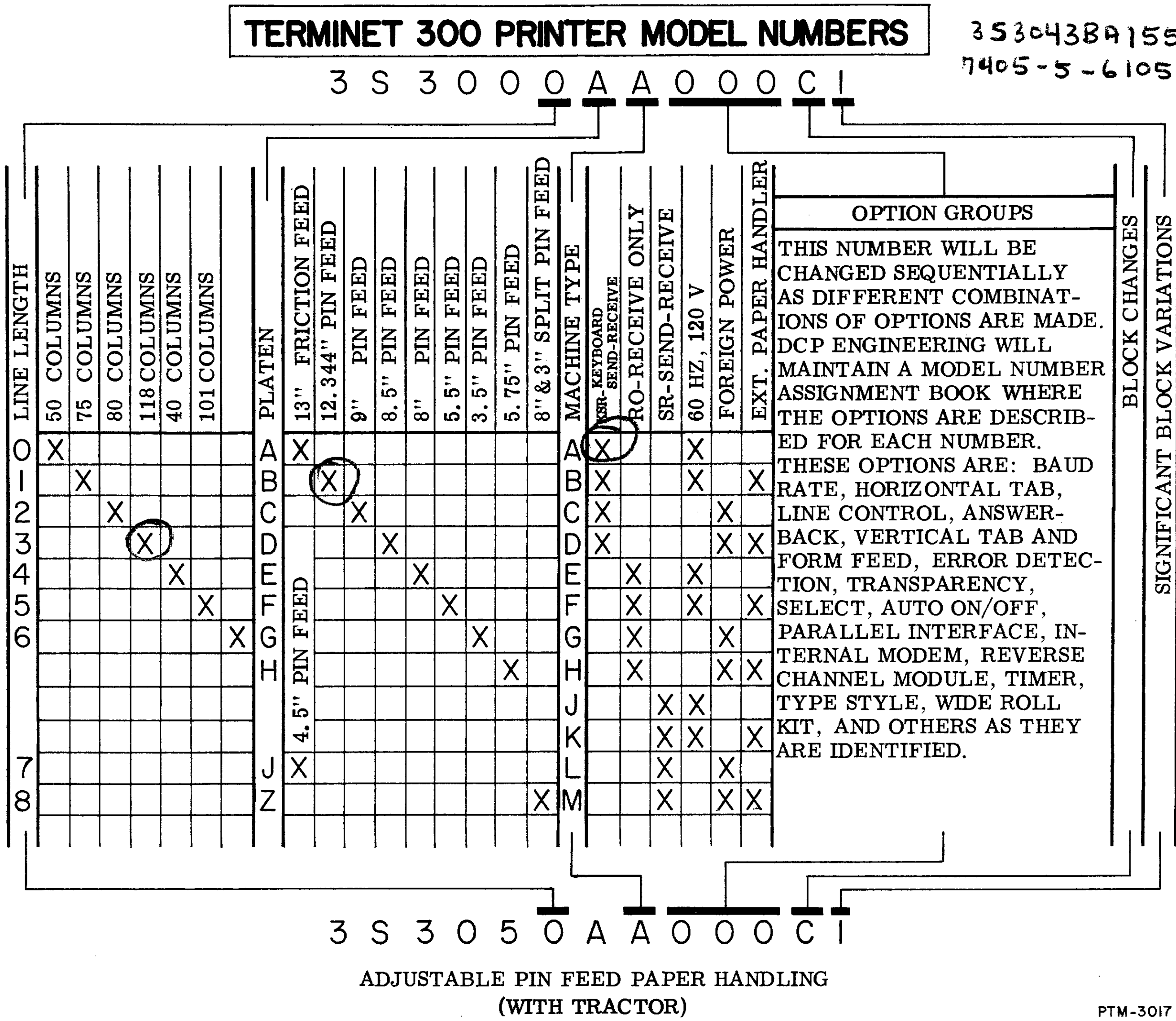


Figure 1-4. Model Number Code Chart.

TYPE OF DATA TRANSMISSION

All transmission is asynchronous. Full duplex telephone lines may be used; or two-way alternate transmission over half duplex telephone lines may be controlled automatically.

DATA SET INTERFACE

The TermiNet 300 Printer can be applied to voice grade lines by using any Modem device meeting RS-232C specifications. Acoustic couplers also provide satisfactory interconnection to transmission circuits. An Internal Modem, an option availalbe with the TermiNet 300 Printer, allows the Printer to be connected to a data access arrangement.

DATA SET CABLE

Standard EIA RS-232-C Interface.

TIMING

Transmission and receiving clocking is accomplished by a crystal oscillator which is accurate to ± .05%.

PARITY

A parity option allows the Printer to check for "Even" parity of data from the keyboard, phone lines, and auxiliary devices. "Even" parity is always generated by the Printer when the keyboard is operated.

MODEL AND SERIAL NUMBER DESIGNATIONS

The nameplate shows both model number and serial number. On standard printers, the nameplate is located on the main frame inside the paper well. On printers with the forms tractor paper handler, the nameplate is located on the external right sideof the main frame.

MODEL NUMBER

The model number on all Printers is coded to indicate model and options. Figure 1-4 is a chart that illustrates how to interpret the code.

SERIAL NUMBER

The serial number is a ten digit number broken down as follows:

First two digits - year of manufacture.

Second two digits - fiscal week of manufacture.

Fifth digit - equipment type.

Last five digits - manufacturing sequence number.

RELATED MANUALS

Additional information on operating the TermiNet 300 Printer can be found in the Operator's Manual, GEH-2184.

If the Printer is of the ASR type, refer to the Punch and Reader Service Manual, GEK-14776, for detailed information on that equipment.

Refer to Parts Manual, GEK-14999 for detailed information on parts.

CHAPTER 2

UNPACKING AND INSTALLATION

UNPACKING

Examine shipping carton for possible damage. Immediately report any damage to shipper. Do not damage or discard shipping carton or polyurethane packing case. They should be used if it is necessary to return the Printer or ship to another location.

1. Open the top of the shipping carton.

2. Remove manuals and papers in the recessed area of the foam case.

3. Cut the tape wrapped around the polyurethane packing case and lift off top half of case.

4. Remove the power cord from the pocket in the side of the lower half of the packing case.

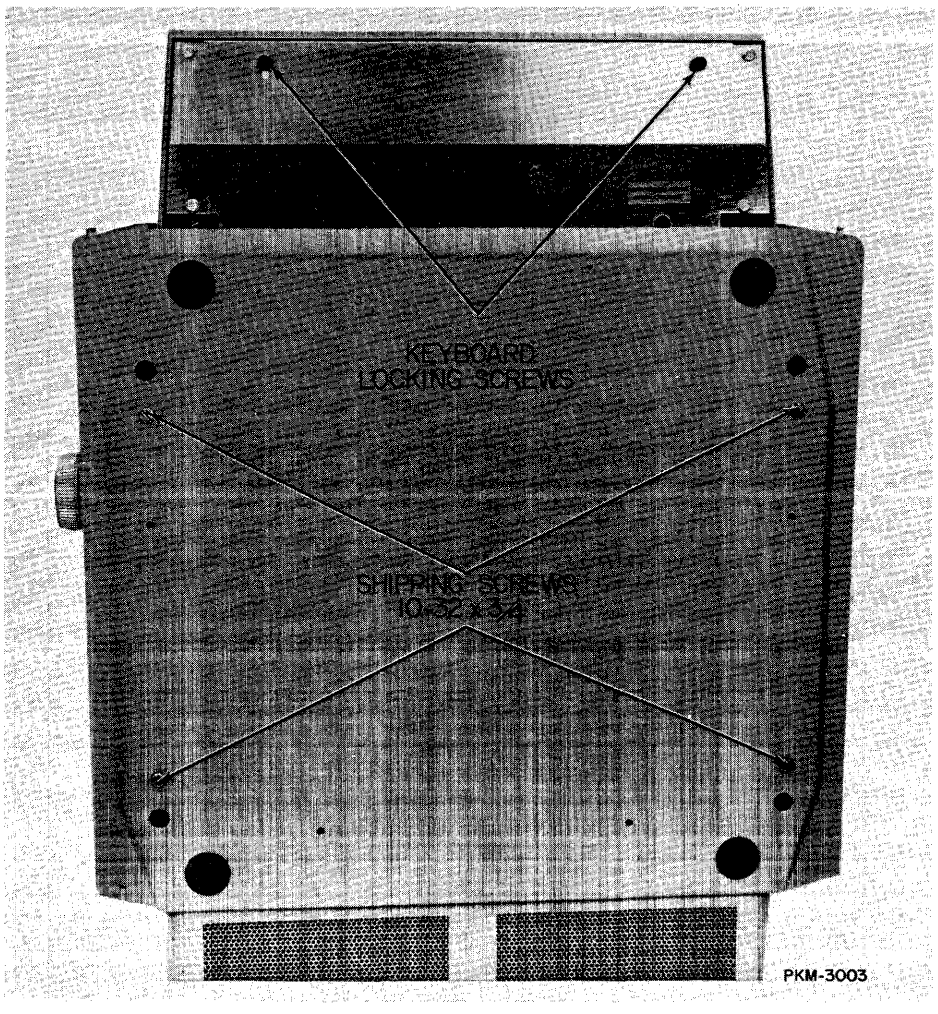
5. Grasp the Printer at each side through the openings provided and remove the Printer from the lower half of the packing case.

6. Set the Printer on a firm flat surface. Tilt the Printer until it is resting vertically on the bustle.

7. Remove the four shipping screws on the bottom of the Printer's case. See Figure 2-1.

NOTE

Printers which are Pedestal mounted do not have shipping screws.



Shipping Screw Locations

Figure 2-1

8. To prevent damage, the keyboard is locked before shipment. Unlock the keyboard as follows:

a. Loosen the two thumb screws located on each side of the bottom of keyboard.

b. Pull screws forward as far as they will go.

c. Retighten the two thumb screws in the forward position.

d. The keyboard is now in the unlocked condition and is ready for use.

e. To lock keyboard, reverse the procedure. Make sure keyboard is locked before shipping Printer.

9. Open the top cover and remove the data package, cables, miscellaneous from the paper roll compartment.

10. Remove the two short pieces of sponge rubber under the platen as follows:

a. Release platen latch lever on each side.

b. Remove platen.

c. Remove two sponge rubber pieces.

d. Replace platen and close platen latch levers.

INSPECTION AND INSTALLATION

1. Make certain that ribbon spools are fully engaged on ribbon hub. Ribbon should be properly routed over guides and between print fingers and platen (see Chapter 3).

2. Make certain that drive belts are in place and routed properly.

3. Make certain that print belt turns freely by hand.

4. Inspect Printer for broken wires, loose or missing parts, and accumulations of dirt, oil, or grease.

5. Install paper (see Chapter 3).

6. Install Printer in area where it is to be used and connect to power. To connect an ASR Model, see Punch and Reader Service Manual (GEK-14776).

CAUTION

Make certain that the power connection has a ground. The absence of a ground can result in damage to the Printer and cause erroneous operation.

CHECKOUT PROCEDURE

This checkout procedure checks the general operation of the KSR Printer. It does not check every possible operating condition. Ignore those steps that apply to an option not provided.

ACTION	RESULT
Set the following switches to: INHIBIT - NORM position RATE - 30 position LINE SPACE - 1 position AUTO L. F. - OFF position TRANSPARENCY - OFF position	
Press "Power On" switch (Located on back of terminal, right side) to the ON position.	Audible tone sounds momentarily. ALARM indicator lights momentarily. STANDBY indicator/switch lights.
Press LOCAL indicator/switch.	LOCAL indicator/switch lights. STANDBY indicator/switch goes out. Motor starts.
Press each key with a printing character on it.	Tone sounds when each key is pressed. Appropriate character prints. PPI (Print Position Indicator) count advances by one as each key is pressed.
Press RETURN key.	PPI indicates "1".
Press LF (Line feed) key.	Printer line-feeds one line.

(continued)

ACTION	RESULT
Press shift LOK key and press each key with printable character on it.	Appropriate upper case character prints.
Press SHIFT key, which unlocks the shift.	
Set AUTO L. F. (Automatic Line Feed) switch to the ON position.	
Press RETURN key	Printer line-feeds one line. PPI indicates "1".
Press ON LINE indicator/ switch	ON LINE indicator/switch lights. LOCAL indicator/switch goes out.
Press STANDBY indicator/switch	STANDBY indicator/switch lights. ON LINE indicator goes out. Motor stops.
Press LOCAL indicator/switch	LOCAL indicator/switch lights. STANDBY indicator/switch goes out. Motor starts.
Lift paper shield (NOTE: not applicable to forms tractor model)	Alarm tone sounds momentarily. ALARM indicator lights. Motor stops. LOCAL indicator/switch stays lit.
Return paper shield to normal position.	ALARM indicator goes out.
EXTERNAL PAPER HANDLER OPTION NOTE Internal paper out switch must be in the locked position.	
Deactivate the external paper out switch on the paper handler by pressing the switch arm.	
Activate the external paper out switch by releasing the switch arm.	Alarm tone sounds. ALARM indicator lights. Motor stops (if DATC board is so jumpered). LOCAL indicator remains lighted.
Return the external paper out switch to its normal position (paper present).	ALARM indicator goes out. Motor starts (if stopped in previous step).
Press LOCAL indicator/switch	Motor starts.
Set LINE SPACE switch to the "2" position and press LF key.	Printer Line-feeds two lines each time LF key is pressed.
Set LINE SPACE switch to the "1" position.	
Set RATE switch to the "15" position and press any character key several times.	Character should print.
Set RATE switch to the "10" position and press any character key several times.	Character should print.
Set RATE switch to the "30" position.	

(continued)

ACTION	RESULT
Press RETURN key.	PPI indicates "1". Printer line-feeds one line.
Press the Space Bar repeatedly and observe PPI.	PPI increments by one up to 76 (short print line Printer) or 119 (long print line Printer). The alarm should sound at counts 68 and 76 (short print line) or 111 and 119 (long print line).
Press BS (Backspace) key several times and observe PPI.	PPI count should decrease by one each time BS key is pressed.
Press RETURN key.	PPI indicates "1". Printer line-feeds one line.
Press and hold any character key and also press and hold the RPT (Repeat) key.	The Printer repeatedly prints the character (at 5 characters per second rate) as long as the RPT key is held.
Press RETURN key.	PPI indicates "1". Printer line-feeds one time.
Set INHIBIT switch to the PRINT position and press any character key several times.	Characters will not print.
Set INHIBIT switch to the TRANS position and press any character key several times.	Characters should print.
Set INHIBIT switch to the NORM position.	
Press RETURN key.	PPI indicates "1". Printer line-feeds one line.
EOT, ESC #, ESC J, AND BEL RECOGNITION OPTION	
Press and hold CTL (Control) key while pressing and releasing D (EOT) key.	Motor stops (if DATC is so jumpered). PPI goes out.
Press and release ESC (Escape) key; then press and release H (Motor on) key	Motor starts (if DATC is so jumpered). PPI indicates "1".
Press and release ESC (Escape) key; then press and release J (Motor off) key.	Motor stops (if DATC is jumpered). PPI goes out.
Press and release ESC (Escape) key; then press and release H (Motor on) key.	Motor starts (if DATC is jumpered). PPI indicates "1".
Press and hold CTL (Control) key while pressing and releasing G (BEL) key.	Tone sounds approximately one-half second.
TRANSPARENCY OPTION	
Set TRANSPARENCY switch to ON position and press any character key several times.	Characters will not print.
Set TRANSPARENCY switch to the OFF position.	

(continued)

ACTION	RESULT
HORIZONTAL TAB OPTION	
Press RETURN key.	PPI indicates "1". Printer line-feeds one line.
Press space bar repeatedly until 10 appears on PPI.	
Press and release ESC key. Then press and release HT SET (Horizontal Tab Set) key.	Beep tone.
Press space bar until PPI indicates 20.	
Press and release ESC key, then press and release HT SET key.	Beep tone.
Press RETURN key.	PPI indicates "10".
Press HT (Horizontal Tab) key	PPI indicates "20".
Press HT key.	PPI indicates 76 (short print line) or 119 (long print line).
Press RETURN key.	PPI indicates "10". Printer line-feeds one line.
Press and release ESC key then press and release HT CLR (horizontal Tab Clear) key.	Beep tone.
Press Return Key.	PPI indicates "1".
ANSWERBACK OPTION	
With Printer in LOCAL mode, press HERE IS pushbutton switch.	Printer should print Answerback Test message if Answerback Board is coded and plugged in.
RED/BLACK PRINT OPTION	
Using red/black tape, print black line of text.	Printing should be in black.
Press and release ESC (Escape) key; then press and release 4 key.	
Pause briefly and type line of text.	Printing should be in red.
Press and release ESC (Escape) key; then press and release 3 key.	
Pause briefly, and type line of text.	Printing should be in black.

CHECK OUT OF RO/SR PRINTERS

Receive only and Send Receive Printers are checked out by sending data from an external source to them. The accuracy of the received message verifies the correct operation of the Printers.

SYSTEM CHECK (KSR, ASR, OR MSR ONLY)

If a problem exists after installing the Printer in the system, a test plug can be fabricated to simulate an "On Line" condition. The problem can then be isolated to the Printer or external equipment. If the problem is isolated to the Printer, the test plug can assist further troubleshooting. Refer to Chapter 4, Section 2, (Functional Troubleshooting, Test Plug) for information on fabricating and using the test plug.

CHAPTER 3

PRINCIPLES OF OPERATION

SECTION 1

GENERAL OPERATING INSTRUCTIONS AND INFORMATION

SWITCHES AND INDICATORS

The following photographs and table point out the locations and explain the basic functions of the switches and indicators on the control panel and the switches at the rear of the Printer (see Figures 3-1, 3-2, and 3-3).

Table 3-1.

Switches and Indicators - KSR Printer

NAME	TYPE	FUNCTION
ALARM	Indicator	Indicates one or more of the following: - Low paper - Paper shield up (not on Forms Tractor models) - Punch out of paper (if in ASR configuration) - Problem in the Printer
AUTO L. F. (Automatic Line-Feed)	Slide Switch	When in the ON position, the paper is advanced automatically when the RETURN key is pressed. (Has no effect on incoming data.)
ALL CAPS (Upper Case)	Slide Switch	When placed in the ON position, all alphabetic printing caused by the keyboard will be upper case.
HERE IS (Optional)	Pushbutton Switch	Triggers terminal answerback code (see Section 2 of this Chapter).
INHIBIT	3 Position Toggle Switch	- PRINT position, inhibits printing and paper punching from local source. - NORM position, printing is normal. - TRANS position, inhibits transmission of data; incoming data not affected.
INTERRUPT	Pushbutton Indicator/ Switch	- Lights when "Break" or "Interrupt" is received. Alarm sounds, keyboard is deactivated, and paper tape reader or TCA is turned off. Data may still be received. Motor is not turned off. - When "Break" or "Interrupt" is received with lamp lit, tape reader or TCA will turn off if on. Data may still be received. Motor is not turned off. - When pressed with lamp lit, light goes out but a "Break" is not transmitted. Keyboard is restored to normal. - When pressed with lamp out, a "Break" is transmitted. Lamp does not light.
LINE SPACE	Toggle Switch	- Set on "1", single line-space. - Set on "2", double line-space. (Only 1 line-feed character sent externally for each generated LF.)

(continued)

Table 3-1. Switches and Indicators - KSR Printer (continued)

NAME	TYPE	FUNCTION
LOCAL	Pushbutton Indicator/ Switch	Lights when pressed. Enables local Printer operation but does not allow the transmission or reception of data.
ON LINE	Pushbutton Indicator/ Switch	Lights when pressed. Turns Printer motor on and enables the transmission and reception of data.
Print Position Indicator	Digital Display	Shows position of next character to be entered.
POWER ON	Switch	Turns on power to Printer. (Located at right rear of Printer.)
RATE	3 Position Toggle Switch	Selects any three of 10, 15, 30 or 60 CPS receiving and transmitting speed. Can be jumpered for 120 cps transmission with the INHIBIT switch in PRINT position.
READY	Indicator	Indicates data set is ready for transmission.
STANDBY	Pushbutton Indicator/ Switch	Lights when pressed. Turns motor off but leaves electronics turned on which enables the transmission and reception of data.
TRANSPARENCY (Optional)	Toggle Switch	Allows the Printer to process (receive or transmit) codes other than ASCII but inhibits printing (see Section 2 of this chapter).
Low Paper (Internal Paper Supply)	Switch	Detects low paper condition and causes an alarm. Switch can be placed in a locked out position.
Cover Interlock	Switch	Print belt stops when cover is lifted. Can be locked out with lock-out lever. If Printer is in Local, it will stay in Local. If Printer is On Line, it will go to Standby. CAUTION Power is still on when the cover is lifted.
Paper Shield Up	Switch	Causes an alarm condition when the paper shield is in the "up" position (not on Printers with Forms Tractor).

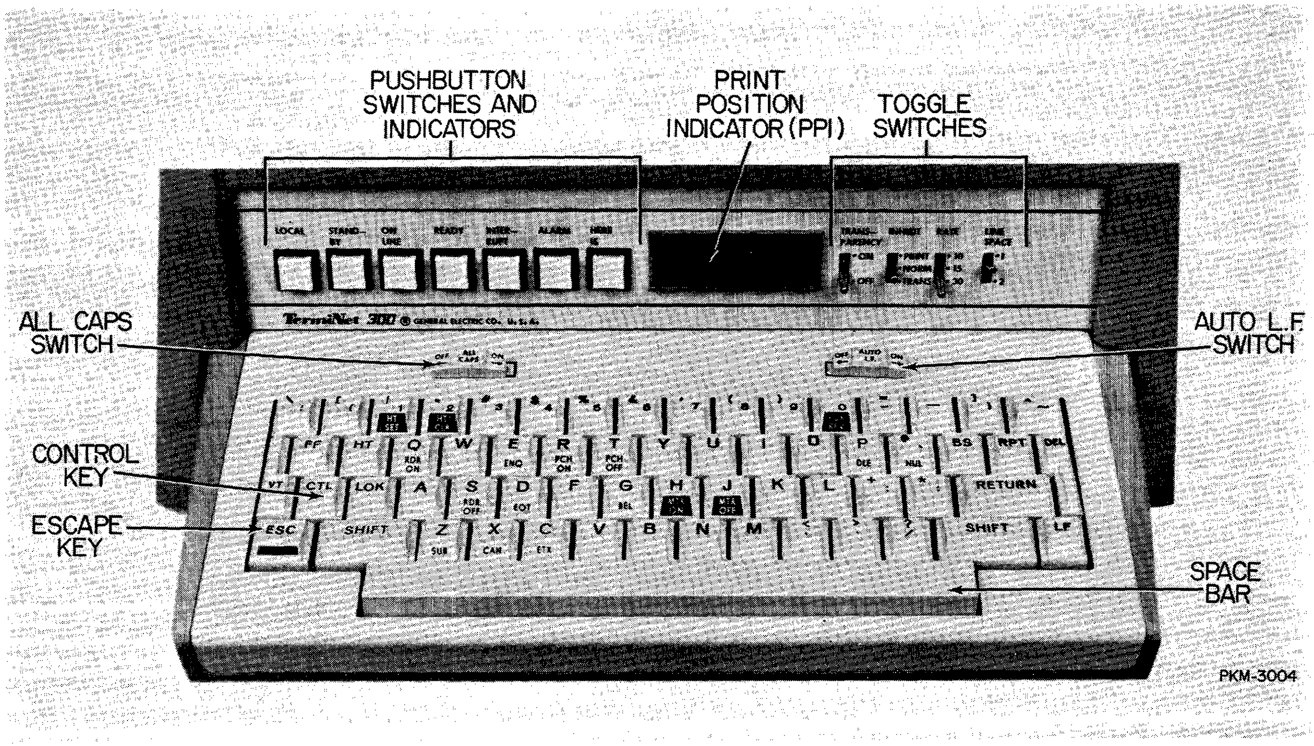


Figure 3-1. KSR Keyboard and Control Panel

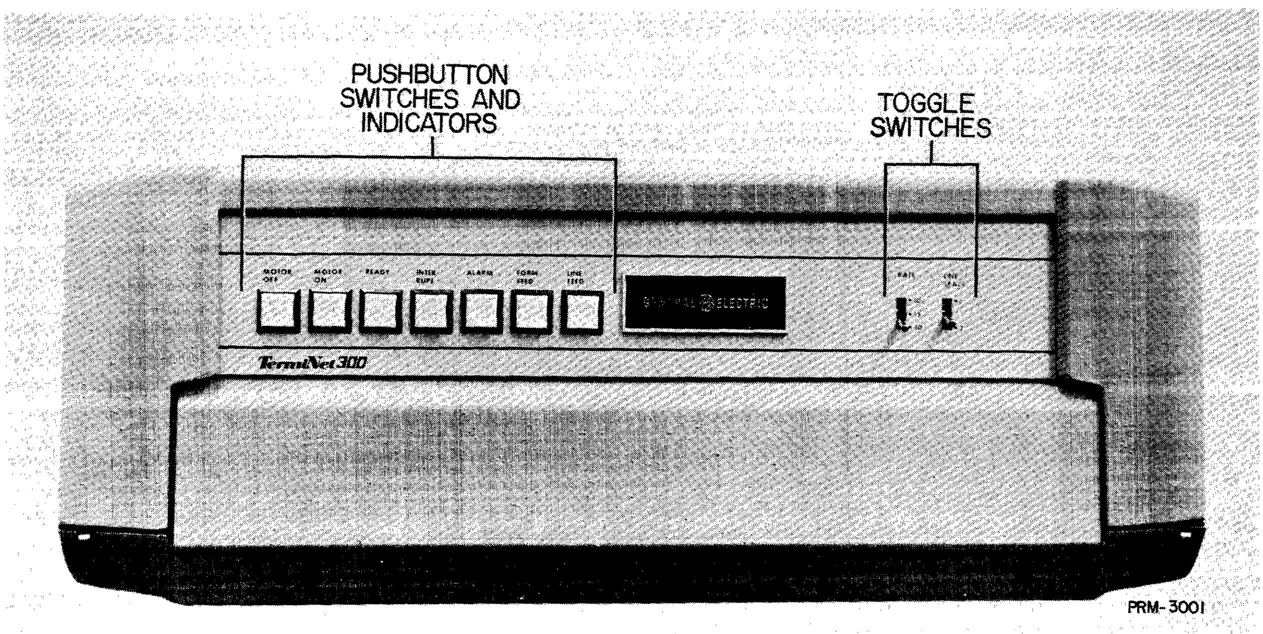


Figure 3-2. RO Control Panel

Table 3-2

Switches and Indicators - RO Printer

NAME	TYPE	FUNCTION
ALARM	Indicator	Indicates one or more of the following: - Low paper. - Paper shield up. (Not on Forms Tractor models.) - Problem in the Printer.
FORM FEED	Pushbutton Switch	When pressed, causes paper to feed continuously to the beginning of the next new form.
INTERRUPT	Pushbutton Indicator/ Switch	- Lights when "Break" or "Interrupt" is received. - When pressed with lamplit, lamp goes out, but a "Break" is not transmitted.
LINE FEED	Pushbutton	Will cause paper to feed one line each time it is pressed and quickly released. When pressed and held, paper will continue to line feed incrementally.
LINE SPACE	Toggle Switch	- Set on "1", single line-feed. - Set on "2", double line-feed.
MOTOR OFF	Pushbutton Indicator/ Switch	Lights when pressed. Turns motor off but leaves electronics turned on.
MOTOR ON	Pushbutton Indicator/ Switch	Lights when pressed. Turns motor on.
RATE	3 Position Toggle Switch	Selects "10", "15", or "30" characters per second depending on rate of incoming data.
READY	Indicator	Indicates data set is ready for reception of data.

SEND-RECEIVE (SR) PRINTERS

The switches and indicators on SR Printers are identical to those found on RO Printers explained in Table 3-2. The main difference between the SR and RO versions is that SR Printers have transmission capability principally for answerback and line control options. RO versions have receiving capability only.

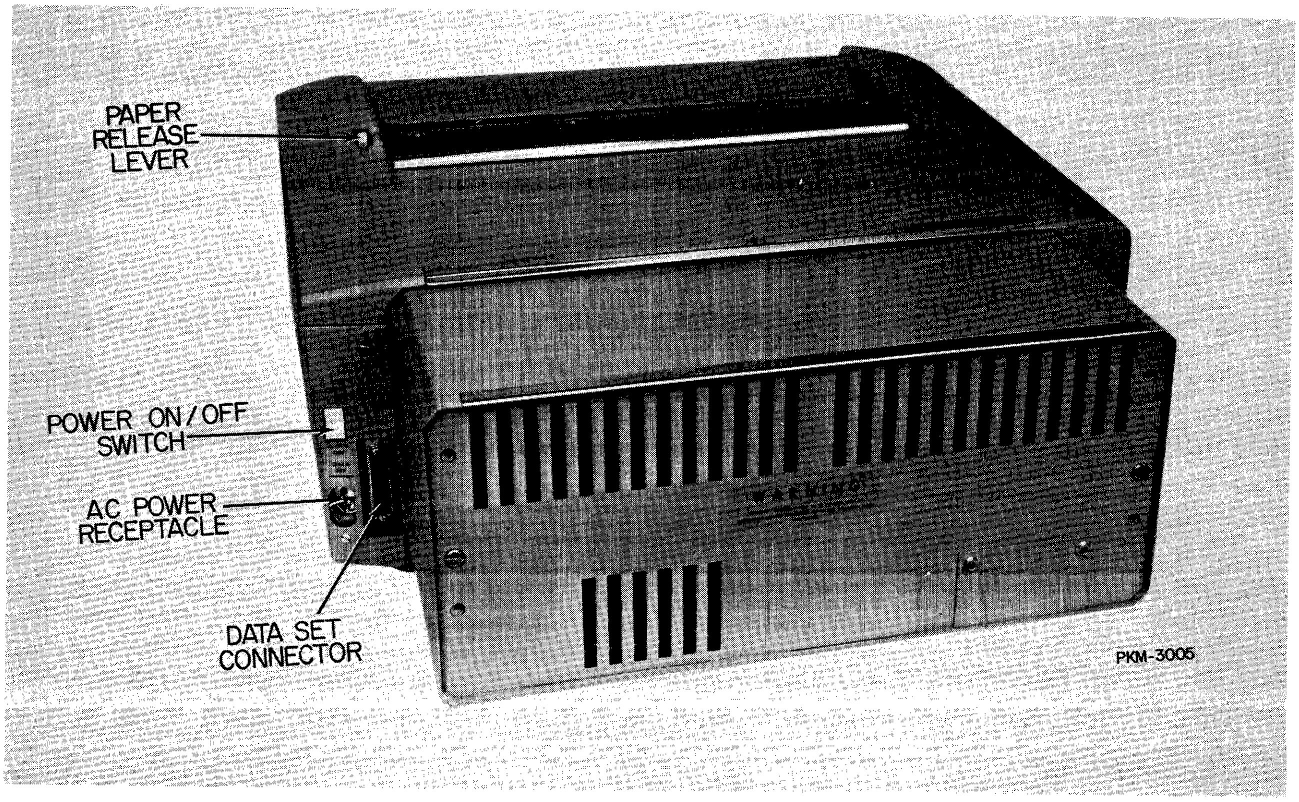


Figure 3-3. Right Rear View of Printer.

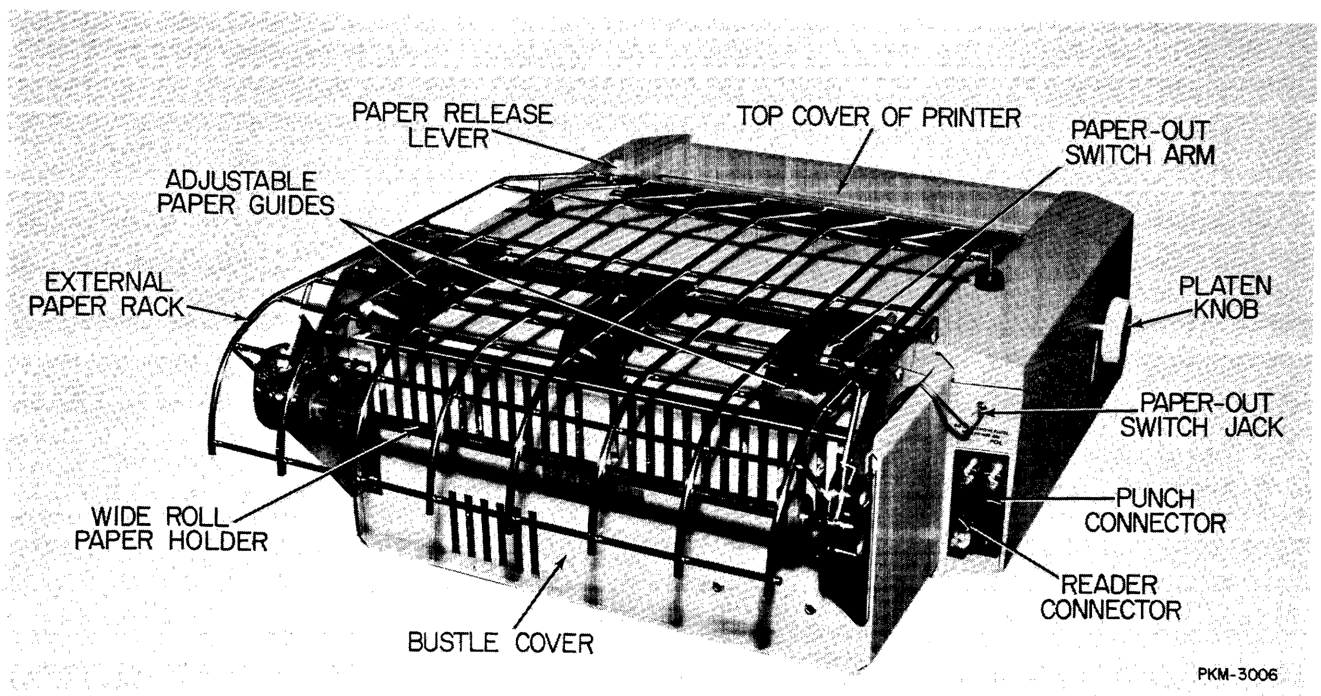


Figure 3-4. Left Rear View of Printer.

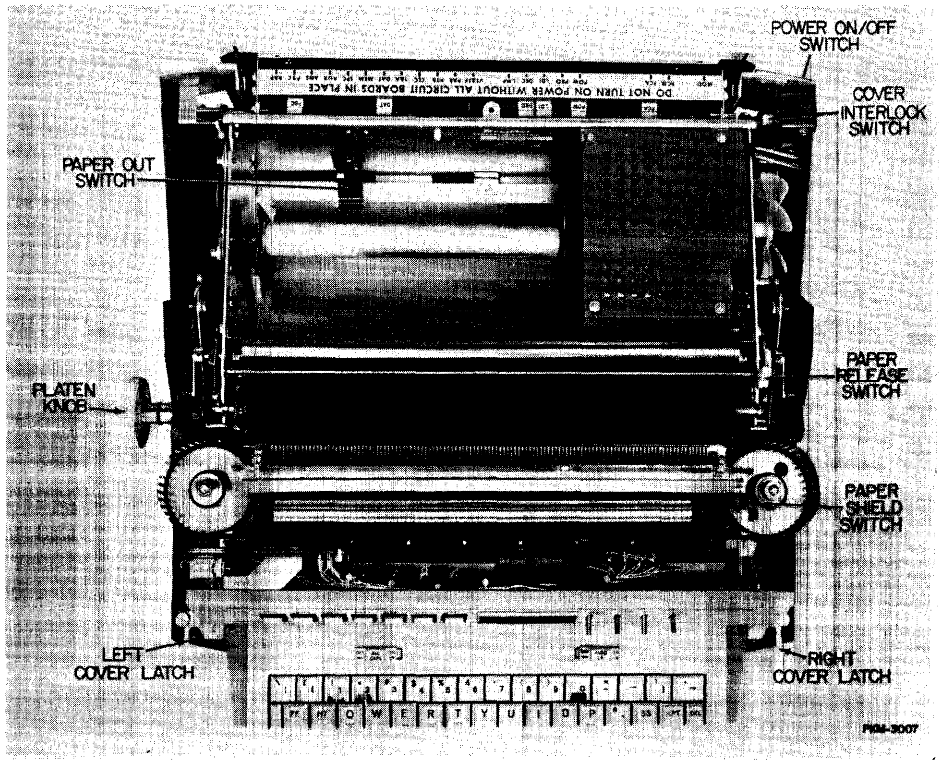


Figure 3-5. Switch Locations and Manual Controls.

AUDIBLE INDICATORS

- Beep tone each time a character is sent.
- High pitch beep tone at print position 69 (111, long print line) and after print position 75 (118, long print line).
- High pitched beep tone when ALARM indicator lights.
- High pitched beep tone when INTERRUPT indicator lights.

KEYBOARD

(See Figure 3-1)

GENERAL DESCRIPTION

The keyboard of the Printer can generate all of the 128 ASCII codes. Special codes are generated by pressing the ESC (Escape) key or the CTL (Control) key and another appropriate key. The ESC key and its associated keys are shaded. Most of the control keys are identified on their front edge.

NOTE

The SHIFT, CTL, or RPT (Repeat) key must be held while the associated key is pressed. The ESC key must be pressed and released before the associated key is pressed.

PRINTER OPERATION KEYS

BS (Backspace) - This key moves the print position one position to the left without printing a character.

LF (Line Feed) - This key advances the paper one or two print lines depending on the setting of the LINE SPACE switch.

FF (Form Feed) - Optional - Pressing this key sends the FF character and causes the paper to advance to the beginning of the next form (see Section 2 of this Chapter).

HT (Horizontal Tab) - Optional - Pressing this key sends an HT character, and moves the printing position to a predetermined print position (see Section 2 of this Chapter).

RPT (Repeat) - Holding this key will cause any other pressed key to repeat at the rate of five characters per second regardless of speed setting.

RETURN - With the AUTO LF switch in the OFF position, pressing the RETURN key returns the Printer to the left hand margin or the first horizontal tab if this option is present. With the AUTO LF switch in the ON position, pressing the RETURN key returns the Printer to the left hand margin and causes a line feed.

SHIFT and LOK (Shift Lock) - Holding the SHIFT key down in conjunction with other keys causes the upper case characters to be printed and transmitted. The LOK key mechanically locks the SHIFT key until the SHIFT key is pressed.

SPACE BAR - This bar moves the printing position one position to the right without printing character.

VT (Vertical Tab) - Optional - Pressing this key sends a VT character, causes the paper to advance to a predetermined line (see Section 2 of this Chapter).

ESCAPE CODE KEYS

Horizontal Tab Set - When the ESC key and "1" (HT SET) key are pressed, in sequence, a tab will be set at the position indicated by the Print Position Indicator. (The "1" will not be printed.) Any number of tabs can be set on a print line (see Section 2 of this Chapter).

Horizontal Tab Clear - When the ESC key and "2" (HT CLR) key are pressed, in sequence, all tabs will be cleared. All tabs will also clear if the Printer is turned "off", however tabs will not clear when the Printer is placed in "Standby".

Motor Off - When the ESC key and "J" (MTR OFF) key are pressed, in sequence, the motor stops, if so jumpered.

Motor On - When the ESC key and "H" (MTR ON) key are pressed,in sequence, the motor starts, if so jumpered.

CONTROL CODE KEYS

Because the control codes are numerous and an explanation of their use is beyond the scope of this manual, detailed information on control codes is not included. Refer to the Operator's Manual (GEK-2184) for detailed information.

MANUAL PAPER HANDLING

PLATEN KNOB (See Figure 3-5)

To manually rotate the platen, push Platen Knob in and turn.

PAPER RELEASE LEVER (See Figure 3-5)

To release the pressure on the platen, move the Paper Release Lever to its forward position (toward the keyboard). To apply pressure to the platen for normal operation, move the Paper Release Lever to its rear position. The Paper Release Lever is locked in its forward position when a pinfeed platen is used. Tractor models don't have this lever.

PAPER INSTALLATION

Before installing paper, reference should be made to the paper installation decal located under the top cover of the Printer (Figure 3-7).

EXTERNAL PAPER SUPPLY

Place the paper supply at the rear of the TermiNet Printer so that the paper will feed over the external paper pan. If multiple form sets are used, the shiny side of the carbon paper must face up as the paper feeds over the paper pan. Adjust the paper pan for width of paper, allowing approximately 1/16" (1.6 mm) clearance on each side. The paper guides, mounted above the bustle, are adjustable to a maximum width of 12 27/32" (32.6 cm).

Slide the paper behind and underneath the platen. (When using thick, multiple copy sets, it may be necessary to push the platen knob in and manually turn platen to assist the paper around the platen.)

Adjust the two tractors on the forms tractor assembly setting above and just behind the paper shield by loosening the knurled knob located behind each tractor. Slide tractors horizontally to the left or right as required to line up with the paper width being used. Lock tractors in this position by tightening the two knurled knobs.

Open the covers on the tractors and fit the holes in the edges of the paper over the tractor pins as in Figure 3-6.

Close covers on the tractors and rotate platen by hand a few lines. Make sure paper is threaded through the paper out switch located to the left rear of the paper pan. The paper out switch senses when incoming paper is no longer at the top of the bustle and causes an "Alarm" condition. Approximately 16" (41 cm) of paper remain available when the "Alarm" occurs.

CAUTION

Make sure the right tractor is engaged with the slide assembly on the anti-snag device.

When using pin feed paper with the pin feed platen instead of a forms tractor, the internal paper-out lever should be depressed and locked in the full roll position.

INTERNAL PAPER SUPPLY (See Figure 3-5)

Follow the steps listed below in order.

- Press the cover release latches and raise the cover.
- Place the tube in the center of the roll.
- Set the roll in place.
- Feed the paper from the bottom of the roll over the paper tensioner and under the platen.

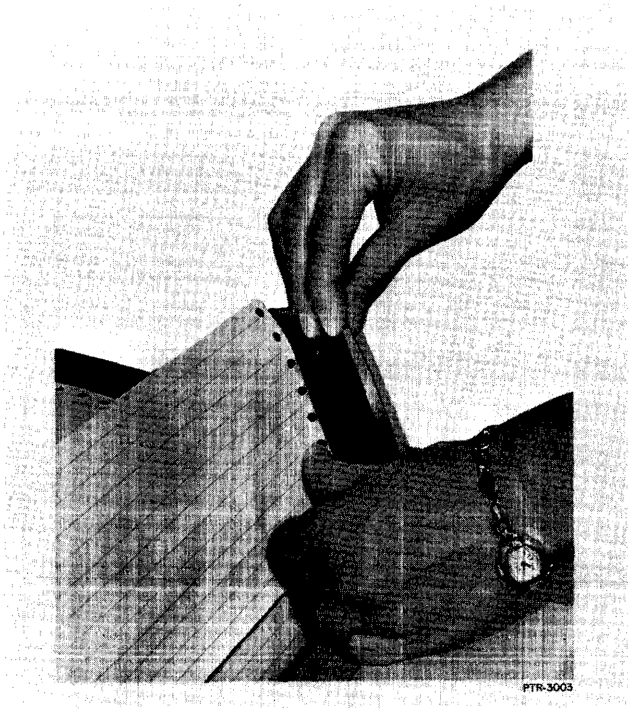


Figure 3-6. Fitting Paper Over Tractor Pins.

- Push the platen knob in, and rotate to advance the paper.
- To align the paper, release the paper friction lever and align the left edge of the paper with the black line on the shield.
- Return the paper release lever to the engaged position.
- When using sheet or pin feed paper, depress and lock the internal paper-out lever.

RIBBON INSTALLATION

Figure 3-8 shows the proper procedure for installing the ribbon. The spools used are a 150 FS Underwood style that has slotted hubs to fit the Printer. If ribbon is replaced, make certain that equivalent spools are used.

CAUTION

When changing spools, make sure there is enough clearance in the spool slot to allow the ribbon out sensor to operate without binding.

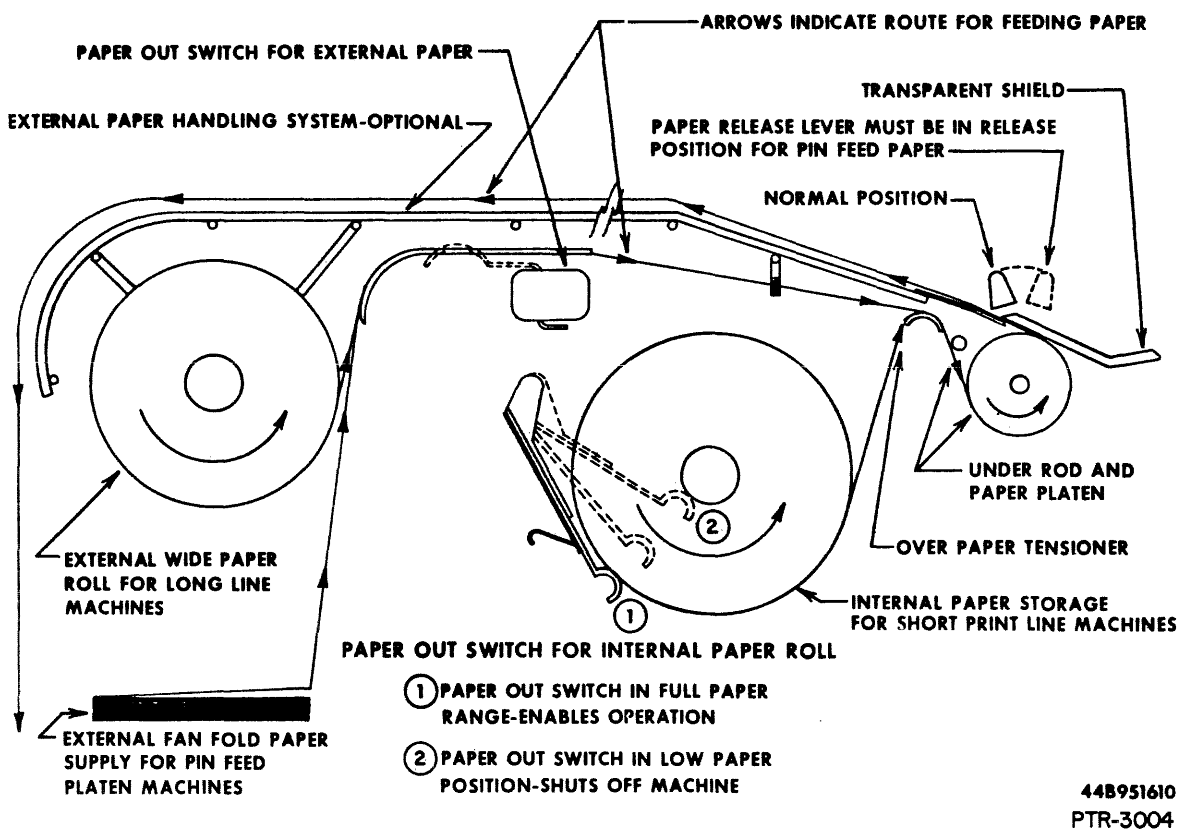


Figure 3-7. Paper Installation.

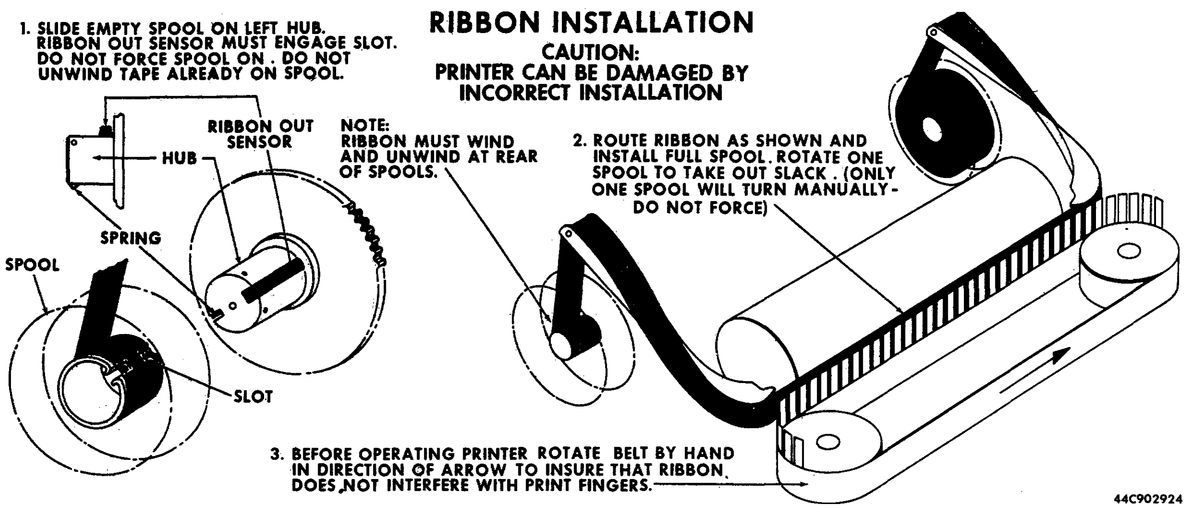


Figure 3-8. Ribbon Installation.

REPLACING PANEL LAMPS

(See Figures 3-9 through 3-14)

Follow the procedure outlined in Figures 3-9 through 3-14 for replacing panel lamps. Note that the HERE IS pushbutton has no lamp.

Figure 3-9. Loosening Cap.

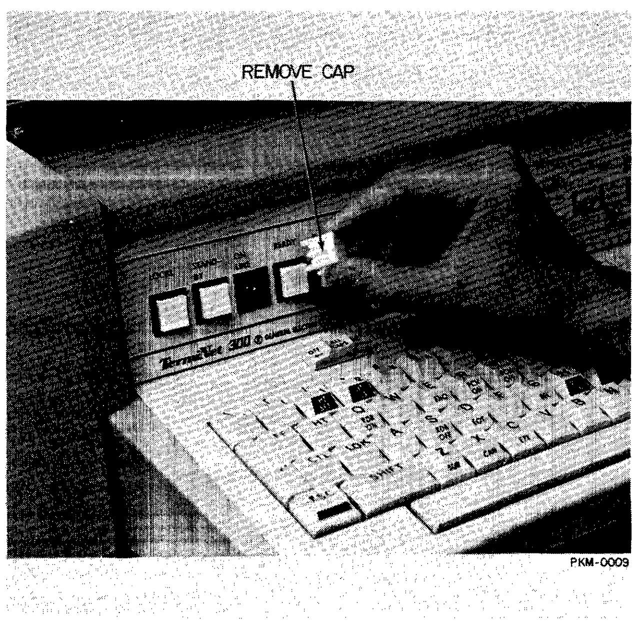


Figure 3-10. Removing Cap.

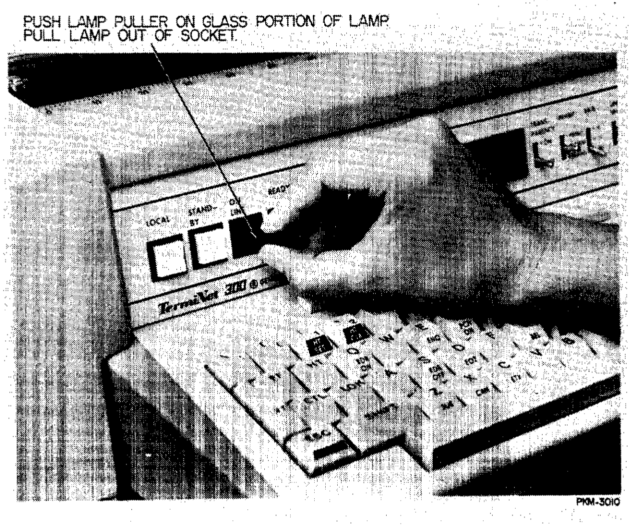


Figure 3-11. Using Lamp Puller.

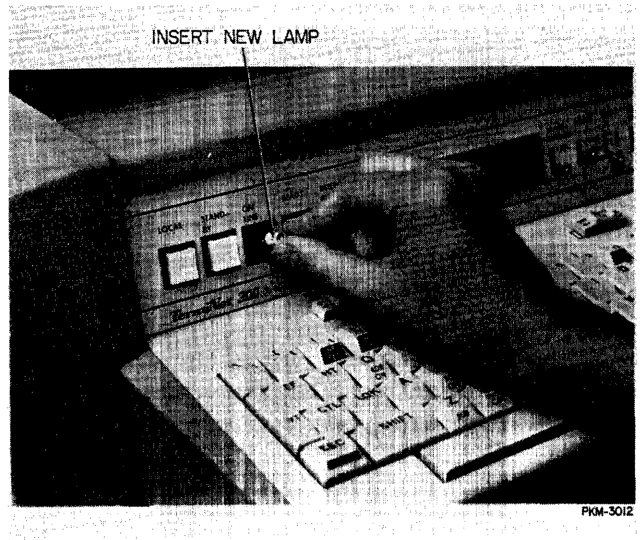


Figure 3-13. Installing Lamp.

Figure 3-12. Removing Lamp.

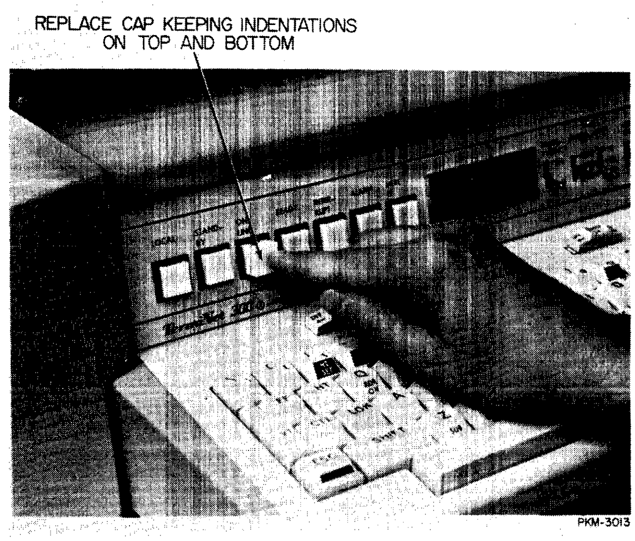


Figure 3-14. Replacing Cap.

SECTION 2

OPTIONS, GENERAL OPERATING INSTRUCTIONS AND INFORMATION

ANSWERBACK (44B417405-G03/G04) NOT USED

The answerback option consists of a printed circuit board which is inserted in the bustle at the rear of the Printer. The Printed Circuit Board contains a special encoding block in which diodes can be inserted to form up to 20 characters. In addition, the G04 board has an automatic answerback circuit which "looks" for the ring indicator from the data set and then looks for signal CB (Clear to Send). After the arrival of signal CB, the ANSC Printed Circuit Board automatically sends the coded answerback message. The new automatic answerback circuit also incorporates a built-in delay which allows the motor to come up to speed before sending the answerback message. For high speed operation (1200 baud transmission) using a 202C type data set, jumper 2J on the ANSC PCB must be removed to disable the automatic disconnect circuit; the automatic disconnect circuit on the 202 interfacing PCB is used.

To encode the ANSC board, perform the following steps:

1. Place the Answerback board before you with the non-component side toward you and the contact fingers to the left.

2. Remove the four screws attaching the encoding block to the board. DO NOT remove the four countersunk screws in the metal cover on the other side.

3. Lift the printed circuit board from the block.

4. With the orientation corner notch of the encoding block to your lower left, note the 21 by 7 array of holes. The rows are labeled BIT 1, BIT 2, etc. The columns are labeled STEP 1, STEP 2, etc. The rows correspond with the bits of the standard ASCII code. The columns correspond to the order in which the characters are executed. By following the ASCII code chart (see Figure 1-3 in Chapter 1), you can determine where to place diodes to obtain the desired message. (See Figure 3-15.)

NOTE

> Diodes must be inserted with the ring (cathode) or arrow pointing into the hole and toward the metal cover.

5. Insert the diodes provided into the appropriate holes to provide the desired message.

AUTOMATIC RETURN

Any character which causes the column count to advance beyond the last print position will be converted to a RETURN signal and cause the print position to automatically return to column one (no linefeed will be supplied). The character causing this return will be lost. The automatic return option is obtained by installing jumper 2J on the MEMC PCB. OK

AUTOMATIC MOTOR CONTROL

This option is accomplished by jumpering a DATC PCB. Normally, for high speed transmission (1200 baud) the Printer will be used with a 202 interfacing PCB and a 202C type data set which requires the use of a Group 2 DATC PCB. This option cannot be used with the Line Control Option.

BUILT-IN-MODEM (44A417330-003) NOT USED

The Modem (MOD) board serves the same purpose as an "originate only" dataset. It allows direct connection between the 25 pin interface connectors on the rear of the Printer and a data line using a MDAA (Manual Data Access Arrangement). It is suited for two-way simultaneous data flow (full duplex), at rates of 110, 150, and 300 baud, using frequency shift modulation.

Operating frequencies are as follows:

Transmit:	1 (Mark) - 1270 Hz
	0 (Space) - 1070 Hz
Receive:	1 (Mark) - 2225 Hz
	0 (Space) - 2025 Hz

Jumpers are provided on the MOD board to allow setting initial transmit level. See Chapter 4, Section 3, for jumpering information.

CURRENT INTERFACE (44A410761-G01/G02)

(See Figure 3-16)

The Current Interface option is available for all TermiNet Printers and consists of a DATI PCB and special data set cable. NOT USED

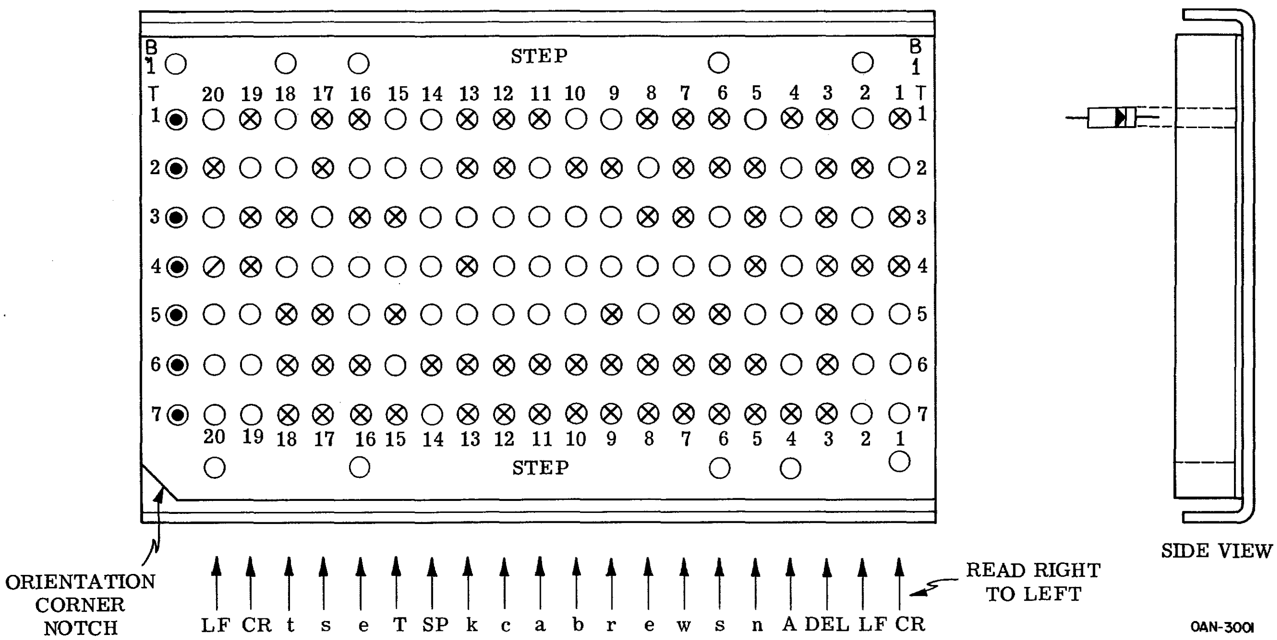
DESCRIPTION OF EQUIPMENT

The DATI PCB is installed in the DATC bustle slot and is a current loop interface which is available in two different configurations as follows:

DATI/2 - For transmit and receive. Uses external current source.

DATI/3 - For transmit and receive. Has internal current source (in transmit loop only).

In order to permit a user to convert from any RS-232C interfacing device to the current loop interface (DATI), two kits are offered which include the special data set cable (44B412537-G01) required when using this interface.



1. Diode positions are indicated with symbol ⊗ for sample message shown below block drawing.
2. Insert diodes in block, as shown in side view.
3. Insert pins in positions indicated with symbol ◉ to make connection between block and printed circuit boards.
4. Start 1st character in row No. 1 at extreme right.
5. Use diodes Catalog No. 44A410259-001 having special tips.
6. Solderable jumper is moved to last programmed character.
7. Diodes must not be inserted past the soldered jumper.

Figure 3-15. Encoding Block

KIT PART NUMBER	KIT CONTENTS
44A410761-G01	Kit includes DATI/2 with cable
44A410761-G02	Kit includes DATI/3 with cable.

The G01 kit including the DATI/2 board may be used with "Receive Only" Printers. This would give the user an added benefit of having the "Status Monitor" feature. The G02 kit includes the DATI/3 board which incorporates an internal current supply on the transmitted data lines.

OPERATION OF EQUIPMENT

The TermiNet Printer usually employs the use of an integral modem or a standard EIA-RS-232C data set for interfacing with other equipment. The DATI offers a third possibility where modem characteristics and complexity are not required or where ground isolation is needed between the TermiNet Printer and the opposite end of the data link. A typical application of the DATI current loop interface system would be a hard-wired, in-plant terminal to terminal or terminal to computer data link. The current loop interface (DATI/2 or DATI/3) can be used in either a two or four wire system with the following characteristics:

PRINTER	TWO WIRE	FOUR WIRE
RO	Printer will receive only. Status cannot be transmitted back to the data source.	Receive and transmit circuits both present allowing status of the Printer to be transmitted back to the data source. ON-LINE sets transmitted data at MARK.
KSR/ASR	Printer will not allow local copy to be inhibited.	Normal full duplex operation is possible. LOCAL sets transmitted data lines at SPACE.

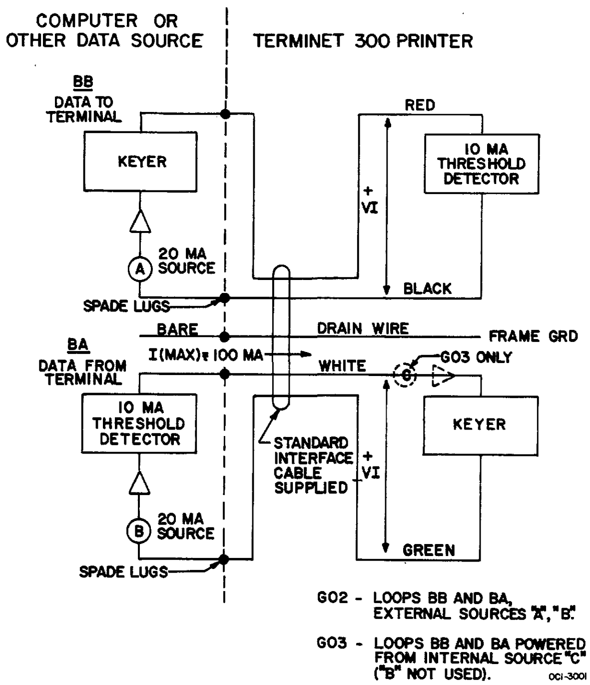


Figure 3-16. Current Loop Interface System.

"Back to back" operation of TermiNet Printers (KSR or ASR) is possible provided both are equipped with the DATI/3 board.

Interconnection cables used with the DATI interface may be very long compared to the distances permitted under the RS-232 voltage interface provided the current source can provide the 20 milliamp current level for data.

One Printer equipped with a DATI/3 board can drive up to four receivers connected in series.

JUMPER OPTIONS

Jumper options for the DATI PCB are defined in Chapter 4.

INSTALLATION

The DATI board, which can be field installed requires a special data set cable which is a five foot long shielded cable with spade type terminal lugs on five leads - four colored and one bare. The bare wire is the drain wire going to frame ground. The red and black leads are for received data (BB) with the red lead positive (current in). The green and white leads are for transmitted data (BA) with the white lead positive (current in).

The threshold potentiometer (1P) on the DATI board is factory set, and no attempt should be made to adjust this in the field.

DATA LINE SPECIFICATIONS

Maximum Open Circuit Voltage - 25V

Maximum Line Current - 100 MA

Maximum Voltage, Line to Frame Ground - 30V DC

Maximum Detector Drop at 20 MA - 2.0V

Maximum Keyer Drop at 20 MA - 1.0V

Detector Threshold - 0-5 MA (Space), 15-20 MA (Mark)

EXTERNAL PAPER HANDLER

The external paper handler option may consist of either a forms tractor with external paper rack mounted on top of the Printer (see Figure 3-17) or a pin feed platen and external paper rack. Either option provides a means to guide various widths (up to 12 27/32 inches) of fanfold pin feed paper to the platen. An adjustable anti-snag device is supplied with the forms tractor when this option is selected (factory installed option).

The wide roll paper holder with external paper rack (see Figure 3-18) is added for friction feed Printers requiring wide roll paper. This option provides a shaft mounted on the rear of the bustle to hold the paper roll. Roll diameters up to four inches may be accommodated.

Models with forms tractors have paper guide pans mounted above the bustle which are adjustable to a maximum width of 12 27/32 inches.

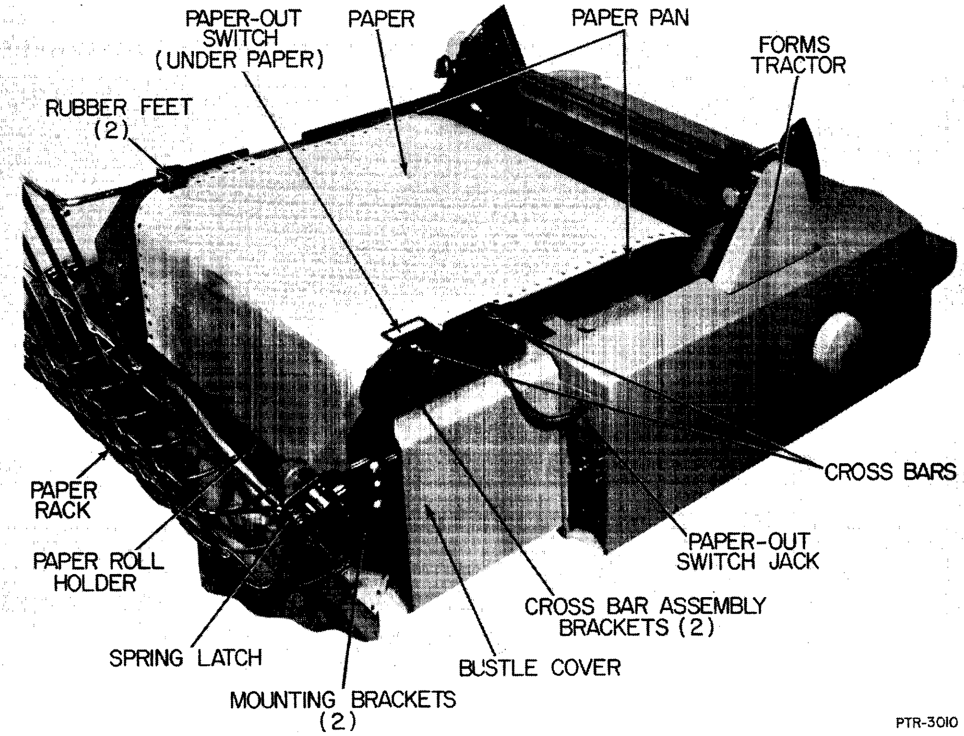


Figure 3-17. External Paper Handler Using Forms Tractor.

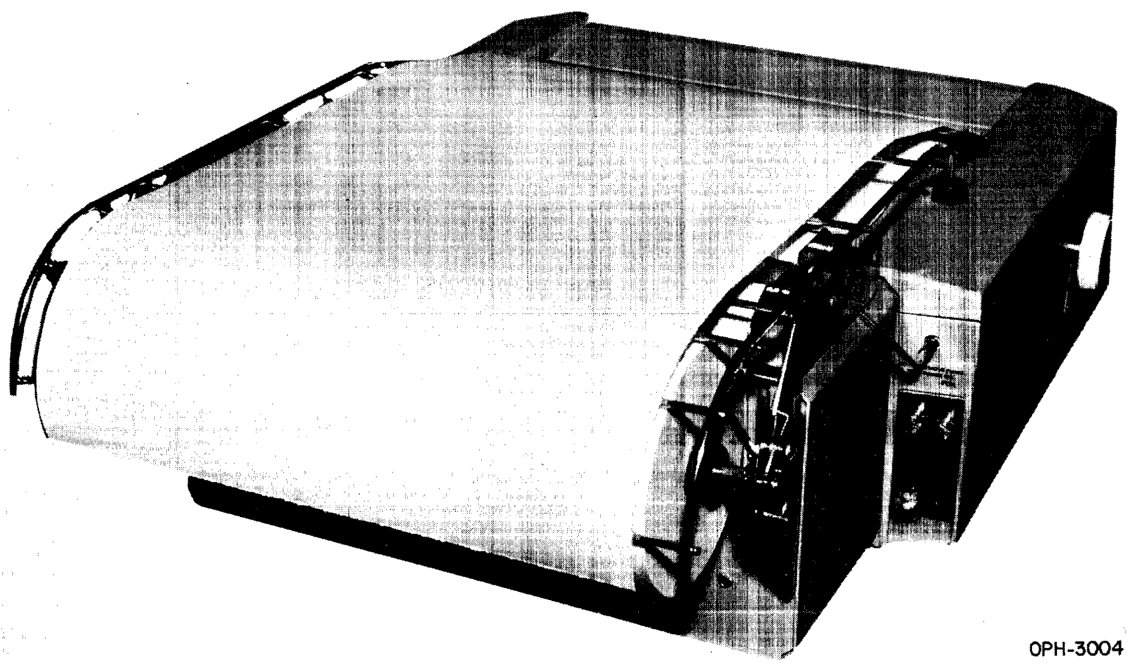


Figure 3-18. External Paper Handler Using Wide Roll Paper Holder.

The paper-out switch on forms tractor models senses when incoming paper is no longer at the top of the logic rack and causes an "Alarm" condition. Approximately 16" of paper remain available when the "Alarm" occurs.

NOTE

See Chapter 5, Section 2 for adjustment procedures.

HORIZONTAL TABULATION (44B412157-G02) YES

This option is accomplished by adding the Horizontal Tabulation (HTBC) PCB.

TAB SET - A tab is set when the escape (ESC) character is recognized and followed by the 1 (one) character. Any number of tabs can be set on a print line. The tab is set at the position showing on the PPI.

TAB CLEARING - All tabs are cleared when the escape (ESC) character is recognized followed by the 2 (two) character.

NOTE

When power is turned off, all tabs are dropped. The tabs do not drop when the Printer is changed to the "Standby" status.

LINE CONTROL (44B417409-G07/G09)

The Line Control option is obtained by installing a group 7 PSCC PCB. (See note concerning the group 9 PSCC PCB.) Neither the Status Monitor option nor the Automatic Motor Control option may be used with the Line Turn-Around option. The PSCC G07 PCB can be jumpered so that ACK or NAK is transmitted after the answerback message. The following functions take place with this option:

1. Line Turn-Around - Printer recognizes control codes to change state of data set lead CA. The following control codes cause this function: ACK, ETX, NAK

2. Wait before transmit:

   - Control "READY" lamp by DLE ?

   - ENQ exchange.

3. Mandatory disconnect - Forced disconnect when Printer recognizes DLE-EOT.

4. Printer recognizes NAK as equivalent to "Break" or "Interrupt".

5. Terminal status - Printer responds to ENQ with ACK or NAK to show Printer status. If answerback is included, ACK or NAK will be last character after answerback.

NOTE

Either EOT or ETX or both are treated as turn codes on PSCC/9 by using diodes to jumper certain cups on the board. Jumper details are given in Table 4-2, Jumper Options.

MAGNETIC TAPE OPTION NOT USED

The TermiNet Cassette Accessory (TCA) is a separate auxiliary device which can be used with a KSR or SR Printer. It employs a magnetic tape and is used as an alternate to paper tape equipment. The TCA is connected to the rear of the Printer through a multi-conductor cable. It provides data storage and retrieval capability using magnetic tape. Read and write speeds are 10, 15, 30, or 120 characters per second. The TCA can be commanded locally or from a remote location to read, write, rewind or stop. A logic interface board (TRP) must be inserted into the R&P slot of the Printer bustle when the TCA is used.

NUMERIC CLUSTER

The Numeric Cluster option is a separately housed, 15-button keyboard which includes a two-foot cable for attachment to the keyboard of a standard TermiNet 300 Printer. It would normally be placed beside the Printer in a convenient spot for the operator. The cable is provided with an attached connector which passes through a clearance hole on the underside of the Printer's keyboard.

As shown in Figure 3-19, the key buttons include the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and the graphic symbols . + * = and ,. The decimal point is grouped with the numerals while the other symbols are slightly separated and to the right of the numerals.

The purpose of this option is to simplify the entry of numerical data by providing a convenient grouping of the numeric keys and the five graphics.

The Numeric Cluster is field installable and may be used on any KSR or ASR Model "C" TermiNet 300 Printer.

OPERATION

Pressing the key buttons on the Numeric Cluster will generate the ASCII code for the associated characters and cause them to be printed and/or transmitted by the TermiNet 300 Printer. The Printer's keyboard is unaffected by the use of the Numeric Cluster so these characters may also be generated by using the proper button on the standard keyboard.

PAPER TAPE OPTION

A Pedestal or Desk, Tape Punch, and Tape Reader is available as an option to be added to any KSR NOT USED

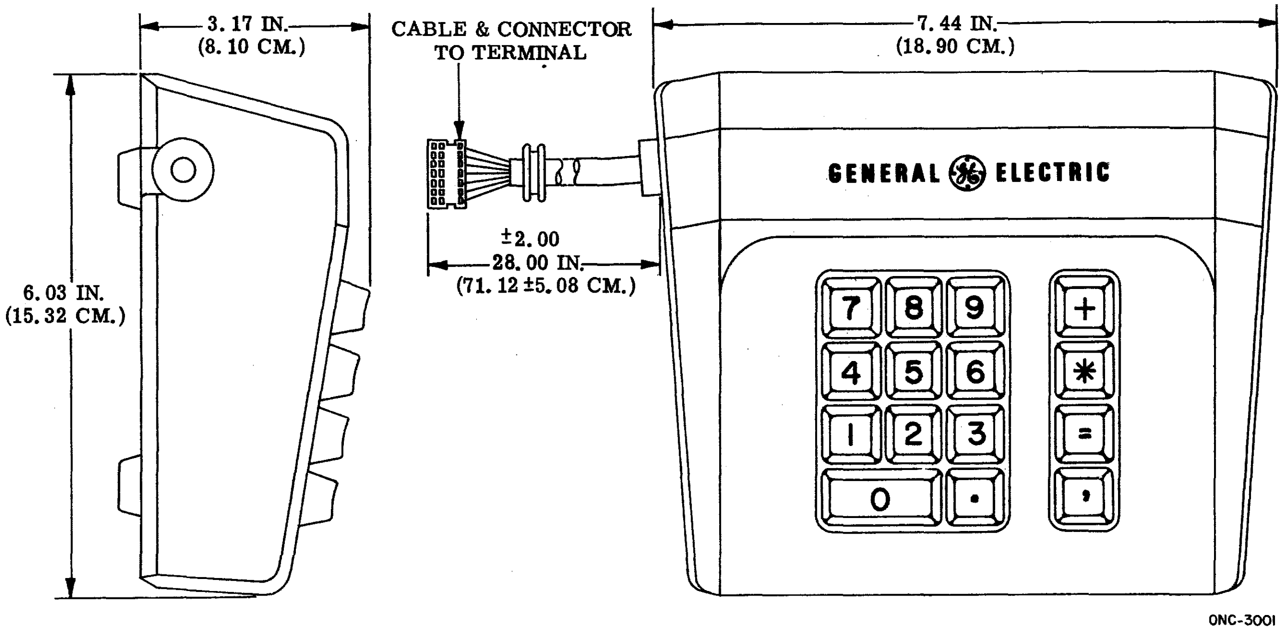


Figure 3-19. Outline of Numeric Cluster Option.

TermiNet Printer and can be installed in the field. A Reader and Punch board (R&PC) is necessary to interface the Reader and Punch with the Printer.

READER

Type: Photoelectric, fully reversible

Tape: One inch EIA, fully perforated, paper

Speed: Up to 120 characters/second

PUNCH

Type: Step and Punch - Solenoid driven

Tape: One inch EIA, paper

Speed: 10, 15, or 30 characters/second determined by RATE selector switch on Printer.

For operating and service information pertaining to this option, refer to Paper Punch and Reader Service and Parts Manual, GEK-14776.

PARITY ERROR DETECTION (44B417415-G01)

The Parity Error Detection option is accomplished by adding the PARC PCB in the bustle.

Parity checking is a technique used to determine whether a correct code has been transmitted or received. The procedure is simply to count the number of bits in a character and determine if the total is even (EVEN parity) or odd (ODD parity).

The parity error detection feature examines each locally generated or received character to determine whether or not there is EVEN parity. In FULL DUPLEX, received data only is checked for parity errors.

If a character is detected with incorrect parity (ODD), there are two possible sets of actions depending on the position of a wire jumper.

Jumper Position #1

Sounds Alarm - momentary

Lights INTERRUPT light until manually reset

Transmits "Interrupt"

Turns Motor "Off" (see note)

Goes to "Standby"

Stops Reader

Jumper Position #2

Sounds Alarm - momentary

Prints Diamond (see note)

Lights INTERRUPT light until manually reset

Does Not Transmit "Interrupt"

Does Not Turn Motor "Off"

Does Not Go to "Standby"

Does Not Stop Reader

On units equipped with the "Transparency" option, a strap on the parity error detection board allows the parity checking to be operative or inhibited when the Printer is in the Transparency mode.

NOTE

In the case where the motor is turned off, it is possible to lose the last few characters because there is no time delay to allow for clearing out the memory.

If a non-printable character (space, delete, or control code) is detected to have a parity error, the diamond will not be printed and the Printer will not advance to the next print position.

If the keyboard Printer is used in conjunction with a paper tape reader and a parity error is detected, a jumper on the PARC board may be installed which will cause the Printer motor to stop, an interrupt to be transmitted, and the reader and data terminal ready lead to be turned off. In the case of received data being punched on tape, a character having a parity error will be punched as it is received. The punch will not be turned off.

NOTE

See Chapter 4 for PARC board jumper options.

NOT USED

RED AND BLACK RIBBON

This option requires a special SPC board and special MEM board.

SPCC/3 (44B412156-G03) or SPCC/5 (44B412156-G05) can be used, however, the G05 board is preferred because it provides 160 ms detect break on received data.

MEM boards required for this option are as follows:

Standard Printers

MEMC/5 (44B412158-G05) (75/118 column)

MEMC/7 (44B412158-G07) or PMEM/2 (44B417413-G02) (80 column)

Printers with Single Point Tab Option

SMEM/1 (44B417455-G01) (80 column)

SMEM/2 (44B417455-G02) (75/118 column)

Export Model (50 Hz) Printers

FMEM/2 (44B417433-G02) (75/118 column)

FMEM/4 (44B417433-G04) (80 column)

FMEM/6 (44B417433-G06) (80 column) (Used with Parallel Interface Option)

Different ribbon height adjustment is necessary and ribbon lift solenoid gap. (See Chapter 5, Maintenance for details.)

The part number for the red/black ribbon is 44A417 013-003 (Olivetti #210-4677AAB/DP).

Fill characters are required before and after changing color.

Before: 300 msec. (6 characters at 30 cps, 3 characters at 15 or 1 character at 10) after last printable character before ESC 3 or ESC 4.

After: 50 msec. (2 characters at 30 cps, 1 character at 10 or 15 cps) after the ESC 3 or ESC 4 before the next printable character.

SELECTIVE ADDRESSING AND POLLING (44B417418-G01)

NOT USED

The Selective Addressing option is added by the installation of the ASXC PCB in the bustle of the Printer. This option is for use in a party-line network and allows addressing of up to 96 Printers using a single character address. The parallel interface option cannot be used with this option. Provision is made for group addressing and for "all-call". Jumpers are provided to disable both the "all-call" and group address recognition if desired. Address codes are field programmable and may be changed without the use of special tools.

The Poll Select (factory installed) option may be used in addition to Selective Addressing. This option consists of a PSCC G05 (parallel to serial converter) printed circuit board, a ASXC G01 printed circuit board, and a BID pushbutton switch on the control panel in place of the HERE IS pushbutton. The Poll Select option would be used in a polling system in which a central computer has the capability to question or poll a specific terminal in order to determine if it has any data for the computer. The Select option functions normally except that one of its codes is used for polling. Machine Poll Code Characters (PCC) are any of the 32 printable characters from columns 2 or 3 of the USASCII Chart. The Answerback option is not necessary but would be a logical part of many polling systems. By maintaining bits 1 - 6 unchanged in the PCC but changing bit 7 to a "1" (columns 6 or 7 of the USASCII Chart) the machine Errorcheck Code Character (ECC) is formed. Receipt of this character in place of the PCC will cause the Printer to respond with status information and parity error information if the Parity option is installed.

SETTING UP THE DIODE MATRIX

With the ASXC board resting on the solder side, and the connector fingers facing outward, the two groups of 28 cups will be located in the upper right-hand corner of the board. Each group is divided into 7 rows of 4 cups labeled 19D - 25D and 28D - 34D. In each row, a diode of pre-cut length can fit into one of two positions. When shifted to the right, the diode will be in the "A" position. When shifted to the left, the diode will be in the "B" position.

Each row numeral corresponds to that particular ASCII code bit of the "select code character". The "A" position corresponds to a "0" bit and the "B" position corresponds to a "1" bit.

The table below shows how the board would be coded if an upper case "G" were chosen as the "select code character". The ASCII code for bits 7 through 1 is (1000111).

TABLE ILLUSTRATING ASXC CODING

ASCII BITS	ASCII CODE	MSL* DIODES	GSL** DIODES	POSITION
1	1	34D	19D	B
2	1	33D	20D	B
3	1	32D	21D	B
4	0	31D	22D	A
5	0	30D	23D	A
6	0	29D	24D	A
7	1	28D	25D	B

* MSL - Individual Selection
**GSL - Group Selection

TRANSPARENCY SWITCH

The Transparency option allows the Printer to process codes other than ASCII when the TRANSPARENCY switch is in the ON position. All Printer decoding is inhibited. The Transparency option is normally used with either a tape reader and punch or with an auxiliary device that is using a code other than ASCII. Remote control of the punch or reader is not possible but a received "Break" will stop a transmitting tape reader. Parity can also be checked if that option is in the Printer.

VERTICAL TAB AND FORM FEED (VTFF)

DESCRIPTION - This option allows the Printer to rapidly feed paper (6 3/4 inches per second) to a predetermined line position upon recognition of a locally or remotely generated form feed (FF) or vertical tabulation (VT) code. The option consists of a Vertical Tab and Form Feed printed circuit board (VTFC) which fits into the main bustle and a frame mounted photoelectric device.

A programmable disc, containing the number of divisions corresponding to the number of print lines on one sheet of paper, is coupled to the line feed drive shaft. These divisions are as follows for the various form sizes:

FORM SIZE	DIVISION
8 inches	48
8 1/2 inches	51
11 inches	66

Figure 3-20 illustrates the disc used with 11 inch forms.

For form-feed operation, this disc can be punched with the disc punch (see Figure 3-20) so that the recognition of a FF code causes the line feed drive to run quickly to the first line of printing on a new form. The vertical tabulation operates in the same manner as the form feed. The programmable disc controls the response of the Printer to a recognized VT code. This operation is used for rapid consecutive line-feeds within a particular form.

The VTFF is designed to help prevent mis-indexing of a form if the operator should inadvertently press the VT rather than the FF key. Recognition of a VT code causes either vertical tabulation or form feed indexing depending on which hole appears next on the programmed disc. If there are no holes punched in the disc or there is a malfunction in the sensing mechanism, a timer will stop paper feeding within a few seconds.

PROGRAMMING THE DISC

1. Mount disc on punch so that disc-key protrudes through the disc key hole (see Figure 3-21).

2. By rotating the disc, set the desired number in line with the VT and FF holes. This number should coincide with the line position where the form is to be started.

3. Press punch in the FF hole to punch a hole in the disc in line with the desired numbered position.

4. Rotate the disc, and punch a hole at each VT position where the form is to have a vertical tab stop.

OPERATING THE VTFF OPTION (See Figure 3-22)

1. Press a pre-punched disc over the keyed hub of the disc wheel until it can be rotated. Rotate disc until key on wheel protrudes through the disc keyhole.

2. Press the FF key. The Printer will line feed to the first line position that is to be printed.

3. Advance the form so the first line to be printed is under the embossed characters on the fingers. The Printer is now ready to print.

STATUS MONITOR

The Status Monitor option can be provided by adding a Group 1 DATC PCB. If a 202PCB and a 202C type data set is being used for high speed transmission (1200 baud), a Group 2 DATC PCB is required. In this case, the Status Monitor cannot be jumpered on the DATC PCB, but can be made available by a jumper option on the 202 board. The Reverse Channel Option must be used.

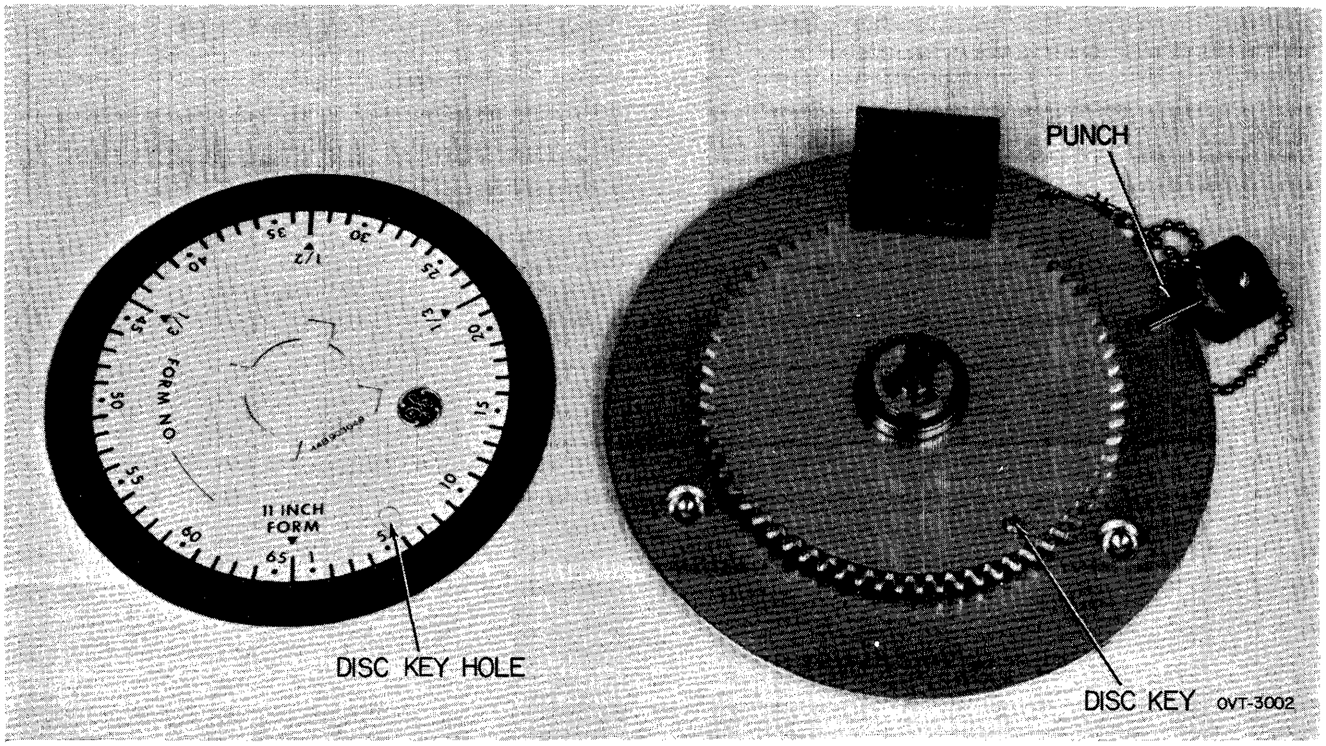


Figure 3-20. Programmable Disc and Disc Punch.

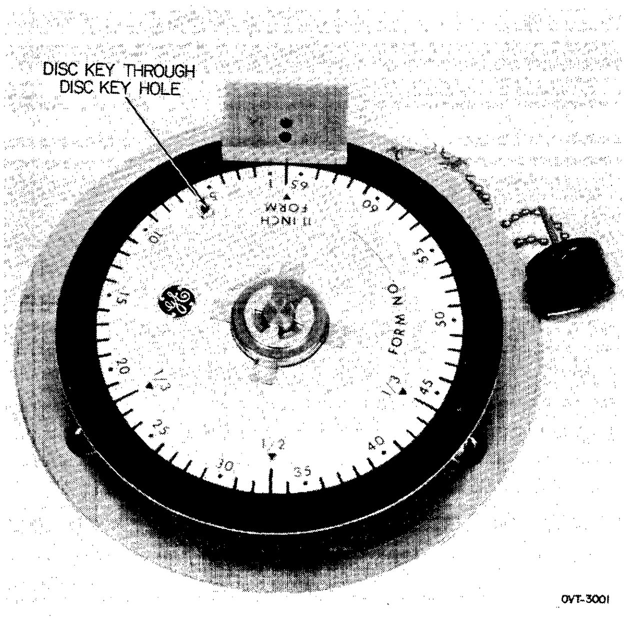


Figure 3-21. Programmable Disc on Disc Punch.

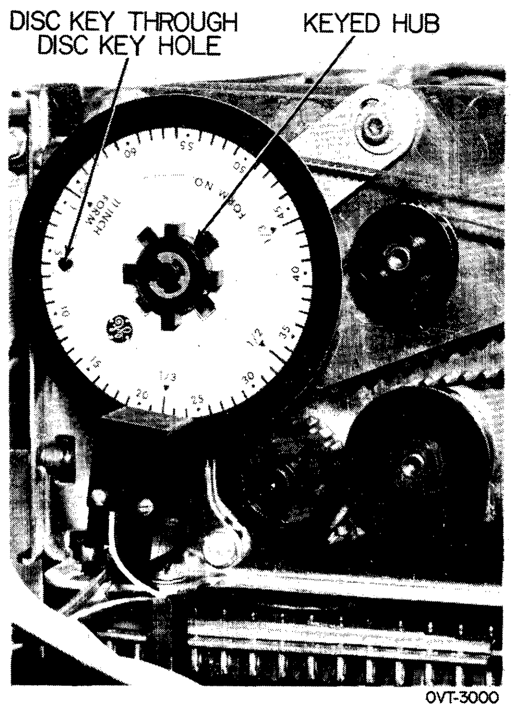


Figure 3-22. Programmed Disc Mounting

SECTION 3
MECHANICAL OPERATION

KEYBOARD

Key encoding occurs when a key is pressed, causing electromagnetic coupling of a drive signal line and two sense lines, which are all routed through the magnetic "U" Core associated with the key. The two sense lines generate a preliminary row and column code which is further encoded within the Sense Line Buffer to give the standard ASCII Code.

These are 56 combinations of paired sense lines, each pair selected so that they are "code printed", which means that a particular sense line, when energized, would always be associated with a certain bit pattern.

The encoding process also detects the simultaneous pressing of two or more keys and inhibits the generation of erroneous characters. If more than one key is pressed, the first key to make contact will produce a character; the last key released, if different from the first one pressed, will also produce a character.

Figure 3-23 shows the general shape of a ferrite "U" core and a ferrite "I" bar. Each ferrite "I" bar is connected to a key. When the key is pressed, the ferrite "I" bar mates with the "U" core and completes the magnetic circuit.

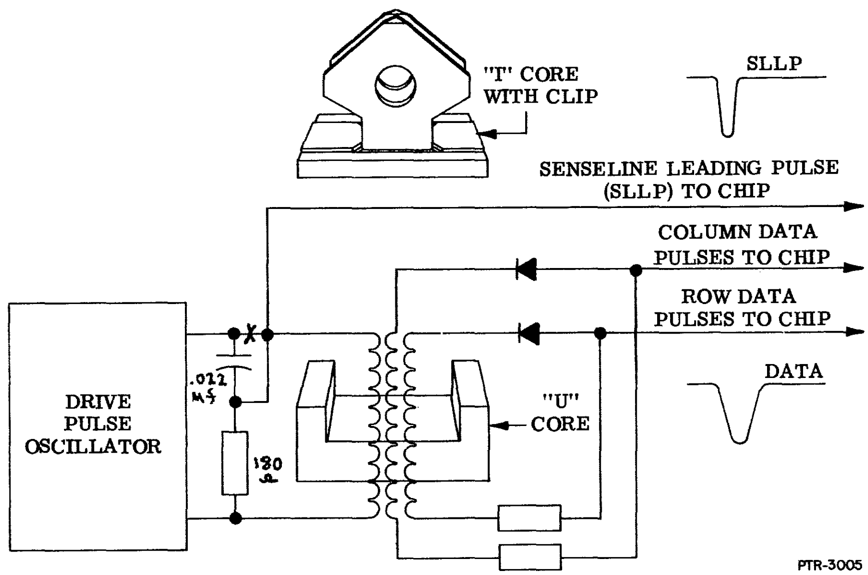
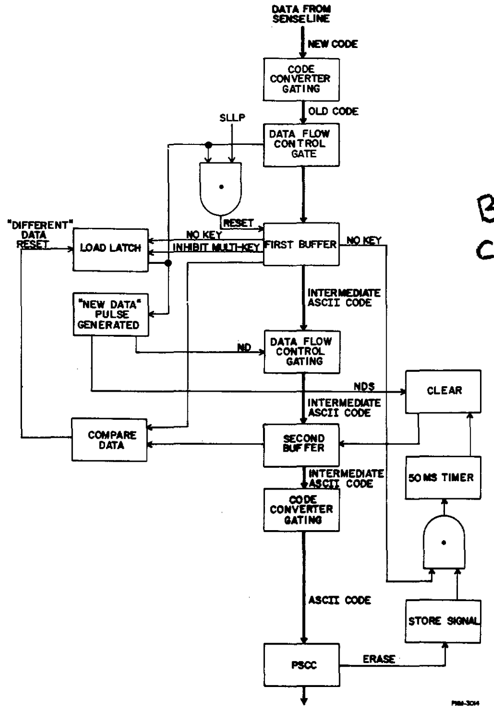


Figure 3-23. "U" Core Mechanics.

The "U" cores are mounted through a double-sided printed circuit board referred to as a Sense Line Converter board (SLC).

When a key is pressed, the associated ferrite "I" bar closes the air gap of the associated "U" core. Through transformer action, the next drive pulse in the drive line is coupled to the lines routed through the core, and the sense line leading pulse (SLLP) resets the first buffer (see Figure 3-24). Data pulses enter the B-2 chip on the SLC board from the sense lines. The new sense line code is converted to the old sense line code. The converted data passes through a control gate and enters the first buffer. Inside the buffer, the data is checked for the number of keys pressed. If only one key was pressed, the loading signal is turned off and the data can neither be erased or altered until processed and typed. When the loading signal is turned off, a pulse is generated to clear the second buffer. As soon as the second buffer is cleared, another pulse is generated to enable flow control gating between the two buffers. The second buffer then accepts data stored in the first buffer. The data in the two buffers is compared; when found to be the same, the loading signal is again turned on, and data flow into the first buffer will resume. Data from the second buffer is then presented to the code converter gate, put into the final form (ASCII), and presented to the Printer for processing. The Printer accepts the data for typing, and transmits a keyboard feedback signal. The feedback signal is stored until the key is released, starting a 50 millisecond timer. If a "no key" condition remains for 50 milliseconds, the second buffer is cleared. If not, the timer will reset, and data in the first and second buffers will be compared. If this data is the same, the "no key" condition is interpreted as key bounce, and data from the first buffer will be rejected by the second buffer. If the data is not the same, the second buffer will accept the data for processing.



B2 CHIP

Figure 3-24. Functional Block Diagram of the Keyboard.

HAMMER AND PRINT BELT ASSEMBLY

The Printer (see Figure 3-25) uses a flexible belt to carry the print fingers used for printing. The fingers are mounted in vertical slots through the belt. Each finger has a type character or symbol embossed on the other end. The belt holds two sets of 96 characters. Ninety-four of the 96 characters are printing characters in each set. The fingers can be replaced by lifting them vertically out of the finger slot in the belt. Note that two of the fingers are special index fingers and cannot be removed from the belt. These two fingers are wider at the bottom and serve as a reference point to trigger an electronic counting circuit used in the hammer and print finger actuation.

The print belt is driven by an AC motor and belt-drive system. The print belt travels counterclockwise (as viewed from the top) at a constant rate of approximately 94 inches per second in front of the paper and platen. An inking ribbon passes between the print finger and the paper. Printing takes place when a print finger is driven by a hammer against the ribbon and paper.

The actuation of a hammer against a print finger is electronically controlled by a timing process which uses an electronic buffer storage and counting system. When a character printout is "called for" by input data, the Printer buffers or stores the input data and permits simultaneous multiple hammer firing if "called for" fingers are in the correct position.

The position of each character in the belt is relative to the special wide index finger which is detected by the photocell light beam. This wide index finger triggers an electronic counting circuit which counts the finger movement of the belt. As the fingers in the belt move past each possible print column position, the column position is compared with the stored input data to determine when a finger is in the correct position. When this comparison indicates that the "called for" finger is in the correct column position, the appropriate hammer is fired. There is a hammer in each print position (column), for a total of 75 (short print line) or 118 (long print line).

All of the individual hammers (see Figure 3-26) are mounted on a common pivot rod. Each hammer is connected by its clevis to a solenoid plunger. The clevis engages a curved slot at the base of the hammer. The other end of the clevis is linked to the solenoid plunger. When the solenoid coil is energized by the hammer drive circuit, the clevis is pulled down by the plunger, causing the hammer to pivot forward about the pivot rod. The face of the hammer travels forward approximately .077 inch while being pulled by the clevis. The curved slot at the base of the hammer serves a dual purpose. It provides an easy means for disconnecting the clevis and allows a means of overtravel (free-flight) for the hammer.

The solenoids are mounted and spaced uniformly in banks on the coil bar assemblies. There are four coil bar assemblies mounted parallel to each other with an angular displacement. Each coil bar assembly consists of a top and bottom piece and two side pieces. The bars are supported at the ends by the belt pulley casting.

The solenoid plunger enters a hole in the top member of the coil bar. The bottom portion of the coil bar has a threaded hole to receive a threaded solenoid pole piece. The penetration of the pole piece in the coil bar is adjustable, and its position or depth is secured by a locking nut. This allows a travel adjustment of the upper plunger. The timing process of actuating a hammer is affected by the photocell position. The time from coil energization to hammer strike is approximately 1.3 milliseconds. When the hammer is at rest, it is held against the hammer backstop bracket by the hammer spring. Located between the hammers and the fingers is the rebound bar. The rebound bar acts as a stop for a finger after a character has been printed. This prevents the fingers from oscillating and either snagging on the hammers or causing print "ghosting".

RIBBON SPOOL DRIVE SYSTEM

The ribbon drive system (see Figure 3-27) uses a pair of reversible, constant tension drive mechanisms to transport the ribbon back and forth across the machine between the paper and the print fingers.

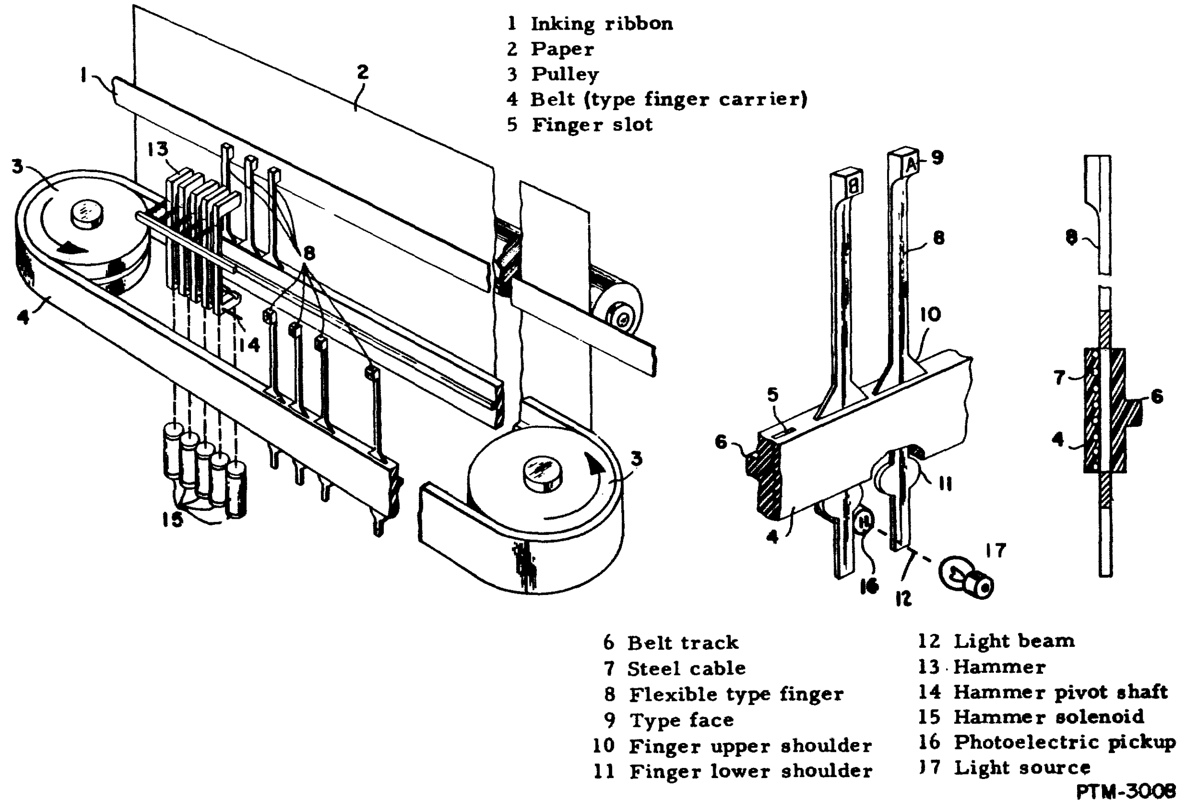


Figure 3-25. Hammer and Print Belt Assembly.

One ribbon mechanism is mounted on each side of the Printer frame. The mechanisms handle an inking ribbon and two spools. The full ribbon spool is mounted on the spindle of one drive assembly (either one) and the empty spool on the spindle of the other drive assembly. While the Printer is in operation, one spool, which is driven by power from the jack-shaft, will take up the ribbon from the other spool as it unwinds under constant tension.

The ribbon leaves and enters the spools via ribbon arms mounted on each side of the Printer frame. The ribbon arms support the ribbon as it stretches under tension across the machine in front of the paper.

When the initially full spool is empty, a sensing finger senses the ribbon-out condition and moves to engage an interposer arm and gear which causes reversal of the spool.

CAUTION

THE SLOT IN THE RIBBON SPOOL MUST BE WIDE ENOUGH TO ALLOW SUFFICIENT CLEARANCE FOR THE SENSING FINGER TO OPERATE FREELY.

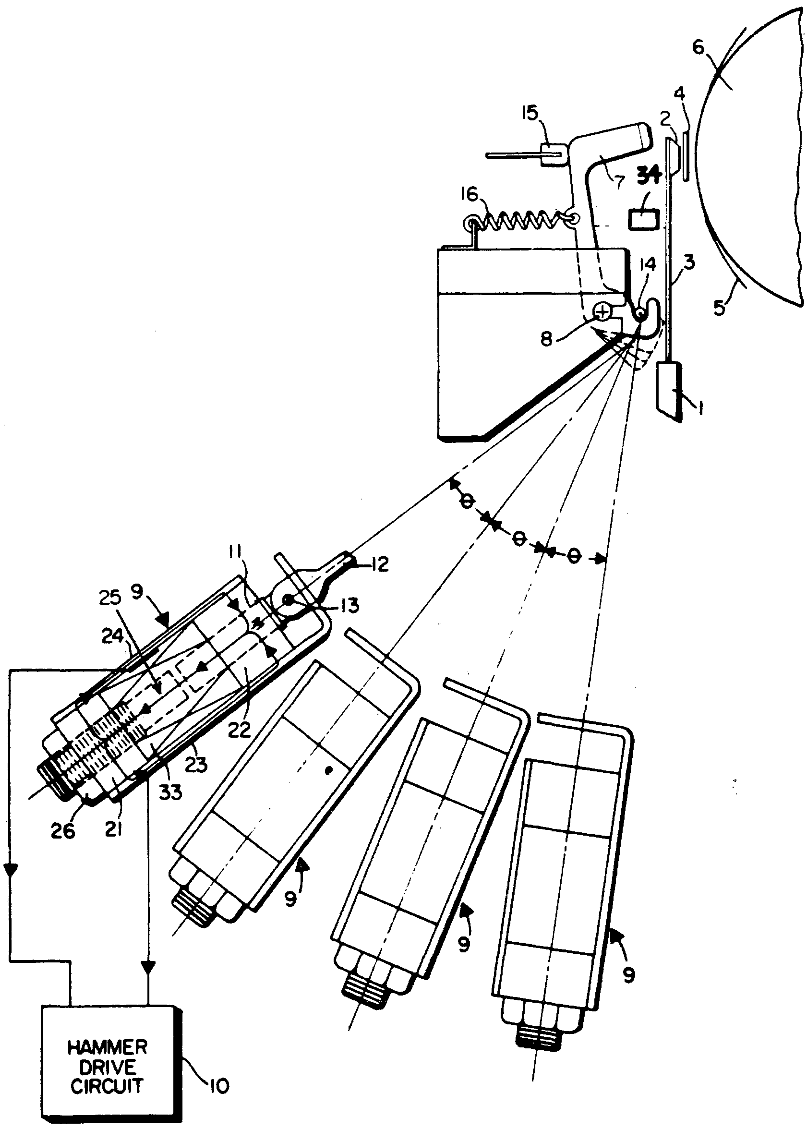
A ribbon reverse shaft connects the two ribbon drive mechanisms and causes both sides to reverse at the same time. In this way, the ribbon (approximately 16 yards or 14.6 meters) moves back and forth from one spool to the other.

NOTE

> The ribbon reversing mechanisms are equipped with a friction clutch to prevent immediate damage to the mechanism, or the ribbon in the event of an improper ribbon installation. Proper ribbon movement should always be verified after installing a ribbon.

<u>RIBBON LIFT</u>

The ribbon arms (see Figure 3-27) pivot up and down. The arms are connected together by a ribbon lift shaft. The ribbon lift solenoid is connected to the shaft so that when the solenoid is energized, the ribbon is lifted in front of the type font. The ribbon lifts only when the Printer is printing. With the ribbon dropped, the printed material can be viewed by the Operator.



1 Print Belt
2 Type Face
3 Print Finger
4 Inking Ribbon
5 Paper
6 Platen
7 Hammer
8 Pivot Rod
9 Coil Bar
10 Hammer Drive Circuit
11 Solenoid Plunger
12 Clevis
13 Clevis Pin
14 Clevis Pin
15 Hammer Backstop Bracket
16 Hammer Spring
21 Coil Bar, Bottom
22 Coil Bar, Top
23 Coil Bar, Side
24 Coil Bar, Side
25 Pole Piece
26 Nut
33 Coil Winding
34 Rebound Bar

PTM-3016

Figure 3-26. Hammer Actuation Mechanics.

MAIN DRIVE

The drive power (see Figure 3-28) for the Printer is provided by a motor located under the TXPC board at the right side of the Printer. The power from the motor is transmitted by means of the right drive belt to the right drive pulley on the jackshaft. At this point the power goes to the right ribbon reversing mechanism, by means of gear coupling, and across the machine by the jackshaft. The jackshaft transmits the power to three separate areas. The first being the line feed clutch used for advancing the paper. The second output from the jackshaft goes to the left ribbon reversing mechanism which is connected in a similar manner as the right ribbon reversing mechanism. The third output goes to the left drive pulley which transmits power to the print belt by means of the left drive belt. Anytime the motor is running the print belt will rotate and the ribbon will travel from one ribbon spool to the other. The line feed clutch only engages when a line feed, vertical tab or form feed (if VTFF option is present) is called for.

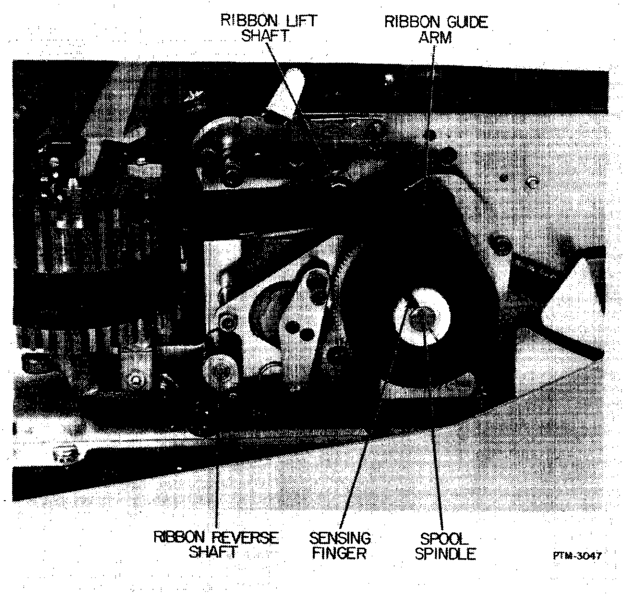


Figure 3-27. Ribbon Spool Drive System. (Right Side View)

PAPER HANDLING

GENERAL - When paper is supplied to the Printer by means of an External Paper Handler (Figure 3-7), fan-fold type paper, punched along the edges for pin feeding, is fed to the Printer from the paper supply located at the rear of the Printer. A forms tractor (factory option) if supplied, is located on top of the Printer (see Figure 3-17) and to the rear of the platen. This device consists of a tractor mechanism for each edge of the pin feed paper. Each tractor employs a row of pins on a flexible belt which engage with the pin holes along the paper edge. Because the forms tractor is connected through gearing to the platen gear, the tractor belts rotate to move the paper exactly one line each time the platen moves one line. A paper-out condition is sensed by the paper-out switch located at the left rear of the paper pan on the External Paper Handler. When the paper-out condition is sensed, an "alarm" condition will exist. This causes the motor to stop and the ALARM indicator to light. The Printer cannot be turned on when this condition exists until the paper-out switch again senses the presence of paper.

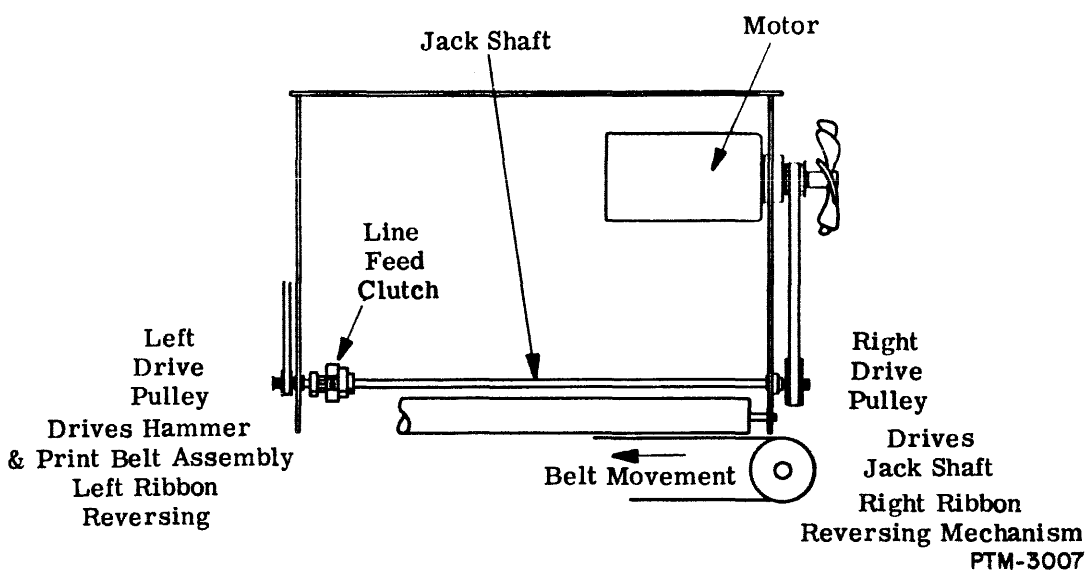


Figure 3-28. Drive Mechanism

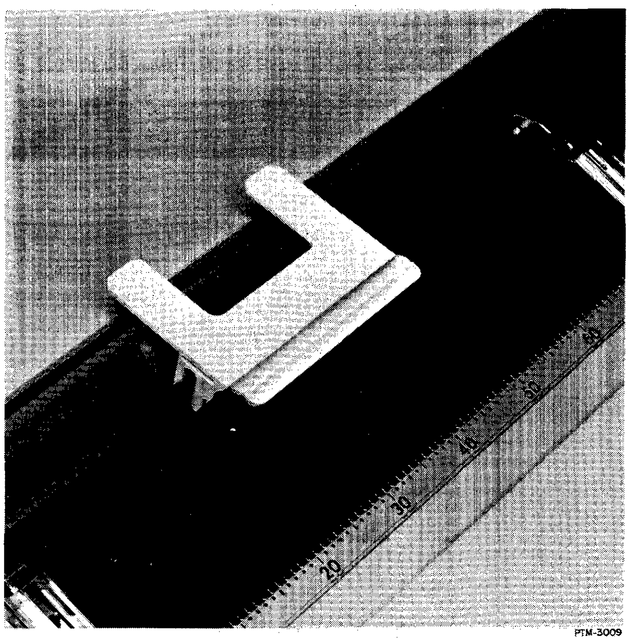


Figure 3-29. Anti Curl Device.

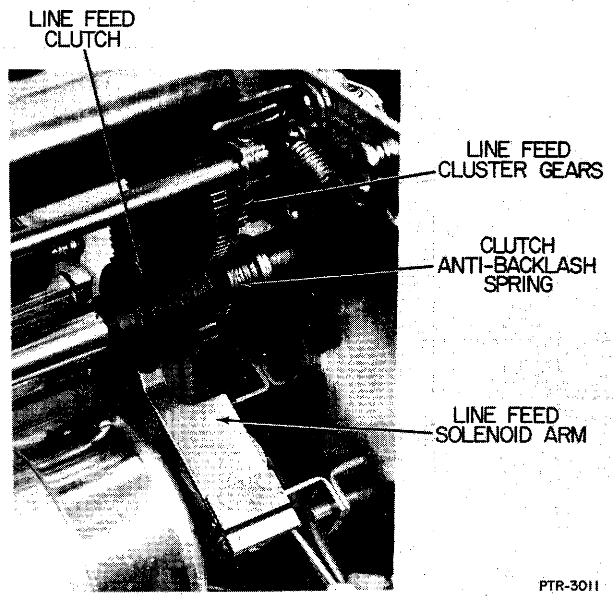


Figure 3-30. Line Feed Mechanics.

When paper is supplied to the Printer from the internal paper roll (Figure 3-7), the paper is routed up and over the paper tensioner and around the platen. A paper-out switch mounted behind the paper roll will sense a low paper condition causing the motor to stop and the ALARM indicator to light. The one-piece plastic anti-curl device should be installed as in Figure 3-29 to prevent the paper from wrapping around the platen.

PAPER PRESSURE. The pressure rollers (friction feed models) apply pressure to the paper on the platen, when the paper pressure release lever (see Figure 3-5) is in its rear-most position, causing advancement of the paper as the platen advances. The release lever in the forward position lowers the pressure rollers for alignment of the paper or when pin feed platens are used.

PAPER ADVANCEMENT. Paper advancement is accomplished by manually rotating the platen knob or by electrical/mechanical feed. When advancing the paper manually the platen knob is pushed in. This disengages the platen gears from the gears connected to the line feed clutch and allows the platen to be moved manually with the platen knob.

LINE FEED. The line feed solenoid and line feed clutch are the components used for normal line feeds (see Figure 3-30). When a line feed is required the line feed solenoid is energized with +95 volts for 8.3 milliseconds. This pulls the line feed solenoid arm away from the line feed cam allowing the clutch to rotate 1/3 of a revolution. This causes gears connected to the line feed drive gear to advance the paper one line. (The anti-backlash spring holds the line feed clutch securely in position and prevents clutch oscillation and wear.)

SECTION 4
FUNCTIONAL ELECTRONIC DESCRIPTION OF THE PRINTER

INTRODUCTION

For servicing the TermiNet 300 Printer, an understanding of the functional electronics is usually all that is needed to determine which printed circuit board (PCB) is defective; seldom should it be necessary to use an oscilloscope.

The easiest way to understand electronic operation of the TermiNet 300 Printer is to divide all the functions into three groups. These groups are:

1. Entry
2. Printout
3. Auxiliary functions

Each of these subjects is covered in detail below.

ENTRY

The end goal of the entry process is to put the character into character memory and the column (print position) into column memory. Character and column information must be stored for later use in the printout process.

Refer to Figures 3-31, 3-32, or 3-33 for a partial Printer block diagram. The entry process uses PCB's from KEYBOARD (SLC) through MEMORY (MEMC).

KEYBOARD

When a character key is pressed, the keyboard electronics, consisting of the keyboard and SLC PCB, generate the ASCII character. The keyboard electronics also has the ability to detect if two or more keys are held down at the same time; if so, the resulting character is considered as being a false character which is not sent to the PARALLEL TO SERIAL CONVERTER (PSCC). If the character is valid (only one character key pressed), the character is sent to the PSCC PCB.

PARALLEL TO SERIAL CONVERTER PSCC|1

When a character is received by PSCC, it is changed from parallel to serial form. PSCC also adds parity, a start bit, and one or two stop bits (depending on rate and jumper options used).

DATA SET BOARD DATC|1

So far as data (characters) is concerned, the DATC board is a dual voltage level changer. It changes logic level voltages to the output levels required by specifications RS-232 for outgoing data, and it changes RS-232 voltages into logic level voltages for incoming data.

SERIAL TO PARALLEL CONVERTER SPCC|11

Internal data from PSCC or remote data coming from DATC arrive at SPCC where each character is changed from serial to parallel form. The SERIAL TO PARALLEL CONVERTER (SPCC) must then determine whether or not the character is a printing or a control character. If it is a control character, SPCC will initiate the signals necessary to accomplish the control function. If the character is a printing character, SPCC must load the character memory and cause the column count (from the column counter) to be put into column memory thus completing the entry process. Column and character memory and column counter are on the MEMC PCB.

MEMC|3

PRINTOUT

The end goal of the printout process is to print the incoming characters in the proper column. To accomplish printout, three things must be known. These are:

1. Character to be printed.
2. Column in which character is to be printed.
3. Print finger position.

CHARACTER. Every 96 microseconds SPCC attempts to read a stored character.

COLUMN. At the time SPCC reads a character, it also reads the column number for that character.

FINGER POSITION. Finger positions are detected by the photocell PCB. Every time a finger interrupts light going to a photocell, the photocell generates a signal; this is done independently by both the odd position photocells.

PCAC|2

These signals are sent to the PHOTOCELL AMPLIFIER (PCAC) where they are further amplified, shaped, and timed. Outputs from PCAC go to SPCC to run (among other things) the belt counter.

Every time the trailing edge of a print finger allows light to hit the even photocell, the belt counter advances (counts up) one; the only exception to this occurs when a reference finger passes the photocell assembly.

A reference finger has a tab welded to the bottom of the finger; this tab is wide enough so that light is still blocked off from one photocell when light is blocked off from the other photocell. When light is blocked off from both photocells simultaneously, the belt counter is reset to 32; therefore, the belt count proceeds from 32 through 127, and then the next count is 32, etc.

The SPCC determines when a finger is approaching the position where the finger is to be printed. When a finger is in the right position for printing, SPCC makes a "compare". In other words SPCC has compared character, column, and finger position to determine that the print finger is in the proper position to initiate the mechanical printing process.

T&AC2

When a compare is made, SPCC sends a FIRE signal to TIMING AND ALARM (T&AC) along with information that tells T&AC whether the compare was for odd or even position. T&AC then tries to turn on all the odd or all the even position SCR's.

At this time, however, the output of the column memory is being decoded by the SERIAL DECODER (DECC); DECC4 this decoded output goes to the HAMMER DRIVER (HDC) and allows only one pair of SCR's to be turned on. Consequently only one SCR is turned on at a time. Timing is such that the compare process can be performed 8 times before print fingers move from one print position to the next. If the compare process shows that more than one finger is in the proper position for printing, then as many as 4 odd or 4 even SCR's will turn on in sequence, enabling 4 hammers to be driven simultaneously. When the compare has been made and the FIRE signal sent, the character is erased from character memory.

The mechanical printing process is accomplished in the following way. At the time the SCR is turned on, the voltage across it is about 2.4 volts. This voltage is not sufficient to pull the hammer forward. Slightly later the drive bus voltage rises to 95 volts; the coil current rises to approximately 5 amperes; and the hammer moves forward, pushing the finger into the ribbon, paper, and platen; when the finger rebounds, the printout process is finished.

AUXILIARY FUNCTIONS

Operation of the TermiNet 300 Printer requires several auxiliary functions; some of the more important ones will now be discussed.

RIBBON LIFT CIRCUITS

When printing is not occurring, the ribbon is lowered so that the operator can see the line which was just typed. Before more printing can occur, the ribbon must be lifted. Whenever a printing character is entered into character memory, if the ribbon is not already lifted, the MEMC PCB generates two ribbon
MEMC3
lift signals. These two signals are sent to the LAMP REGULATOR (LMPC) PCB. The two signals are called PICK and HOLD. LMPC4

One signal (PICK) is amplified to be -33 volts by the LMPC PCB; this -33 volts is applied to the ribbon lift solenoid for 45 milliseconds to quickly lift the ribbon. During the time of the PICK signal, printing is inhibited.

The other ribbon lift signal (HOLD) is changed to -16 volts by the LMPC PCB. This -16 volts is applied to the ribbon lift solenoid to hold the ribbon up while printing is occurring.

LINEFEED CIRCUITS

Linefeeding is somewhat complicated by the fact that all characters on a given line must be printed before the paper is advanced, then the paper must advance, and then printing can commence on the new line.

Printing characters entering the Printer prior to a LF character are entered into the character memory with the eighth character bit made equal to zero. When a LF character is recognized, until the linefeed is executed, succeeding printing characters will be entered into character memory with the eighth bit equal to one. (Characters having the eighth character bit equal to one are inhibited from printing.)

MEMC11

Before the linefeed is executed, the Printer will check to see that all printing characters having the eigth bit equal to zero are printed; then the linefeed is executed by the MEMC PCB sending a linefeed signal to the HDC PCB. Upon receiving the linefeed signal from MEMC, the HDC applies +95 volts to the linefeed solenoid; this allows the linefeed clutch to advance 1/3 turn thus advancing the paper 1/6 of an inch.

After the linefeeding has been accomplished, all printing characters in character memory which have the eighth bit equal to a one will have the eighth bit changed to a zero. Those characters will then print.

POWER SUPPLIES POWC14

Several regulated power supplies provide DC voltages for various functions. Some of the voltages present are (with respect to chassis) +95, +15, +3, +2.4, -15, and -27 volts. (See Figure 3-34.)

LOGIC CLOCK CLCC13

A quartz crystal oscillator running at 672 kHz is counted down by digital logic to give various frequencies from 84 kHz to 220 Hz. These various frequencies are used for clocking the internal logic and for setting the data (character) clocking rate.

SECTION 5

FUNCTIONAL DESCRIPTION OF PRINTED CIRCUIT BOARDS

The following diagrams and text describe the majority of functions performed by each printed circuit board. Figure 3-31 is a functional block diagram of the TermiNet 300 KSR Printer. Figures 3-32 and 3-33 are functional block diagrams of the SR and RO versions respectively. The remainder of the figures and associated text describe the functions of each circuit board and the functional relationship between the various printed circuit boards.

POWER SUPPLY POWC|4

(See Figure 3-34.)

Power is routed through the interlocks and the 2A line fuse to the motor and motor relay circuit. Power then passes through the line filter on the TXPC board to eliminate effects of line noise. The power out of the line filter is applied to the power transformer 1T.

The secondary of 1T has three sets of windings. The 116 volt winding through a full wave bridge supplies the unregulated +155V DC for the HDC board. The center-tap winding supplies power to the POWC board for the regulated +15V DC and -15V DC. The third winding supplies power for the regulated -27V DC.

To protect for overvoltage, a crowbar circuit is used in the -27V DC circuit. When the -27V DC bus exceeds -32.5V DC, the crowbar circuit short circuits the -27V DC and causes 3FU to blow. Undervoltage protection is accomplished by monitoring the +16V DC on the PROC board. If the 117V AC line voltage drops below 105V AC the +16V DC will drop accordingly, causing an alarm to be generated and the motor to be shut down.

CONNECTOR CROSS REFERENCE

Before using Figure 3-34, it may be necessary to consult Table 3-3, Connector Cross Reference.

Starting approximately January 1972, some of the Burndy connectors used in the TermiNet 300 Printer were replaced by AMP connectors. The Burndy connector is green in color and uses numeric characters only to identify the connection. The AMP connector is brown in color and uses alphabetic and numeric characters to identify the connections.

Table 3-3. Connector Cross Reference

AMP (BROWN) CONNECTOR	BURNDY (GREEN) CONNECTOR	AMP (BROWN) CONNECTOR	BURNDY (GREEN) CONNECTOR	AMP (BROWN) CONNECTOR	BURNDY (GREEN) CONNECTOR
1	1	13	25	J	16
2	3	14	27	K	18
3	5	15	29	L	20
4	7	16	31	M	22
5	9	17	33	N	24
6	11	A	2	P	26
7	13	B	4	R	28
8	15	C	6	S	30
9	17	D	8	T	32
10	19	E	10	U	34
11	21	F	12		
12	23	H	14		

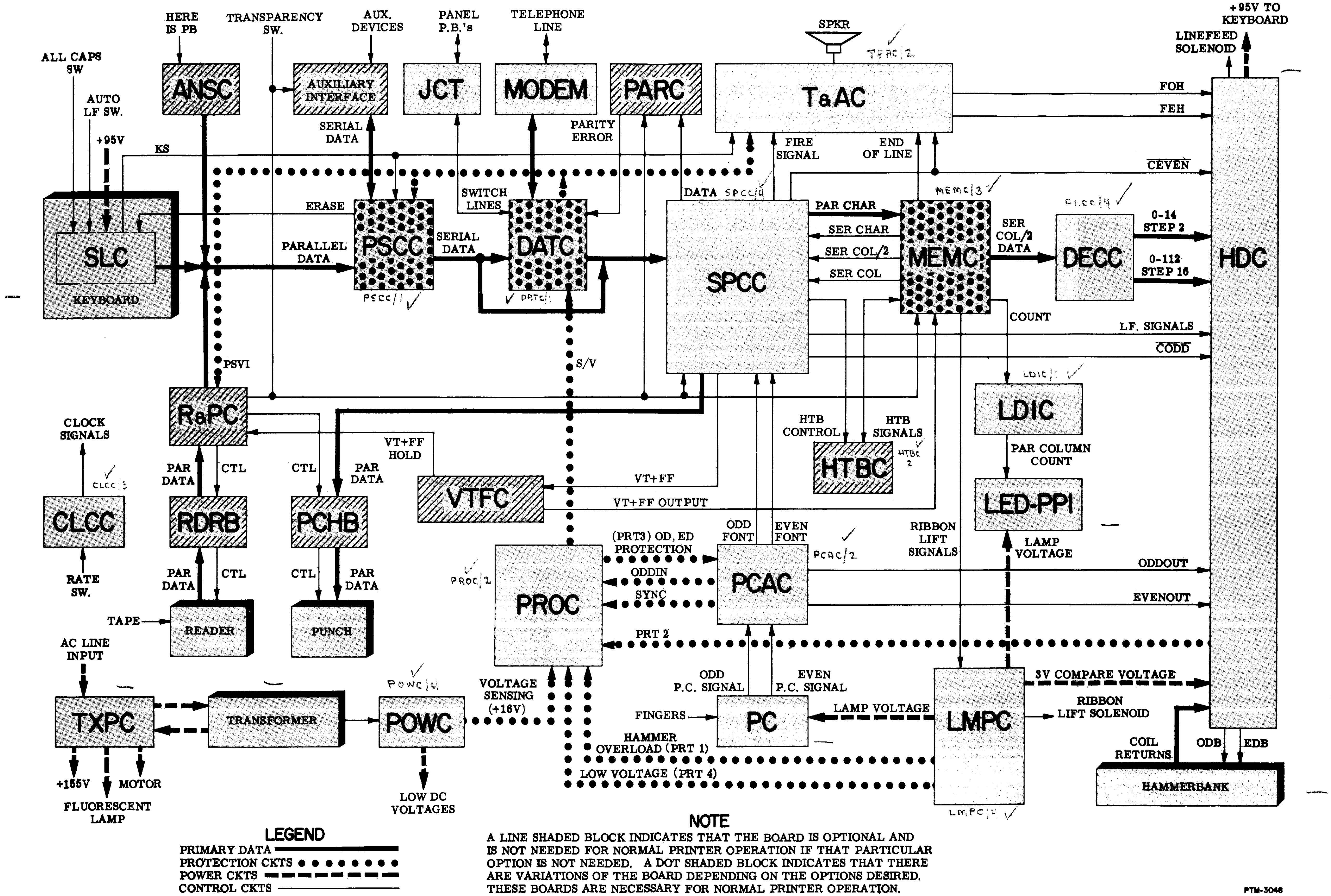


Figure 3-31. Functional Block Diagram of KSR TermiNet 300 Printer

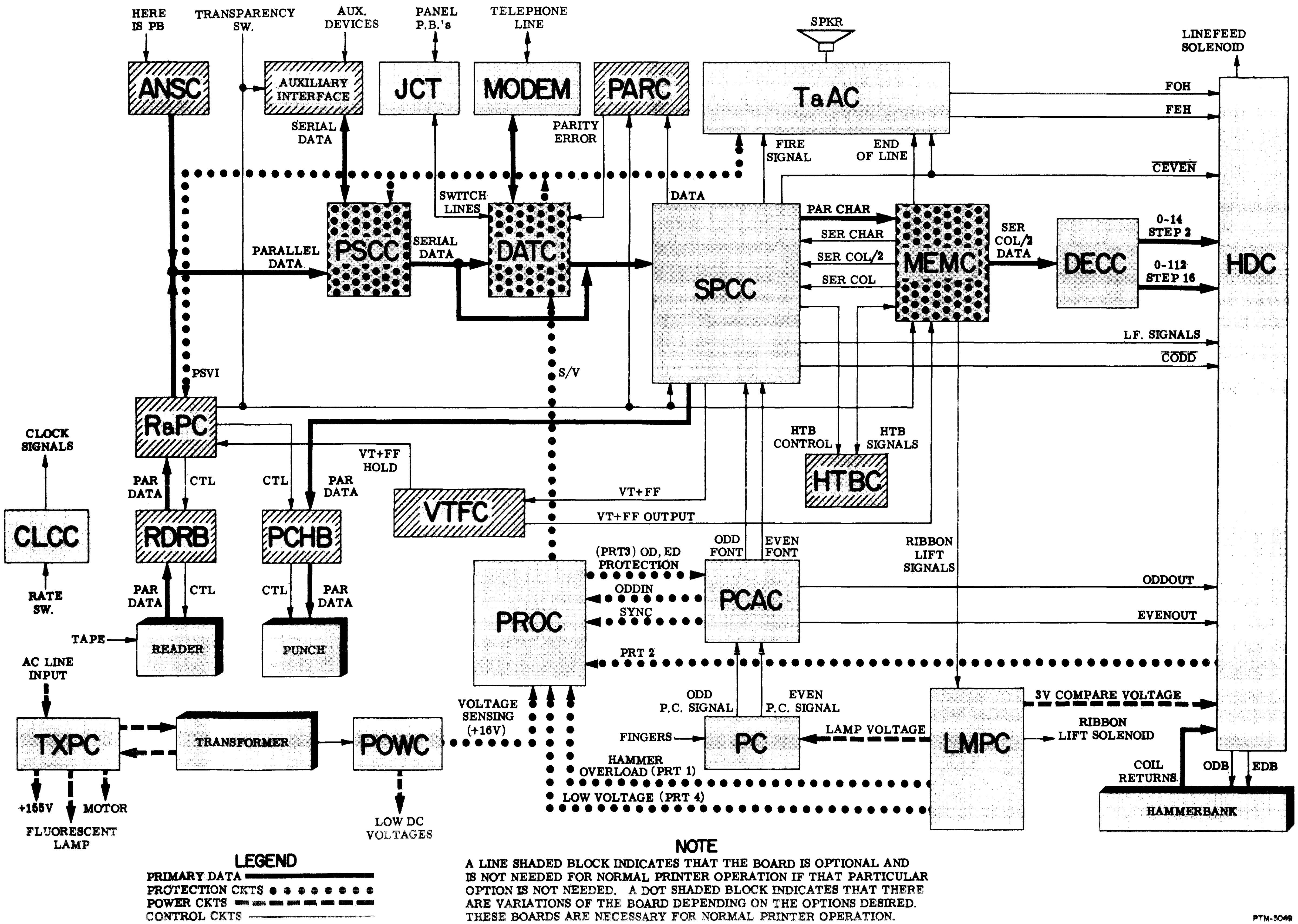


Figure 3-32. Functional Block Diagram of SR TermiNet 300 Printer

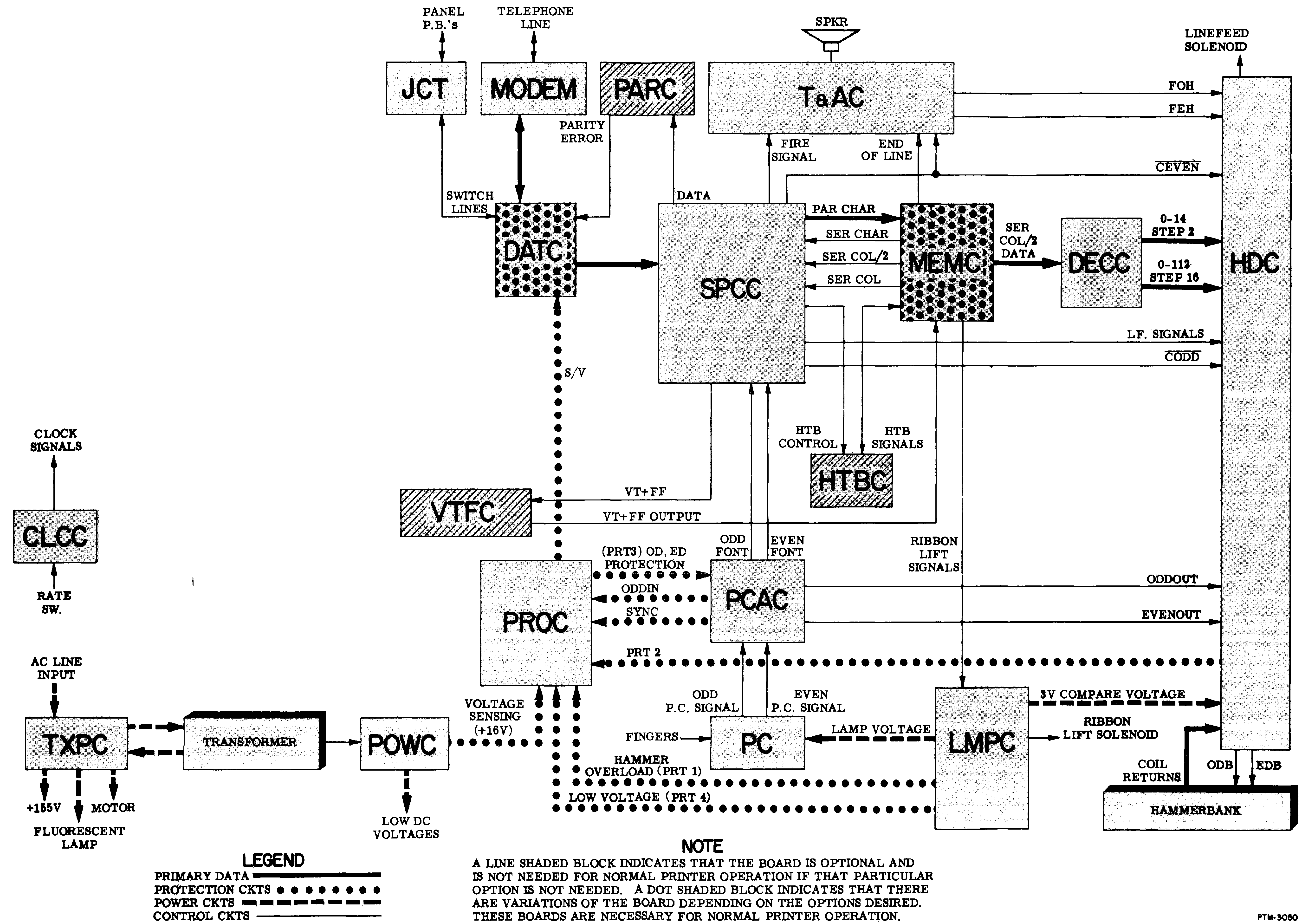


Figure 3-33. Functional Block Diagram of RO TermiNet 300 Printer

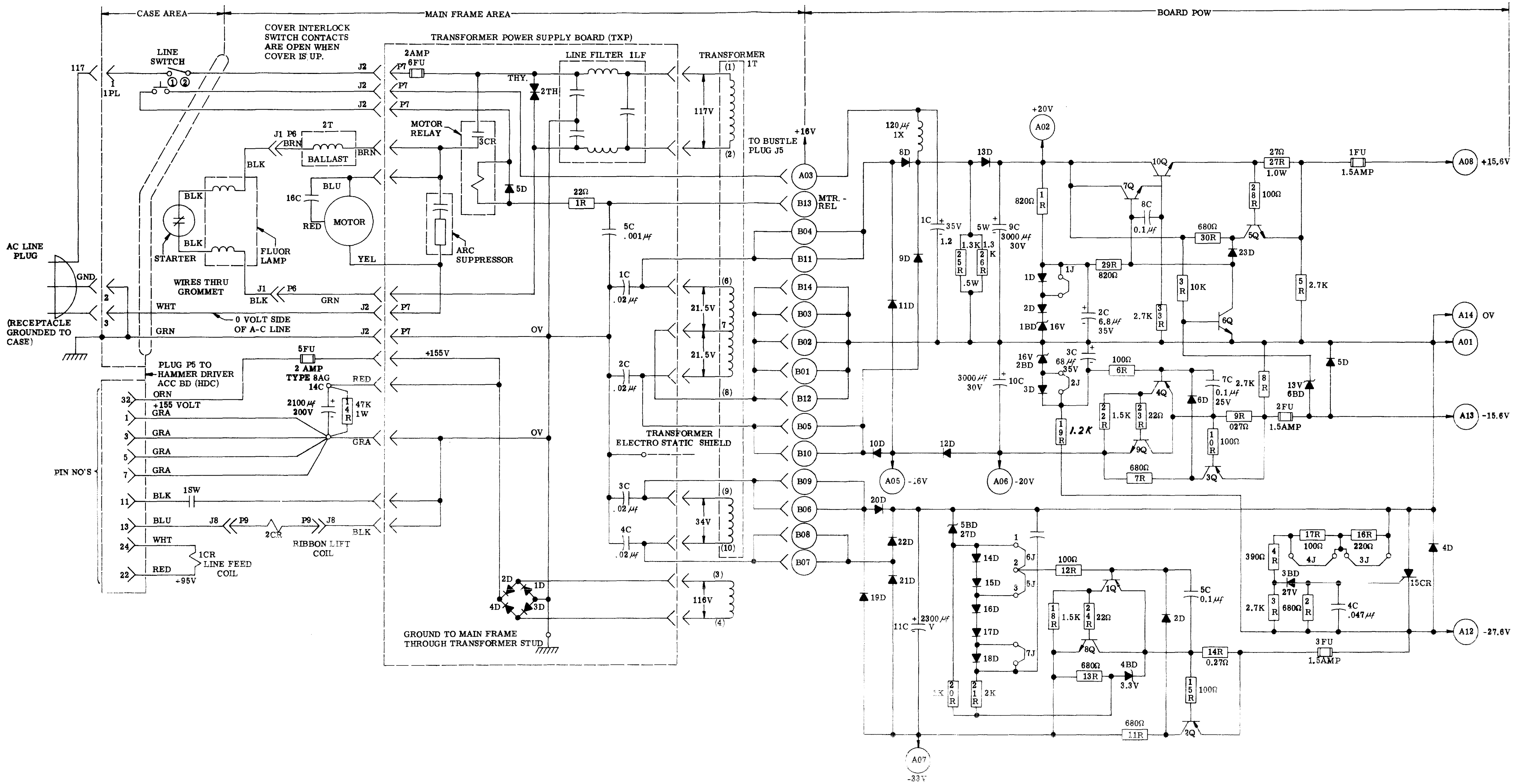


Figure 3-34. Power Supply

CLOCK AND CYCLE CONTROL (CLCC)

(See Figure 3-35.) CLCC 3

This board has a crystal controlled oscillator which generates clock signals used throughout the system for timing and control purposes.

The clock outputs of this board are phase 1, phase 2, T1, X (Transmit), R (Receive) and outputs for 10, 15, 30, 60, and 120 characters per second.

The board may be jumpered for combinations of any three of the 10, 15, 30, 60, or 120 cps clock rates.

KEYBOARD INTERFACE (SLC)

(See Figure 3-35.)

The SCL board is located in the keyboard. The input power of +95V DC is received from the single white wire from the HDC board.

The SLC board contains a clock for generation of excitation for the keyboard "U" core drive line.

1. Receives the keyboard sense line signals; further encodes them to the ASCII Code and converts them to logic levels.

2. Senses single and multiple key-down conditions.

3. Generates a keyboard strobe pulse to initiate the use of the codes produced by the keyboard.

4. When the RPT is pressed, the SLC board allows the strobe pulse to repeat as each reference finger passes the photocells.

5. Provides automatic line feed after a Return character is generated by the keyboard if the Auto LF Switch is set to the ON position.

6. Provides the Escape character for several device control codes. (An Escape code is a two character code.)

7. Provides a Control code when CTL key is pressed. (Control codes always have bits 6 and 7 equal to zero.)

8. Provides standard "Shift" function when SHIFT key is pressed. The changes of characters are indicated on the keys.

9. Contains the CAPS ONLY switch for the capability of generating upper-case letters without use of the SHIFT key.

10. Provides delete override of control and shift.

11. Inhibits the keyboard during "Answerback" or "Interrupt" condition.

12. Transmits parallel data to the PSCC board.

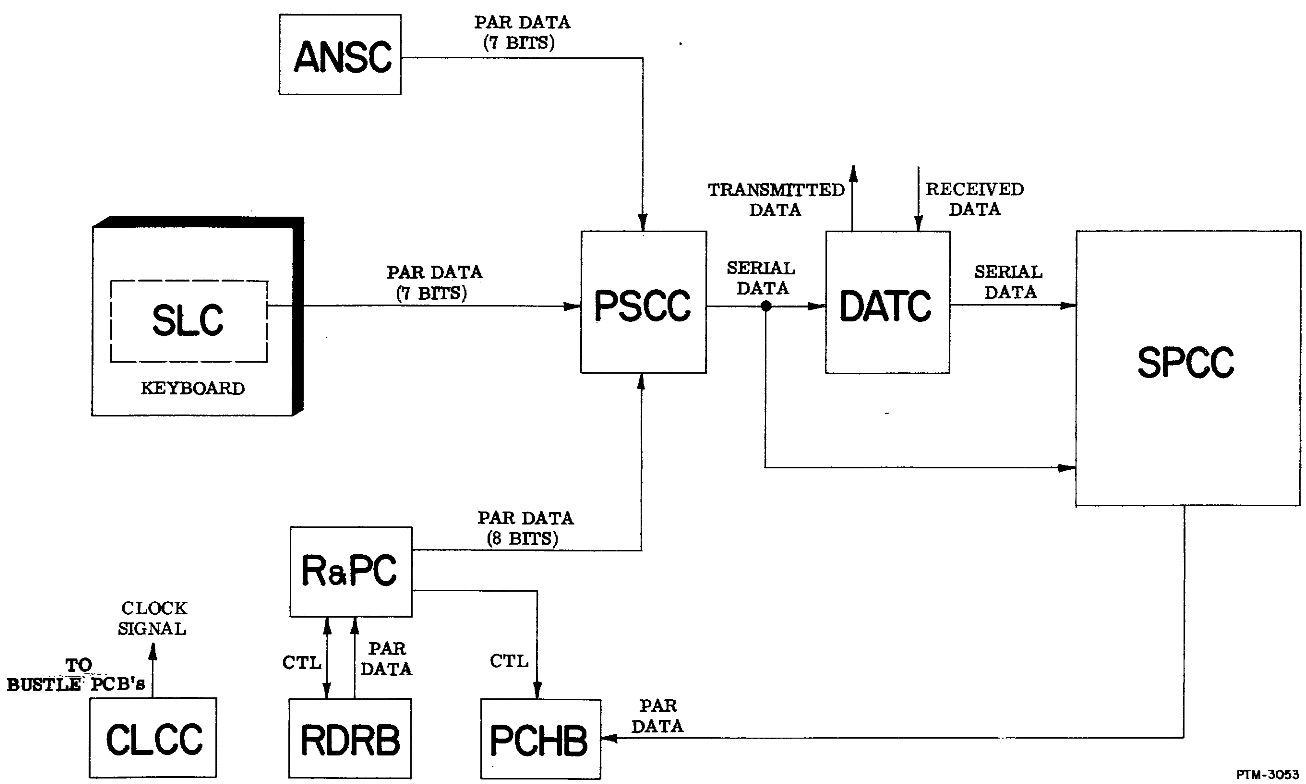


Figure 3-35. Functional Block Diagram of CLCC, SLC, ANSC, R&PC, and PSCC.

ANSWERBACK

NOT USED

(See Figure 3-35.)

1. Generates a code up to 20 characters when HERE IS button is pressed, ENQ is received, ENQRD (enquiry received and delayed during turnaround), or when incoming Dataset Ring (CE) is received.

2. Produces a keyboard inhibit (KINH) to SLC during Answerback.

3. Can be jumpered at last character to inhibit answerback transmission of remaining character spaces. If jumpered, the remaining character spaces must have diodes removed.

4. Answerback code is transmitted in parallel form to the PSCC board.

READER AND PUNCH (R&PC)

NOT USED

(See Figure 3-35.)

1. This board controls the operation of both the reader and punch.

2. Receives parallel data from the RDRB board and transmits this received data to the PSCC board.

3. Produces timing pulses for the punch.

PARALLEL TO SERIAL CONVERTER (PSCC)

(See Figure 3-35.)

PSCC

1. Receives 7 or 8 bit codes in parallel form from the keyboard, ANSC board, or the R&PC board.

2. Converts data from parallel form to serial form

3. Adds eighth bit for Even, Odd, or No Parity, as selected by jumpering.

4. Generates start and stop bits. Can be jumpered for two stop bits at any one, any two, or all three speeds (Low, Medium, High).

5. Sends generated data to SPCC board for Printer, Punch, or TCA; also sends to DATC board for external transmission.

NOTE

Items 6 and 7 below refer only to PSCC Boards with the line control option.

6. Produces bits 2 and 3 to generate an ACK if no fault is present during enquiry; produces bits 1 and 3 to generate a NAK if a fault is present during enquiry.

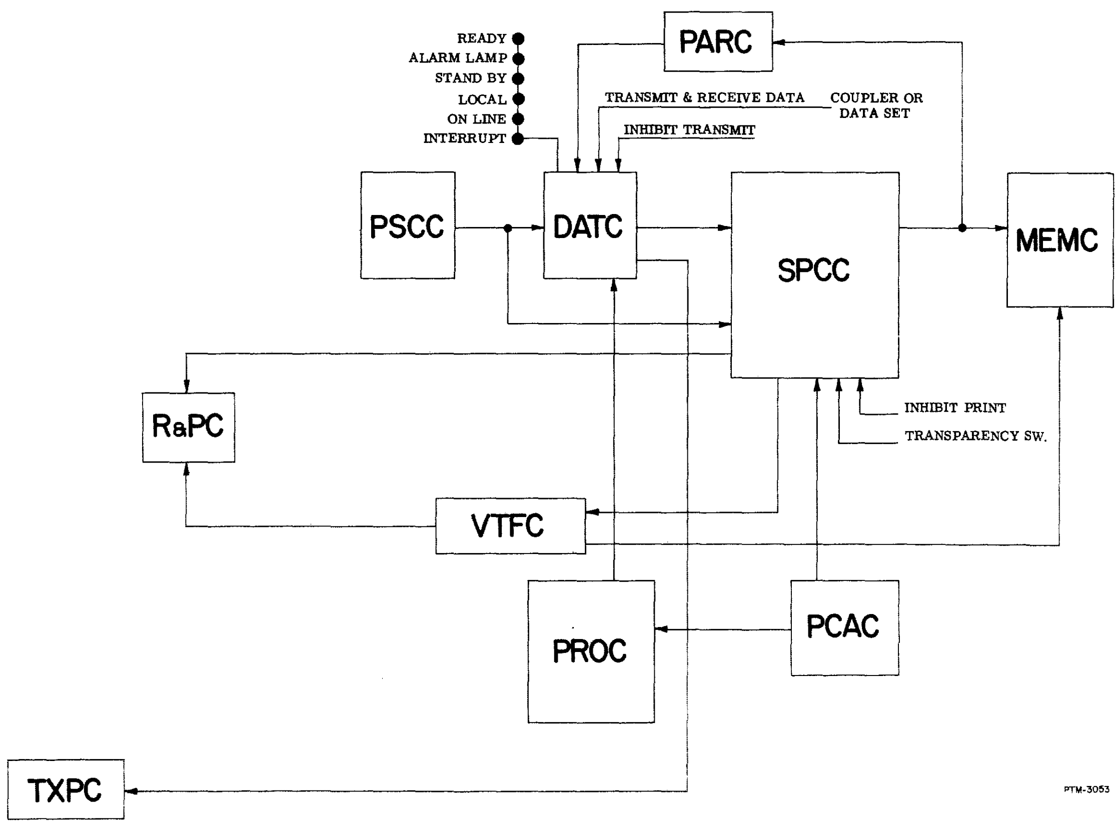


Figure 3-36. Functional Block Diagram of DATC, SPCC, PARC, and VTFC

7. Receives Control codes ACK, NAK, and ETX to generate line turnaround signals.

DATA SET CONTROL (DATC) DATC/1

(See Figure 3-36.)

1. Receives serial data from PSCC board, and transmits this data to BA of the dataset.

2. Connected to INHIBIT switch to inhibit transmission of data.

3. Provides a signal to CA of the data set.

4. Receives a signal CB from the data set to indicate that it is prepared to transmit data.

5. Generates a signal to CD of the data set.

6. Receives MOTOR ON-OFF signals and transmits them to the motor relay on TXPC.

7. Receives signals from LOCAL, STANDBY and ON LINE indicator switches.

8. Receives signals from some fault conditions to light ALARM indicator.

9. Generates internal logic signal when an "Interrupt" is received from SPCC.

10. Transmits received data to the SPCC board.

11. See Printed Circuit Boards, Chapter 4, Section 3, for various jumpers that may be used.

SERIAL TO PARALLEL CONVERTER (SPCC)

(See Figure 3-36.) SPCC/4

1. Receives data in a serial form from the PSCC board and the DATC board.

2. Decodes the data to recognize escape codes, control codes, space delete and characters to be printed.

3. Inhibits local printing when the INHIBIT switch is in the PRINT position or all printing when the TRANSPARENCY switch is in the ON position.

4. Detects breaks.

5. Converts the incoming serial data to parallel data.

6. Transmits the parallel data to the MEMC board, PCHB board, or TCA.

7. Contains the belt reference counter to keep track of the fingers passing the photocell.

8. Adds one half of the column memory to the belt count and compares the output with the character memory.

9. Generates even-odd compare pulses to allow only even number during compare even permissive time or odd number during compare odd permissive time.

10. Generates an erase signal to erase space or other non-print characters immediately, and printing characters when printed.

11. Sends compare signals to the T&AC board.

PARITY ERROR DETECTION (PARC) NOT USED

(See Figure 3-36.)

The PARC board detects data parity errors and reacts to an error by sending a signal to the DATC board to light the INTERRUPT indicator. This signal also allows printing of an unused print character when a parity error is detected. Jumper options allow selection of odd or even parity error detection. Jumper 3J allows sending a break, going to Standby, and stopping tape reader. Jumper 4J In stops error detection during "Transparency" mode of operation.

VERTICAL TAB AND FORM FEED (VTFC) NOT USED

(See Figure 3-36.)

1. Receives VT or FF code from SPCC board.

2. Transmits signal to the MEMC board to start VT or FF.

3. Stops VT or FF when signal is received from the VT or FF photocell.

4. Inhibits the reader when VT or FF is in operation.

5. Generates VTFF photocell lamp power.

MEMORY BOARD (MEMC) MEMC/3

(See Figure 3-37.)

1. Receives character to be printed from SPCC board.

2. Stores up to eight characters of information.

3. Sends column number to be printed to SPCC board and DECC board.

4. Character is erased when character has been printed.

5. Keeps track of column for next character to be entered.

6. Has jumper option for either short or long print line.

7. Generates the Print and Space Inhibit (PSI) signal when a non-printing code is received.

8. Sends signal to HDC board when line-feed is needed.

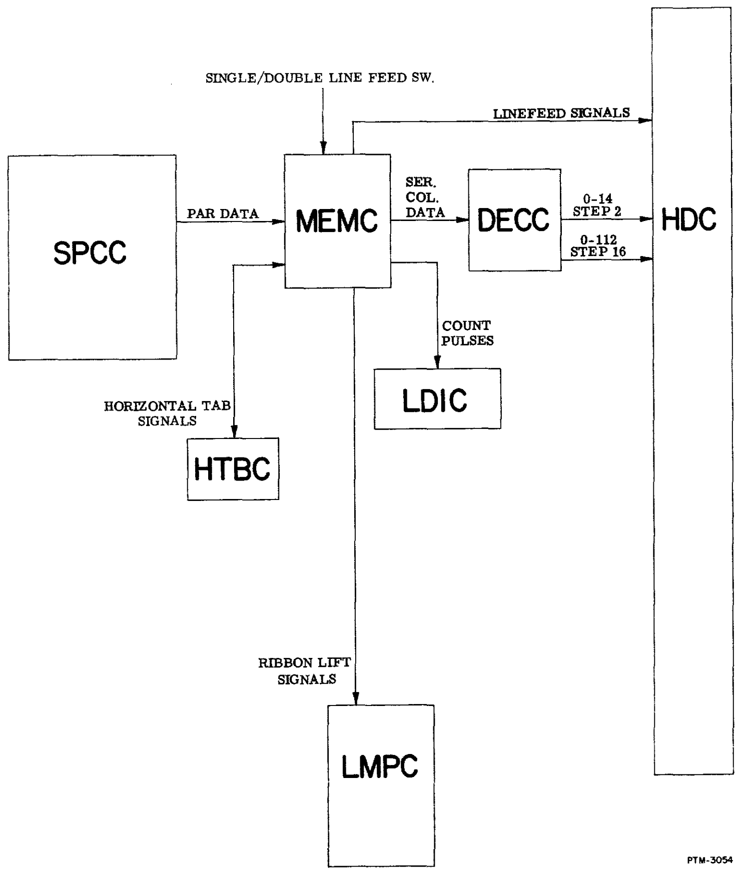


Figure 3-37. Functional Block Diagram of MEMC, DECC, HTBC, and LDIC.

9. Connected to Line Feed switch to produce single or double line-feed when LF signal is recognized.

10. Makes the eighth bit a one in every new printing character after a line-feed character has been received. The eighth bit serves as a flag to delay print until the line feed has been executed.

11. Provides signals to the LMPC board to pick up ribbon when a printing character is entered into memory.

12. Receives signal from HTBC board for advancing column count to the correct position during horizontal tabbing.

SERIAL DECODER (DECC) DECC|4

(See Figure 3-37.)

1. Receives serial information from the column memory section of the MEMC board.

2. The information is decoded into two set lines; one 0-14 in multiples of two and the other 0-112 in multiples of 16. Each output from these lines is amplified and sent to the HDC board.

HORIZONTAL TAB (HTBC) HTBC|2

(See Figure 3-37.)

1. Enables tabs to be set at each and every column position.

2. Sends a signal to the MEMC board when horizontal tabbing to advance the column counter to the correct position.

PRINT POSITION INDICATOR (LDIC) LDIC/

(See Figure 3-37.)

1. Receives counting pulses from the MEMC board.

2. Applies a signal to the Print Position Indicator light emitting diodes to illuminate number of position where next character entered is to be printed.

HAMMER DRIVER CONVERTER (HDC)

(See Figure 3-38.)

1. The HDC board contains an SCR for each hammer position.

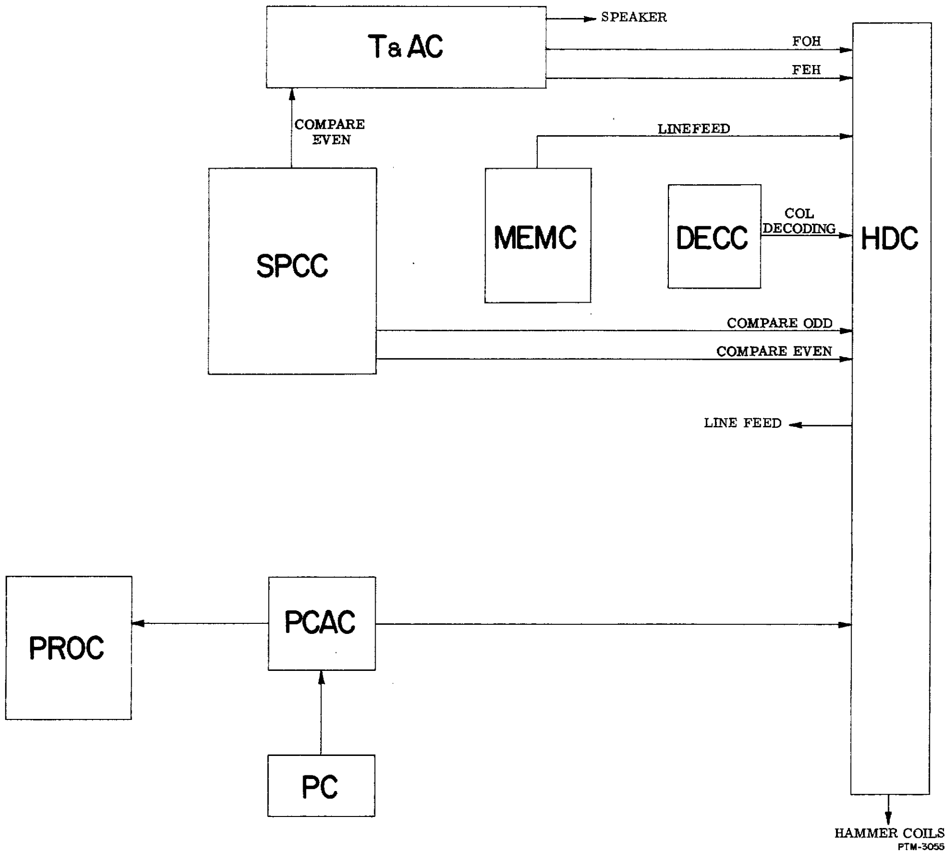


Figure 3-38. Functional Block Diagram of HDC and T&AC

2. Receives the fire even (FEH) and the fire odd (FOH) signals from the T&AC board. Even hammers will only fire during FEH time and odd hammers will only fire during FOH time.

3. Receives the called for column position from the DECC board.

4. Receives signals from MEMC board and amplifies to operate the line feed solenoid.

5. Amplifies the received compare signals from SPCC and places +2.4V DC through the hammer coils to the anodes of the SCR's. This allows the SCR's to stay turned on after the appropriate signals are received at the SCR gates.

6. Takes the +155V DC supplied from the TXPC board and regulates this to +95V DC.

7. Receives "odd" and "even" drive signals from the PCAC board. Amplifies this signal through a switcher circuit to obtain the high voltage and current necessary to operate the hammer coils. The "even" pulse is applied to the coils of the even numbered hammers and the "odd" pulse is applied to the coils of the odd numbered hammers.

8. Contains a pull-down circuit to remove the current from the coils after the hammers have been energized.

TIMING AND ALARM (T&AC) T&AC 12

(See Figure 3-38.)

1. Receives input from INHIBIT switch (SPSW) to suppress local printing.

2. Receives "Fire" signal from SPCC board. Gates this signal with "compare even" (CE) from the SPCC board and amplifies the results to produce "fire even hammer" (FEH) and "fire odd hammer" (FOH). Sends the resultant signal to HDC board.

3. Contains potentiometers to control speaker volume.

4. Generates 500 cycle signal for keyboard sound and 1000 cycle signal for beeping end of line, margin alarm, bell, machine faults and received break.

5. Contains power amplifier and fuse 1FU for phase 2 of the clock.

LAMP REGULATOR (LMPC)

(See Figure 3-39.) LMPC/4

1. Supplies power to the ribbon lift solenoid.

2. Supplies power (+2.4V DC) to the photocell lamp.

3. Supplies power for Print Position Indicator.

4. Supplies anode comparison voltage (+3V DC) to HDC board.

5. Has sensing circuits for hammer overload protection and for -15V and -27V low voltage protection.

6. Has a time meter to indicate hours of operation (optional).

7. Contains 1FU for PPI lamps and photocell lamp.

PHOTOCELL BOARD (PC BD)

(See Figure 3-39.)

1. Detects the fingers passing between two photocells and lamp.

2. Amplifies "odd" and "even" signal and sends to PCAC board.

PHOTOCELL AMPLIFIER BOARD (PCAC)

(See Figure 3-39.) PCAC/2

1. Receives "odd" and "even" photocell output.

2. Amplifies and squares "odd" and "even" pulses and limits each pulse to 0.9 msec.

3. Sends amplified "odd" and "even" photocell output to SPCC board for comparison and the HDC board for hammer firing.

PROTECTION (PROC)

(See Figure 3-40.) PROC/2

1. Detects momentary drop in line voltage below 105V RMS. The 105V detection level is adjustable by potentiometer P2.

2. Holds Motor Off to allow all voltages to reach their respective level after power is first applied.

3. Disables logic circuitry of Printer approximately 0.5 seconds to allow all voltages to reach their proper level after power is first applied.

4. Prevents power being applied to hammer drive bus during fault condition.

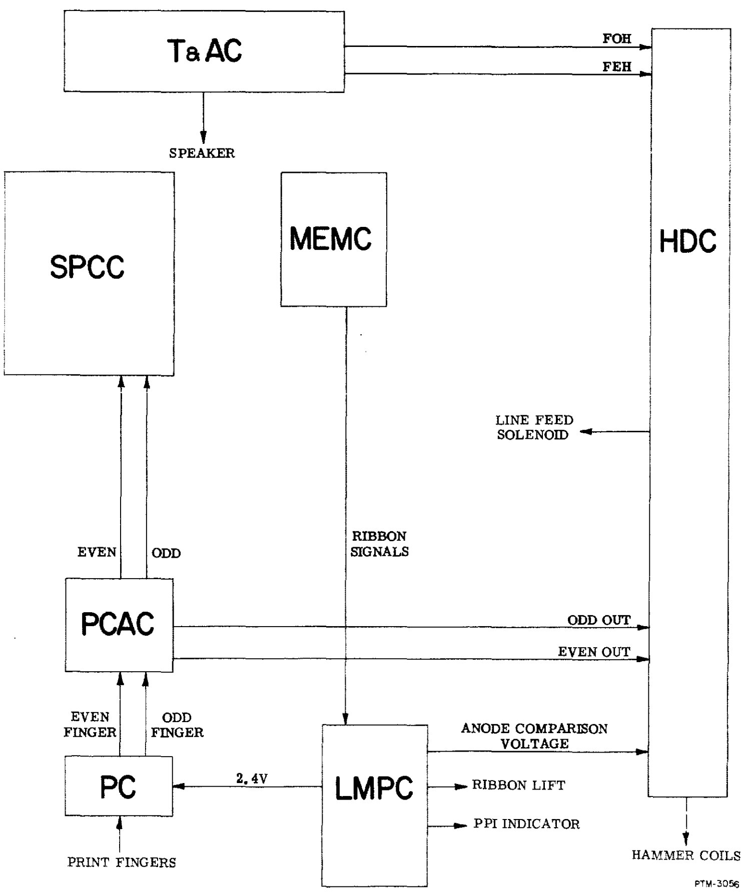


Figure 3-39. Functional Block Diagram of LMPC, PC, and PCAC

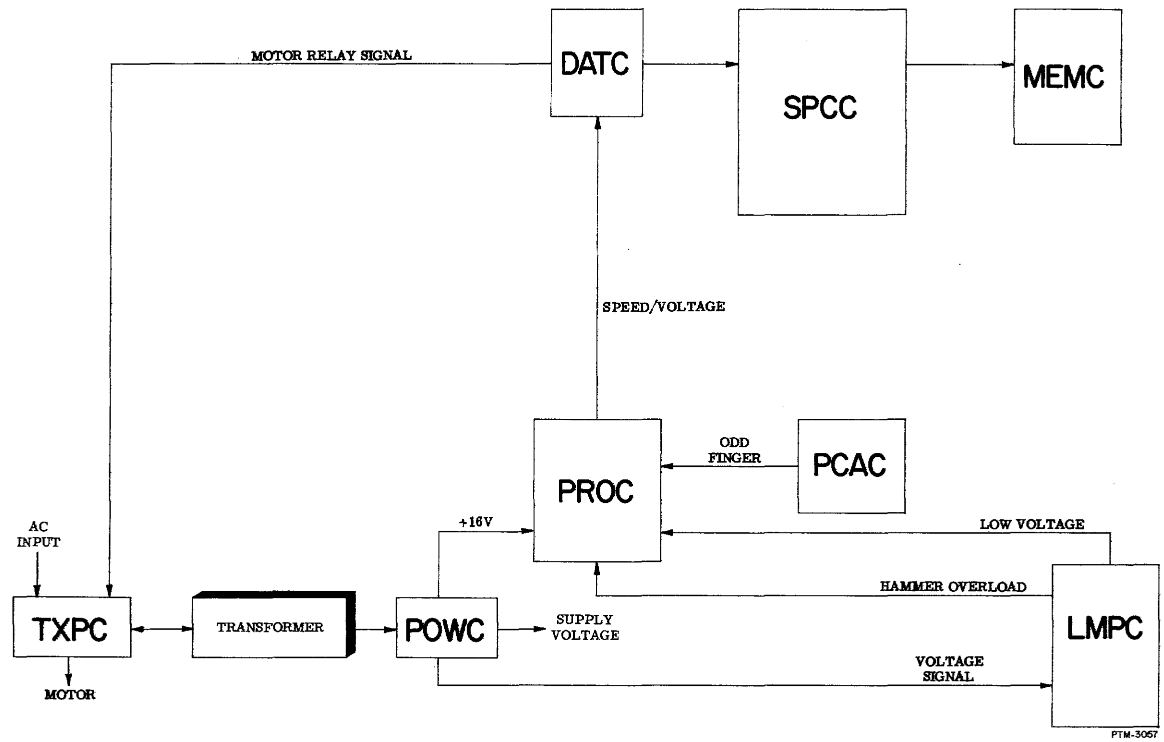


Figure 3-40. Functional Block Diagram of PROC, TXPC, and POWC

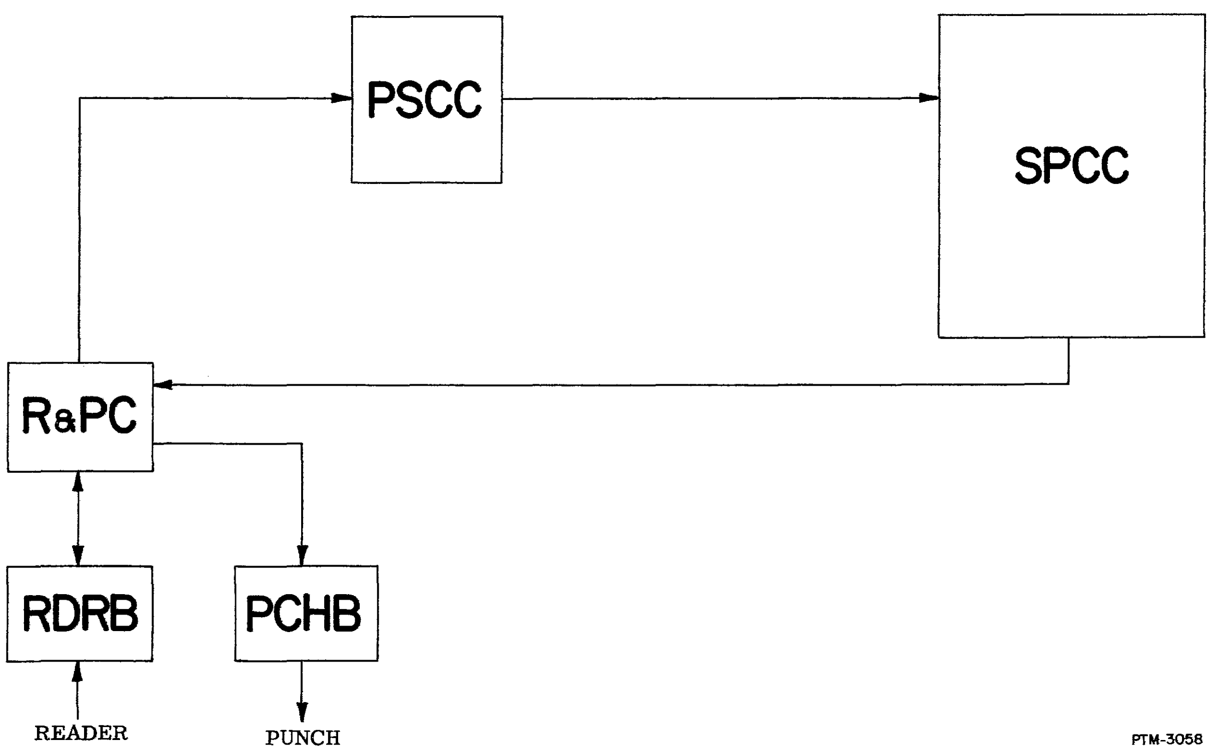


Figure 3-41. Functional Block Diagram of RDRB and PCHB

5. Stops motor if more than six hammer SCR's conduct.

6. Stops motor if belt slows below the specified speed. The tolerance is adjustable by potentiometer P1.

7. Delays motor cut-off during hammer fire time.

TRANSFORMER POWER SUPPLY (TXPC)

(See Figure 3-40.)

1. Contains input fuse for AC line.

2. Contains filtering for input power lines.

3. Contains relay for the motor which is controlled from the DATC board.

LOW VOLTAGE POWER SUPPLY (POWC)

(See Figure 3-40.) POWC|4

1. Receives input voltages from TXPC board.

2. Contains filtering and regulation for +15V DC, -15V DC, and -27V DC and has unregulated +20V DC, -33V DC, and +16V DC which is used by the PROC Board to sample input voltage.

3. Contains 1FU, 2FU and 3FU for the +15V DC, -15V DC and -27V DC outputs.

READER BOARD (RDRB)

(See Figure 3-41.)

1. Supplies the three phase voltage to the reader motor.

2. Receives a low level voltage from the photocells, amplifies this voltage and sends it to the R&PC board.

3. Contains a potentiometer to adjust the bias voltage for the photocell signals.

PUNCH BOARD (PCHB)

(See Figure 3-41.)

1. Receives signals from the SPCC board for holes to be punched, amplifies signals and transmits voltage to the correct punch solenoids.

2. Controls voltage for the punch bail solenoids.

3. Controls voltage to advance solenoid after a character has been punched.

CHAPTER 4
TROUBLESHOOTING

SECTION 1
TROUBLESHOOTING GUIDE

INTRODUCTION

Before using the Troubleshooting Guide on the following pages, determine what the problem is and determine what functions are operating correctly. Find the problem description in the center of the guide that best describes your problem. Under the problem decription, find the conditions in the left hand column of the guide that best describes the conditions related with your problem. In the right hand column, across from the appropriate condition, you will find a possible cause to your problem.

Table 4-1

Troubleshooting Guide

CONDITIONS	POSSIBLE CAUSE
PRINTER WILL NOT TURN ON	
No Lamps, Beep, Motor, etc.	1. Printer not plugged into outlet. 2. +15V Fuse (F1) on POWC Board. 3. -15V Fuse (F2) on POWC Board. 4. -27V Fuse (F3) on POWC Board. 5. Primary fuse missing or blown. 6. TXPC Board. 7. Cut Control Panel cable.
Lamps, Beep, But No Motor Alarm Light ON	1. Shield switch. 2. Low Paper switch. 3. Low Voltage (AC Input). 4. DATC Board. 5. PROC Board. 6. CLCC Board. 7. Cut Control Panel cable.
Lamps, Beep, But No Motor Alarm Light **OFF**	1. Print belt tight in guides. 2. Line Feed clutch. 3. TXPC Board. 4. Pushbutton switch. 5. DATC Board. 6. Starting capacitor - shorted or leads off. 7. Defective Motor. 8. Print fingers caught. 9. Hammer caught in fingers. 10. Print belt tight in belt guide. 11. Right or left drive belt tight. 12. Misalignment of pulleys and belt guide.
MOTOR WILL NOT KEEP RUNNING	
Runs or attempts to run 2 - 3 seconds only.	Electrical 1. Photocell Board (PC). 2. Loose plug to Photocell Board. 3. Broken wire to Photocell Board. 4. 3/8A fuse on LMPC Board.

(continued)

Table 4-1, Troubleshooting Guide (continued)

CONDITIONS	POSSIBLE CAUSE
MOTOR WILL NOT KEEP RUNNING (continued)	
Runs or attempts to run 2 - 3 seconds only. (continued)	Electrical (continued) 5. PROC Board. 6. PCAC Board. 7. Open run on HDC Board or Cable. Mechanical 1. Print finger missing. 2. Print finger bent. 3. Drive belt off. 4. Photocell bulb holder bent.
Runs Minutes to Hours	Electrical Noise 1. Open ground lead. 2. Loose or intermittent connection. 3. TXPC Board. Electrical 1. Photocell Board. 2. PCAC Board. 3. LMPC Board. 4. PROC Board. 5. MBC Board. Mechanical 1. Print belt dirty. 2. Rear belt guide needs adjusting. 3. Right or left drive belts tight. 4. No clearance at right jackshaft pulley (.012"). 5. Rear idler pulley binding on shaft. 6. Misalignment between pulleys and belt guide.
MOTOR RUNS BUT NO PRINTING	
No Keyboard Beep	1. +155V fuse on right side frame missing or blown. 2. Keyboard +95V lead not connected. 3. T&AC Board. 4. HDC Board.
Keyboard Beep - No Printing	1. SPCC Board. 2. T&AC Board. 3. PCAC Board. 4. HDC Board. 5. CLCC Board. 6. No Plug connection to HDC Board.
No Printing In Some Columns	1. Broken common wire on coil bank (missing every fourth print position). 2. PCAC Board (missing all odd or all even hammers). 3. DECC Board (missing a group of columns). 4. HDC Board (missing all odd or even hammers or every fourth hammer). 5. Broken wire on coil bank (missing one column).

(continued)

Table 4-1, Troubleshooting Guide (continued)

CONDITIONS	POSSIBLE CAUSE
MOTOR RUNS BUT NO PRINTING (continued)	
A Specific Character Does Not Print or is Smudged	1. Bent print finger. 2. Top part of print finger missing.
PRINTS BUT SNAGS FINGERS	
On Particular Characters Only	Bent Print finger.
On Particular Column Only	1. Dirty hammer-clevis linkage. 2. Hammer throw adjustment. 3. Bent clevis. 4. Plunger binding in coil bank.
On Odd or Even Columns	HDC Board.
At Any Column or Character.	1. Bent Print finger. 2. Photocell timing. 3. Misadjusted rebound bar. 4. HDC Board.
PRINTS LIGHT ON ONE PART OF CHARACTER	
Light On Top or Bottom All Columns	1. Hammer bank too low or too high. 2. Print belt riding low or high (replace belt or adjust front belt guide).
Light On Top One Character Only	Finger not seated in belt.
Light On Left (one position only)	1. Hammer throw adjustment. 2. Bent clevis. 3. Plunger binding in coil bank.
Light On Right	1. Bent Print finger. 2. Photocell timing (fast).
PRINTS COLUMN CALLED FOR PLUS ADDITIONAL COLUMNS	
	1. DECC Board. 2. HDC Board.
"Ghosting" In Additional Columns	Rebound Bar Adjustment.
LINE FEED PROBLEMS	
Uneven Line Feeds - Tension Limiter does not Bottom (Friction Feed Only)	1. Paper pressure incorrectly adjusted. 2. Worn or dirty platen rollers. 3. Platen roller missing.

(continued)

Table 4-1, Troubleshooting Guide (continued)

CONDITIONS	POSSIBLE CAUSE
LINE FEED PROBLEMS (continued)	
Uneven Line Feeds - Tension Limiter Bottoms (Friction Feed Only)	1. Adjust horizontal freedom of paper roll. 2. Uneven paper roll. 3. Obstruction holding paper roll.
Double Line Feed When Single Called For	Electrical 1. Control Panel switch. 2. MEMC Board. 3. Control Panel wiring. Mechanical 1. Line feed solenoid too far from clutch. 2. Line feed solenoid defective.
Single Line Feed When Double Called For	Electrical 1. Control Panel switch. 2. MEMC Board. 3. Control Panel wiring. Mechanical 1. Line Feed solenoid too close to clutch. 2. Line Feed solenoid armature gaps incorrect.
Continuous Line Feeds When Power is Applied. All Control Panel pushbuttons (except HERE IS) Lit.	1. Phase 2 Fuse (1FU) on T&AC Board. 2. CLCC Board.
Continuous Line Feeds After Going "On Line" or "Local"	Electrical 1. HDC Board. 2. MEMC Board. Mechanical 1. Line Feed solenoid.
RIBBON DOES NOT LIFT OR LIFTS SLOWLY	
	Electrical 1. LMPC Board. 2. HDC Board. 3. Open wire to solenoid. Mechanical 1. Lifting arm shaft binding in bearings. 2. Lifting arms loose on shaft. 3. Ribbon lift solenoid link disconnected. 4. Ribbon lift solenoid plunger sticking to plunger stop. 5. Ribbon arms adjusted too low. 6. Ribbon folding. 7. Ribbon missing.
RIBBON WILL NOT DROP	
	Electrical LMPC Board.

(continued)

Table 4-1, Troubleshooting Guide (continued)

CONDITIONS	POSSIBLE CAUSE
RIBBON WILL NOT DROP (continued)	
	Mechanical 1. Ribbon lift shaft binding. 2. Plunger sticking in ribbon lift solenoid. 3. Return spring missing. 4. Ribbon adjusted too high.
RIBBON SAGS	
When Ribbon Moves to Right	Replace left ribbon reverse mechanism.
When Ribbon Moves to Left	Replace right ribbon reverse mechanism.
RIBBON WILL NOT REVERSE	
Reverse Mechanism Oscillates	1. Reversing shaft binding in bearings. 2. Horseshoe spring missing from reverse mechanism. 3. Ribbon mechanism interposer arm binding. 4. Worn gear in reverse mechanism. 5. Ribbon spool not installed correctly. 6. Ribbon not installed on spool correctly.
Reverse Mechanism Hangs Up	1. Reversing shaft binding in bearings. 2. Horseshoe spring missing from reverse mechanism. 3. Worn gear in reverse mechanism.
Ribbon Tears At End	1. Wrong ribbon used. 2. Old ribbon needs replacement. 3. Ribbon tension high. Replace reverse mechanism.
RIBBON FRAYS EASILY	
	1. Incorrect ribbon used. 2. Old ribbon needs replacing. 3. Ribbon adjusted too close to fingers. 4. Ribbon adjusted too high. 5. Ribbon adjusted too low.
PAPER HANDLING	
Will Not Feed Correctly	See Line Feed Section.
Tracks To One Side	1. Damaged paper roll. 2. No horizontal freedom of paper roll. 3. Obstruction holding paper roll. 4. Dirty or worn platen rollers. 5. Dirty or worn platen. 6. Paper holder adjustment. 7. Platen not locked at ends. 8. Platen rollers missing.

(continued)

Table 4-1, Troubleshooting Guide (continued)

CONDITIONS	POSSIBLE CAUSE
PAPER HANDLING (continued)	
Bunches Up Under Paper Shield	Star wheels in paper shield sticking.
KEYBOARD AND LOCAL OPERATION	
No Upper Case Printing From Keyboard	1. SLC Board. 2. Defective Keyboard switch (if shift key works properly).
No Lower Case Printing From Keyboard	1. SLC Board. 2. Defective Keyboard switch. 3. MEMC Board.
Some Characters Will Not Print and There Is No Beep	1. Broken Ferrite "U" Core. 2. Missing Ferrite "I" Core.
Keyboard Locked Up	1. +155V fuse on right side frame missing or blown. 2. Clear "INTERRUPT". 3. SPCC Board. 4. MEMC Board. 5. SLC Board. 6. HDC Board.
Keyboard Locks Up After Pressing One Key	1. SPCC Board. 2. MEMC Board.
Will Not Back Space From Keyboard	1. Broken Backspace Ferrite "U" Core. 2. MEMC Board.
Blows 100V Fuse At Every Other Print Position	HDC Board.
ON LINE OPERATION	
Received Information Causes INTERRUPT Indicator to Light	1. CLCC Board. 2. Speed Setting. 3. Loose data plug. 4. Coupler noisy. 5. Computer clock timing. 6. Noisy telephone line.
STANDBY Indicator Lights When Data Is Received	1. DATC Board. 2. SPCC Board. 3. Normal condition (e.g., received ESC J or EOT).
INTERRUPT Indicator Lights When Operating From Keyboard	Typing while receiving information while in half duplex.

(continued)

Table 4-1, Troubleshooting Guide (continued)

CONDITIONS	POSSIBLE CAUSES
ON LINE OR LOCAL OPERATION	
Hammer Fires Repeatedly In Column 1	Font tab missing
Hammer Fires Each Time Finger Passes Photocell	1. HDC Board (shorted SCR). 2. HDC Board (short on PC runs).
Random Hammer Misfire	1. Insufficient grounding. 2. HDC Board.
100V Fuse Blows	1. HDC Board. 2. SPCC Board. 3. DECC Board.
Primary Fuse Blows When Power Is Applied	1. TXPC Board short. 2. 2100 MFD capacitor shorted. 3. Wiring short from TXPC. 4. Shorted Power Transformer.
Blows Primary Fuse or 100V Fuse at Particular Hammer Position	Shorted coil.
LMPC Fuse Blows	LMPC Board (oscillator shorted).
ALARM Indicator Lights Only - No Beep	1. CLCC Board (1FU Fuse). 2. CLCC Board
Power On - INTERRUPT Indicator Lights	1. SPCC Board. 2. MEMC Board.
Power On - INTERRUPT And STANDBY Indicators Light	T&AC Board.
Constant Speaker Alarm	1. T&AC Board. 2. DATC Board.
Motor Runs When Power Is Applied	1. DATC Board. 2. TXPC Board.
Constant READY Light	DATC Board.
PPI Counts Beyond 119	1. MEMC Board. 2. T&AC Board.
Garbled Printing	1. R&PC Board in Printer with Reader disconnected. 2. MEMC Board. 3. SPCC Board.

SECTION 2
FUNCTIONAL TROUBLESHOOTING

ELECTRICAL

When troubleshooting the TermiNet 300 Printer for electrical problems, consult Figures 3-31, 3-32, and 3-33 which are functional diagrams showing the major control signals and data flow in the Printer. Figures 4-1 through 4-9 show the control signals and data flow involved in a single function, operation or related functions and operations.

By noting the conditions of the Printer concurrent with the problem, these functional diagrams should be used as an aid to isolate the cause of the problem to a specific assembly or circuit board.

Troubleshooting the Printer can be simplified by using a test plug in the data set connector which simulates an "On Line" condition.

To troubleshoot a "Receive Only" Printer, a device capable of generating ASCII code must be connected to the Printer (see Table 4-2a, Special Tools and Test Equipment).

OBTAINING A TEST PLUG

A test plug may be purchased (G. E. Part Number 44A410618-G01) or fabricated from a RS-232 type connector plug (25 bin "Cinch DB-51226-1" or equivalent). The test plug may be fabricated by soldering a wire jumper from pin 2 to pin 3 and another wire jumper from pin 5 to pin 20.

USING THE TEST PLUG

To troubleshoot with a test plug, perform the following:

1. With power on make sure Printer functions normally.

2. Put INHIBIT switch in PRINT position and make sure local printing is inhibited.

3. With power turned "off", insert the test plug into the DATA SET connector on the right rear of the Printer.

4. Set the INHIBIT switch on the Control Panel to the PRINT position.

5. Apply power; the STANDBY and READY indicators should light.

6. Press the ON LINE Indicator/Switch; the Printer should go into and "On Line" condition with READY light on, and print normally.

The simulated "On Line" condition made possible by using a test plug allows use of the keyboard on KSR models to exercise the send and receive circuits of the Printer. This procedure will isolate a problem to the Printer or the external equipment. If the problem is isolated to the Printer, the following detailed description of each of the Printers circuits should help to identify the problem area.

PROTECTION CIRCUITS
(See Figure 4-1)

The PROC board is the central area for all protection circuits. This board receives information from the POWC board as to the condition of the incoming voltage. If the 115V AC input drops below 105V, the +16V from the POWC board will drop accordingly. A signal will be sent from the PROC board to the PCAC board to cut off the drive pulses. At the same time two signals will be sent to the DATC board; one as a LV (low voltage) signal to light the ALARM light and sound a beep at the speaker, and the other to de-energize the relay on the TXPC board, which will cut off the drive motor. Other inputs are handled in the same way.

Low paper and shield "up" does not go through the PROC board. This signal is handled by the DATC board, which lights the alarm, sounds the beep tone, and drops the motor relay.

MOTOR AND LINE FEED CIRCUITS
(See Figure 4-2)

MOTOR CIRCUITS

Parallel data from the keyboard or serial data from the phone line is processed through the Printer to the SPCC board. Here, the signal is decoded as a motor "on" signal and sent to the DATC board. The logic signal is changed to a relay drive signal and sent to the relay on the TXPC board. The relay is energized which starts the motor.

LINE FEED CIRCUITS

Data received at the SPCC board is decoded as a line feed signal and sent to the MEMC board. The Single/Double line feed switch determines if this signal is for a single or double space. The logic signal is then sent to the HDC board where it goes to an amplifier which drives the line feed solenoid.

DATA SIGNALS

Figure 4-3 shows a simplified data signal flow to help determine where a problem exists.

Using an example of occasional garbled printing, the first thing to determine is if the problem exists only

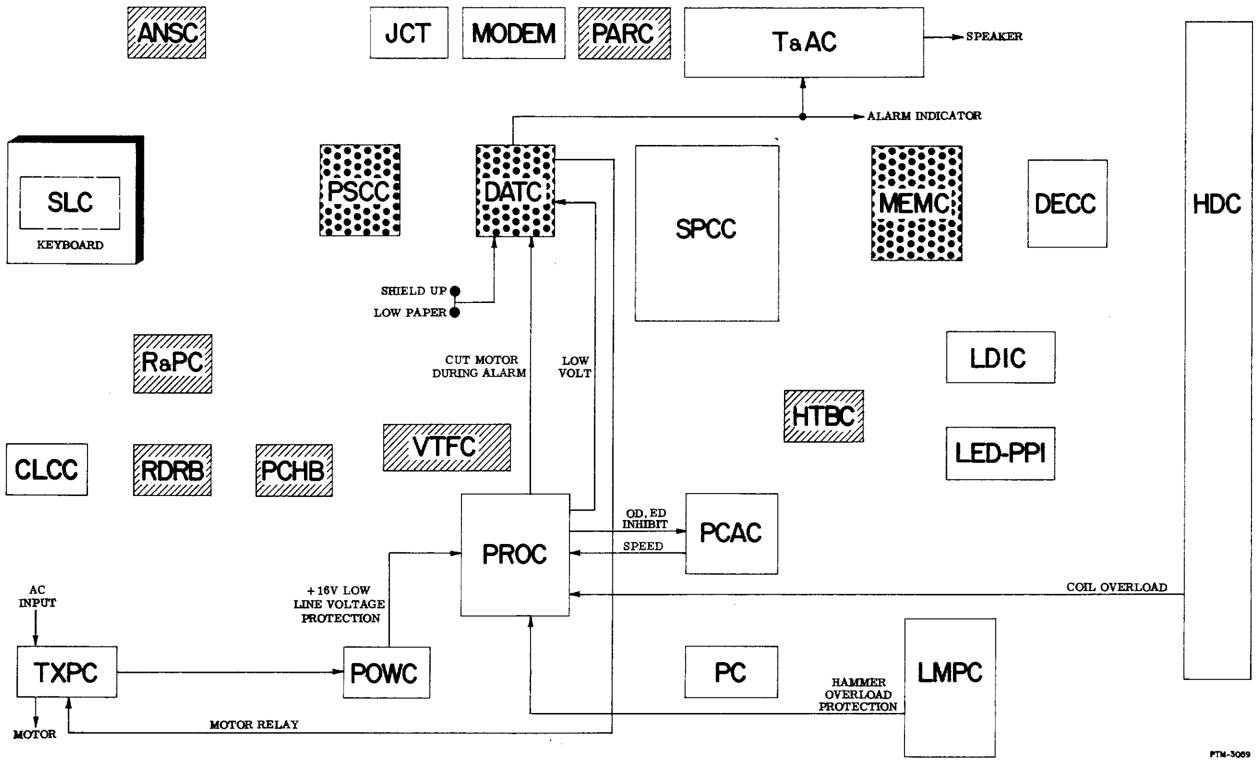


Figure 4-1. Protection Circuits

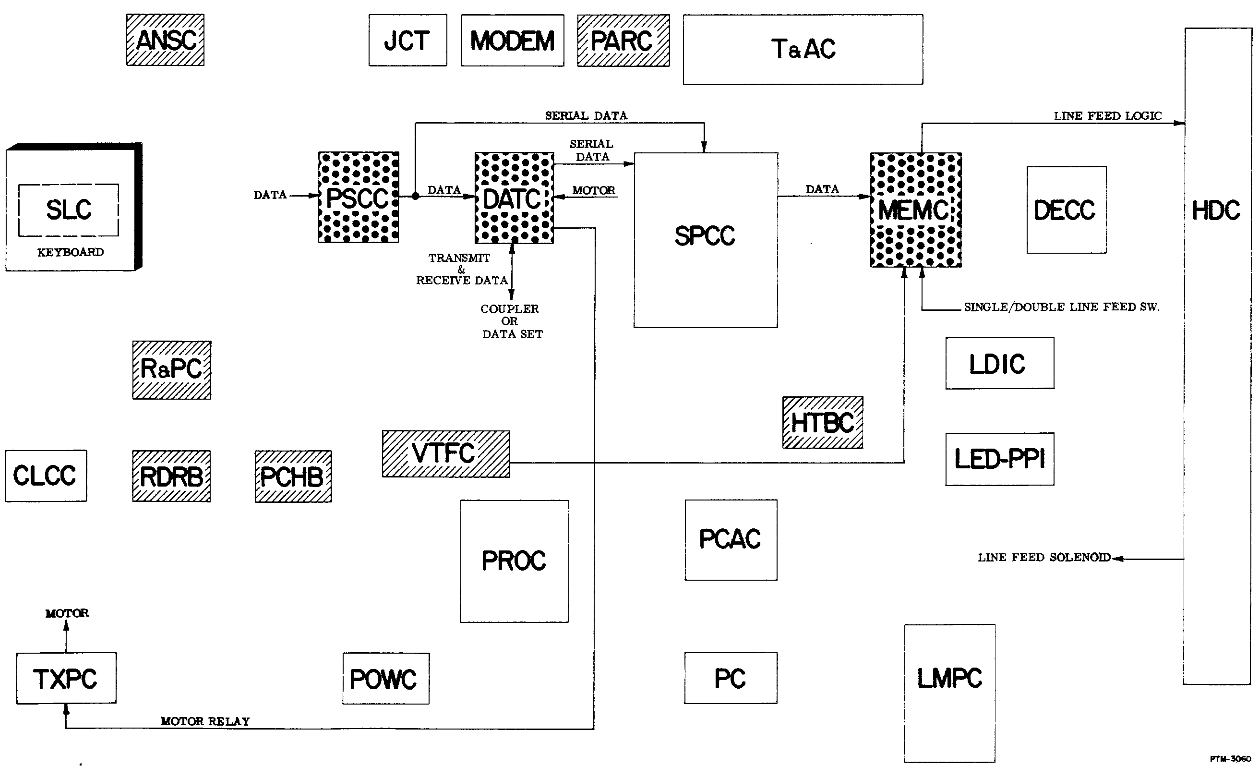


Figure 4-2. Motor and Line Feed Circuits

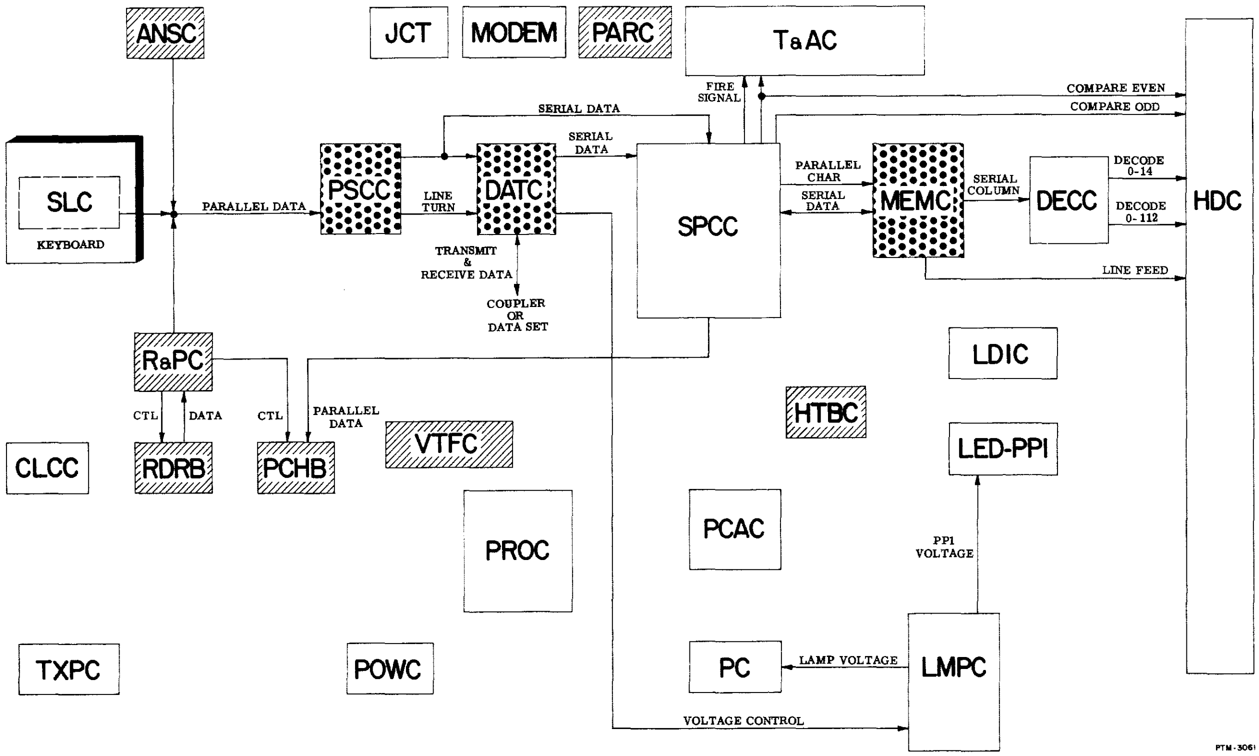


Figure 4-3. Data Signals.

with local printing from the keyboard or only from incoming data, or both.

It can be seen from the block diagram that if the problem exists only with received data, then the keyboard, SLC board and PSCC board can ordinarily be eliminated. If the problem exists only when using the keyboard, but is not encountered when receiving incoming data, the problem is reduced to the PSCC, SLC or keyboard. If the answerback or reader is included, information can be checked from these points. Since the signals from these two options are fed to the PSCC board, the PSCC board can be eliminated as a possible cause if the Answerback or Reader operates properly; if either do not, the PSCC board can be assumed to be the problem.

If the problem exists no matter where the data is coming from, it can be seen by the block diagram that only the SPCC and MEMC boards are associated with data under all incoming conditions. Here again, if the punch option is included and the information is correct at the punch, the MEMC board is the probable cause. If the MEMC board is not found to be at fault, the SPCC board should be the next suspected problem area.

HIGH VOLTAGE CIRCUITS
(See Figure 4-4)

The 105V AC to 129V AC input, when applied to the Printer is fed to and across the TXPC board to the transformer. One side of the line is tied through the relay contacts to the motor and fluorescent lamp. The voltage from the transformer secondary is again brought to the TXPC board where the rectified voltage is wired to the large 2100 MFD capacitor (on main frame) for filtering and then to the HDC board. The +155V DC is regulated to +95 volts and is used at the keyboard, the line feed relay, and after passing through a switching circuit, is used to drive the hammer coils.

ODD-EVEN PULSE CIRCUITS
(See Figure 4-5)

The finger signals originate from the PC board. The lamp signal is chopped by the lower portion of the print fingers passing between two photocells and the photocell lamp. From one cell the "Odd" photocell signal is derived, and from the other cell the "Even" photocell signal. Each signal is sent to the PCAC board where it is squared, amplified and timed to create a 0.9 msec drive signal. A sample of the "Odd" photocell signal is sent to the PROC board where it is used to detect low belt speed. Both "Odd" and "Even" drive signals are sent to the HDC board where they pass through a power switching circuit and then separated into two drive signals for the odd and even numbered hammer coils.

The PCAC also sends the finger signals to the SPCC board. Signals from the SPCC are sent to the HDC

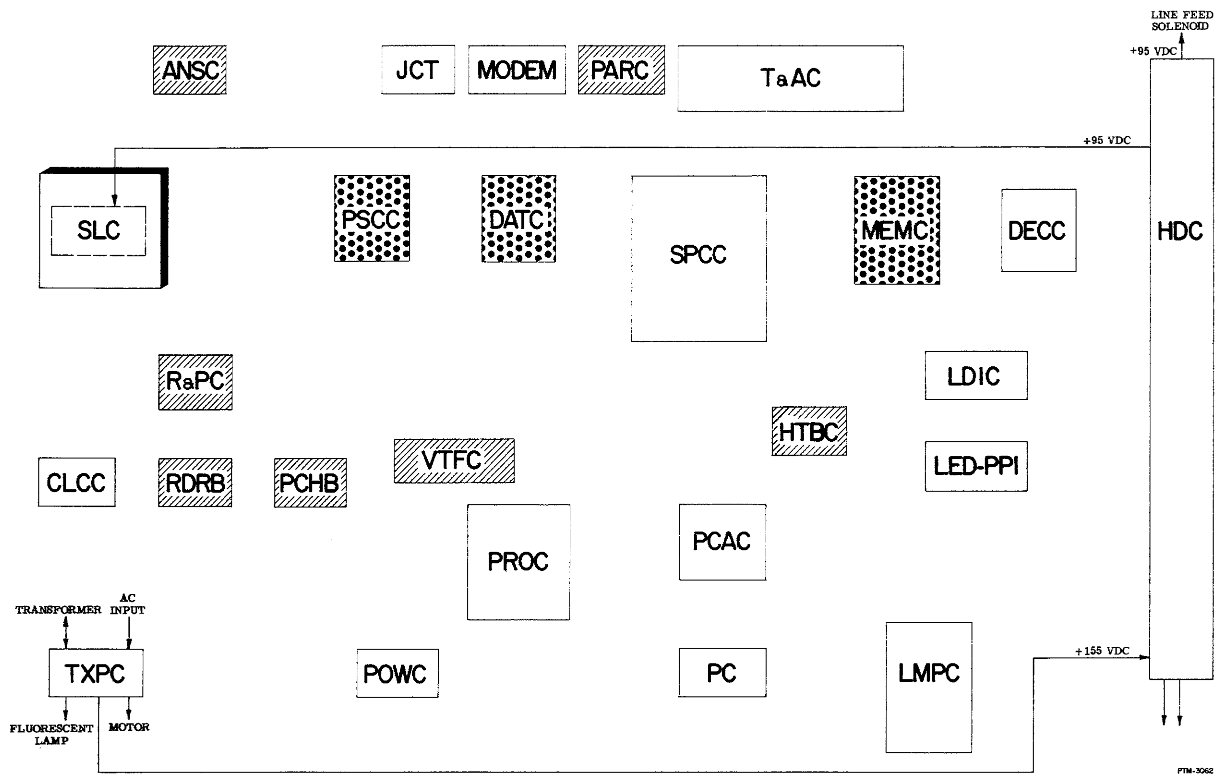


Figure 4-4. High Voltage Circuits.

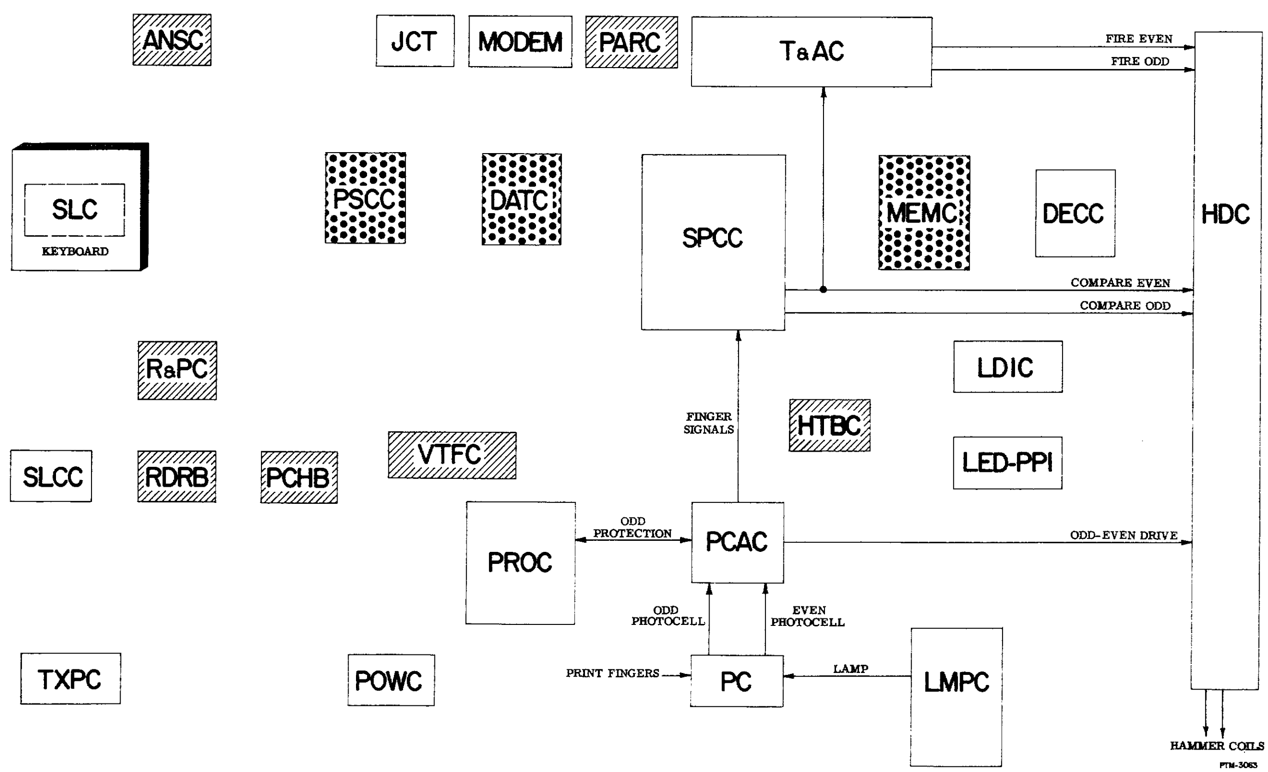


Figure 4-5. Odd-Even Pulse Circuit.

for logic comparison. The compare even signal is also sent to the T&AC board and passes through an "OR" circuit. The other input to the "OR" circuit is the FIRE signal from SPCC. From this is generated a Fire Odd and a Fire Even signal which is sent to the HDC board to cause the Odd or the Even numbered SCR's to turn on at the appropriate time.

AUXILIARY LAMPS AND SWITCHES
(See Figure 4-6)

Figure 4-6 shows the boards that affect, or are affected by the different lamps and switches on the Printer. Notice in particular the direction of the arrows which indicate if the switches are doing the controlling or if the boards are controlling the lamps.

SPEAKER CIRCUIT
(See Figure 4-7)

There are several inputs to the speaker to cause it to "beep". Some during normal operation and others to bring attention to a problem. Some imputs used during normal operation are the keyboard and end of line beep. Both of these tones are controlled by two volume controls on the T&AC board.

There are inputs from a switch mounted at the right edge of the paper shield (not on forms tractor models) and in parallel with that is another switch mounted at the rear frame. Should the shield be raised or paper be removed from the roll, a "beep" will sound. If an interrupt signal is received the INTERRUPT indicator will light and the beep will sound.

Any condition that would cause the ALARM indicator to light will cause the speaker to "beep". Examples of this would be for the input AC voltage to drop below 105V AC, the belt speed to drop beyond its present limits, too many hammers to be set up during compare time, or if too many hammers try to fire at one time. Any of these would create a signal at the PROC board to sound the "beep" and cause the Printer to go to "Standby" status if On Line; if Printer is in LOCAL, the motor stops after an alarm condition, but the Local light stays lit.

RIBBON LIFT
(See Figure 4-8)

Any incoming information, either serial or parallel, when decoded at the MEMC board as a printing character will create a ribbon up logic signal. This signal is sent to the LMPC board, through a transistor driver circuit, then across the HDC board to the ribbon lift solenoid.

OPTION BOARDS
(See Figure 4-9)

The option boards used in the Printer are shown in the line shaded blocks and are not necessary for

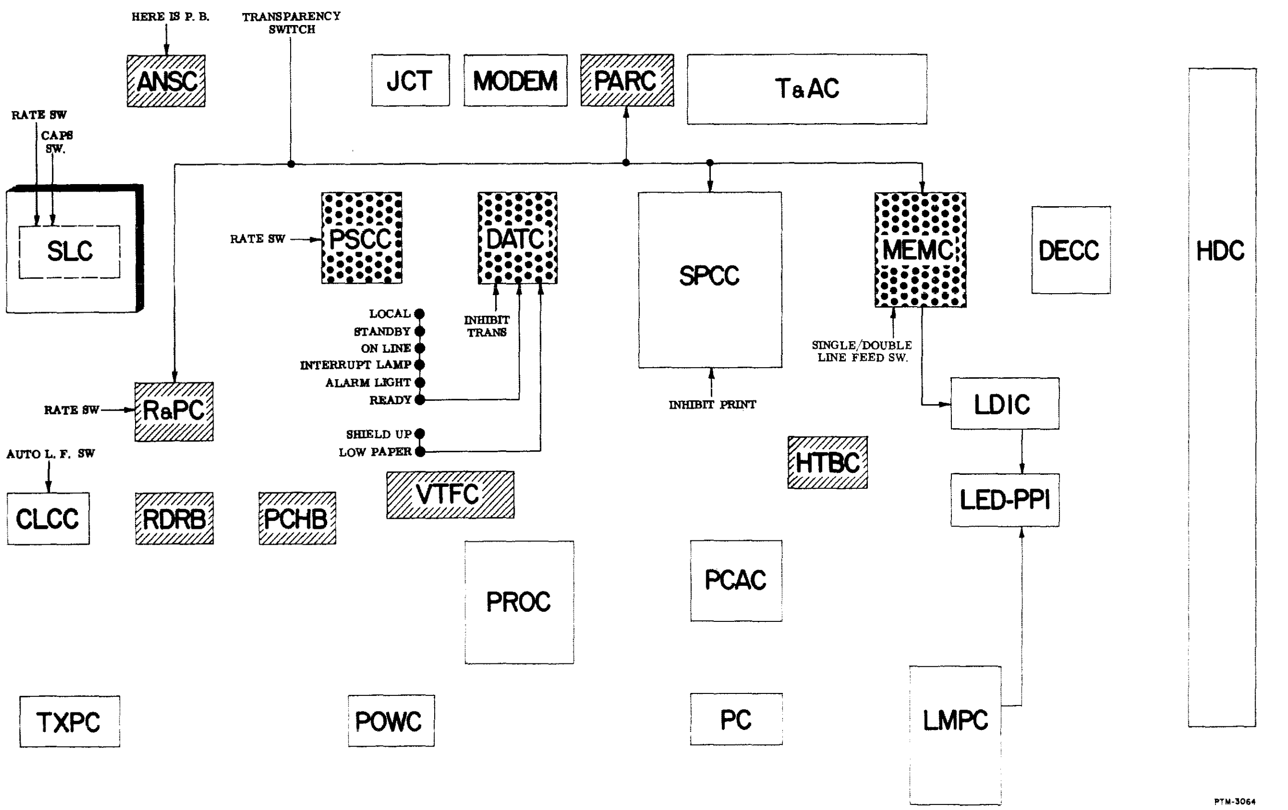


Figure 4-6. Auxiliary Lamps and Switches.

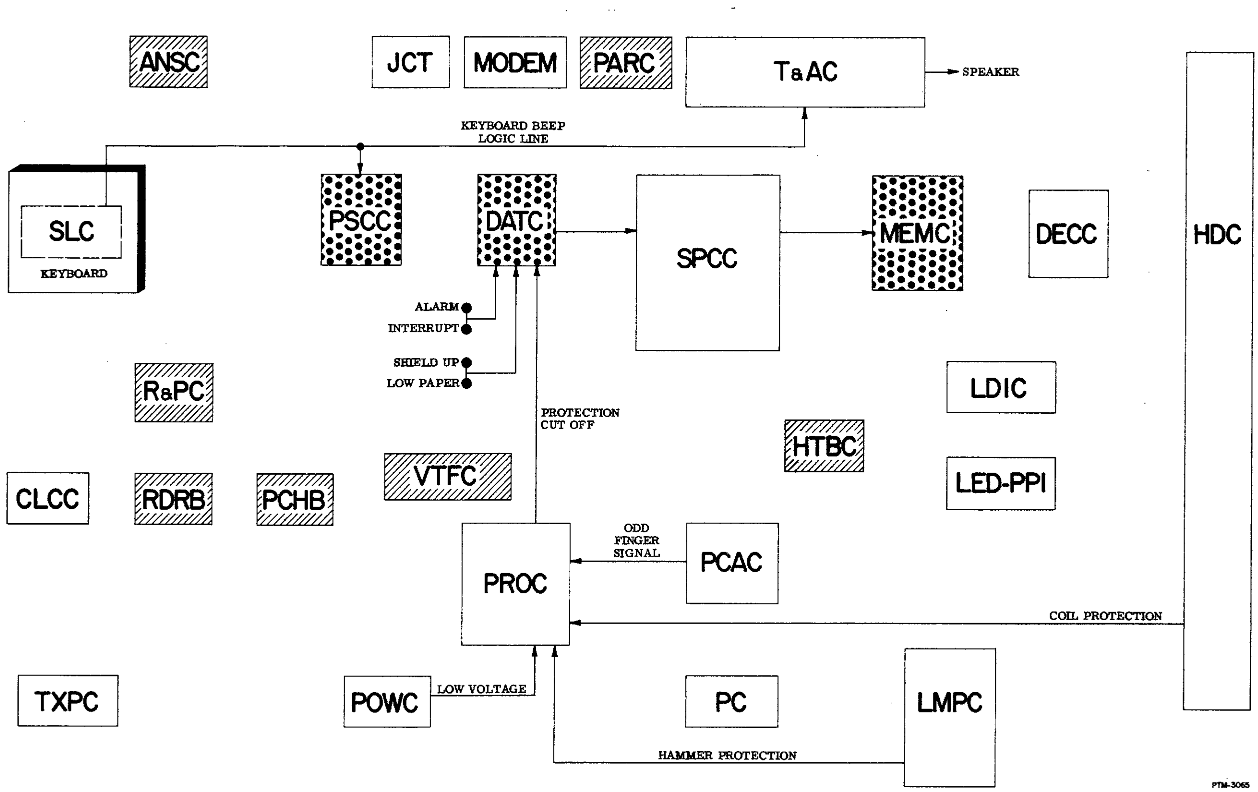


Figure 4-7. Speaker Circuit.

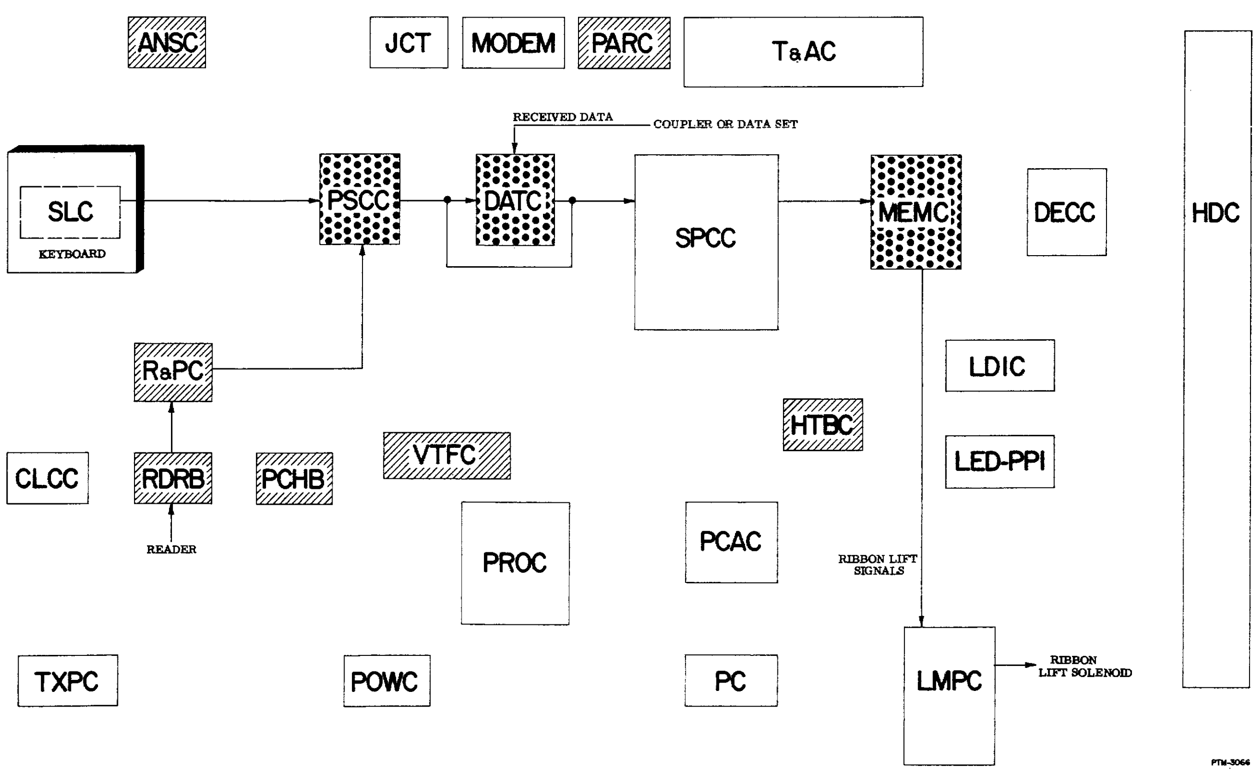


Figure 4-8. Ribbon Lift.

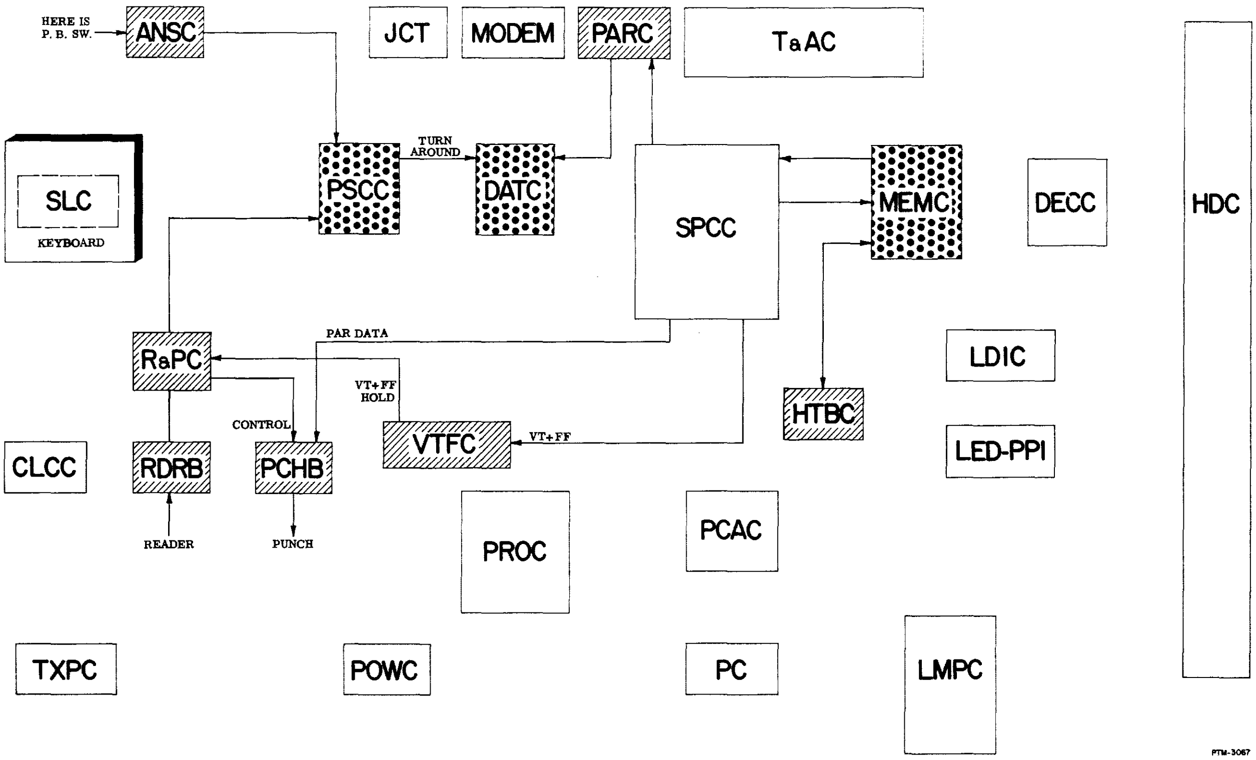


Figure 4-9. Option Boards.

normal Printer operation unless that particular option is required. In addition, three blocks are shown with a dot shading to indicate optional boards of this type are available; however, these boards are necessary for the proper operation of the Printer and only through different variations of these boards will a particular option be available.

The RDRB board and PCHB board are used on an ASR unit and must be used with R&PC board. Parallel information from the reader is amplified at the RDRB board and sent to the R&PC board. The incoming signals are converted to logic form and sent in parallel form to the PSCC board to be converted to serial information.

Parallel information from the SPCC board is sent to the PCHB board. If the reader and punch are not used as in an ASR unit, the R&PC board should be removed from the Printer.

The Vertical Tab-Form Feed (VTFF) option consists of a VTFC bustle board and mechanical parts.

The Answerback option consists of an ANSC bustle board which needs only to be plugged into the bustle for operation. The Answerback option can be programmed with a message up to twenty characters.

The Parity Error Detection option consists of a PARC bustle board. The option can be disabled by removing the PARC board from the bustle.

The Horizontal Tab option consists of an HTBC bustle board that requires only to be plugged into the Printer for operation.

The Line Control option, which allows the use of a lower cost, single line, telephone system, consists of a special PSCC board.

The Automatic Motor Control option consists of a jumper option on the SPCC board.

The Automatic Return option consists of a special MEMC board.

The TRP board is used to interface a TermiNet Cassette Accessory (TCA) with the Printer. This board must be present in the R&PC slot in the Printer whenever a TCA is used.

MECHANICAL

Mechanical problems in the Printer causing excessive noise or binding can be isolated to the left or the right drive train by slipping the left drive belt off of the small pulley on the left print belt pulley shaft and checking to see if the problem is still present.

PRINT BELT STICKING

If print belt sticking is encountered, the following procedure should be followed:

1. Remove the fluorescent lamp from the machine.

2. With the motor running, spray the inside of the belt at the right side of the machine near the pulley with aerosol dry lubricant (G.E. Part No. 44A417371).

CAUTION

Do not spray at left side near the photocell.

3. The inside of the belt should be coated at the rib guide. An adequate coating can be applied with one to two seconds of spraying.

NOTE

The aerosol can must be equipped with a small hose to direct the spray accurately inside the print belt.

4. After the lubricant has been applied, measure the resistivity between the moving print fingers and the machine frame. The measured resistance must not exceed one megohm. Should the resistance exceed one megohm, the belt must be cleaned and resprayed or the belt may be wiped to remove enough lubricant to bring the resistance within limits.

5. Check to make sure there is 0.003 to 0.008 inches (0.08 to 0.20 mm) of clearance between the belt and rear belt guide.

6. If the problem persists, remove the rear belt guide and the print belt, and check for proper pulley-to-guide alignment between the print belt pulleys and the front belt guide (see Chapter 5, Maintenance for details).

TEST EQUIPMENT

The test equipment recommended for checking outputs on PCB test points is a Dual Trace Oscilloscope. Scope syncing should be done internally from observed test points.

Test conditions are with motor on and at a 30 character per second rate unless otherwise stated.

When using the "scope" to troubleshoot, refer to Section 3 of this chapter. Amplitudes of logic levels (unless otherwise stated) are negative (between -10 and -15 volts) and 0 volts. A bit pulse may be a negative going or a positive going pulse.

Special tools and test equipment helpful to servicing the TermiNet Printer are listed in Table 4-2a. A listing of suggested standard tools for servicing the Printer appears in Table 4-2b.

Table 4-2a

Special Tools and Test Equipment
(Illustrated In Parts Manual, GEK-14999)

PART NUMBER	ITEM	PURPOSE
44A410368-G01	Board Puller Tool	Removal of Bustle PCB's.
44A410619-G01	Timing Gauge	To set correct timing of hammer fire for correct print out.
44A410618-G01	Test Plug	Used in data receptacle to "loop-back".
44A410588-G01	Bearing Puller Tool	Removal of jackshaft bearings.
44A410583-001	Pulley Height Gauge	Setting correct vertical height of shimmed print belt pulleys (to match belt guides).
44B412269-001	Finger Removal Pliers	For extracting and replacing print belt print fingers without damaging type head.
**PL-27RW	TermiTester*	Mag tape electrical device provides canned input test programs to data receptacle.

*Trademark of General Electric Company, USA
**Distributed by General Electric Company, Pittsburg Instrumentation Service, 4930 Buttermilk Hollow Road, West Mifflin, Pa. 15122.

Table 4-2b

Suggested Standard Tools

Soldering Handle Ungar #6903 Soldering Elements Ungar #6915 Soldering Tips Ungar #6961	Feeler Gauge .0015-025 General #226T Wire Cutting and Stripping Tool Klein #1000 Brush, Typewriter Cleaning #B-14
Tweezers Hunter # C-22 Tapered Nose Nippers Proto #452-F Chain Nose Pliers Proto #282-G	Screwdriver, Offset #36-1/4 Screwdriver, Offset #34-1/4 Phillips Hd. V.O.M. Triplett #310C w/#369 Case
Diagonal Pliers Proto #204-G Knife Hunter #E-20 or E-30 Knife Blades Set Hunter #E-26	Set of Hex Keys HS 107 (Allen Wrenches) Spring Hook (Pull) #142554 Spring Hook (Push) #142555
Conduct-A-Lite Insp. Kit 60-40 Solder, Resin Core Cotton Tip Wood Applicators	Comb. Wrench 1/4" Proto #1208L Comb. Wrench 5/16" Proto #1210L Comb. Wrench 11/32" Proto #1211
File, 6" Flat Smooth File, 6" Round Smooth Wrench, 6" Adjustable Proto #706	Screwdriver #2 Proto #9624 Screwdriver #6 Proto #9632 Screwdriver, Screwholding Proto #9853

SECTION 3

PRINTED CIRCUIT BOARDS

This section contains information on TermiNet Printer Printed Circuit Boards manufactured to date. This information is compiled in chart form, and the chart titles are listed below.

Table 4-3. Printed Circuit Board Description

Table 4-4. Jumper Options

Table 4-5. Fuses

The last part of this section contains a listing of the various circuit board Test Points, and the expected signal output at each one.

Table 4-3.

TermiNet 300 Printer Circuit Board (PCB) Descriptions

This table gives you essential information about a given PCB except for Jumpers and Fuses. If there is a "Yes" in the JUMPERS or FUSES column, refer to Table 4-4 (Jumpers) or Table 4-5 (Fuses).

Bustle PCB's are listed first and the Non-Bustle PCB's are listed last. All PCB's are listed alphabetically by their mnemonic name.

BUSTLE PCB's

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
AHX/1*	Parallel Interface	44B417441-G01	AUX	44C401200		X			X			Yes	No	CRT interface board. Can be used in specially modified "B" Printers.
AHX/2*	Parallel Interface	44B417441-G02	AUX				X		X			Yes	No	CRT interface board.
AMUX/1*	Address Memory Unit Interface	44B417414-G01	AUX	44D400307	X	X			X			No	No	Turns on CB to start reader during AMV record mode.
AMUX/2*	Address Memory Unit Interface	44B417414-G01	AUX	44D400307			X		X			No	No	Enables AMV recording mode to start reader without turning on CB.
ANS/1	Answerback	44B412153-G01	ANS	44C400110	X	X			X			Yes	No	ANS/2-44B412153-G02 is a sub-assembly of ANS/1.
ANSC/1	Answerback	44B417405-G01	ANS	44D400308			X		X			Yes	No	No automatic answerback or disconnect option.
ANSC/2	Answerback	44B417405-G02	ANS	44D400308			X		X			Yes	No	Has automatic answerback and automatic disconnect option.
ANSC/3*	Answerback	44B417405-G03	ANS	44D400308			X					Yes	No	Modifies G02 Board Has automatic answerback and is Transmit ACK or NAK coincident with the first character of the answerback message.

NOT USED

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
ANSC/4	Answerback	44B417405-G04	ANS	44D400308			X		X			Yes	No	Functionally the same as the ANSC/2. Has improved automatic answerback and automatic disconnect options.
ANSC/5	Answerback	44B417405-G05	ANS	44D400308			X		X			Yes	No	Same as ANSC/1 except it employs a new diode spring socket in the diode matrix.
ANSC/6	Answerback	44B417405-G06	ANS	44D400308			X		X			Yes	No	Same as ANSC/4 except it employs a new diode spring socket in the diode matrix.
ASXC/1	Automatic Selective Addressing	44B417418-G01	AUX	44D400314		X	X	X	X			Yes	No	
CLC/1	Clock	44B412159-G01	CLC	44C400109	X	X		X	X			Yes	Yes	600 Baud
CLC/2	Clock	44B412159-G02	CLC	44C400109	X	X		X	X			Yes	Yes	200 Baud
CLCC/3	Clock	44B412159-G03	CLC	44C400109	X	X	X	X	X			Yes	Yes	600 Baud
CLCC/4	Clock	44B412159-G04	CLC	44C400109	X	X	X	X	X			Yes	Yes	200 Baud
CLCC/5*	Clock	44B412159-G05	CLC	44C400109	X	X	X	X	X			Yes	Yes	1050 Baud
DAT/1	Data Set	44B412155-G01	DAT	44C400101	X	X		X	X			Yes	No	
DAT/2	Data Set	44B412155-G02	DAT	44C400101	X	X		X	X			Yes	No	Has automatic motor on/off option from CB.
DATB/1	Data Set	44B412428-G01	DAT	44D400300	X	X		X	X			Yes	No	Has automatic motor on/off CB, status monitor option using CA, and paper out alarm jumper option; also has improved RS232 interface ckt.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
DATC/1	Data Set	44B417416-G01	DAT	44D400309	X	X	X	X	X			Yes	No	Same as DATB/1. Also, turn to receive (PTTR) when break detected (DETBK).
DATC/2	Data Set	44B417416-G02	DAT	44D400309	X	X	X	X	X			Yes	No	Same as DATC/1 except CB does not block BA.
DATC/3*	Data Set	44B417416-G03	DAT	44D400309	X	X	X	X	X			Yes	No	Same as DATC/1 except CA is off when in local and CB has no effect on CA.
DATC/4*	Data Set	44B417416-G04	DAT	44D400309 Sh. 2	X	X	X	X	X			Yes	No	Same as G01 except when in Local. Received Data is transmitted back to send.
DATC/6*	Data Set	44B417416-G06	DAT	44D400309 Sh. 3			X		X			Yes	No	Used in units with closed loop interface.
DATC/7*	Data Set	44B417416-G07	DAT	44D400309			X		X			Yes	No	Modified DATC/1 to give bad status on VTFF. Needs MBC/7 for proper operation. Does not provide line-feed for platen motion.
DATC/8*	Data Set	44B417416-G08	DAT	44D400309			X		X			Yes	No	Provides closed loop interface for platen motion (LF). Identical to DATC/1/2/3 except for status circuits on CA. Needs MBC/7 Mod 1 for proper operation.
DATC/9*	Data Set	44B417416-G09	DAT	44D400309 Sh. 2			X		X			Yes	No	Used with PSCC/8 and R&PC/11. Automatic local to On Line by CB. Allows Punch to receive data during an Alarm condition. CA treated as "BID" in system. DLE & EOT will not force disconnect. CD does not reflect paper out when CB is off. No Alarm when punch is out of tape.

(continued)

*Special Application

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
DATD/1*	Data Set Control	44B412307-G01	DAT	44C400146	X			X				Yes	No	
DATI/1*	Current Loop Interface	44B417422-G01	DAT	44D400310	X	X	X	X				Yes	No	
DATI/2	Current Interface	44B417422-G02	DAT	44D400310		X	X	X	X			Yes	No	Transmit and Receive Current interface with external current source.
DATI/3	Current Interface	44B417422-G03	DAT	44D400310		X	X	X	X			Yes	No	Transmit and Receive Current interface with external current source.
DATI/4*	Current Loop Interface	44B417422-G04	DAT	44D400310	X	X	X	X	X			Yes	No	Same as G02 except for modified Output circuits.
DATI/5	Current Loop Interface	44B417422-G05	DAT	44D400310	X	X	X	X	X			Yes	No	Same as DATI/2 except $\overline{LV}$ is used to give motor on when power is energized. Not compatible with internal Modems.
DEC/1	Serial Decoder	44B412160-G01	DEC	44C400118-G01	X	X		X	X			No	No	For short Print Line Printers.
DEC/2	Serial Decoder	44B412160-G02	DEC	44C400118	X	X		X	X			No	No	For long Print Line Printers.
DECC/3	Serial Decoder	44B412160-G03	DEC	44C400118	X	X	X	X	X			No	No	For short Print Line Printers.
DECC/4	Serial Decoder	44B412160-G04	DEC	44C400118	X	X	X	X	X			No	No	For long Print Line Printers.
DRD/1*	Data Set Relay Driver	44B417437-G01	AUX	44A400610			X		X			No	No	Data Set Relay Driver Board.
HTB/1	Horizontal Tabulation	44B412157-G01	HTB	44C400103	X	X		X	X			No	No	

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
HTBC/2	Horizontal Tabulation	44B412157-G02	HTB	44C400103	X	X	X	X	X			No	No	Functionally the same as HTB/1.
KIF/1	Keyboard Interface	44B412169-G01	KIF	44C400102	X	X			X			Yes	No	Always all cap's - no switch.
KIF/3	Keyboard Interface	44B412169-G03	KIF	44C400102	X	X			X			Yes	No	Standard PCB. To insure proper operation, the KIF PCB should be Rev. 003 with mod. 3 and 4, Rev. 004 with mod. 4, or Rev. 006 with mod. 5.
LMP/1	Lamp Regulator	44B412165-G01	LMP	44C400115	X	X		X	X			No	Yes	
LMP/2*	Lamp Regulator	44B412165-G02	LMP	44C400115	X	X		X				No	Yes	No ribbon lift circuit.
LMPC/3	Lamp Regulator	44B412165-G03	LMP	44C400115	X	X	X	X	X			No	Yes	No elapsed time indicator.
LMPC/4	Lamp Regulator	44B412165-G04		44C400115	X	X	X	X	X			No	Yes	Has elapsed time indicator.
LMPC/5	Lamp Regulator	44B412165-G05	LMP	44C400115	X	X	X	X	X			No	Yes	Used with TXPC/6 or TXPC/7 on uints when timer is required.
LDIC/1	Light Diode Indicator	44B412405-G01	LDIC	44C400161			X		X			No	No	For use with C Model LED display.
LTU*	Line Termination Unit	44A417323-100	LTU	19C319199	X	X		X				Yes	No	
MEM/1	Memory	44B412158-G01	MEM	44C400108	X	X		X	X			Yes	No	No automatic carriage return option.
MEM/2	Memory	44B412158-G02	MEM	44C400108	X	X		X	X			Yes	No	Automatic CR at end of line.
MEM/4*	Memory	44B412158-G04	MEM	44C400108	X	X		X				No	No	

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
MEMC/3	Memory	44B412158-G03	MEM	44C400108	X	X	X	X	X			Yes	No	For one color ribbon.
MEMC/5	Memory	44B412158-G05	MEM	44C400108			X	X	X			Yes	No	For two color ribbon.
MEMC/6	Memory	44B412158-G06	MEM	44C400108		X	X	X	X			Yes	No	80 column.
MEMC/7	Memory	44B412158-G07	MEM	44C400108			X	X	X			Yes	No	80 column.
MEMC/8*	Memory	44B412158-G08	MEM	44C400108			X	X	X			Yes	No	
MEMC/9	Memory	44B412158-G09	MEM	44C400108			X	X	X			Yes	No	120 column - one color ribbon.
MEMC/10	Memory	44B412158-G10	MEM	44C400108			X	X	X			Yes	No	120 column - two color ribbon.
FMEM/1	Memory	44B417433-G01	MEM	44C400178			X	X	X			Yes	No	Foreign power (50 Hz) model for one color ribbon. 118 column print line.
FMEM/2	Memory	44B417433-G02	MEM	44C400178			X	X	X			Yes	No	Foreign power (50 Hz) model for two color ribbon. 118 column print line.
FMEM/3	Memory	44B417433-G03	MEM	44C400178			X	X	X			Yes	No	Foreign power (50 Hz) model for one color ribbon. 80 column print line.
FMEM/4	Memory	44B417433-G04	MEM	44C400178			X	X	X			Yes	No	Foreign power (50 Hz) model for two color ribbon. 80 column print line.
FMEM/5*	Memory	44D417433-G05	MEM	44C400178			X	X	X			Yes	No	Foreign power (50 Hz) 118/75 print column model. Same as FMEM/1 except signal E2A is brought out to finger B12 for use with AHX.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
FMEM/6*	Memory	44D417433-G06	MEM	44C400178			X	X	X			Yes	No	Foreign Power (50 Hz) 80 column model. Same as FMEM/3 except signal E2A is brought out to Finger B12 for use with AHX.
PMEM/1	Memory	44B417413-G01	MEM	44C400169		X	X	X	X			Yes	No	80 column for one color ribbon.
PMEM/2	Memory	44B417413-G02	MEM	44C400169			X	X	X			Yes	No	80 column for two color ribbon.
MOD-1	Modem	44A417330-001	MOD	19R620379		X		X	X			Yes	No	
MOD-2	Modem*	44A417323-002	MOD	19D414550	X	X		X				No	No	
MOD-3	Modem	44A417330-003	MOD	19R620379		X	X	X	X			Yes	No	Functionally the same as MOD-1. Components are relocated.
202/1 MOD	202 Interface	44B417435-G01	MOD	44C400185 Sh. 1			X	X	X			Yes	No	Interface for 202C data set.
202/2 MOD	202 Interface	44B417432-G02	MOD	44C400185 Sh. 2			X	X	X			Yes	No	Interface for 202C data set with status monitor capability.
PAR/1	Parity Error Detection	44B412260-G01	PAR	44C400139	X	X		X	X			Yes	No	Diamond not printed on "A" Printer.
PAR/2	Parity Error Detection	44B412260-G02	PAR	44C400139	X	X	X	X	X			Yes	No	Modified PAR/1 to remove switch for use in "C" Printer.
PARC/1	Parity Error Detection	44B417415-G01	PAR	44C400177	X	X	X	X	X			Yes	No	No on/off switch on PCB. Parity not checked when transparency is on.
PCA/1	Photocell Amplifier	44B412166-G01	PCA	44C400128	X	X		X	X			No	No	

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
PCAC/2	Photocell Amplifier	44B412166-G02	PCA	44C400128	X	X	X	X	X			No	No	Functionally the same as PCA/1.
POW/1	Low Voltage Power Supply	44B412170-G01	POW	44C400105	X	X		X	X			Yes	Yes	3/4 amp fuses.
POW/2	Low Voltage Power Supply	44B412170-G02	POW	44C400105	X	X		X	X			Yes	Yes	1 1/2 amp fuses.
POW/3	Low Voltage Power Supply	44B412170-G03	POW	44C400164	X	X		X	X			Yes	Yes	1 1/2 amp fuses; +15V and -15V busses slaved to -27V buss.
POWC/4	Low Voltage Power Supply	44B412170-G04	POW	44C400164	X	X	X	X	X			Yes	Yes	Functionally the same as POW/3.
PPI/1	Print Position Indicator	44B412162-G01	PPI	44C400112	X	X			X			No	No	
PRO/1	Speed Voltage Protection	44B412164-G01	PRO	44C400127	X	X		X	X			No	No	
PROC/2	Speed Voltage Protection	44B412164-G02	PRO	44C400127	X	X	X	X	X			No	No	Functionally the same as PRO/1.
PSC/1	Parallel to Serial Converter	44B412154-G01	PSC	44C400119 Sh. 1	X	X			X			Yes	No	
PSC/2	Parallel to Serial Converter	44B412154-G02	PSC	44C400119 Sh. 2	X	X			X			Yes	No	Used for data set turn control option.
PSC/3	Parallel to Serial Converter	44B412154-G03	PSC	44C400119 Sh. 3	X	X			X			Yes	No	Functionally the same as PSC/1.
PSCC/1	Parallel to Serial Converter	44B417409-G01	PSC	44C400166 Sh. 1			X		X			Yes	No	

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
PSCC/2	Parallel to Serial Converter	44B417409-G02	PSC	44C400166 Sh. 2			X		X			Yes	No	Used for data set turn control option.
PSCC/3	Parallel to Serial Converter	44B417409-G03	PSC	44C400166 Sh. 3			X		X			Yes	No	Special limited use in 1200 baud time share system. Functionally the same as PSCC/2 plus EOT is automatically generated when CR is pressed.
PSCC/4	Parallel to Serial Converter	44B417409-G04	PSC	44D400313			X		X			Yes	No	Special limited use in 1200 baud time share system. Functionally the same as PSCC/2 plus ETX is automatically generated when CR is pressed.
PSCC/5	Parallel to Serial Converter	44B417409-G05	PSC	44D400315			X		X			Yes	No	Used in poll and select system similar to PSCC/2 with added polling logic.
PSCC/8*	Parallel to Serial Converter	44B417409-G08	PSC	44C400166 Sh. 5			X		X			Yes	No	Same as PSCC/6 except can be jumpered so finger D14 is -15V and finger C10 is output. Used with DATC/9 and R&PC/11.
PSCC/9*	Parallel to Serial Converter	44B417409-G09	PSC	44D400313			X		X			Yes	No	Provides Line turn around with EOT and/or ETX.
RCM	Reverse Channel Modem	44A417710-002	RCM				X	X	X			No	No	Reverse Channel Modem (1200 Baud).
R&P/1	Reader and Punch	44B412163-G01	R&P	44C400113 Sh. 1	X	X			X			Yes	No	Reader stops when DC3 is read. When the Reader is restarted, a DC3 is transmitted and punched on tape. The Reader does not stop.
R&P/2	Reader and Punch	44B417408-G02	R&P	44C400305	X	X			X			Yes	No	When a DC3 code is read, a DC3 is punched and transmitted; and the Reader stops. The ESC 0 reverse sequence cannot be used.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
R&PC/3	Reader and Punch	44B412163-G03	R&P	44C400113 Sh. 2	X	X	X		X			Yes	No	No edit line mode. Edit word mode does not stop on C/R. Reader stops on DC3 only when read in reverse direction. The transparency option cannot be used.
R&P/4	Reader and Punch	44B412163-G04	R&P	44C400113 Sh. 3	X	X			X			Yes	No	When "On Line" or in "Standby", the reader does not respond to a DC3 code. Jumper option can disable code functions at all times.
R&PC/5	Reader and Punch	44B412163-G05	R&P	44C400113 Sh. 1	X	X	X		X			Yes	No	Functionally the same as R&P/1.
R&PC/6	Reader and Punch	44B417408-G06	R&P	44C400305	X	X	X		X			Yes	No	Functionally the same as R&P/2.
R&PC/7	Reader and Punch	44B412163-G07	R&P	44C400113 Sh. 4	X	X	X		X			Yes	No	Functionally the same as R&P/4.
R&PC/8	Reader and Punch	44B412163-G08	R&P	44C400113 Sh. 5	X	X	X		X			Yes	No	Tape feeds at rate selected by RATE switch. Otherwise, it is functionally the same as R&PC/5.
R&PC/9	Reader and Punch	44B412163-G09	R&P	44C400113	X	X	X		X			Yes	No	Same as R&PC/5/8 except has chip which is used to generate fill characters. Feed rate is 30 cps. No fill characters required if both VTFF discs are same.
R&PC/10	Reader and Punch	44B417408-G10	R&P	44D400305	X	X	X		X			Yes	No	Same as R&PC/2 except has chip which is used to generate fill characters. No fill characters required if both VTFF discs are same.
R&P/11*	Reader and Punch	44B412163-G11	R&P	44C400113			X		X			Yes	No	Same as other R&P groups except tape feeds at 30 cps and DC3 is sent before tape reader stops. Can be jumpered so $\overline{PTOF}$ is on finger c07. Used with PSCC/8 and DATC/9.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
SLC/1	Senseline Converter	44B412470-G01		44D400304			X		X			No	No	Model C keyboard Logic.
SLC/3*	Senseline Converter	44B412470-G03		44D400304			X		X			No	No	Same as SLC/1 with longer cables.
SLC/4*	Senseline Converter	44B412470-G04		44D400304			X		X			No	No	Modified to be used with a specially designed Numeric Cluster.
SMEM/1*	Memory	44B417455-G01	MEM	44C401228			X		X					80 column; used for single point tabulation with BS as Tab Key. BS and LF give right form return. Can be jumpered for Automatic End of Line Return and for two color ribbon.
SMEM/2*	Memory	44B417455-G02	MEM	44C401228			X		X				No	Same as SMEM/1 except for 75/118 column.
SPC/1	Serial to Parallel Converter	44B412156-G01	SPC	44C400106	X	X		X	X			Yes	No	
SPCC/2	Serial to Parallel Converter	44B412156-G02	SPC	44C400106			X	X	X			Yes	No	Functionally the same as SPC/1.
SPCC/3	Serial to Parallel Converter	44B412156-G03	SPC	44D400311 Sh. 1			X	X	X			Yes	No	Used for two color ribbon.
SPCC/4	Serial to Parallel Converter	44B412156-G04	SPC	44D400311 Sh. 2			X	X	X			Yes	No	Functionally the same as the SPCC/2 except a "Break" is not detected until RCVD stays at "O" for approximately 160 milliseconds.
SPCC/5	Serial to Parallel Converter	44B412156-G05	SPC	44D400311 Sh. 3			X	X	X			Yes	No	Functionally the same as the SPCC/3 except a "Break" is not detected until RCVD stays at "O" for approximately 160 milliseconds.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
SPCC/2 Rev. 0, 1, 2, 3, 4	Serial to Parallel Converter	44B412156-G02	SPC	44C400106			X		X			Yes	No	1. Not compatible with A and B Model Printers. 2. When used in C Model Printers the following boards should have these modifications: a. ASXC/1 Rev 0 Mod 1 b. PAR/2 Rev 0 Mod 2 c. PARC/1 Rev 0 Mod 1 PARC/1 Rev 2 or greater.
SPCC/3 Rev. 0, 1, With Mod 1	Serial to Parallel Converter	44B412156-G03	SPC	44D400311			X		X			Yes	No	
SPCC/4 Rev 0, 1 With Mod 1 or SPCC/4 Rev 2 or greater	Serial to Parallel Converter	44B412156-G04	SPC	44D400311			X		X			Yes	No	
SPCC/5 Rev 0, 1 With Mod 1 or SPCC/5 Rev 2 or greater	Serial to Parallel Converter	44B412156-G05	SPC	44D400311			X		X			Yes	No	
SPCD/1*	Serial to Parallel Converter	44B412313-G01	SPC	44C400145	X	X		X				No	No	
SPR*	Split Platen Relay	44B417445-G01		44A400617			X		X			No	No	Used for split platen operation.
T&A/1	Timing and Alarm	44B412161-G01	T&A	44C400111	X	X		X	X			Yes	Yes	
T&AC/2	Timing and Alarm	44B412161-G02	T&A	44C400111	X	X	X	X	X			Yes	Yes	Functionally the same as T&A/1.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
T&AC/3*	Timing and Alarm	44B412161-G03	T&A	44C400111			X	X	X			Yes	Yes	50 Millisecond alarm tone.
TAD/1*	Timing and Alarm	44B412314-G01	T&A	44C400117	X	X		X				Yes	Yes	
TRP/1	Tape Cassette Accessory Interface	44B417402-G01	R&P	44C420203 Sh. 1	X	X	X		X			Yes	No	TermiNet Cassette Accessory PCB.
TRP/2	Tape Cassette Accessory Interface	44B417402-G02	R&P	44C420203 Sh. 2	X	X	X		X			Yes	No	TermiNet Cassette Accessory PCB.
VTFF/1	Vertical Tab & Form Feed	44B412372-G01	VTFF	44C400152		X		X				No	Yes	
VTFF/2	Vertical Tab & Form Feed	44B412372-G02	VTFF	44C400167 Sh. 1		X		X	X			No	Yes	
VTFC/3**	Vertical Tab & Form Feed	44B412372-G03	VTFF	44C401219		X	X	X	X			Yes	Yes	Functionally the same as VTFF/2.
VTFC/4*	Vertical Tab & Form Feed	44B412372-G04	VTFF	44C400167 Sh. 2			X	X	X			No	Yes	Used only with a special vertical tab and form feed system.
VTFC/6*	Vertical Tab & Form Feed	44B412372-G06	VTFF	44C401219			X	X	X			Yes	Yes	Similar to VTFC/3 except modified to allow a VTFF hold while in suppressed print. Interchangeable with VTFC/3 Boards.

*Special Application
** Revision 10 or later

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

NON-BUSTLE PCB's

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
HD/1	Hammer Driver	44C414064-G01		44D400219	X	X		X	X			No	No	75 Print Position
HD/2	Hammer Driver	44C414064-G02		44D400219	X	X		X	X			No	No	80 Print Position
HD/3	Hammer Driver	44C414064-G03		44D400219	X	X		X	X			No	No	118 Print Position
HD/4	Hammer Driver	44C414064-G04		44D400219	X	X		X	X			No	No	120 Print Position
HD/5*	Hammer Driver	44C414064-G05		44D400219	X	X		X				No	No	HDAD/1
HD/6	Hammer Driver	44C414064-G06		44D400219	X	X		X	X			No	No	50 Print Position
HDA/1	Hammer Driver Accessory	44C414063-G01		44D400220	X	X		X	X			Yes	Yes	
HDA/2*	Hammer Driver Accessory	44C414063-G02		44D400220	X	X		X				Yes	Yes	
HDAD/1*	Hammer Driver Accessory	44C414126-G01		44D400303	X	X		X				Yes	Yes	
HDC/1	Hammer Driver Converter	44C414166-G01		44D400306	X	X		X	X			Yes	No	50 Print Positions
HDC/2	Hammer Driver Converter	44C414166-G02		44D400306	X	X		X	X			Yes	No	75 Print Positions
HDC/3	Hammer Driver Converter	44C414166-G03		44D400306	X	X		X	X			No	No	80 Print Positions
HDC/4	Hammer Driver Converter	44C414166-G04		44D400306	X	X		X	X			Yes	No	118 Print Positions

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

NON-BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
HDC/5	Hammer Driver Converter	44C414166-G05		44D400306			X		X			Yes	No	50 Print Positions
HDC/6	Hammer Driver Converter	44C414166-G06		44D400306			X		X			Yes	No	75 Print Positions
HDC/7	Hammer Driver Converter	44C414166-G07		44D400306			X		X			Yes	No	80 Print Positions
HDC/8	Hammer Driver Converter	44C414166-G08		44D400306			X		X			Yes	No	118 Printer Positions
HDC/9	Hammer Driver Converter	44C414166-G09		44D400306			X	X				Yes	No	50 Print Positions
HDC/10	Hammer Driver Converter	44C414166-G10		44D400306			X	X				Yes	No	75 Print Line
HDC/11	Hammer Driver Converter	44C414166-G11		44D400306			X	X				Yes	No	80 Print Positions
HDC/12	Hammer Driver Converter	44C414166-G12		44D400306			X	X				Yes	No	118 Print Positions
HDC/13*	Hammer Driver Converter	44C414166-G13		44D400306			X	X				No	No	75 print position. Same as HDC/10 except longer cables.
HDC/14*	Hammer Driver Converter	44C414166-G14		44D400306			X	X	X			No	No	Same as HDC/8 except longer cables.
HDC/15	Hammer Driver Converter	44C414166-G15	HDC	44D400306	X	X	X	X	X			No	No	50 Print Positions. Replaces HDC/1/5/9.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

NON-BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
HDC/16	Hammer Driver Converter	44C414166-G16	HDC	44D400306	X	X	X	X	X			No	No	80 Print Positions. Replaces HDC/2/3/6/7/10/11.
HDC/17	Hammer Driver Converter	44C414166-G17	HDC	44D400306	X	X	X	X	X			No	No	118 Print Positions. Replaces HDC/4/8/12.
HDC/18	Hammer Driver Converter	44C414166-G18	HDC	44D400306			X	X	X			No	No	120 Print Positions.
JCTC/1	Junction	44B417411-G01					X	X	X			No	No	Mounts on C Printer control panel.
JCTC/3	Junction	44B417411-G03					X	X	X			No	No	Causes unit to go to "Standby" when rate switch moved to high position; mounts on control panel. For 1200 baud application.
JCT/4*	Junction	44B417411-G04					X	X	X			No	No	
LED/1	Light Emitting Diode	44B417412-G01					X		X			No	No	
LED/2	Light Emitting Diode	44B417412-G02					X		X			No	No	
MB/1	Mother Board	44B412167-G01			X				X			No	No	No MOD or VTFF slots
MB/2	Mother Board	44B412167-G02			X			X				No	No	No MOD or VTFF slots
MBB/2	Mother Board	44B412298-G02			X	X			X			No	No	
MBB/4	Mother Board	44B412298-G04			X	X		X				No	No	
MBB/5*	Mother Board	44B412298-G05				X		X				No	No	Modified MBB/2

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

NON-BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
MBC/1	Mother Board	44B412426-G01					X		X			No	No	
MBC/2	Mother Board	44B412426-G02					X	X				No	No	
MBC/3*	Mother Board	44B412426-G03					X		X			No	No	Used with AHX/1.
MBC/4*	Mother Board	44B412426-G04					X		X			No	No	Has extra cable for Special Customer option.
MBC/5*	Mother Board	44B412426-G05					X		X			No	No	Special Split Platen Printer.
MBC/6*	Mother Board	44B412426-G06					X	X				No	No	Requires AHX/2 and PSCC for proper operation.
MBC/7*	Mother Board	44B412426-G07					X		X			No	No	Used with DATC/7.
MBC/7* MOD 1	Mother Board	44B412426-G07 MOD 1					X		X			No	No	Used with DATC/8.
MBC/8*	Mother Board	44B412426-G08					X		X			No	No	Has retaining devices on the Dataset, Reader and Punch Plugs.
MBC/9*		44B412426-G09					X	X				No	No	Has retaining devices on the Dataset plug.
MBC/10*		44B412426-G10					X		X			No	No	Used with special customer supplied keyboard
MBC/11		44B412426-G11					X	X	X			No	No	Requires PSCC/5 and new control panel. Used with poll-select option.
MBD/1*	Mother Board	44B412298-G01			X	X		X				No	No	

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

NON-BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR			Jumper	Fuses	Comments and Characteristics
MBD/3*	Mother Board	44B412298-G03				X		X				No	No	Subassembly of MBD/1.
PC/1	Photocell	44B412005-G01		44B400000	X	X	X	X	X			No	No	
TXP/1	Transformer Power Supply	44B412168-G01		44C400104	X	X		X	X			No	No	
TXP/2*	Transformer Power Supply	44B412168-G02		44C400104		X		X	X			No	No	
TXP/3	Transformer Power Supply	44B412168-G03		44C400104		X		X	X			No	No	Foreign Power (50 Hz) Model
TXPC/1	Transformer Power Supply	44B417406-G01		44C400171			X	X	X			No	Yes	
TXPC/2	Transformer Power Supply	44B417406-G02		44C400171			X	X	X			No	Yes	Foreign Power (50 Hz) Model.
TXPC/3*	Transformer Power Supply	44B417406-G03		44C400171			X	X	X			No	Yes	Same as TXPC/1 except has longer cables.
TXPC/4*	Transformer Power Supply	44B417406-G04		44C400171			X	X	X			No	Yes	Same as TXPC/1 except has longer cables.
TXPC/5*	Transformer Power Supply	44B417406-G05		44C400171			X	X	X			No	Yes	Same as TXPC/1 except has longer cables.
TXPC/6*	Transformer Power Supply	44B417406-G06		44C400171			X	X	X					Same as TXPC/1 except provides 115V for removable timer mounted on frame.

*Special Application

(continued)

Table 4-3. TermiNet 300 Printer Circuit Board (PCB) Descriptions (continued)

NON-BUSTLE PCB's (continued)

PCB Mnemonic	PCB Name	Part No.	Bustle Slot	Elementary No.	A	B	C	RO	KSR		Jumper	Fuses	Comments and Characteristics
TXPC/7	Transformer Power Supply	44B417406-G07		44C400171			X	X	X		No	Yes	Foreign Power (50 Hz) units same as TXPC/2 except provides 115V for removable timer mounted on frame.
TXPC/8*	Transformer Power Supply	44B417406-G07		44C400171			X	X	X		No	Yes	Same as TXPC/4 except provides 115V for removable timer mounted on frame.
TXPC/9*	Transformer Power Supply	44B417406-G07		44C400171			X	X	X		No	Yes	Same as TXP/2 except longer cables and 115V provision for removable timer mounted on frame.

*Special Application

Table 4-4

TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers

This Table gives you information about standard jumpers and a description of each jumper option. Standard Jumpers are those jumpers that are usually installed when the PCB is shipped from the factory. In some cases, under the column "Description of Jumper Options", you will find the term FACTORY JUMPER, DO NOT REMOVE. These are not option jumpers and are listed for reference only.

BUSTLE PCB'S

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
AHX/1*			FACTORY JUMPER - DO NOT REMOVE.
AHX/2*	1J, 4J	2J - 3J	1J Negative Data Strobe. 2J Positive Data Strobe. 3J ISWOP (with 8 bit). 4J ISWOP (without 8 bit).
ANS/1	1J		1J - Stop message at position jumpered.
ANSC/1	3J, 4J	1J, 2J	1J and 2J - Never installed 3J - Stops message at position jumpered 4J - Always in. Connects ENQRD signal to circuit so that message starts when ENQ code is received. Rev. 1 and higher do not have 4J.
ANSC/2	1J, 2J and 3J	4J	1J - Enables automatic answerback 2J - Enables automatic disconnect 3J - Stops message at position strapped 4J - Never installed NOTE If you have a Automatic Data Set and it is not in Auto answer, 15 seconds after an incoming phone call is made, the Printer goes to standby.
ANSC/3*	1J, 2J, and 3J	4J	Same as ANSC/2
ANSC/4	1J, 2J, and 3J		Same as ANSC/2 except no 4J.
ANSC/5	3J, 4J	1J, 2J	Same as ANSC/1.
ANSC/6	1J, 2J, 3J		Same as ANSC/4

*Special Application

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

<table>
<tr><th rowspan="2">PCB Mnemonic</th><th colspan="2">Standard Jumpers</th><th rowspan="2">Description of Jumper Options</th></tr>
<tr><th>In</th><th>Out</th></tr>
<tr><td>ASXC/1</td><td>2J, 3J, 4J, 19D-25D in DELETE position, and 28D-34D in NUL position</td><td>1J</td><td>1J - Disables all data transmission until the Printer has been selected.
2J - Enables the answerback response to the received ENQ during selection.
3J - Enables selection by the diode coded "SELECT CODE CHARACTER" associated with the marking artwork letter "M".
4J - Enables selection by the diode coded "SELECT CODE CHARACTER" associated with the marking artwork letter "G".</td></tr>
<tr><td>AUX/1</td><td></td><td></td><td>1J - Enables auxiliary device turn-off by LV
2J - Enables auxiliary device turn-off by DET BK
3J - Enables auxiliary device turn-off by alarm condition (PSVI)</td></tr>
<tr><td>CLC/1</td><td>1J - 3J, cup 1 to cup 6
-5J, cup 2 to cup 5</td><td></td><td>1J - FACTORY JUMPER, DO NOT REMOVE.
<table><tr><th>3J and 5J
From</th><th>To</th></tr><tr><td>Cup 1, 15 cps
Cup 2, 30 cps
Cup 3, 60 cps
Cup 4, 120 cps</td><td>Cup 5, High Rate
Cup 6, Medium Rate
Cup 7, Low Rate</td></tr></table></td></tr>
<tr><td>CLC/2</td><td>Same as CLC/1</td><td></td><td>Same as CLC/1</td></tr>
<tr><td>CLCC/3</td><td>Same as CLC/1</td><td></td><td>Same as CLC/1</td></tr>
<tr><td>CLCC/4</td><td>Same as CLC/1</td><td></td><td>Same as CLC/1</td></tr>
<tr><td>CLCC/5/6/7*</td><td>Same as CLCC/1</td><td></td><td>Same as CLCC/1</td></tr>
<tr><td>DAT/1</td><td>1J and 2J</td><td></td><td>1J - Motor will stop when control D (EOT) is recognized.
2J - Factory Jumper DO NOT REMOVE</td></tr>
</table>

*Special Application

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
DAT/2	1J		1J - Motor will stop when Control D (EOT) is recognized.
DATB/1	1J, 3J, 5J, 6J	2J, 4J	1J IN- Low paper alarm will: Light ALARM, sound alarm tone, transmit "Break", and turn Printer motor and Reader off. With 1J Out, ALARM will light only 2J IN- Loss of CA puts transmit data at mark hold. 3J IN 4J OUT - Line Control from CA 4J IN, 3J OUT - Status monitor from CA. (Printer in standby or alarm will turn off CA). 5J IN - Auto motor On/Off with CB On/Off. 5J OUT and 4J IN - CA controlled by CB when in standby 6J IN - Motor will stop when control D (EOT) is recognized. With 6J Out, the motor will not stop.
DATC/1	2J, 4J, 5J and 6J	1J and 3J	1J - Enables CA for status monitor. CA will be off when either an alarm condition exists or the Printer is in "Standby". 2J - Enables CA for line Control. 3J - Enables forced "Mark Hold" condition on transmitted data with loss of CA during line control. Loss of CB or CD will always do this. When in Suppress Transmit mode, transmitted data will always be forced to "Mark Hold". 4J - Enables control of CA by CB when in "Standby" mode and 1J is in. CB on state will turn off CA. 4J also enables automatic motor on-off with CB on-off. Without 4J, CB will have no effect on CA. 5J - Enables low paper condition to: a. Light the ALARM lamp b. Sound the momentary alarm tone. c. Transmit a "Break" signal. d. Turn the motor off. e. Turn the reader off Without 5J, low paper condition will light the ALARM lamp only. 6J - Enables motor to be turned off upon receipt of EOT.
DATC/2	2J, 5J and 6J	1J, 3J and 4J	Same as DATC/1
DATC/3*	1J, 4J, 5J and 6J	2J and 3J	Same as DATC/1
DATC/4*	1J, 4J, 5J, 6J and 7J	2J and 3J	Same as DATC/1 except with 7J in, the loop-back option is operational.

*Special Application

(continued)

CA - RS232 REQUEST TO SEND
CB - RS232 CLEAR TO SEND ✓
CD - RS232 DATA TERMINAL READY

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
DATC/5*	2J, 5J, 6J	1J, 3J, 4J	Same as DATC/1.
DATC/6*	2J, 4J, 7J	3J, 5J, 6J	1J - Not present. 2J - When In allows board to operate in 300 Printer. 3J - When In allows board to operate in 1200 Printer. 4J - When In allows board to operate in 300 Printer. 5J - When In provides Automatic Motor Control. 6J - When In allows Motor Off with receipt of EOT. 7J - When In Low Paper causes: Alarm Light Alarm Beep Transmit "Break" Motor Off Reader Off 7J - When Out Low Paper causes Alarm Light only.
DATC/7*	1J, 4J, 5J	1J, 3J, 2J, 6J	1J - In: CA disabled during Local, Standby, Alarm, or Data Terminal Ready. 2J - In: Allows ICA to control CA for Line Control. 3J - In: Causes a "Mark Hold" on sent data with loss of CA. 4J - In: CB control Motor On/Off. 5J - In: Low Paper causes PSVI and Alarm. 5J - Out: Low Paper causes Alarm only. 6J - In: EOT causes Motor Off.
DATC/8*	1J, 4J, 5J	2J, 3J, 6J	1J - In: CA disabled during Local, Standby, Alarm, Line Feed, Vertical Tab or Form Feed. 2J - 3J - 4J - Same as Group 7 5J - 6J -
DATC/9*	2J, 4J, 5J	1J, 3J, 6J	1J - In: CA disabled during Local, Standby, Alarm, or during Data Terminal Ready. 2J - 3J - 4J - Same as Group 7 5J - 6J -

*Special Application

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
DATD/1*	1J		1J - Enables receipt of "EOT" to stop motor.
DATI/1*	1J, 5J and 6J	2J, 3J and 4J	1J IN - Causes low paper condition to: (1) Light the ALARM lamp. (2) Sound the momentary alarm tone. (3) Transmit a "Break" signal. (4) Turn the motor off. (5) Turn the reader off. With 1J out, the low paper condition will light the ALARM lamp only. 2J, 3J, and 4J - Never installed in DATI/1. 5J IN - Causes motor to turn off when EOT is received. 6J IN - Factory jumper that is always installed. Removed for factory test only.
DATI/2	1J, 2J, 4J, 5J and 6J	3J	1J IN - Causes low paper condition to: (1) Light the ALARM lamp. (2) Sound the momentary alarm tone. (3) Transmit a "Break" signal (4) Turn the motor off. (5) Turn the reader off. With 1J out, the low paper condition will light the ALARM lamp only. 2J IN - Factory jumper in DATI/2 only. Completes current loop for transmitting with external current source. 3J IN, 4J OUT - Enables forced "Mark Hold" condition on transmitted data only when on line. 3J OUT, 4J IN - Enables a forced "Space Hold" condition on transmitted data only when in local mode of operation. Used for data transmission when on line. 5J IN - Causes motor to turn off when EOT is received. 6J IN - Factory jumper that is always installed. Removed for factory test only.
DATI/3	1J, 4J, 5J and 6J	2J and 3J	1J IN - Causes low paper condition to: (1) Light the ALARM lamp. (2) Sound the momentary alarm tone. (3) Transmit a "Break" signal. (4) Turn the motor off. (5) turn the reader off. With 1J out, the low paper condition will light the ALARM lamp only. 2J - Never installed in DATI/3 3J IN, 4J OUT - Enables a forced "Space Hold" condition on transmitted data only when in local mode of operation. Used for data transmission when on line.

*Special Application

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
DATI/3 (continued)	1J, 4J, 5J and 6J (continued)	2J and 3J (continued)	5J IN - Causes motor to turn off when EOT is received. 6J IN - Factory jumper that is always installed. Removed for factory test only.
DATI/4*	1J, 2J, 3J, 5J, 6J	4J	
DATI/5	1J, 2J, 4J, 5J, 6J	3J	Same as DATI/2
HAHX	1J	2J, 3J	1J negative data strobe; 2J positive data strobe; 3J ISWOP (without 8th Bit).
KIF/1			Factory Jumper - DO NOT REMOVE
KIF/3		1J	Factory Jumper - DO NOT REMOVE
LTU*	1J in 600 ohm position		1J - Impedance matching jumper. Should be left in 600 ohm positions unless advised otherwise.
MEM/1	1J		1J IN - Long Print Line (118) 1J OUT - Short Print Line (75)
MEM/2	1J, 2J, 3J		1J IN - Long Print Line (118) 1J OUT - Short Print Line (75) 2J IN - Auto CR at End of Line 3J factory jumper; standard ribbon lift.
MEMC/3	1J and 3J	2J and 4J	1J IN - 118 column print line, OUT for 75 column Print line. 2J IN - Causes automatic carriage return at the end of print line. 3J IN - Factory jumper soldered in MEMC/3 for standard ribbon lift operation. 4J - Never installed in MEMC/3.
MEMC/5	1J and 4J	2J and 3J	1J IN - 118 column print line, OUT for 75 column print line. 2J IN - Causes automatic carriage return at the end of print line. 3J - Never installed in MEMC/5. 4J - Factory Jumper soldered in MEMC/5 for two color ribbon lift operation.

*Special Application

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Out	Description of Jumper Options
MEMC/6	3J	2J and 4J	Same as MEMC/3 except there is no 1J. NOTE There may be 1J marked on PCB but there are no cups.
MEMC/7	4J	2J and 3J	Same as MEMC/5 except there is no 1J. NOTE There may be 1J marked on the PCB but there are no cups.
MEMC/8*	Same as on MEMC/3		Same as on MEMC/3.
MEMC/9	1J 3J	2J 4J	1J IN: Allows 118 Print Positions. 1J IN and Pin 6 of M2 chip tied to -15 volts and Pin 14 tied to 0 volts: allows 120 print positions. 1J OUT and Pin 6 of M2 chip tied to 0 volts: Allows 132 print positions. 2J IN: Allows an Automatic End of Line CR. 3J IN: Allows single color ribbon operation. 4J IN: Allows 2 color ribbon operation.
MEMC/10	1J 4J	2J 3J	Same as MEMC/9.
FMEM/1	1J, 4J, 6J	2J, 3J, 5J	1J IN, 3J OUT - Two font Printers. 1J OUT, 3J IN - Three font Printers. 2J IN - Enables automatic end of line carriage return option. 4J IN, 5J OUT, G01 and G03 PCB's - One color ribbon operation. 4J OUT, 5J IN, G02 and G04 PCB's - Two color ribbon operation. 6J IN, G01 and G02 PCB's - 118 column operation. 6J OUT, G01 and G02 PCB's 75 column operation. 6J OUT, G03 and G04 PCB's - Always out (80 column PCB's)
FMEM/2	1J, 5J, 6J	2J, 3J, 4J	
FMEM/3	1J, 4J	2J, 3J, 5J, 6J	
FMEM/4	1J, 5J	2J, 3J, 4J, 6J	
FMEM/5*	1J, 4J, 6J	2J, 3J, 5J	
FMEM/6*	1J, 4J	2J, 3J, 5J, 6J	

*Special Application

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers		Description of Jumper Options
	In	Out	
MOD-1	J1 or H3 (A) to J3 J10 or H4 (B) to J14 J4 or H6 (C) to J6 J7 or H5 (D) to J16		Transmitter level: (DBM) 0 J10 (B) to J11 -3 J10 (B) to J12 -6 J10 (B) to J13 -9 J10 (B) to J14 Factory Setting -12 J10 (B) to J15 Receiver sensitivity: (DBM) -40 J1 (A) to J3 Factory Setting -50 J1 (A) to J2 CA strapped off J7 (D) to nothing CA strapped on J7 (D) J8 CA controlled by Terminal J7 (D) to J9 CA controlled by CB J7 (D) to J16 Factory Setting Printer Transmitted data connected to modem (Normal) J4 (C) to J6 Factory Setting Received Data connected to transmitted data (Test) J4 (C) to J5 Note: During installation of the Modem board and the associated Data Access Arrangement, check with the Telephone Company to insure that the Transmit Level and Receive Sensitivity are adequate.
MOD-3	Same as MOD/1		Same as MOD/1
202/1 MOD	1J and 2J	3J	1J IN - Causes a "Break" to be sent on the reverse channel when there is an alarm condition or the INTERRUPT pushbutton is pressed. Used with 3J OUT for line control. 2J IN - Causes recognition of signal CB (clear to send) only after receipt of the reverse channel tone. Therefore, data can not be transmitted and the READY lamp will not light until the other end of the line is ready to receive data. 3J IN - Causes the reverse channel to transmit a steady state OFF/ON to reflect status of the terminal. Used with 1J out for status monitor so that the reverse channel transmitter is turned on only when the Printer is "on line" with no alarm condition.

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
202/2 MOD	1J, 2J, 4J	3J	1J and 4J IN and 3J OUT - Enables Reverse Channel to transmit a break. Used with line control. 3J IN and 1J and 4J OUT - Enables Reverse Channel to transmit steadily when the unit is ON LINE with no alarm condition. This configuration is used for status monitor. 2J IN, CB will not be recognized until the Reverse Channel tone is received from the other end of the line.
MOD 44A417410-004 (4 wire)	A to J1 B to J4 C to J10 D to J11 E to J14 F to J16 J to J19 G to J23 H to J17 K to J21		Letters indicate wire identification. J1 through J21 indicate jacks.
MOD 44A417410-001 (2 wire)	H3 to J7 H4 to J12 H5 to J13 H7 to J15	H4 to J11	J11 IN: Allows reverse channel operation J12 IN: Disables reverse channel operation. Wires (H). Jacks (J).
PAR/1	2J	1J, 3J, 4J	1J IN, 2 J OUT - Checks "Odd" parity 2J IN, 1J OUT - Checks "Even" parity 3J IN - Causes the following when error is detected. (1) Momentary alarm sounds. (2) "Break" is transmitted. (3) Motor turns off. (4) Reader turns off. 4J IN - Stops error detection during "Transparency" mode of operation. Switch S1 - On, parity error detection Off, no parity error detection.
PAR/2	2J	1J, 3J, 4J	Same as PAR/1

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
PARC/1	2J	1J, 3J, 4J	Same as PAR/1
PMEM/1	2J and 4J	1J, 3J, and 5J	1J IN - Causes automatic carriage return at the end of print line 2J IN - Factory Jumper; soldered in for two font units. 3J IN - Factory Jumper; soldered in for three font units. 4J IN - Factory jumper; soldered in PMEM/1 only for standard ribbon lift operation. 5J - Never installed in PMEM/1.
PMEM/2	2J and 5J	1J, 3J, and 4J	1J IN - Causes automatic carriage return at the end of print line. 2J IN - Factory Jumper; soldered in for two font units. 3J IN - Factory Jumper; soldered in for three font units. 4J - Never installed in PMEM/2 5J IN - Factory jumper; soldered in PMEM/2 only for two color ribbon lift operation.
POW/1			Factory, DO NOT CHANGE IN FIELD. 1J - Adjust +15.6V buss reference voltage. 2J - Adjusts -15.6V buss reference voltage. 3J and 4J - Adjust crowbar circuit trip point. 5J, 6J and 7J - Adjusts -27.6V buss reference voltage.
POW/2			Factory, DO NOT CHANGE IN FIELD Same as POW/1
POW/3			Factory, DO NOT CHANGE IN FIELD Same as POW/1
POWC/4			Factory, DO NOT CHANGE IN FIELD Same as POW/1
PSC/1	1J	2J, 3J	1J IN - Two stop bits at low speed. 2J IN - Two stop bits at medium speed. 3J IN - Two stop bits at high speed. Note: If more than one jumper is to be used at the same time, replace the jumpers with 44B232028-001 diodes.

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
PSC/2	1J	2J, 3J	Same as PSC/1
PSC/3	1J	2J, 3J	Same as PSC/1
PSCC/1	Rev. 000 to 003 - 3J Rev. 004 and up - Cup 1 to Cup 2	Rev. 000 to 003 1J, 2J, 4J and 5J Rev. 004 and up 4J, 5J and Cups 3 through 6	Rev. 000 to 003 1J IN - Generates 2 stop bits per character at medium speed 2J IN - Generates 2 stop bits per character at high speed 3J IN - Generates 2 stop bits per character at low speed. Note: If more than one jumper (1J, 2J and 3J) is to be used at the same time, replace the jumpers with 44B232028-001 diodes. Rev. 004 - up Cup 1 to Cup 2 - Generates two stop bits per character at low speed. Cup 3 to Cup 4 - Generates two stop bits per character at medium speed Cup 5 to Cup 6 - Generates two stop bits per character at high speed. Note: Diode jumpers (44B232028-001) must be used. All PSCC/1 4J - Never installed in PSCC/1 5J - Never installed for present options.
PSCC/2	Rev. 000 to Rev. 003 3J and 4J Rev. 004 and up Cup 1 to Cup 2, 4J	Rev. 000 to Rev. 003 1J, 2J, 5J Rev. 004 and up 5J, Cups 3 and 6	Rev. 000 to 003 1J IN - Generates 2 stop bits per character at medium speed. 2J IN - Generates 2 stop bits per character at high speed. 3J IN - Generates 2 stop bits per character at low speed. Note: If more than one jumper (1J, 2J, and 3J) is used at the same time, replace the jumper with 44B232028-001 diodes. Rev. 004 - up Cup 1 to Cup 2 - Generates two stop bits per character at low speed Cup 3 to Cup 4 - Generates two stop bits per character at medium speed Cup 5 to Cup 6 - Generates two stop bits per character at high speed. All PSCC/2 4J IN - Factory jumper for PSCC/2 only. Used with line turnaround option so that ACK or NAK is transmitted after the answerback message. 5J - Never installed for present options.
PSCC/3	Cup 1 to Cup 2 Cup 11 to Cup 12 9J and 16J	Cups 3 through 10 5J, 10J, 11J and 17J	Cup 1 to Cup 2 - Generates 2 stop bits per character at low speed. Cup 3 to Cup 4 - Generates 2 stop bits per character at medium speed. Cup 5 to Cup 6 - Generates 2 stop bits per character at high speed.

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
PSCC/3 (continued)	Cup 1 to Cup 2 Cup 11 to Cup 12 9J and 16J (continued)	Cups 3 through 10 5J, 10J, 11J and 17J (continued)	Cup 7 to Cup 8 - Enables EOT or ETX to be generated when the RATE switch is in the LO position. Cup 9 to Cup 10 - Enables EOT or ETX to be generated when the RATE switch is in the MED position. Cup 11 to Cup 12 - Enables EOT or ETX to be generated when the RATE switch is in the HI position. 9J IN - Causes "Even" parity to be generated. 10J IN - Causes "Odd" parity to be generated. 11J IN - Inhibits printing at those rates selected by diode jumpers in cups 7 through 12. Codes such as CR, LF, turn characters, etc. will still be processed. 16J IN and 17J OUT - ETX will be recognized as a turn character. 16J OUT and 17J IN - EOT will be recognized as a turn character. CAUTION: Do Not Install 16J and 17J at the same time.
PSCC/4	Same as PSCC/3	Same	Same as PSCC/3.
PSCC/5	13J 14J 15J Cup 1 to Cup 2	12J Cup 3 through Cup 6	Cup 1 to Cup 2 for LO Rate Cup 3 to Cup 4 for MED Rate Cup 5 to Cup 6 for HI Rate 12J IN allows Fast Poll mode without Answerback 13J IN allows Fast Poll mode with Answerback 12J OUT allows Formal Poll mode 13J OUT allows Formal Poll mode 14J IN enables automatic motor control in Fast Poll mode 15J IN enables error memory to store alarms.
PSCC/8	6J, 7J Diodes in Cups 1 - 2 (LO Rate) 3 - 4 (MED Rate) 5 - 6 (HI Rate)	5J	5J - Not installed. 6J - IN: Finger D14 connected to -15V. 7J - IN: Finger C10 connected to output. 6J, 7J - IN: CA is turned on when tape is loaded in Reader and Reader is in Normal mode.
PSCC/9	4J 13J Cups 1-2 Cups 15-16	5J 12J Cups 3 through 6 Cups 13 and 14	4J - IN; Allows turnaround Option. 5J - Factory Jumper - Not installed in this group. Cups 13 to 14 turn on ETO. Cups 15 to 16 turn on ETX. Cups 13-14 and 15-16 can both be installed to allow ETO and ETX.

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
RCM 44A417710-002 (Reverse Channel Modem)	H1 - J1 H2 - J3 H3 - H4 H10 - J10		Letters indicate wire identification and J1 through J10 indicates jacks.
R&P/1	Cup 5 to Cup 6	1J and Cups 1 through 4	1J IN - Reader will not turn off when Reader off code is received. Cup 1 to Cup 2 - Inhibits Reader generated delays at low speed of operation. Cup 3 to Cup 4 - Inhibits Reader generated delays at medium speed operation. Cup 5 to Cup 6 - Inhibits Reader generated delays at high speed of operation.
R&P/2	Same as R&P/1		Same as R&P/1 except 2J 2J IN - Prevents Reader Off code (DC3) on tape from stopping reader at all times.
R&P/4	Same as R&P/1		Same as R&P/1
R&PC/3	Cup 5 to Cup 6	1J and Cups 1 through 4	Same as R&P/1
R&PC/5	Cup 5 to Cup 6, 2J	1J and Cups 1 through 4	Same as R&P/1
R&PC/6	Cup 5 to Cup 6	1, 2J, and Cups 1 through 4	Same as R&P/2
R&PC/7	Cup 5 to Cup 6	1J, 2J and Cups 1 through 4	Same as R&P/2
R&PC/8	Cup 5 to Cup 6, 3J	1J, 2J, and Cups 1 through 4	Same as R&P/2
R&PC/9	Cup 5 to Cup 6	1J, Cup 1 through Cup 4	Same as R&P/1.

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

<table>
<tr><th rowspan="2">PCB Mnemonic</th><th colspan="2">Standard Jumpers</th><th rowspan="2">Description of Jumper Options</th></tr>
<tr><th>In</th><th>Out</th></tr>
<tr><td>R&PC/10</td><td>5J
Cup 5 to Cup 6</td><td>1J, 2J Cup 1
through Cup 4</td><td>1J IN: Received DC3 will not stop Reader.
1J OUT: Received DC3 will stop Reader.
2J IN: Any DC3 will not stop Reader.
2J OUT: Any DC3 will stop Reader.
5J - Factory jumper, Do Not Remove.</td></tr>
<tr><td>R&PC/11</td><td>6J</td><td>1J, 2J,
5J
Cups 1
through 6</td><td>1J, 2J Same as R&PC/10
5J IN: $\overline{\text{PTOF}}$ tied to finger C07.
6J IN: Makes board compatible with DATC/9.
5J OUT, 6J IN: $\overline{\text{PCHLMP}}$ tied to finger C07.</td></tr>
<tr><td>SMEM/1</td><td>3J
Diodes 12,
13, 14, and 16</td><td>2J
4J
Diodes
15, 17 & 18</td><td>JUMPERS
2J IN enables Automatic End of Line CR
3J IN for one color ribbon
4J IN for two color ribbon
DIODES
12D - 18D Selects the column return position when BS is keyed. The diodes select the column position as a binary number. A diode installed generates a "1" bit. A diode removed generates a "0" bit.
<table>
<tr><td>BIT NUMBER</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr>
<tr><td>DIODE NUMBER</td><td>17D</td><td>13D</td><td>15D</td><td>16D</td><td>14D</td><td>12D</td><td>18D</td></tr>
</table>
EXAMPLE: An SMEM Board with diodes 12D, 14D, 16D, and 13D installed yields a Binary Number of 0101110. This Binary Number decimal equivalent is 46.</td></tr>
<tr><td>SMEM/2</td><td>1J, 3J
Diodes 14, 15, 16,
17, and 18</td><td>2J
4J
Diodes 12 and 13</td><td>JUMPERS
1J IN for 118 column units.
1J OUT for 75 column units.
2J IN enables Automatic End of Line CR.
3J IN for one color ribbon.
4J IN for two color ribbon.
DIODES
Same as SMEM/2.</td></tr>
</table>

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Out	Description of Jumper Options
SPC/1	1J	2J and 3J	1J IN, 2J OUT - Inhibits Echo - Plex operation 1J OUT, 2J IN - Enables Echo -Plex operation with local printing. 3J IN - Enables control of Motor On and Motor Off function with received codes only. - Enables full duplex operation and inhibits local printing when an Escape semi-colon is recognized. - Discontinues full duplex operation and allows local printing when an Escape colon is received. 3J OUT - Enables control of Motor On and Motor Off function with recognized Escape Codes. NOTE: If the Printer is in full duplex mode with 3J removed, the full duplex mode can not be discontinued with a locally generated Escape colon.
SPCC/2	1J	2J, 3J	Same as SPC/1
SPCC/3	1J	2J, 3J	Same as SPC/1
SPCC/4	4J	3J	Same as SPC/1
SPCC/5	5J	4J	Same as SPC/1
T&A/1			1J and 2J never used. Enables 200 baud with CLC changes.
T&AC/2			1J and 2J never used.
T&AC/3*			1J and 2J never used.
TAD/1*	1J		1J IN - Beep Tone on paper out and S/V alarm. OUT - No Beep Tone on alarm (Bell and News flash Beep Tone only)
TRP/1	1J, 2J, 3J		1J or 4J always in. 2J and 3J OUT - Normal operation at 10, 15, or 30 cps.

*Special Application

(continued)

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

BUSTLE PCB'S (continued)

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
TRP/1 (continued)	1J, 2J, 3J (continued)		2J IN, 3J OUT - Operation at 120 cps if the Printer is set to operate at 120 cps with the RATE switch in the middle position. 2J OUT, 3J IN - Operation at 120 cps if the Printer is set to operate at 120 cps with the RATE switch in the bottom position.
TRP/2	1J, 3J, 4J, 5J	2J	2J and 3J - Same as TRP/1 4J IN - DC3 is transmitted when DC3 is read on tape. 5J IN - Received DC2 causes TCA to go in "Write" mode of operation and create an inter-block gap.
VTFC/3/6	1J	2J	Factory Jumpers DO NOT CHANGE

NON-BUSTLE PCB's

PCB Mnemonic	Standard Jumpers In	Standard Jumpers Out	Description of Jumper Options
HDA/1	Factory Installed - DO NOT REMOVE		None
HDA/2*	Factory Installed - DO NOT REMOVE		None
HDAD/1*	Factory Installed - DO NOT REMOVE		None
HDC/1	1J, 2J Factory Installed - DO NOT REMOVE		None 1J removed will prevent overload protection on less than 5 hammers. 2J removed will increase 95V supply voltage.
HDC/2	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/3	1J, 2J Factory Installed - DO NOT REMOVE		None

(continued)

*Special Application

Table 4-4. TermiNet 300 Printer Printed Circuit Board (PCB) Jumpers (continued)

NON-BUSTLE PCB's (continued)

PCB Mnemonic	Standard Jumpers In	Out	Description of Jumper Options
HDC/4	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/5	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/6	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/7	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/8	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/9	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/10	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/11	1J, 2J Factory Installed - DO NOT REMOVE		None
HDC/12	1J, 2J Factory Installed - DO NOT REMOVE		None

Table 4-5

Fuse Chart

This table gives you general information about the fuses and the circuit name that is fused.

Location	Fuse	Size	Circuit Name	Part Number
CLC/1/2 & CLCC/3/4/5/6/7	1FU	1/8A Pico	Phase One Clock	44A417087-001
HDA/1/2 & HDAD/1	1FU 2FU 3FU 4FU	3A Pico 3A Pico 3A Pico 3A Pico	Odd Hammer Bank #1 Even Hammer Bank #2 Odd Hammer Bank #3 Even Hammer Bank #4	44A417087-009 44A417087-009 44A417087-009 44A417087-009
LMP*/1/2 & LMPC/3/4	1FU	3/8A Pico	+20V	44A417087-003
POW/1	1FU 2FU 3FU	3/4A Pico 3/4A Pico 3/4A Pico	+15V -15V -27V	44A417087-005 44A417087-005 44A417087-005
POW/2/3 & POW/4	1FU 2FU 3FU	1 1/2A Pico 1 1/2A Pico 1 1/2A Pico	-15V -15V -27V	44A417087-007 44A417087-007 44A417087-007
T&A/1, T&AC/ 1/2/3 and TAD/1	1FU	1/8A Pico	Phase Two Clock	44A417087-001
VT&FF/1/2 & VT&FC/3/4/6	1FU	3/8A Pico	+20V	44A417087-003
TXPC/1/3/4/5/6/8	1FU	2A	Input Power	K9774740P5
TXPC/2/7/9	1FU	1A	Input Power	K9774740P4
Right Side Frame	5FU	2A	+155V	44A417073-001

*Note: Pico Fuses ARE NOT NORMALLY SOLDERED into the Board, but on some early LMP Boards, the fuse may be found soldered.

TEST POINTS

The following list contains the various TermiNet 300 test points, their locations and a brief description of their proper signals.

ANSC

TP9	Answerback Signal
TP10	Keyboard Inhibit

CLCC

TP1	Phase One Clock
TP2	T1
TP3	Transmit Clock
TP5	Receive Clock
TP6	Phase Two Clock

DATC

TP2	Receive Data
TP4	Paper, Speed, Voltage Inhibit
TP6	67 msec Clock

DECC

TP1	$\overline{O}$
TP2	$\overline{Z}$
TP3	$\overline{1}$

HDC

TP1	Odd Hammer Drive
TP2	+95V
TP3	+155V
TP6	Even Hammer Drive

HTB

TP1	Serial Write B
TP4	Tab Column Advance
TP5	Serial Write A
TP6	Tab Column Store
TP7	Tab
TP8	Tab Count
TP9	T64.01
TP10	T128.02

LMPC

TP1	Ribbon Lift Coil
TP2	+2.3V
TP3	+21V
TP4	+15.6V
TP5	+16V
TP6	+3V (PRT 1)
TP7	-33V
TP8	-27.6V
TP9	-15.6V
TP10	Ground

MEMC

TP1	Clock Pulse
TP2	Character Strobe Modified
TP3	Print Space Inhibit
TP5	Serial Character Count
TP6	Bit 1 of Parallel Code
TP8	Write Pulse A Section
TP9	Line Feed GØ
TP10	Serial Column Count

PARC

TP3	Interrupt Lamp Node
TP4	Inhibit Print
TP5	Word 127

PCAC

TP1	Hammer Bus Sync Signal
TP2	Odd Photocell Input
TP3	Odd Even Drive Time
TP4	Even Finger
TP5	Font Signal
TP6	Odd Finger
TP7	Even Drive
TP8	Even Photocell
TP9	Odd Photocell
TP10	Odd Drive

PPI

TP1	Count Down
TP2	Command to Count
TP3	Reset Counter to 1

PROC

TP1	Hammer Bus Protection (PRT3)
TP2	Delayed 13V (SLO13)
TP8	Low Voltage Signal
TP9	Speed/Voltage Fault Signal
TP10	Hammer Coil Protection (PRT2)

PSCC

TP1	Generated Data
TP2	Input Strobe Without Parity
TP3	Input Strob With Parity
TP4	Strobe In
TP5	Transmit Turn Control
TP8	Keyboard Strobe
TP9	Part Turn to Receive

R&P

TP1	Read Tape and Advance
TP2	Reader GØ
TP3	Motor Phase C
TP4	Motor Phase B
TP5	Motor Phase A

TP6	Sprocket
TP7	536 msec Clock
TP8	Advance Tape
TP9	Tape Out Flip-Flop

SPCC

TP1	Detect Break
TP2	Decoded Output 0
TP3	Incoming Data
TP4	Belt Count
TP5	Compare Odd
TP6	Compare Even
TP7	Font Reset
TP8	Decoder Output
TP9	Decoder Output
TP10	Erase Store Flip-Flop

T&AC

TP1	Fire Even Hammers
TP2	Fire Odd Hammers
TP3	Fire Either Hammer
TP4	Oscillator 2kHz

VTFF

TP1	End Delay Eliminator
TP2	Lamp Voltage Oscillator
TP3	VT Decoder Output
TP4	VTFF Start
TP5	Fault Timer Input
TP6	FF Decoder Output
TP7	VTFF Stored
TP8	VT Photocell
TP9	FF Photocell
TP10	Regulated Lamp Supply

VTFC/3 Revision 10 and later

TP2	Lamp Voltage Oscillator
TP4	VTFF Start
TP5	TL (Oscillator Output)
TP7	VTFF Stored
TP8	VT Photocell
TP9	FF Photocell
TP10	Regulated Lamp Supply

TEST POINT WAVEFORMS

Many of the preceding test points provide a meaningful waveform which is useful for troubleshooting. The following pages list these PCB board test points and show a sample of the proper waveform.

The waveforms were obtained with a Tektronix 564 Dual Trace Oscilloscope. All scope syncing was done internally. Waveforms and voltages are approximate.

Test Conditions are with motor on and at a 30 character per second rate unless otherwise stated.

Unless otherwise stated, all logic levels have amplitudes that are negative, between -10 and -15 volts, and 0 volts. A bit pulse may be negative to 0 or 0 to negative. Circled numbers to the left of dual waveforms refer to the channel and probe number of the oscilloscope.

ANSWERBACK BOARD

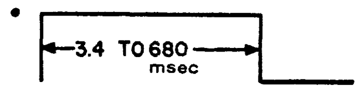
TP9 = Answerback Signal (ANS)

One 12 μs pulse at completion of answerback.

Sync: -

TP10 = Keyboard Inhibit ($\overline{\text{KINH}}$) -

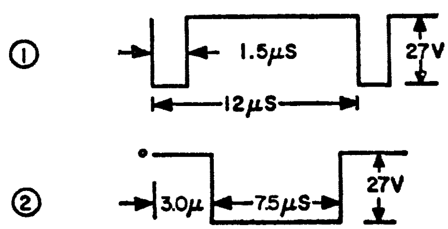
Starts at the beginning of first character of ANS message, and ends after last character of ANS message.



Sync: +

CLOCK BOARD

TP1 = Phase One, (Ø1) (Probe 1)
TP6 = Phase Two, (Ø2) (Probe 2)



Sync: -

TP2 = T1

12 μs pulse every 96 μs.

Sync: -

TP3 = Transmit Clock (X Clock)

12 μs pulse every;
1.7 msec at 30 cps
3.4 msec at 15 cps
4.6 msec at 10 cps

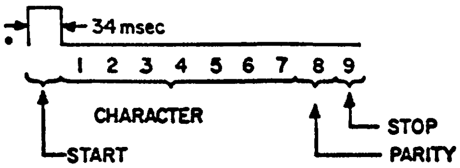
Sync:

TP5 = Receive Clock (R Clock)

Strike a Key
19 pulses, 12 μs wide every;
1.7 msec at 30 cps
3.4 msec at 15 cps
4.6 msec at 10 cps

DATASET BOARD

TP2 = Receive Data (RCVD)



Trace Shown is "Delete" Code

Sync: -

TP4 = Paper, Speed, Voltage Inhibit ($\overline{\text{PSVI}}$)

Low paper, low tape or shield up shifts this point to 0 volts. Low speed or low line voltage causes a 12 μs pulse.

Sync: +

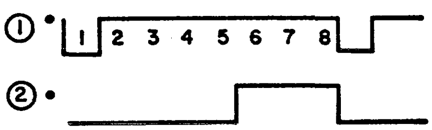
TP6 = 67 msec Clock ($\overline{\text{67 ms}}$)

12 μs pulse every 67 msec

Sync: +

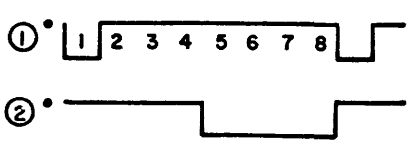
SERIAL DECODER BOARD

TP1 = $\overline{\text{O}}$ (Probe 2)*
(Probe 1) TP2 CLC Board



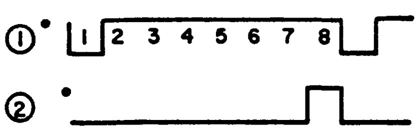
Sync: + from probe 1

TP2 = $\overline{\text{Z}}$ (Probe 2)*
(Probe 1) TP2 CLC Board



Sync: + from probe 1

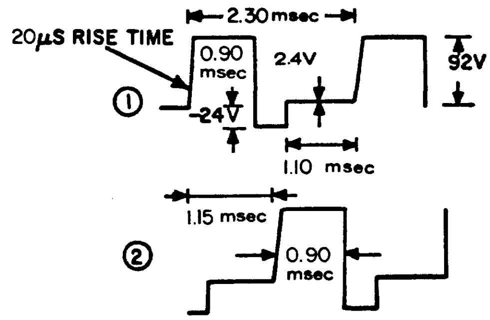
TP3 = $\overline{\text{1}}$ (Probe 2)*
(Probe 1) TP2 CLC Board



Sync: + from probe 1

HAMMER DRIVER CONTROLLER BOARD

TP1 = Odd Hammer Drive (OHD) (Probe 1)
TP6 = Even Hammer Drive (EHD) (Probe 2)*



Sync: + from probe 1

NOTE

The above 0.90 msec pulses should appear at the time of SCR conduction (Hammer Fire). At a time other than SCR conduction, the 0.90 msec pulse may narrow down in duration to a pulse width of 50 μs.

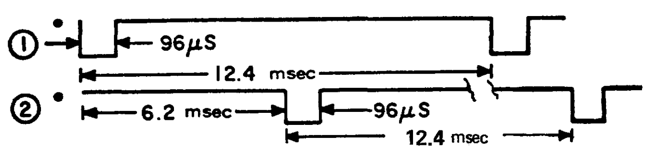
TP2 = +95V
+95V Minimum
+102V Maximum
Sync: None

TP3 = +155V Maximum
+155V Belt Stopped
+147V Belt Moving
(Varies with Line Voltage)
Sync: None

HORIZONTAL TABULATION BOARD

TP1 = Serial Write B (SWB) (Probe 2)*
TP5 = Serial Write A (SWA) (Probe 1)

Set One Tab



Further tabs will increase the number of Pulses
Sync: - from probe 1

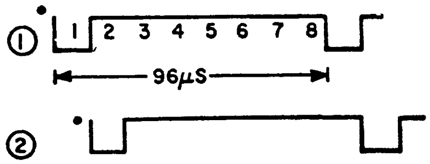
TP4 = Tab Column Advance (TCA) motor on, set Tab in column 1 plus any other column. Strike "CR", see that PPI goes to 1. Strike "HT" Series of 12 μs pulses every 96 μs.

Number of Pulses = Second tab position minus one.

Sync: -

TP6 = Tab Column Store (TCS) (Probe 2)
(Probe 1) TP2 CLC Board
Clear Tab Memory, space to PPI "3"

*Note: Adjust Sweep on probe 2 to show the above traces while printing.

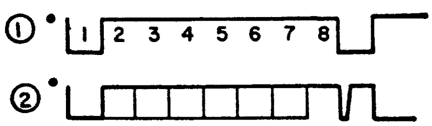


Sync: - from probe 1

TP7 = Tab (TQ)
Strike a Key
Chain of 12 μs pulses every 12.4 msec

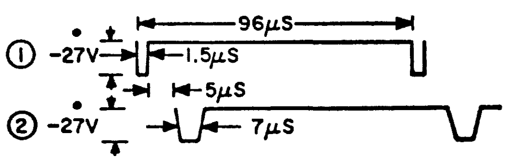
Sync: -

TP8 = Tab Count (TC) (Probe 2)*
(Probe 1) TP2 CLC Board



Sync: - from probe 1

TP9 = T64.Ø1 (Probe 1)
TP10 = T128.Ø2 (Probe 2)*

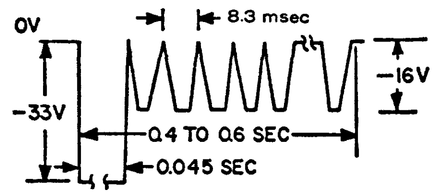


Positive overshoots must not exceed 0.5 V for 0.1 μs

Sync: -

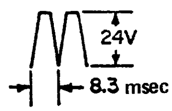
LAMP REGULATOR BOARD

TP1 = Ribbon Lift (-RIBV)
Strike a printable Key



Sync: -

TP2 = +2.3V Regulated (Photocell Lamp Voltage)
TP3 = +20V** (Filtered- Unregulated)
TP4 = +15.6V Regulated (14.8V to 16.5V) ✓



Sync: +

+16V** after filtering 17.8
TP6 = +3.0V Hammer Overload Protection (PRT1) - 3.2
TP7 = -33V** (Filtered-Unregulated) - 42
TP8 = -27.6V Regulated (-27V to -29V)
TP9 = -15.2V to -16.5V)
TP10 = Ground (0V)

*Note: Adjust sweep on probe 2 as needed.
**Note: Voltages vary with Line Voltage.

MEMORY BOARD

TP1 = Clock Pulse (TL)

12 μs pulses every 8.3 msec

Sync: -

TP2 = Character Strobe Modified ($\overline{\text{CSM}}$)

1.7 msec pulse when key is struck

Sync: +

TP3 = Print Space Inhibit ($\overline{\text{PSI}}$)

1.7 msec pulse when non-printable key is struck

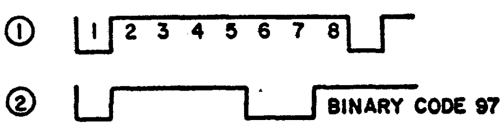
Sync: +

TP4 = Hold Ribbon Up (HOLD)

0.4 to 0.6 sec pulse every printable character

Sync: -

TP5 = Serial Character Count (64A) (Probe 2)*
(Probe 1) TP2 CLC Board



Repeat "A" Shown

Sync: - from probe 1

TP6 = Bit 1 of Column Count (XI)

Strike CR, -10 to -15V
Alternates between 0V and above voltage as PPI advances
Sync: + or -

TP7 = Ribbon Up Signal (PICK)

40 to 50 msec pulse every printable character

Sync: -

TP8 = Write Pulse A Section (WPA)

12 μs Pulse when key is struck

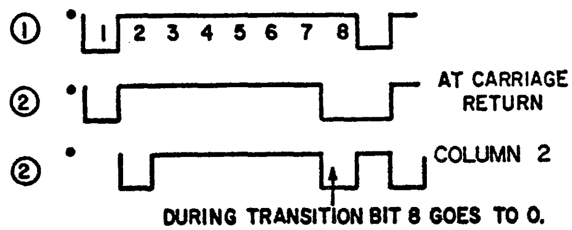
Sync: -

TP9 = Line Feed Go ($\overline{\text{LFG}}$)

Single LF Struck, 8.3 msec pulse
Double LF Struck, 25 msec pulse
Sync: +

*Note: Adjust Sweep on probe 2 as needed

TP10 = Serial Column Count (64B) (Probe 2)*
(Probe 1) TP2 CLC Board



Sync: - from probe 1

PARITY ERROR BOARD

TP3 = Interrupt Lamp Node ($\overline{\text{INTLND}}$). Occurs simultaneously with CSM upon error detection.

One pulse per error
1.7 msec at 30 cps
3.4 msec at 15 cps
4.6 msec at 10 cps
Sync: -

TP4 = Inhibit Print (INHPRT)

With Transparency switch on, -10 to -15V.
With Transparency switch off, 0V.
Sync: None

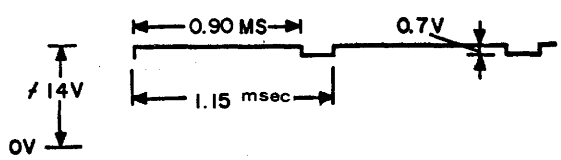
TP5 = Word 127 (W127)

96 μsec pulse every error detection. Begins at end of WPA, stops at end of next $\overline{\text{T64}}$ clock pulse.

Sync: -

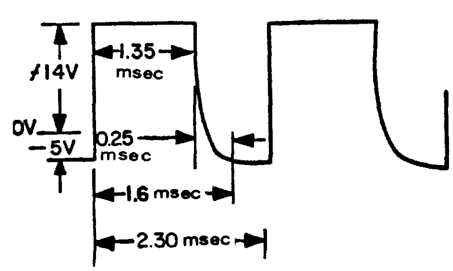
PHOTOCELL AMPLIFIER BOARD PCAC/2

TP1 = Hammer Bus Sync Signal (SYNC)



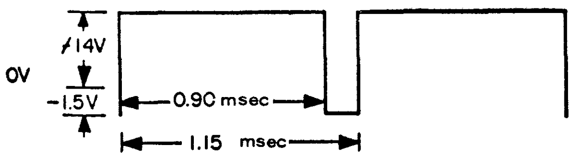
Sync: +

TP2 = Odd Photocell Input (ODD IN)



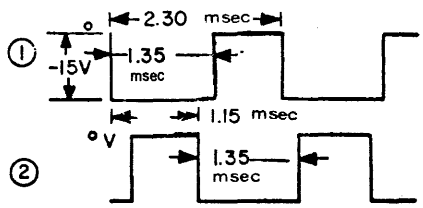
Sync: +

TP3 = Odd Even Drive Time (OE)



Sync: +

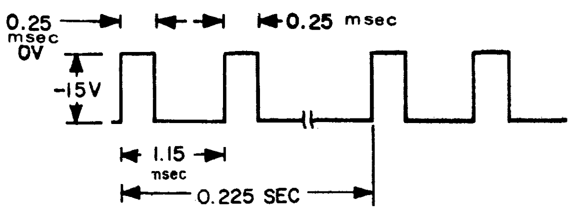
TP4 = Even Finger (EF) (Probe 1)
TP6 = Odd Finger (OF) (Probe 2)



Sync: - from probe 1

All waveforms subject to pulse position jitter.

TP5 = (FONT SIGNAL)

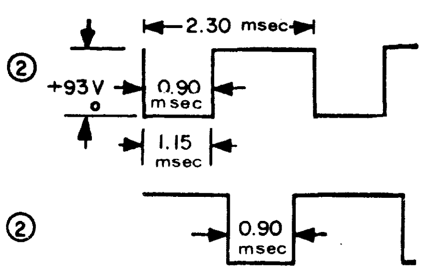


Sync: +

TP7 = (EVEN DRIVE) (Probe 1)
TP10 = (ODD DRIVE) (Probe 2)

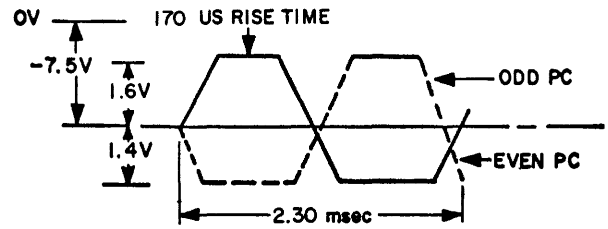
CAUTION

Remove power before connecting scope.



Sync: - from probe 1

TP8 = Even Photocell (EVEN PC) (Probe 2)
TP9 = Odd Photocell (ODD PC) (Probe 1)



Sync: + from probe 1

PRINT POSITION INDICATOR

TP1 = Count Down (CDN)

One 12 μsec pulse every "Backspace" character

Sync: -

TP2 = Command to Count (COUNT)

One 12 μsec pulse every "Space" or printable character.

Sync: -

TP3 = Reset Counter to 1 ($\overline{1\ SET}$)

One 1.7 msec pulse every "Carriage Return"

Sync: +

PROTECTION BOARD

TP1 = Hammer Bus Protection (PRT 3)

+9V with motor stopped and during fault condition. Goes to 0V approximately 280 msec after the motor starts.

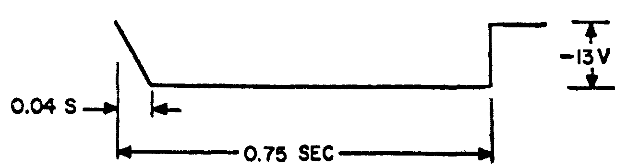
Sync: None

TP2 = Delayed 13V (SLO13)

+15V approximately 750 msec after power is applied (0V during low voltage condition stops motor).

Sync: +

TP8 = Low Voltage Signal (LV) when power is applied (also during low voltage condition).



Sync: -

TP9 = Speed/Voltage Fault Signal (S/V)

-15V with motor stopped. Goes to 0V approximately 280 msec after motor starts. -15V during fault condition.

Sync: None

TP10 = Hammer Coil Protection (PRT2)

+1.5V to +7V
Approximately -15V during fault condition.

Sync: None

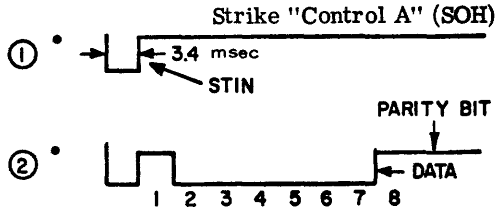
PARALLEL TO SERIAL CONVERTER

TP1 = Generated Data ($\overline{\text{GENDAT}}$) (Probe 2)
TP4 = Strobe in (STIN) (Probe 1)

NOTE

Even though $\overline{\text{GENDAT}}$ is a "barred" signal, it will rest at 0V between characters.

Strike "Control A" (SOH)



Any character can now be struck. Bit levels will follow the numbers in Waveform Two above.

Sync: - from probe 1

TP2 = Input strobe without Parity ($\overline{\text{ISWOP}}$)

One 12 μsec pulse every 33 msec during Answerback transmission at 30 cps.

Sync: +

TP3 = Input strobe with Parity ($\overline{\text{ISWIP}}$)

Start a tape through the Reader

One 12 μsec pulse every 33 msec.

Pattern changes for "CR", "LF", "BS", and "ESC O".

Sync: +

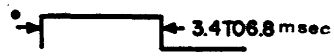
TP4 = Strobe In (STIN)

One 3.4 msec pulse every time a key is struck

Sync: -

TP8 = Keyboard strobe ($\overline{\text{KS}}$)

Strike a Key



Sync: +

READER AND PUNCH BOARD

Note: TP1 through 6 is with Reader On. TP8 is with Punch On.

TP1 = Read Tape and Advance ($\overline{\text{STEP}}$)

One 3.4 msec pulse for each character read.

Sync: +

TP2 = Reader Go (GO)

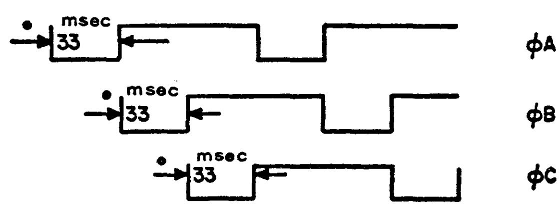
One 12 μsec pulse for each character read.

Sync: -

TP5 = Phase A (ØA)

TP4 = Phase B (ØB)

TP3 = Phase C (ØC)



"CR", "LF", "BS" and "ESC" codes will lengthen the pulses

Sync: -

TP6 = Sprocket (SPKT)

Sync: -

TP7 = 536 msec Clock ($\overline{\text{536MS}}$)

One 12 μsec pulse every 536 msec

Sync: +

TP8 = Advance Tape (ADV)

One 12.4 msec pulse for every punched character.

Sync: -

TP9 = Tape Out Flip-Flop ($\overline{PTOF}$)

With Punch On

-15V, when Punch has Tape 0V, when Punch runs out of Tape with Punch Off.

-15V

Sync: None

SERIAL TO PARALLEL CONVERTER BOARD

TP1 = Detect Break (DET BK)

One 12 μsec pulse when interrupt is received

Sync: -

TP2 = Decoded Output 0 ($\overline{SZ}$)

1.7 msec pulse when Space Bar is struck

Sync: +

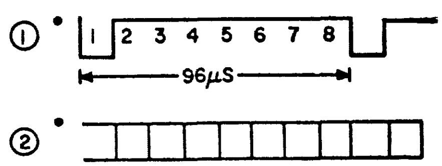
TP3 = Incoming Data (DATA)

ASCII Code

Sync: +

TP4 = Belt Count (BC) (Probe 2)*

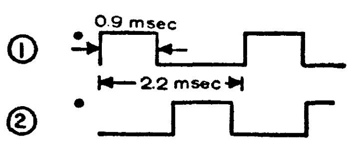
(Probe 1) TP2 = CLC Board



Sync: - from probe 1

TP5 = Compare Odd ($\overline{CO}$) (Probe 1)

TP6 = Compare Even ($\overline{CE}$) (Probe 2)



Sync: + from probe 1

TP7 = Font Reset (FR)

12 μs pulse every 220 msec

Sync: -

*Note: Adjust sweep on probe 2 as needed.

TP8 = Decoder Output ($\overline{SO}$)

1.7 msec pulse when "CTL SOH" is struck

Sync: +

TP9 = Decoder Output ($\overline{S32}$)

1.7 msec pulse when "Space" is struck

Sync: +

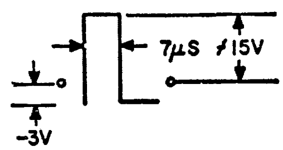
TP10 = Erase Store Flip-Flop (EIA)

96 μs pulse when any character is received. Printable characters erased after they are typed. Control characters erased immediately upon being written into memory.

TIMING AND ALARM BOARD

TP1 = Fire Even Hammers (FEH)

Every time even hammer is actuated



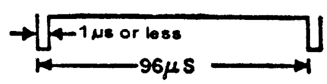
Sync: +

TP2 = Fire Odd Hammer (FOH)

Same waveform as TP1 when odd hammer is actuated

Sync: +

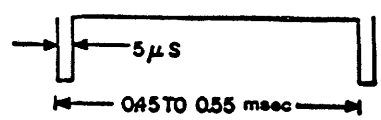
TP3 = Fire Either Hammer ($\overline{FIRE}$)



One of above pulses will widen to 12 μs with each print

Sync: -

TP4 = Oscillator 2 kHz (2Kc)



Sync: -

VERTICAL TAB AND FORM FEED BOARD

NOTE

Unless otherwise specified, all waveshapes are with a "Coded" VT & FF Disc installed.

TP1 = End Delay Eliminator ($\overline{EDE}$) (Probe 1). TP1 not used in VTFC/3, Revision 10 and later.

TP7 = VT & FF Stored (Probe 2)

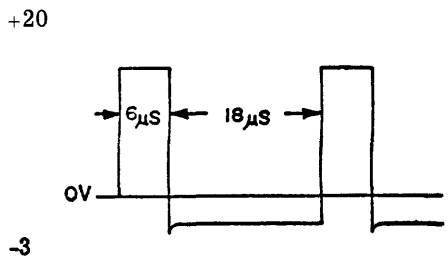
Sync: +

Signal goes from logic 1 (-) to logic 0 (+) with each VT or FF.

Signal length depends on length of VT or FF coding

Sync: +

TP2 = Lamp Voltage Oscillator (LO)



Sync: +

TP3 = VT Decoded Output (VT). TP3 not used in VTFC/3, Revision 10 and later.

One pulse every time VT is recognized.

Sync: -

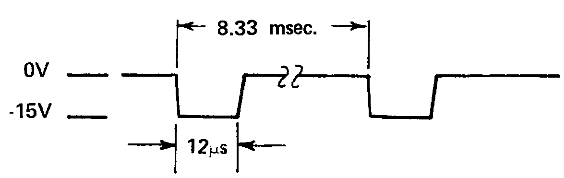
TP4 = VT + FF Start

One pulse at the completion of every VT or FF.

Sync: -

TP5 = Fault Timer Input (FTI) (Probe 2)

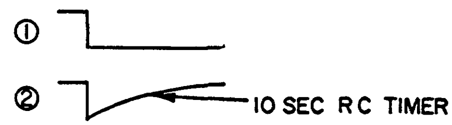
TP5, VTFC/3, Revision 10 and later = TL (Oscillator Output)



Sync: -

TP7 = VT & FF Stored (See TP7) (Probe 1)

Use "Uncoded" VT & FF Disc.



Sync: -

TP6 = FF Decoded Output (FF). TP6 not used in VTFC/3, Revision 10 and later.

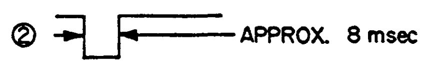
One pulse every time FF is recognized

Sync: -

TP7 = VT & FF Stored (VT & FF) (Probe 2)

TP8 = VT Photocell (VTP) (Probe 1)

VTP = One pulse for every VT Hole in coding disc.



Signal length depends on length of VT or FF Coding.

Sync: - from probe 2.

TP9 = FF Photocell (FFP)

One pulse for every hole in FF row of coding disc.

Sync: -

TP10 = Regulated Lamp Supply (LAMP)

+2.1V ± 10%

Sync: None

CHAPTER 5
MAINTENANCE
SECTION 1
ROUTINE MAINTENANCE

GENERAL

Routine maintenance consists mainly of visual inspection, cleaning, and lubrication. If a problem is discovered and the cause is not obvious, refer to the Troubleshooting chapter. If the cause of the problem has been determined, refer to Parts Removal and Adjustment section of this chapter to install a new component or to make an adjustment.

Preventative maintenance should be performed every six months or 1000 hours of motor on time whichever occurs first. Preventive maintenance procedures should include cleaning, adjustment, lubrication, and replacement of excessively worn parts or assemblies.

The repair philosophy for the TermiNet Printer generally does not include the field repair of mechanical parts and assemblies but rather promotes the discard and replacement of such pieces. This would apply to all such items as clutches, drive motor, ribbon reversing assemblies, etc. Printed circuit boards are factory repairable and can be returned for repair at the option of the user either in or out of warranty. Certain printed circuit boards are considered field repairable by the General Electric Company, and are covered by separate field instructions. PCB field repairs are recommended only when the repair technician is qualified and has the required tools, test equipment and parts as outlined in the "Shop Technical Instructions".

Normal use of the TermiNet Printer does not require readjustments at maintenance time due to wear in mechanical parts. However, if adjustments are required see the Adjustment Procedures.

When used in a clean environment it is advisable to leave the Printer energized in "Standby" while not in actual use -- especially in a humid climate. If the environment is dirty or dusty the dust cover should be kept on the Printer with the Printer de-energized when not in use.

CAUTION

Never keep the dust cover on the Printer while it is energized.

VISUAL INSPECTION

Raise the cover and check the Printer as follows:

1. Check for accumulation of dust, dirt, or other foreign matter. If an accumulation of dust is under the pulleys or line feed clutch, this is an indication of excessive wear of a pulley, clutch, or a drive belt.

2. Check for loose or missing parts.

3. Check for bent or broken print fingers.

4. Check for frayed or folded ribbon.

5. Check operation of the paper tensioner to see that it moves freely.

6. While holding the fan blade stationary, move the print belt back and forth and check for excessive play in the system. Too much play (movement greater than one finger width) indicates a loose pulley or drive belt.

CAUTION

Excessively tight belts will damage bearings and cause unnecessary loading. See adjustment tables for correct tension.

OPERATION CHECKS

Perform the checkout procedure in Chapter 2.

CLEANING AND LUBRICATION

CLEANING

The platen, pressure rollers (under paper pan), and ribbon guide arms should be cleaned with alcohol to remove ink accumulations.

CAUTION

Do not apply alcohol or any other cleaning agent to an OILITE* bearing.

Accumulations of dirt inside the Printer can be removed with a cloth dampened in alcohol or blown out with dry compressed air (if available).

Type fingers can be cleaned by using a type cleaning brush backed by a sponge or soft cloth (see Figure 5-1).

Print belts should be removed, cleaned, adjusted, and relubed during maintenance checks. Use a dry cloth to clean. Do not use water or chemicals. After cleaning re-graphite the surface to eliminate static build up and spray with lubricant. Recheck guides and pulleys for correct adjustment if binding is present. Print belts should move freely when pulleys are turned by hand.

*Registered Trademark of Chrysler Corp. / Amplex Division.

LUBRICATION

1. When cleaning parts, do not use alcohol or any other cleaning agent on OILITE bearings.

2. Use a good grade of non-detergent, inhibited, number 10 SAE oil. Do not use household variety, sewing machine, or general purpose oils unless it is certain that the specifications of the recommended oil are met.

3. After lubrication of a given area, work oil into friction points as well as possible, and thoroughly wipe away all excess oil.

LUBRICATION TABLE

The following table points out the parts to lubricate and the methods in which the parts are to be lubricated. Read table thoroughly before starting.

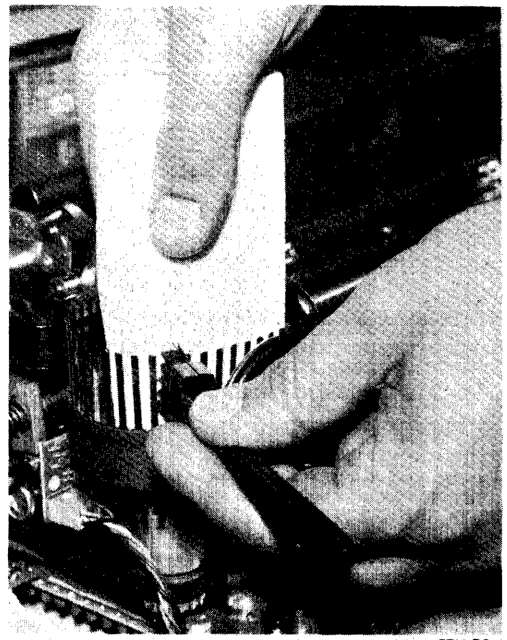


Figure 5-1. Cleaning Type Fingers.

Table 5-1

Lubrication Points
(Reference Figures 5-2 thru 5-5)

LUBRICATION POINT	METHOD
Rear Idler Pulley	- Remove belt and pulley. - Wipe bearing clean with clean cloth. - Wipe bearing shaft clean and apply two drops of oil. - Reinstall pulley.
Left Jackshaft Bearing	- Apply two drops between pulley and side frame.
Right Jackshaft Bearing	- Apply two drops of oil on shaft adjacent to end of bearing on inside of the side frame.
Line Feed Clutch	- Apply two drops between the "E" ring and clutch housing.
Platen Drive Gears	- Remove any dried grease and dirt from gears and oil holes.
Line Feed Idler Gear	- Apply two drops of oil in oil hole.
Platen Drive Gear	- Apply one drop of oil on shaft at each end of gear.
Fractional Line Space Gear	- Press platen knob in and apply two drops of oil to shaft in fractional line space gear.
General	- Apply thin film of oil to teeth of each gear (pipe cleaner or small brush can be used). Start Printer and make consecutive line feeds to work in oil.
Platen Bearings	- Remove platen. (Refer to Section 2.) - Remove "C" ring and bearing from one end of platen. - Wipe platen shaft and bearing clean. - Apply two drops of oil to shaft and reinstall bearing and "C" ring on shaft. - Repeat process for other end of platen and reinstall platen.

(continued)

Table 5-1. Lubrication Points (continued)

LUBRICATION POINT	METHOD
Platen Knob Shaft Bearing	- Remove dried grease and dirt from oil hole and apply one drop of oil in hole. - Push in platen knob and rotate several times to work in oil. Repeat process with another drop of oil.
*Forms Tractor	- Apply one drop on idler gear bearing under left cover. DO NOT OIL ANY OTHER PARTS ON THE FORMS TRACTOR.
Ribbon Reversing Mechanisms	- Remove ribbon reversing mechanisms. (Refer to Section 2.) - Wipe entire mechanism clean. - Apply one drop of oil to each shaft of the 3 drive gears. - Manually rotate gears to work in oil. - Thoroughly wipe off all excess oil.
Ribbon Lift Arm Shaft Bearing	- Apply one drop of oil at each bearing.
Print Belt	- Remove and clean with a dry cloth or dry fiber brush. Use no chemicals. Coat surface with graphite (anti-static) solution GE 44A410695-G01 and spray with aerosol dry lubricant GE 44A417371. (If print belt seizes check alignment of guides and pulleys.)

*Special paper handling option

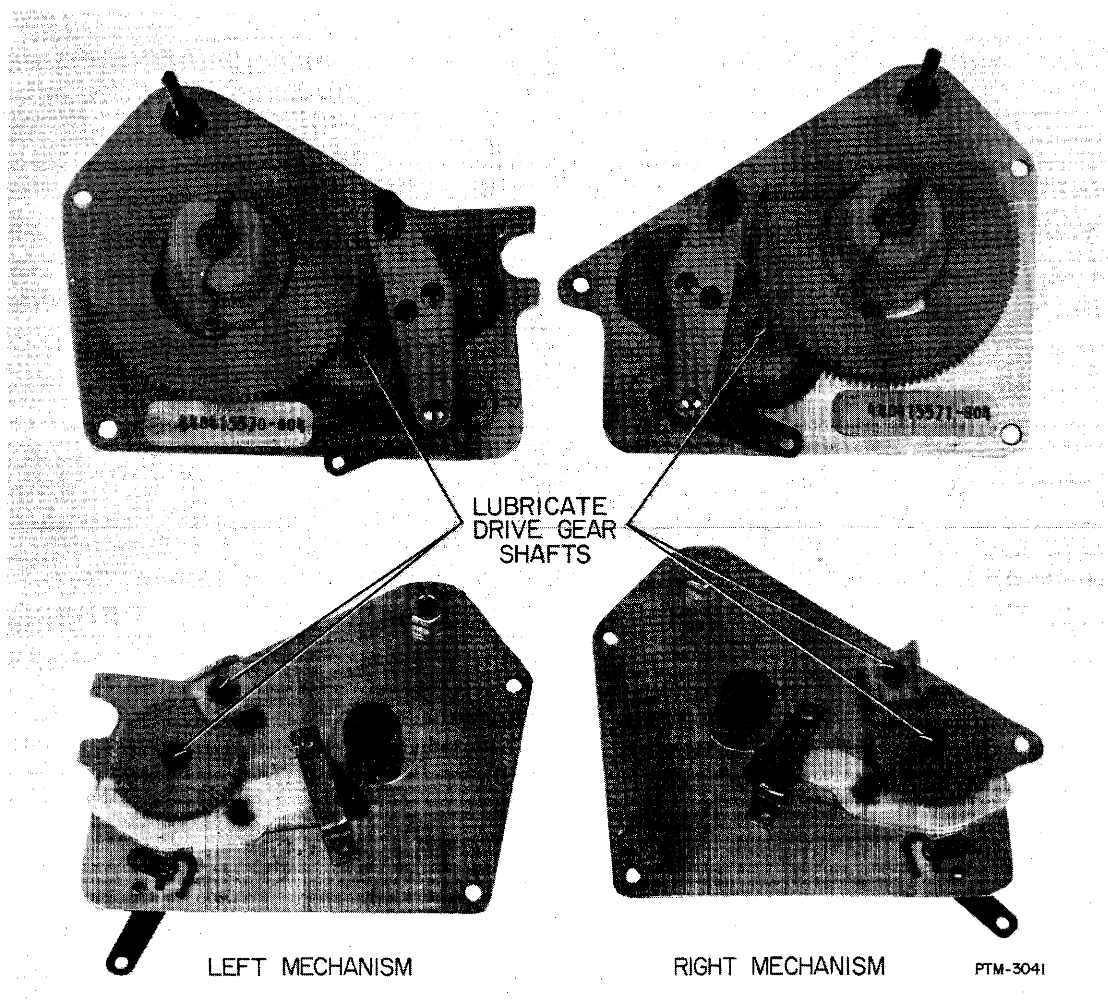


Figure 5-2. Lubrication Points - Ribbon Reversing Mechanisms.

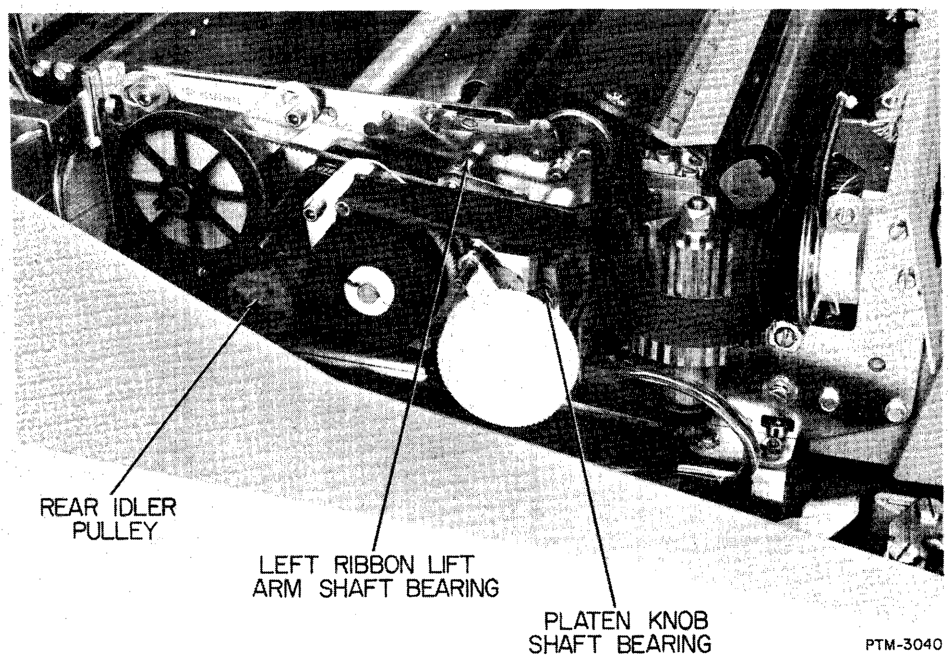


Figure 5-3. Lubrication Points - Printer Left Side.

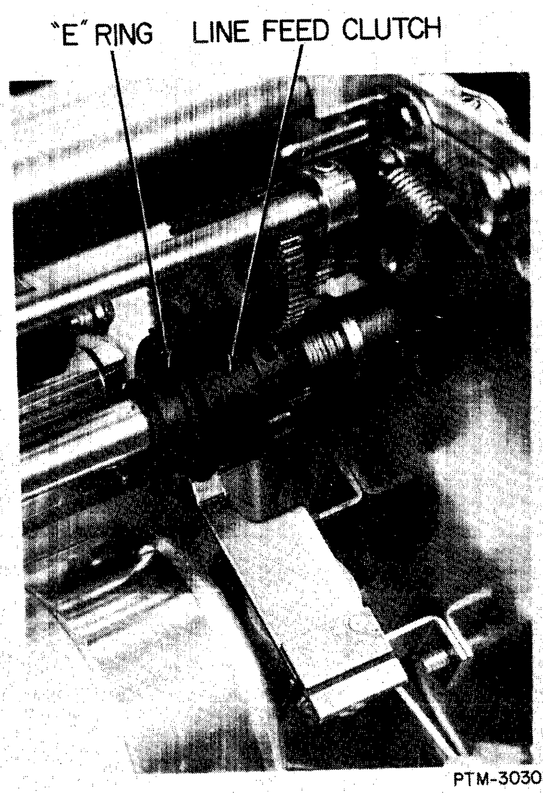


Figure 5-4. Lubrication Points - Clutch and Jackshaft.

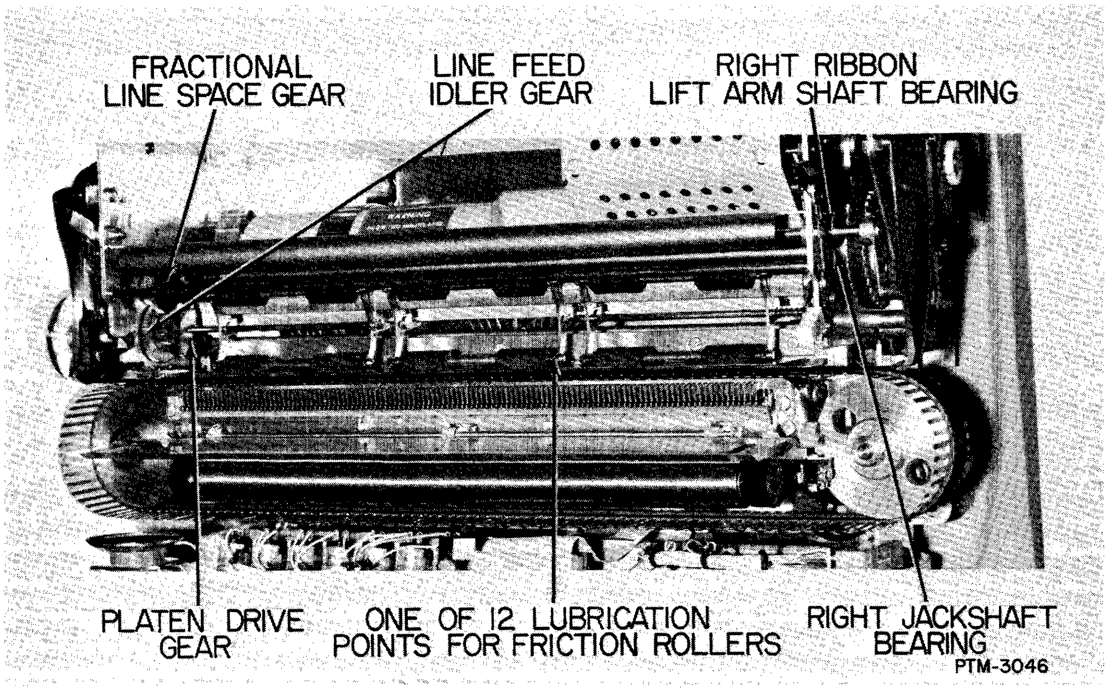


Figure 5-5. Lubrication Points - Printer Interior.

ADJUSTMENT CHECKS

The following tables give the mechanical and electrical adjustments in the Printer. If any adjustments are required refer to Section 2 of this Chapter.

The TermiNet 300 Printer has been designed so that few electrical adjustments are needed. The variable controls which are included are for the most part factory set. Several controls, however, are available which are considered field adjustable. The chart lists those controls and the text reference describing their adjustment.

Table 5-2

Mechanical Adjustments with Hammer Bank Installed in Frame.
(See Procedures in Section 2.)

PART	ADJUSTMENT LOCATION	SPECIFICATION	PAGE LOCATION OF PROCEDURE
Ribbon Lift Solenoid	Plunger Throw.	0.100 - 0.125 in. (2.5 - 3.2 mm)	5-12
Ribbon Lift Solenoid with Red/Black Ribbon Option	Plunger Throw.	.128 to .137 in. (3.2 to 3.4 mm)	5-31
Ribbon (Std.)	Horizontal Position	Halfway between the type fingers and the paper.	5-13
Ribbon (Red/Black)	Horizontal Position	Halfway between the type fingers and the paper.	5-13

(continued)

Table 5-2. Mechanical Adjustments with Hammer Bank Installed in Frame (continued)

PART	ADJUSTMENT LOCATION	SPECIFICATION	PAGE LOCATION OF PROCEDURE
Ribbon (Std.)	Vertical Position - top edge of ribbon with respect to the tops of the print fingers (solenoid energized).	0.031 ± 0.031 in. (.8 ± .8mm)	5-13
Ribbon (Red/Black)	Vertical Position - top edge of ribbon with respect to the tops of the print fingers (solenoid de-energized).	.039 ± .010 in. (0.975 ± .25 mm)	5-31
Ribbon Reversing Shaft	End Play	0.010 - 0.015 in. (.25 - .38 mm)	5-13
Ribbon Lift	End Play	.005 - .015 in. (.1 - .38 mm)	5-14
Ribbon Lift Lever and Ribbon Lift Arm	Clearance Between Lift Lever and Lift Arm	.005 - .010 in. (.10 - .25 mm)	5-14
Left and Right Drive Belt	Deflection of belt with 4 oz. (113.4g) of applied force.	0.100 - 1.175 in. (2.5 - 4.5 mm)	5-15
Jackshaft	End Play - left side	0.005 - 0.010 in. (.13 - .25 mm)	5-18
Jackshaft	Pulley-to-Bearing Clearance - right side	0.012 - 0.015 in. (.30 - .38 mm)	5-18
Line Feed Solenoid	Between Solenoid Arm and Clutch lobes. (Highest point on lobe and arm all the way down.)	0.005 - 0.010 in. (.13 - .25 mm)	5-17
Line Feed Solenoid	Air Gap Between Solenoid Arm and Center of Coil	0.008 - 0-010 in. (.20 - .25 mm)	5-17
Line Feed Solenoid	Air Gap Between Rear of Solenoid Arm and Coil Frame	0.004 - 0.006 in. (.10 - .15 mm)	5-17
Rear Print Belt Guide	Clearance Between Belt and Guide	0.003 - 0.008 in. (.08 - .20 mm)	5-21
Front Print Belt Guide	Between Outside Edge of Right Print Belt Pulley and Rear Surface of Front Belt Guide. (Pulley in normal running position.)	.019 - .025 in. (.475 - .625 mm)	5-21
Hammer Bank	Distance Between Platen and Hammer Faces	0.180 - 0.190 in. (4.6 - 4.8 mm)	5-25
Vertical Tab and Form Feed Drive Belt	Deflection of Belt with 2 oz. (56.7g) of Applied Force	0.100 ± 0.031 in. (2.5 ± .8 mm)	5-31

(continued)

Table 5-2. Mechanical Adjustments with Hammer Bank Installed in Frame (continued)

PART	ADJUSTMENT LOCATION	SPECIFICATIONS	PAGE LOCATION OF PROCEDURE
Rebound Bar	Distance Between Edge of Rebound Bar (Facing toward the Platen) and the Hammer Faces	.071 - .079 in. (1.8 - 2.0 mm)	5-22
Photocell	Initial Setting	.050 in. (1.3 mm)	5-28
Anti-Snag Assembly Option	Clearance Between Platen and Paper Guide	Light Friction Fit over entire use range of platen.	5-30
Paper Pressure	Torque Shaft thru hole in right jackshaft pulley	Paper won't slip under platen with 15 lbs. (6.75 kgm) pull.	5-19
Paper Skew (Paper Holder Bracket)	Bracket Stud thru left main frame	.677 in. (16.9 mm) Between Paper Tube Flange and inside left main frame.	5-20

Table 5-3

Electrical Adjustments.

CONTROL LOCATION	CONTROL SYMBOL	FUNCTION OF CONTROL	TEXT REFERENCE
PROC Board	P1	Speed protection adjustment. Factory Set/Field Adjustable.	5-29
	P2	Voltage protection adjustment. Factory Set/Field Adjustable.	5-29
T&A Board	1P	Volume Control for Alarm Beep. Field Adjustable.	5-29
	2P	Volume Control for Keyboard Beep - field adjustable.	5-29

SECTION 2

PARTS REPLACEMENT AND ADJUSTMENTS

WARNING

Disconnect all power from the Printer before removing or replacing any parts.

KEYBOARD

(Figures 5-6 and 5-7)

1. Raise the top cover.

2. Disconnect the PSC plug from the connecting pins on the Mother Board.

3. Remove the four keyboard mounting screws - two on each side of the keyboard.

4. Slide the keyboard off horizontally away from the front of the Printer.

5. Disconnect the keyboard wire underneath the right side of the keyboard.

6. Replace by reversing this procedure.

SLC BOARD ASSEMBLY

(Figure 5-8)

1. Remove the SLC Board by first removing the keyboard from the Printer.

2. Lay the keyboard face down and remove the four mounting screws in the bottom cover.

3. Lift off the bottom cover.

4. Remove the four mounting screws from the SLC board at the extreme ends of the SLC mounting plate.

5. Lift the SLC board assembly partially out of the keyboard casting, and disconnect the in-line wire connector for the "ALL CAPS" and "AUTO L. F." switches.

6. Remove the SLC board assembly.

NOTE

The plug and ribbon cable assembly must not be removed from the SLC board.

7. Replace by reversing this procedure.

FERRITE CORES

"I" CORE AND CLIPS (Figure 5-9)

After removing the "I" core and clip from the keybar, check for the presence of a shock absorber (see Figure 5-9). This is a strip of medium resilient plastic often referred to as a "doggy bone" because of its shape. Its part number is 44A410884-G01. The "doggy bone" cushions the "I" core as it contacts the "U" core. This helps to prevent the possiblity of the damage to "U" core if the key is struck too hard.

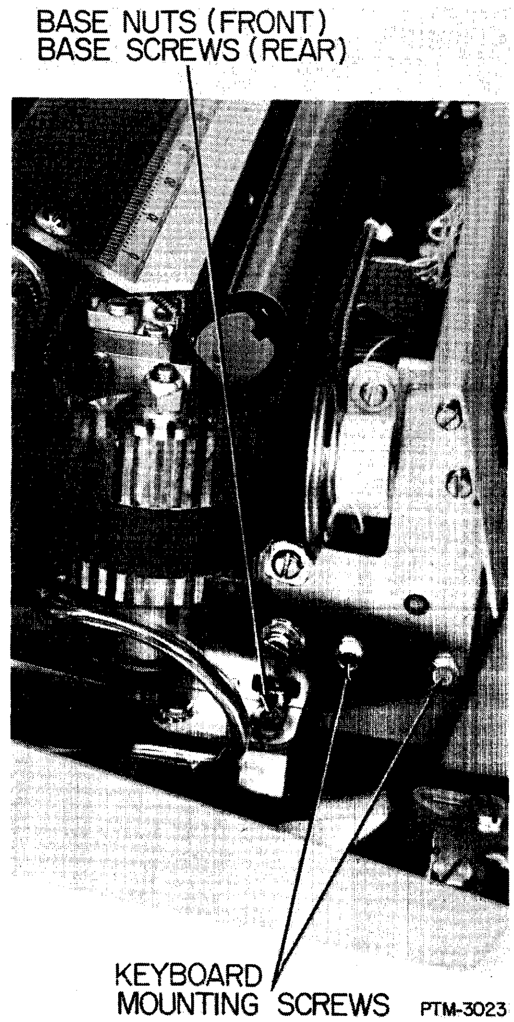


Figure 5-6. Keyboard Mounting.

IMPORTANT NOTE

The "doggie bone" will only be found on keyboards from group 7 on. They are not retrofittable on group 1-6 keyboards and will not be found there.

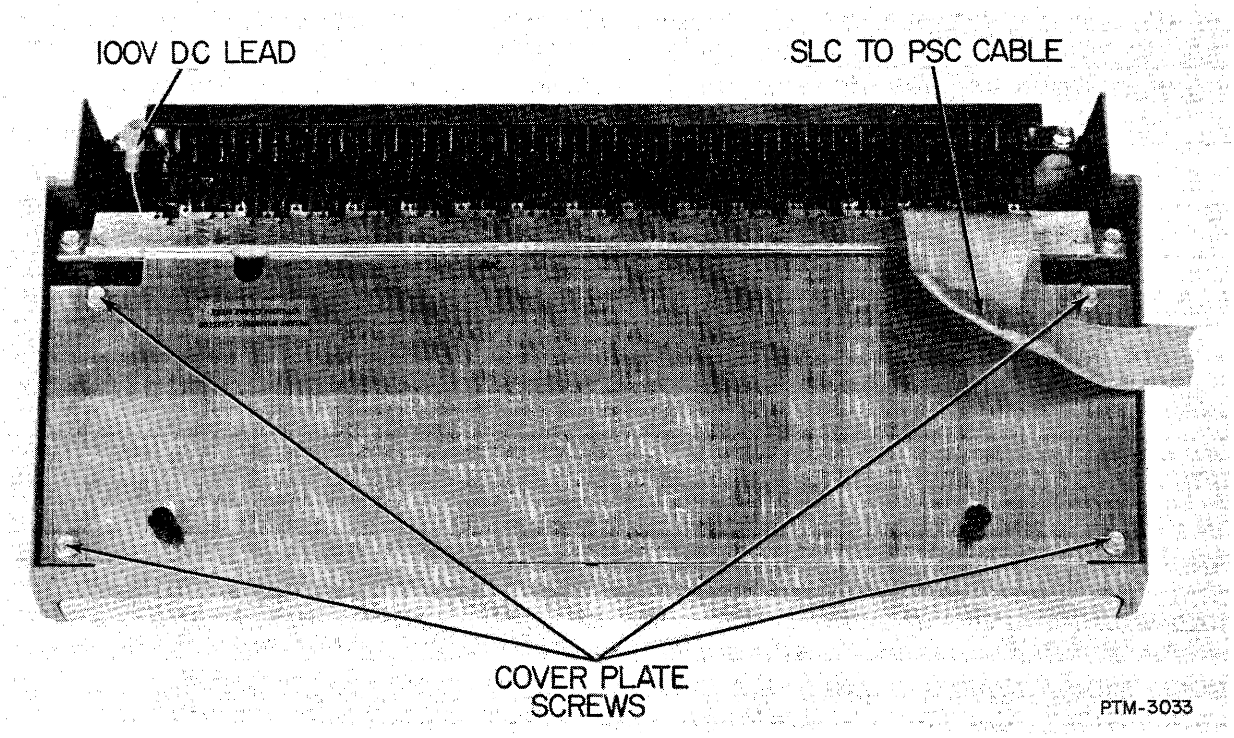


Figure 5-7. Keyboard Hardware.

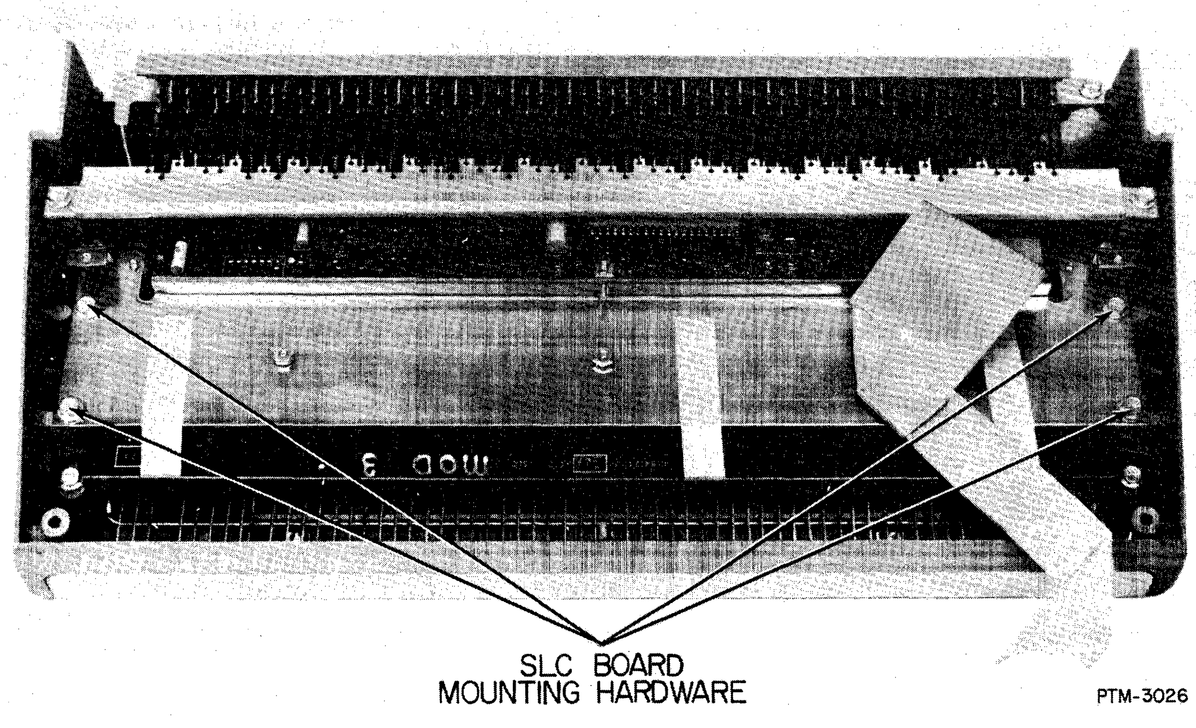


Figure 5-8. Sense Line Combined Board Mounting.

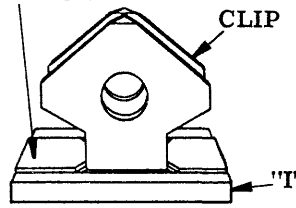


Figure 5-9. "I" Core Clip.

"U" CORES

The ferrite "U" cores located in the SLC (sense line) board assembly are cemented to the metal supporting plate located under the board. To replace a defective core, proceed as follows:

1. Remove the SLC board assembly from the keyboard.

2. Remove the metal supporting plate from the SLC board.

3. With a sharp knife, cut through the cement strip on each side of the core.

4. Apply heat directly under the core to be removed by placing the tip of a large soldering iron (150 watts minimum) to the opposite side of the metal plate for one minute.

5. Using a pair of pliers, lift up the defective core and remove it from the plate.

6. Scrape the plate clean of any remaining residue.

7. Place a piece of strip adhesive (polyethelyne copolymer) to the replacement core. Trim off any excessive adhesive. Position the core on the plate by aligning the SLC board with the supporting plate and reassemble the SLC board to the plate.

8. Apply pressure on the core and heat the opposite side of the supporting plate with the soldering iron until the adhesive melts (at least one minute).

9. Let the adhesive cool and remove pressure from the core.

10. Install the SLC board assembly in the keyboard.

MAIN FRAME

1. Disconnect all outgoing cables.

2. Remove the two screws holding the bustle cover and remove bustle cover.

3. Remove the four screws on the TXPC cover and then remove the cover (see Figure 5-10).

4. Unplug the TXPC power cord.

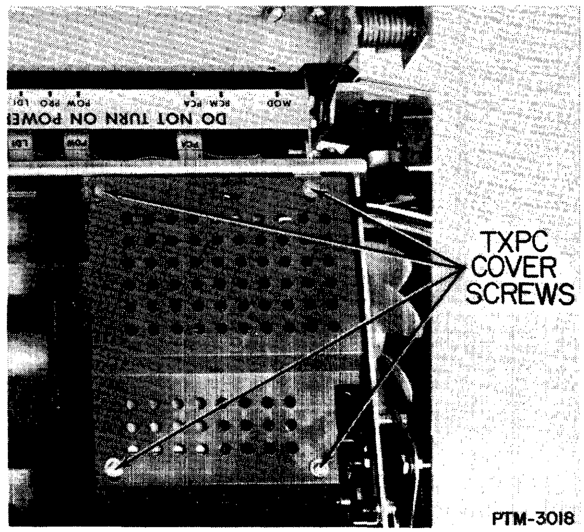


Figure 5-10. TXPC Cover Mounting.

5. Remove the base nuts on the shock absorbers located at the front corners of the main frame base plate (see Figure 5-6).

6. Remove the two screws from the rear corners of the base plate.

NOTE

Some early C Model Printers had nuts at the rear corners instead of screws. To remove these nuts, use a long shank 11/32 nut driver. Replacement of these nuts is best accomplished by following this procedure:

a. Hold a long slim rod (spring hook) on the end of the stud.

b. Drop the nut down around this rod to the stud.

c. With the rod still in place, start the nut on the stud threads. Use a long screw driver to turn the nut.

d. Tighten the nut with the nut driver.

7. Gently lift themain frame up and forward.

8. Set the Printer on a flat surface on the four feet provided.

9. Replace the frame in the cover by reversing steps 2 through 8.

BUSTLE FRAME

1. Remove main frame from casting.

2. Remove the ground strap from the Mother Board. (Do not remove the end secured to the frame.)

3. Remove the two screws on the top of the bustle where the bustle connects to the main frame.

4. Unplug the six connecting plugs on the Mother Board.

5. Remove the two screws on the bottom of the bustle where the bustle connects to the main frame.

NOTE

The Bustle can be hinged on the bottom screws for servicing, by sliding the Bustle portion of the Printer beyond the workbench edge. This method reduces the need for removing these screws.

BUSTLE PRINTED CIRCUIT BOARDS (PCB)

1. Disconnect power.

2. Remove bustle cover.

3. Remove the screw on bustle board clamp and remove clamp.

4. Pull the PCB straight out of the bustle. The ideal method for removing PCB's is to use the fiber handle Bustle Board Extractor (44A410368-G01).

NOTE

When replacing printed circuit boards, the component side should face the left side of the bustle as viewed from front of the Printer.

TXPC BOARD

1. Remove the four screws and lift off the protecting cover over the TXPC board (see Figure 5-10).

2. Unplug the power cord and nine (9) separate plug-on wires on top of the TXPC board (see Figure 5-11).

3. Remove the fluorescent lamp starter.

4. Remove the three mounting screws at the corners of the TXPC board, shown in Figure 5-11.

5. Remove the top bustle screws.

6. Disconnect TXPC cable at the Mother Board.

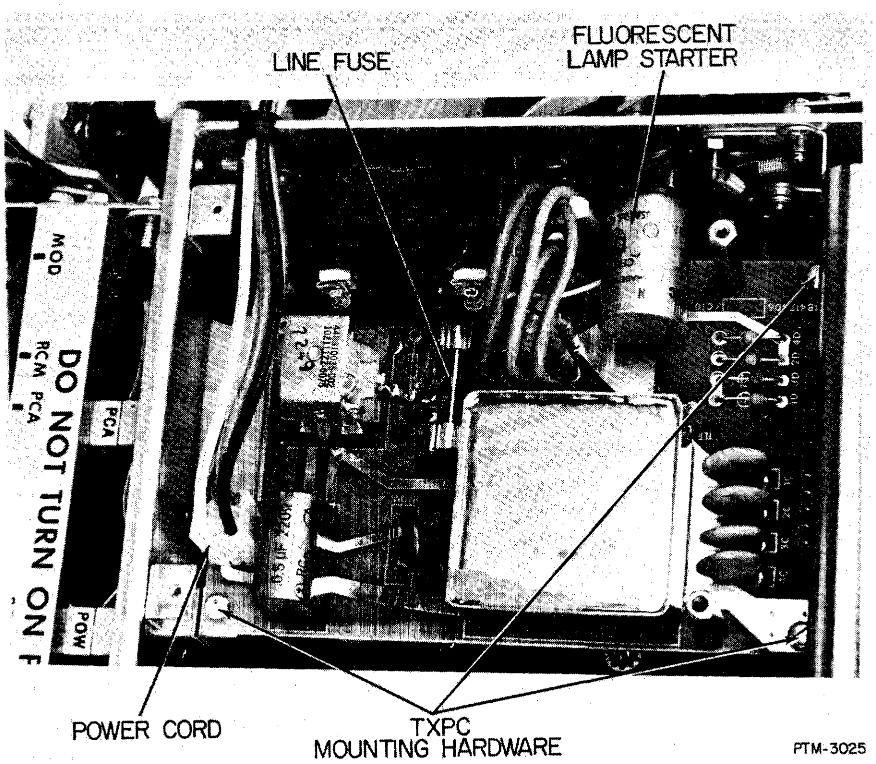


Figure 5-11. TXP Board Mounting.

7. Unplug the TXPC board from the transformer and lift out of Printer.

8. To reassemble reverse steps 1 through 5.

NOTE

It is very important that an external tooth lock washer be replaced underneath the left front TXPC mounting screw. This connects together all the Printer grounds.

RIBBON REVERSING MECHANISMS

(See Figure 5-15)

1. Remove the ribbon and spool.

2. Remove the "E" ring and lift the connecting link off of the ribbon reversing lever.

3. Remove the two Allen Head screws holding the mechanism in place. (Right side has three screws.)

4. This mechanism should now be free. Gently move back and away from the frame.

5. When replacing the ribbon reversing mechanism, insert the pinion into the slots in the jackshaft pulley. Make sure that the ribbon reversing lever attached to the right side of the ribbon reversing shaft is pointing down and the one on the other end of the shaft is pointing up.

RIBBON LIFT SOLENOID

1. Remove the right ribbon mechanism.

2. Remove the drive belt.

3. Remove the large jackshaft pulley.

4. Remove the "E" ring on the solenoid arm (see Figure 5-12).

5. Remove the four screws holding the solenoid plate to the side frame (see Figure 5-13).

6. The solenoid is now free and can be removed by turning slightly and pulling out of the side frame.

7. Disconnect the solenoid by unplugging it from the Printer.

8. Replace the solenoid by reversing steps 1 through 7.

RIBBON LIFT SOLENOID PLUNGER ADJUSTMENT

The Ribbon Lift Solenoid is best adjusted with the solenoid removed from the Printer.

To adjust the plunger throw, seat the plunger in the coil body. Place the feeler gauge between the top of the plunger and the bent metal tab directly above the

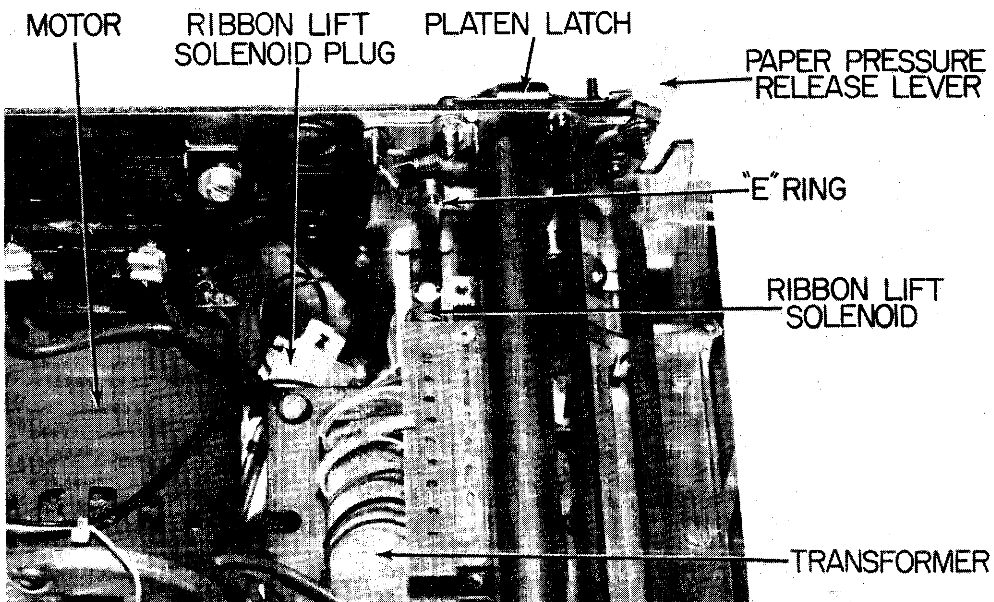


Figure 5-12. Internal Printer Components, Right Side.

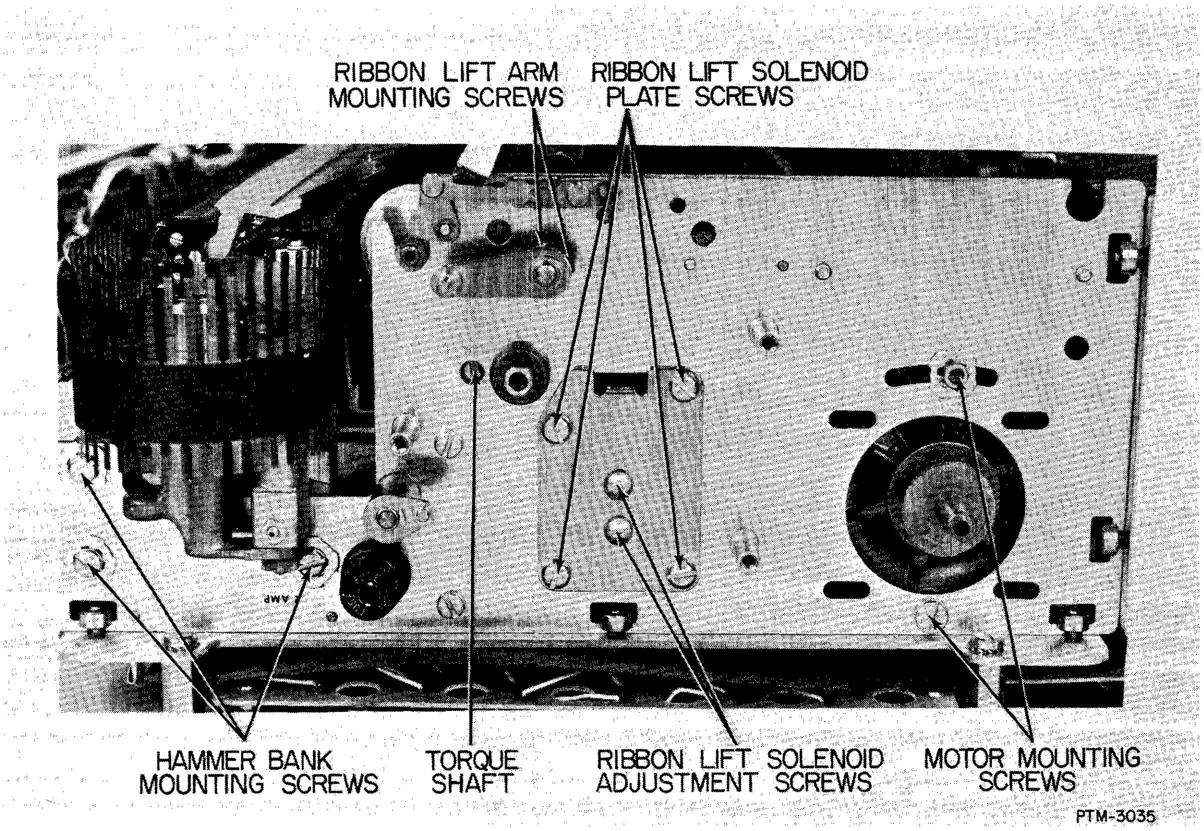


Figure 5-13. External Right Side View of Printer.

plunger (see Figure 5-14). The gap should be 0.100 inch to 0.125 inch (2.5 to 3.1 mm). This setting is different if a two color ribbon is used. Refer to the Options portion of this Chapter for this Adjustment setting.

RIBBON ADJUSTMENT

HORIZONTAL

The ribbon should be adjusted so as to be halfway between the fingers and the paper. Loosen the ribbon guide arm stud and move the guide arm forward or backward as needed (see Figure 5-15).

VERTICAL

The top edge of the ribbon should be 0.031" ± 0.031" above the tops of the print fingers while the solenoid is energized. Refer to the Options section for the setting of the two color ribbon height.

RIBBON REVERSING SHAFT

(And Reversing Shaft Adjustment)

REMOVAL

1. Remove the "E" rings and lift the connecting links off the ribbon reversing levers (see Figure 5-15).

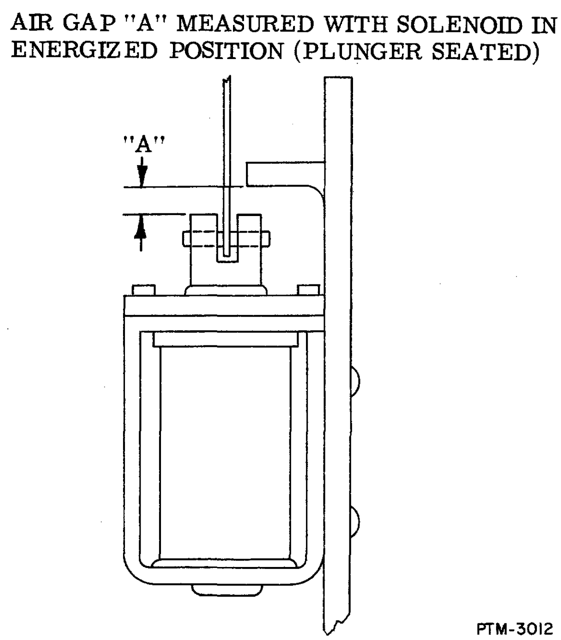


Figure 5-14. Ribbon Lift Solenoid.

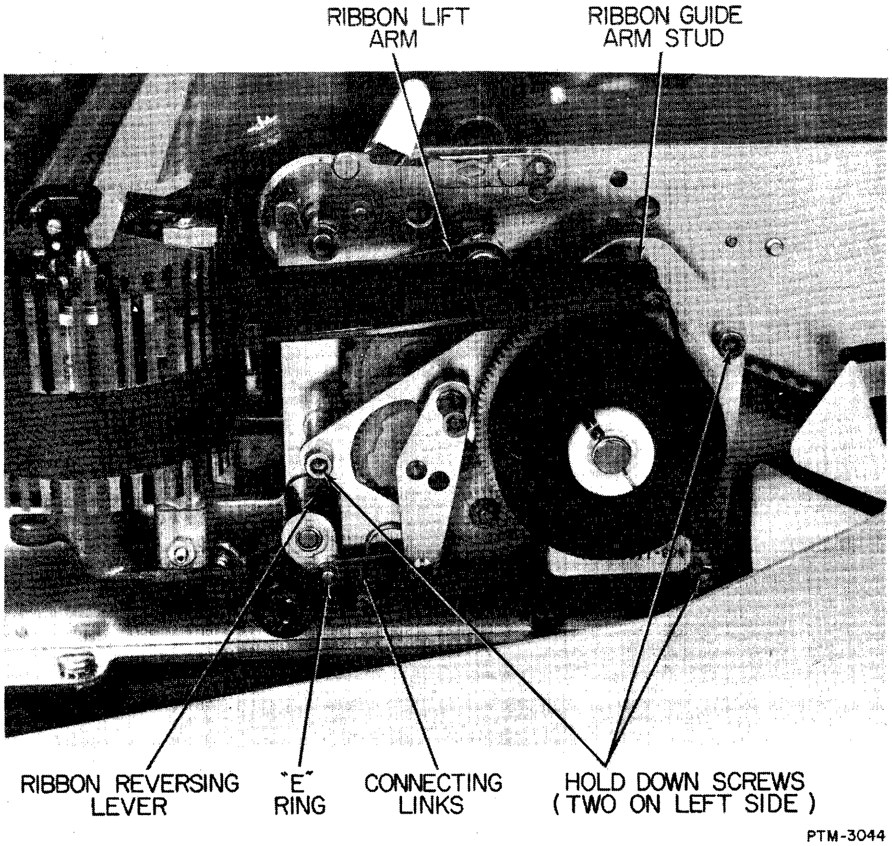


Figure 5-15. Ribbon Reversing Mechanism Hardware.

2. Loosen set screws in ribbon reversing levers.

3. Remove reversing shaft by sliding out of frame.

INSTALLATION

1. Insert bearing in frame and replace shaft.

2. Add ribbon reversing lever to both ends of shaft and tighten set screw only on the left side.

3. Attach the links and "E" rings to the reversing levers.

4. On the left side, point the ribbon reversing lever up and connect link and "E" ring. Move the link forward to disengage the reversing mechanism.

5. On the right side, point the ribbon reversing lever down and connect link and "E" ring. Move the link rearward to engage the reversing mechanism.

6. Rotate print belt approximately one-half rotation to insure the gears are engaged.

7. Allow .010" to .015" (.254 - .381 mm) end play in the reversing shaft and tighten set screw in right ribbon reversing lever. The hammer bank must be mounted in place when setting this end play.

8. Operate reversing mechanism several times to verify proper operation.

RIBBON LIFT SHAFT ADJUSTMENT

1. Allow an End Play in the ribbon lift arm shaft of .005 to .015 in. (.1 - .38 mm).

   a. Loosen the collar set screw on the left end of the shaft.

   b. Gauge the setting between the bushing and the main frame.

   c. Tighten the collar set screw.

2. Allow a clearance of .005 - .010 in. (.127 - .254 mm) between the ribbon lift lever and the ribbon lift arm.

   a. Loosen the set screw in the lift lever.

   b. Gauge the clearance between the lift arm and lift lever.

   c. Tighten the lift lever set screw.

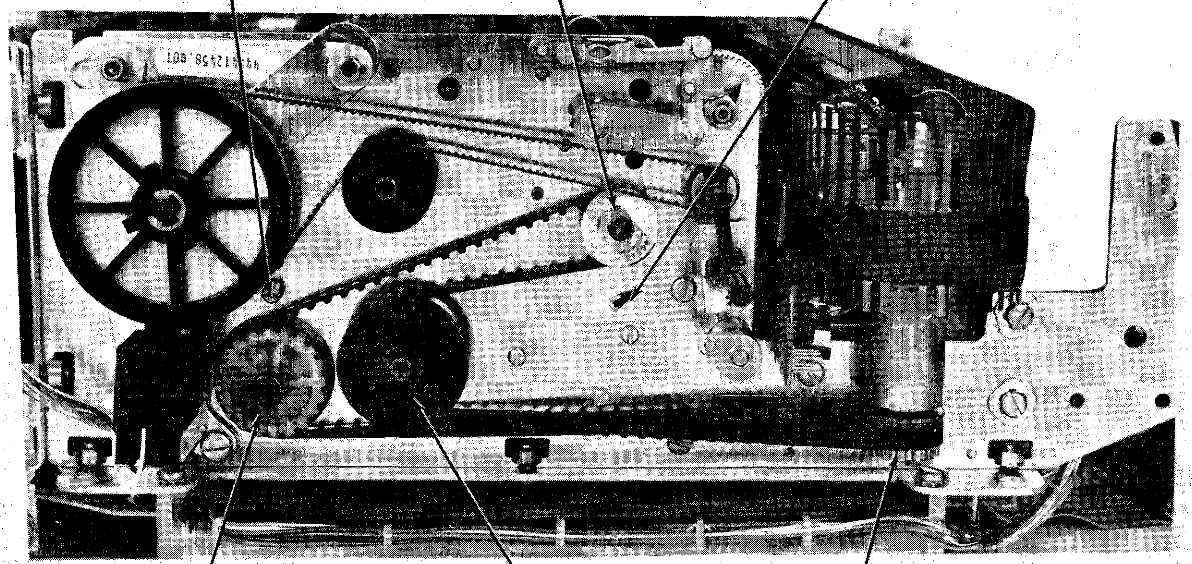


Figure 5-16. Left Drive Belts and Pulleys.

3. Operate the lifting mechanism several times to insure proper operation.

NOTE

Both clearance settings must be made with the hammer bank mounted in place.

DRIVE BELTS (AND DRIVE BELT ADJUSTMENTS)

LEFT DRIVE BELT

a. Remove ribbon.

b. Remove left ribbon reversing mechanism.

c. Push down on drive belt next to the print belt pulley and rotate print belt clockwise. The belt will ride off of the pulley.

d. To reinstall, mount drive belt as shown in Figure 5-16.

e. Adjust Drive Belt Tension by moving Rear Idler Pulley. The Belt should deflect 0.1" to .175" (2.5 to 4.5 mm) with 4 oz. (113g) of pressure applied between the left jackshaft pulley and the rear idler pulley.

RIGHT DRIVE BELT

a. Remove ribbon and the right ribbon reversing mechanism.

b. Remove the belt by sliding it off jackshaft pulley. When replacing the drive belt, adjust the motor position so that the drive belt deflects .1" to .175" (2.5 to 4.5 mm) with 4 oz. (113g) pressure applied midway between the motor pulley and jackshaft pulley. To adjust tension, loosen the top Allen Head screw and rotate the motor about the lower screw axis (see Figure 5-17). Check the tension by holding the fan blade and moving the Print Belt. The Print Belt should move one print finger width, when taking up the slack in the drive belt.

CAUTION

Do not force or stretch the drive belt when making this test.

PLASTIC PAPER SHIELD

To remove the Paper Shield, follow this procedure.

1. Unhook the spring ends from the Main Frame of the Printer. A pair of slender needle nose pliers or a spring hook will be required.

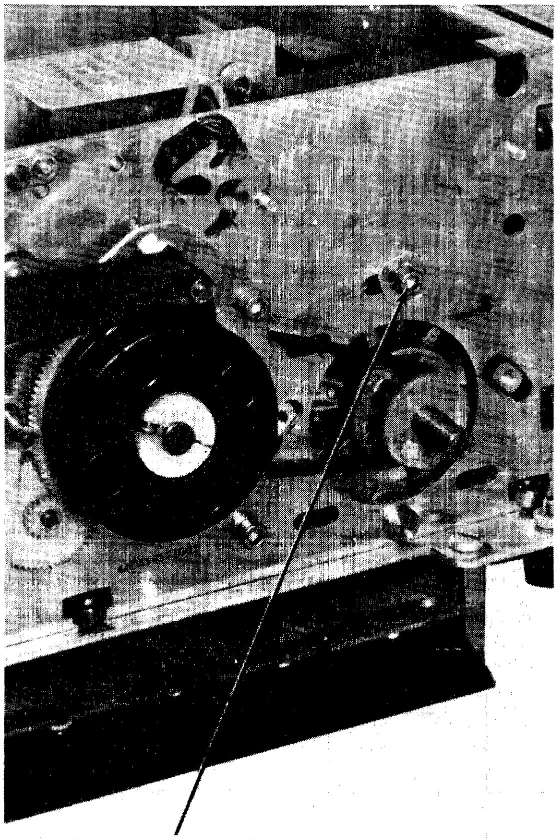


Figure 5-17. Right Drive Belt Adjustment.

2. Slide the hinge rod toward the left side of the Printer. The rod will not slide easily toward the right because the retaining clip hole is too small.

3. Reinstall by reversing this procedure. Be sure to hook the spring as shown in Figure 5-18.

PLATEN PAPER PAN, AND PRESSURE ROLLERS

PLATEN

1. Release the platen latches (see Figure 5-12) at each side of the frame.

2. Lift the platen straight up and out of the Printer. When installing the platen, insure that the platen gear is to the left side. Seat the platen firmly in the slots provided in the side frames and lock the platen latches.

Pin Feed Platens have two clips which fit on the Pin Feed Rod and one clip which fits into the right Paper Release Lever. Be sure these are engaged when installing the Platen.

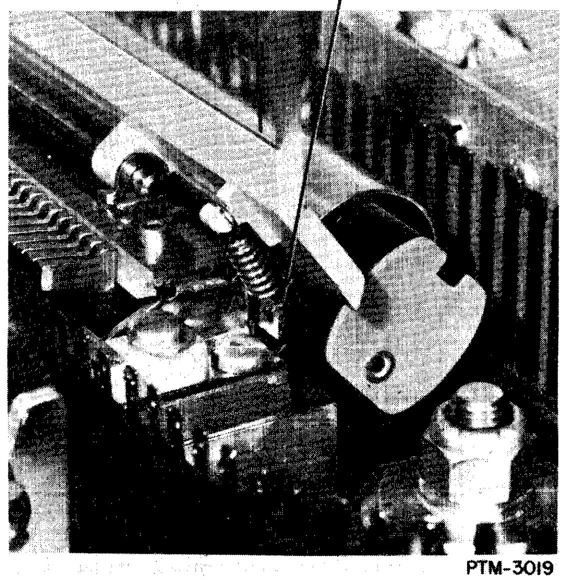


Figure 5-18. Paper Shield Spring Clip.

PAPER PAN

The paper pan is held by a pin under each end of the pan. The pin on the right side is spring loaded (see Figure 5-23). Push this pin in toward the left with a small screwdriver and lift the right side up. Move the pan to the left and lift out of the machine. To install the paper pan, engage the right side over the spring loaded pin and move the pan to the left. Drop the left side over the pin and move the pan to the right.

PRESSURE ROLLERS

Lift pressure rollers straight up and out of the yoke arms. When installing the pressure rollers, insure that the three large rollers are toward the back of the machine and the three small rollers are toward the belt guide. Printers which have Pin Feed Platens do not have Pressure Rollers.

PLATEN KNOB

1. Open the top cover.

2. Slide the rubber "O" ring out of the groove in the shank on the platen knob.

3. With a small slender tool, push out the pin inside of the groove.

4. Remove the platen knob, place the pin back in the hole, and slide the "O" ring back in the groove to keep the pin from becoming lost.

5. Remove the spring from the shaft.

6. To install the platen knob, place the spring on the shaft, remove the pin from the hole in the platen knob shank, place the knob on the shaft, push the knob in slightly to insert the pin, and slide the "O" ring back into the groove on the shank.

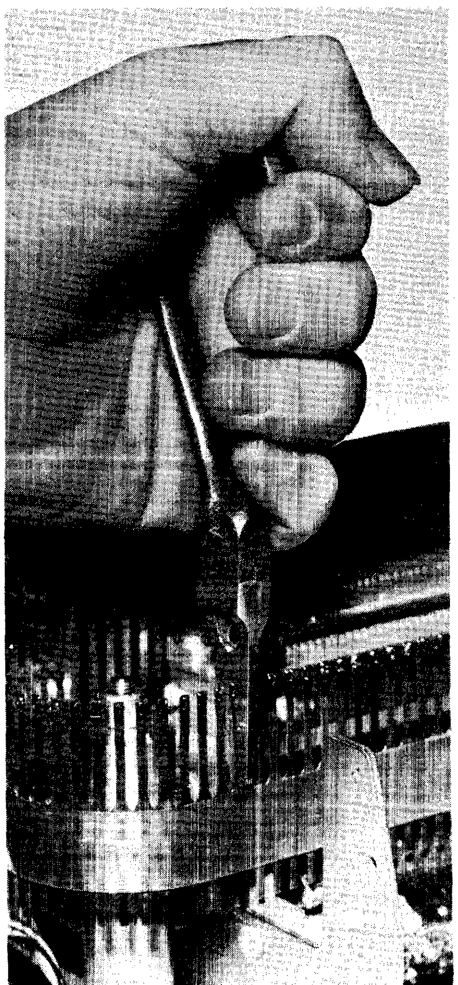
PRINT FINGER

1. Move the print belt to the right (counterclockwise) until the damaged finger is just moving off the drive pulley toward the front of the Printer.

NOTE

The two fingers with wide bottoms (Font Fingers) must not be removed.

2. Grasp the finger firmly (close to belt) with the finger removal pliers and pull straight up and out of the belt (see Figure 5-19). Special finger removal pliers (44B412269-001) have opening in jaws which prevent damage to the type face.



PTM-3013

Figure 5-19. Print Finger Removal.

3. Grasp a new finger as far down as possible and insert it in the slot. Push the new finger in approximately a quarter of an inch at a time. Be careful not to bend the finger as it may break if bent.

4. Push the finger down until the wide flange is firmly seated against the belt.

5. Check the linear alignment on the top of the finger in relation to the other fingers in the belt. If slightly out of line, it may be bent slightly to conform with the other fingers.

LINE FEED SOLENOID (AND ADJUSTMENT)

(Figure 5-20)

MOUNTING

1. Remove the left ribbon reversing mechanism.

2. Remove the three solenoid screws from the left side frame.

3. Lift the solenoid up and back to clear the clutch assembly.

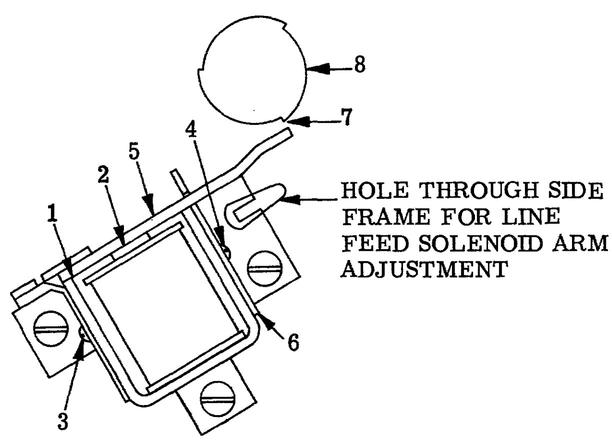
4. Install the solenoid by reversing steps 2 and 3 above. Lightly tighten the mounting screws.

5. Perform the adjustment outlined below.

6. Install the ribbon reversing mechanism.

ADJUSTMENT

Adjust the position of the line feed solenoid until a clearance of 0.005 - 0.010 in. (0.13 - 0.25 mm) is obtained between the solenoid arm and the lobes on the clutch (measured at highest point on clutch lobe with solenoid armature pushed all the way down).



1. AIR GAP - 0.004 - 0.006" (.100 - .150MM)
2. AIR GAP - 0.008 - 0.010" (.200 - .025MM)
3. TWO SCREWS
4. TWO SCREWS
5. SOLENOID ARM
6. STOP BRACKET
7. CLEARANCE 0.005" to 0.010" (.125 - .250MM)
8. LINE FEED CLUTCH

PTR-3012

Figure 5-20. Line Feed Solenoid Adjustment.

This adjustment is made by rotating a screwdriver in the adjustment slot located in the frame, in the area of the line feed solenoid. After the correct adjustment is made, tighten the line feed solenoid mounting screws.

JACKSHAFT AND LINE FEED CLUTCH (AND ADJUSTMENT)

LINE FEED CLUTCH

1. Remove left and right ribbon reverse mechanism.

2. Slip the right and left drive belts off of the jackshaft pulleys.

3. Remove the left jackshaft pulley and washer.

4. Remove the right jackshaft pulley.

5. Remove the platen and internal paper pan.

6. Loosen the set screw in the small collar on the right end of the clutch and slide the jackshaft to the right out of the Line Feed Clutch.

7. Hold the clutch together so it does not separate during disassembly.

8. Install the clutch by reversing this procedure.

NOTE

Be sure the clutch is all the way to the left and is fully engaged with the anti-backlash spring. The chamfered end should be placed next to the clutch.

9. Refer to the section below for Jackshaft adjustment.

JACKSHAFT (Figure 5-21)

REMOVAL

For removal of the jackshaft, proceed as though removing the line feed clutch.

ADJUSTMENT

When replacing the jackshaft, the jackshaft pulleys or the Line Feed Clutch, the following adjustments must be made:

Left Side

1. Loosen the set screw on the clutch.

2. Insert a 0.008" (0.200 mm) feeler gauge between the jackshaft shoulder and the line feed clutch. With the gauge in place, tighten the set screw on the clutch lightly for temporary adjustment. Push the shaft to the left until the clutch stops against the frame.

3. If one is not already present, add a 0.005" (0.127 mm) brass washer between the left pulley and the bearing.

4. Slide the left pulley all the way to the right, removing all existing clearance.

5. Tighten the pulley on the jackshaft, making the washer snug between the pulley and the left bearing.

6. Loosen the clutch set screw, and slide the jackshaft to the left until the shoulder stops on the clutch. Tighten the clutch set screw.

Right Side

1. Slide the jackshaft all the way to the left. Slide the right jackshaft pulley all the way to the left, and lightly tighten the pulley set screw.

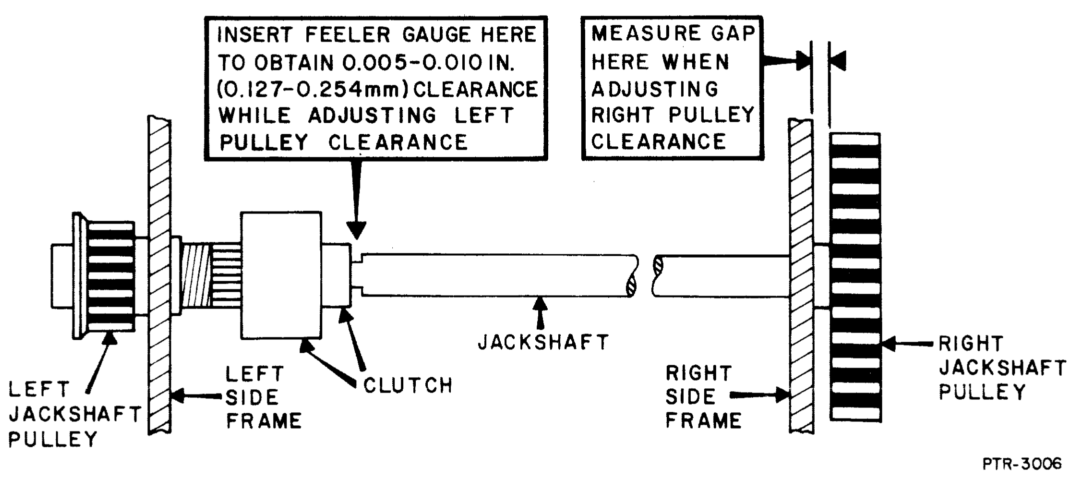


Figure 5-21. Jackshaft Adjustment.

2. With the jackshaft at the extreme left position, measure the gap between the inside edge of the right jackshaft pulley and the right side frame of the Printer. Record this measurement.

3. Add 0.012 - 0.015" (0.305 - 0.381 mm) to the measurement recorded in the above step.

4. Keeping the jackshaft in the extreme left position, loosen the set screw in the right jackshaft pulley. Slide the pulley to the right until the gap which exits between the inside edge of the right pulley and the right side frame is equal to the recorded measurement plus the specified clearance. Tighten the pulley set screw.

5. Rotate the jackshaft a few revolutions by hand to make sure that no binding exists. By sliding the jackshaft back and forth in a horizontal direction, check to see that end play is evident.

6. Jackshaft end play should be .005 - .010" (.127 - .254 mm) when all adjustments are complete.

NOTE

The right hand jackshaft adjustment must be made with the Hammer Bank installed.

JACKSHAFT BEARING REPLACEMENT

To remove the jackshaft bearing you will need a bearing puller (44A410588-G01). The bearing puller consists of three pieces: body, head and cap screw.

Refer to Figure 5-22 and follow this procedure:

1. Remove the Jackshaft from the Printer.

2. Place the body of the bearing puller with the larger inside diameter against the large end of the bearing.

3. Place the head of the bearing puller against the other end of the bearing. When removing the smaller size bearings, use the smaller end of the head to press against the bearing.

4. Push the socket head cap screw through the head, bearing, and into the body of the bearing puller. The body is threaded inside so that the cap screw can be tightened applying force against the bearing. Align tool so that the head is pushing against only the bearing.

5. While using an Allen wrench to hold the cap screw, apply force to the bearing by turning the body of the bearing puller using a suitable open end wrench. Continue applying force against the bearing until it is free.

Jackshaft bearing replacement is accomplished in the following manner.

1. Apply a thin layer of Loctite* on that surface which fits in the hole and on the outer surface of the Bearing Flange.

2. Install the Bearing in place and slip the Jackshaft into its correct position, to insure proper alignment of the Bearing. Make sure no Loctite is on the Jackshaft.

3. After the Loctite has set, the final Jackshaft installation and adjustment can be made.

PAPER PRESSURE ADJUSTMENT

(Friction Feed Machines)

The right Jackshaft Pulley in the Printer has holes in it so that the torque shaft can be reached with a slender screwdriver. Therefore, it is not necessary to remove the Jackshaft pulley to perform the following adjustment.

If the paper can be made to slip under the Platen with less than 15 lbs. (6.75 kgm) of pull when the Paper Release Lever is engaged in the rearward position (see Figure 5-12), perform the following steps:

1. Clean Platen with alcohol.

2. Loosen the set screw in the collar on the torque shaft (see Figure 5-23).

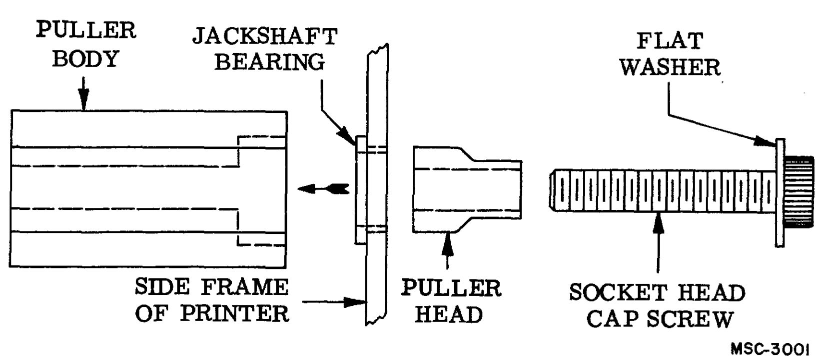


Figure 5-22. Bearing Puller.

*Registered Trademark of the Loctite Corp.

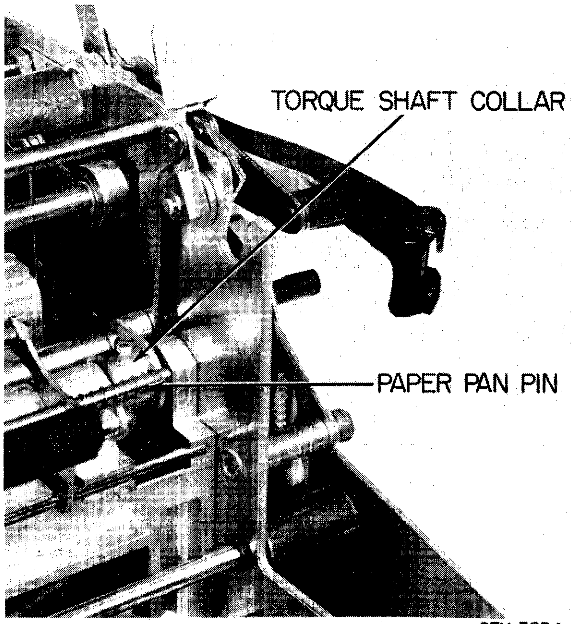


Figure 5-23. Paper Pressure Adjustment.

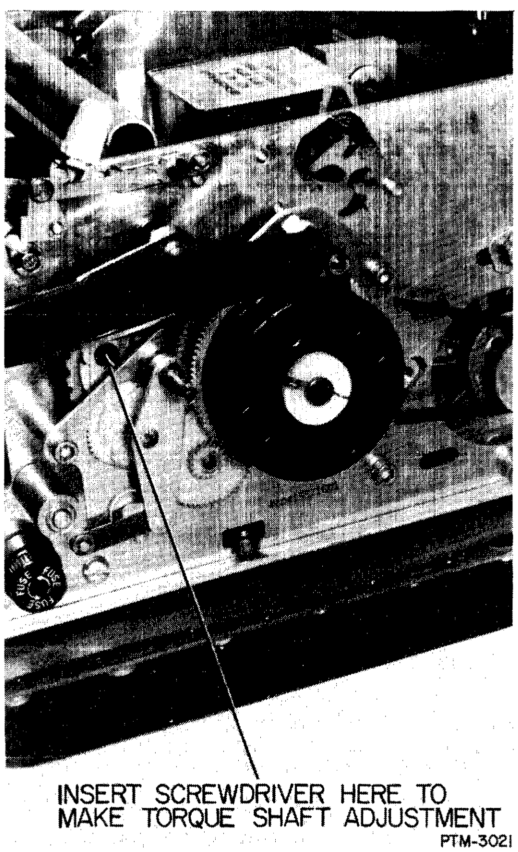


Figure 5-24. Torque Shaft Adjustment.

3. Holding the Paper Release Lever in the engaged position, place a screwdriver in the end of the torque shaft (see Figure 5-24) and turn counterclockwise until pressure is felt.

NOTE

Hold the other end of the rod with your hand to insure it does not bind on the Line Feed Clutch.

4. Lock the set screw while holding the screwdriver in place.

5. Install paper and perform pull test (paper should not slip under platen with 15 lbs. (6.75 kgm) pull on the paper).

PAPER SKEW ADJUSTMENT

(See Figure 5-25)

If the paper does not follow a correct alignment thru the Printer then proceed with the following adjustment:

1. Remove the paper tube from the notched slots in the two mounted brackets.

2. Measure the distance between the back edge of the right bracket and the base plate.

3. Measure the left bracket distance. This distance must be the same as measured in Step 2. If this distance is different then loosen the hardware retaining the left bracket and move the left bracket until the measured distance is the same.

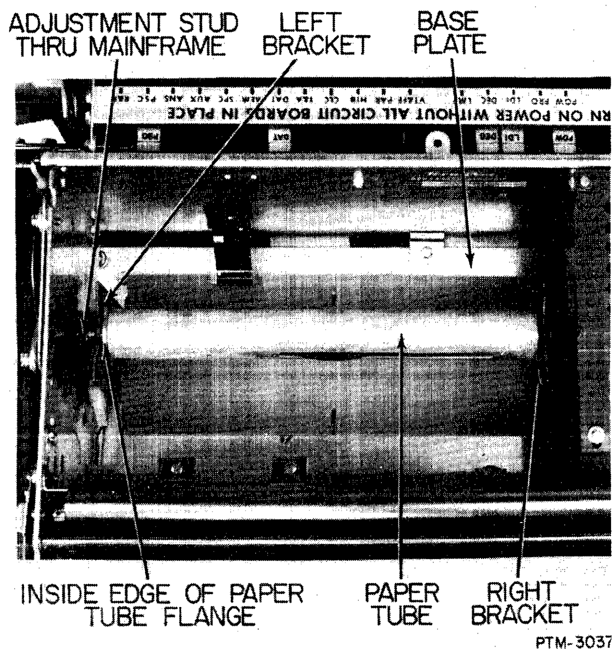


Figure 5-25. Paper Roll Holder.

4. Tighten the left bracket down at this point.

5. Install the paper tube in the Printer. The flats on the paper tube shaft must be correctly seated in the notched slots of the two brackets.

6. Adjust the stud on the left bracket to obtain a clearance of .677" (16.9 mm) between the inside edge of the metal flange on the paper tube and the inside surface of the left side frame.

PRINT BELT AND REAR BELT GUIDE ADJUSTMENT

PRINT BELT REMOVAL

1. Remove the ribbon, platen, and paper pan.

2. Loosen the two rear belt guide screws protruding through the paper holder and slide the belt guide toward the rear of the Printer, away from the print belt.

3. Push in and hold the right pulley casting on the Hammer and Print Belt Assembly to relieve tension on the belt.

4. Slip the print belt up and over the tops of the print belt pulleys.

PRINT BELT REPLACEMENT

To replace the belt, reverse Steps 3 and 4. Also make sure that the lower portion of the print fingers are between the belt guides and not touching the photocell shield.

REAR BELT GUIDE ADJUSTMENT (Figure 5-26)

1. To adjust the rear belt guide, insert a 0.008" (0.2 mm) feeler gauge between the belt and the left end of the guide. Slide the guide forward until it is snug against the gauge and lightly tighten the left guide screw. Remove the gauge and repeat above procedure for the right end. To check for the correct setting, insert a 0.003" (0.08 mm) feeler gauge between the belt and guide on the extreme left end of the guide. Slide the feeler gauge to the right of the entire length of the belt guide. Almost no drag on the gauge should be felt. Rotate the print belt approximately one-third of a revolution two times, repeating the above check.

2. When the rear belt guide has been correctly adjusted, finish tightening the two rear guide screws.

3. Replace the paper pan, platen, and ribbon.

FRONT BELT GUIDE (AND FRONT BELT GUIDE ADJUSTMENT)

The front or lower belt guide is secured to the hammer bank castings by screws located at each end of the belt guide. During normal print belt clearance checks, do not loosen these screws.

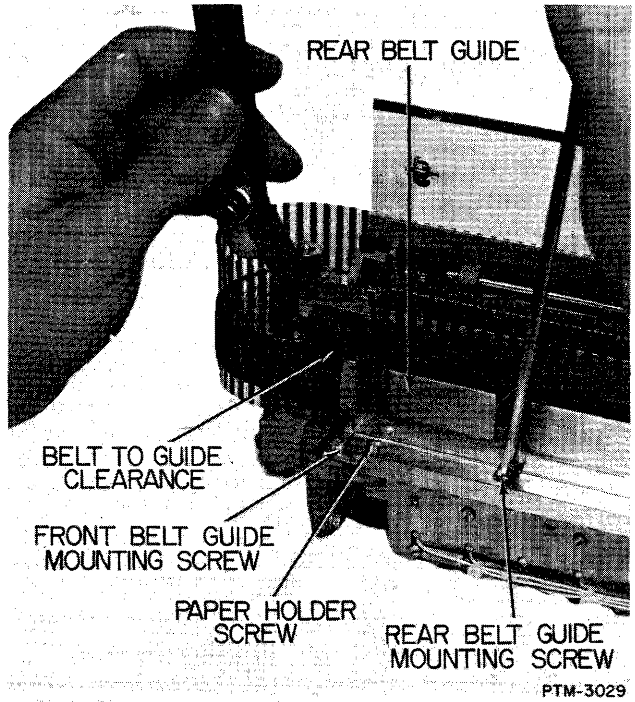


Figure 5-26. Rear Belt Guide Adjustment.

REMOVAL OF FRONT BELT GUIDE

1. Remove the ribbon.

2. Remove the platen and paper pan.

3. Remove the three small pressure rollers.

4. Loosen the two screws holding the rear belt guide and move the guide away from the belt.

5. Remove the print belt.

6. Remove the rear belt guide by lifting up and tilting back 90°.

7. Remove the two screws holding the front belt guide.

8. Lift the guide up and tilt back 90°.

9. Carefully move the guide by the clevis arms and hammers and remove from the Printer.

INSTALLATION OF FRONT BELT GUIDE

1. Tilt guide back 90° and insert lower edge between yoke arms and clevis.

2. With the belt guide, move the yoke arms back and lower the guide into the Printer while tilting the guide forward.

3. Position the guide on the castings and insert the two screws (do not tighten).

4. Make the required adjustments as set forth in the adjustment outline below.

5. Complete the installation by reversing steps 1 through 6 in the section on the previous page.

FRONT BELT GUIDE ADJUSTMENT

VERTICAL (See Figure 5-27)

The height of the front belt guide is not normally field adjusted. In rare cases, after field replacement of a print belt, light printing at either the tops or bottoms of the characters might occur. This print quality may be improved by adjusting the front belt guide height. The height of the front belt guide is adjusted by adding or taking away 0.005" shims (44A410762-001) under the guide. Normally, three shims are used under each end.

IMPORTANT NOTE

> When changing the height of the front belt guide, both print belt pulleys must be removed and .005" bearing shims (44A410146-002) under the pulleys added or taken away so as the heights of the pulleys will be displaced by the same amount as the front belt guide.

It is recommended that the alignment of the pulleys be checked after making any adjustment of the front belt guide height.

The alignment can be checked and accurately set by the use of a pulley alignment gauge (44A410583-001).

If the grooves in the pulleys don't line up with the grooves in the front belt guide, adjust the height of the pulley rather than reshim the guide.

LATERAL (See Figure 5-28)

1. The casting holding the right pulley is spring loaded. Move this casting toward the side frame until the pulley is at its normal position. A 10-32 x 1.25" screw in the right casting may be used to hold the pulley in this position with the belt employed as a positioning guide.

2. Insert a straight edge along the belt guide where the print belt makes contact.

3. Using a straight edge, adjust front guide for clearance between pulley and straight edge, .019 - .025 inches (.475 - .625 mm).

4. Tighten the screws holding the Belt Guide in place.

REBOUND BAR ADJUSTMENT

1. Raise the paper shield.

2. Loosen the two screws (one at each end of the rebound bar).

3. Slide the rebound bar forward until the edge of the rebound bar (facing toward the platen) is 0.072 to 0.079 in. (1.78 - 1.98 mm) from the face of the hammers.

4. When correct adjustment has been made, tighten screws firmly. DO NOT OVER-TIGHTEN.

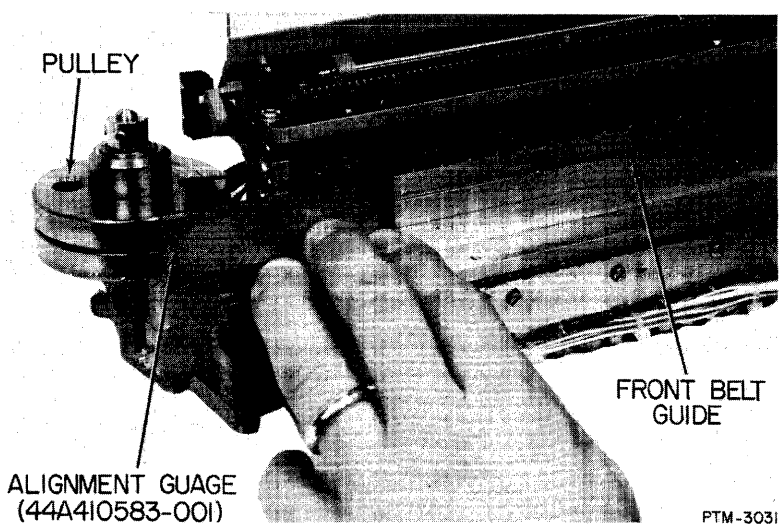


Figure 5-27. Checking Alignment Between the Pulley and Front Belt Guide.

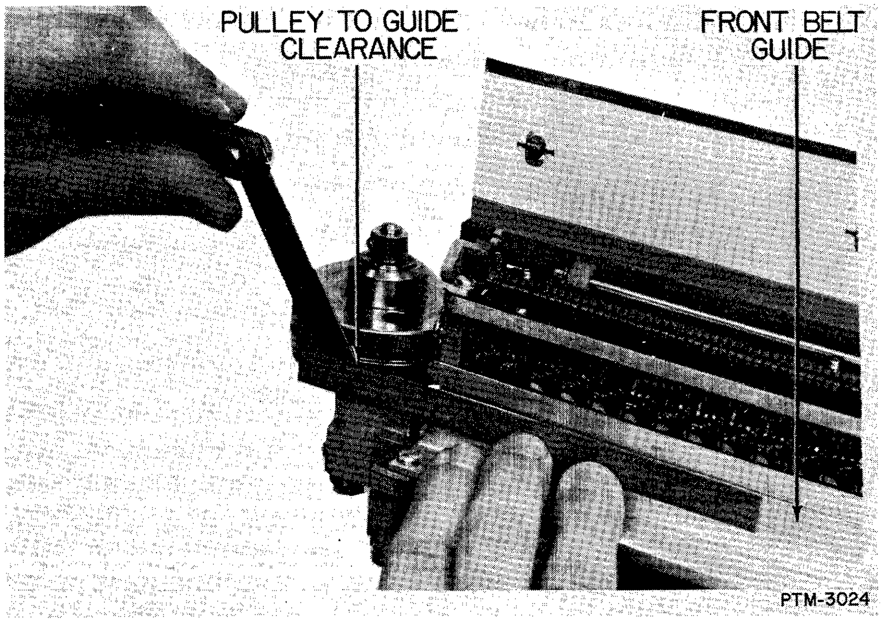


Figure 5-28. Front Belt Guide Adjustment.

5. Measure the distance between each finger and the rebound bar. This distance must be .018 (.450 mm) maximum.

BACKSTOP BAR

The backstop bar is the bar the hammers rest against. The placement is critical and the adjustment is factory set. Do not ever make any field adjustment of the backstop bar.

MOTOR

1. Remove the bustle, top cover and paper roll.
2. Remove the Printer from its case.
3. Follow the TXPC removal instructions; however, the POW cable does not have to be removed.
4. Lay the TXPC board back over the bustle frame.
5. Remove the fan blade and the two screws (see Figure 5-24) holding the motor to the frame.
6. Remove the capacitor cover directly in front of the paper roll.
7. Disconnect the two motor leads to the motor starting capacitor.
8. Remove the small transformer directly above the motor.
9. Remove the drive belt from the motor pulley.
10. By lifting the back of the motor and twisting slightly, the motor may be removed from the frame.

CAUTION

When installing the motor, the two blue wires will go to the same capacitor terminal located nearest the power transformer. Position the blue wires and the red wire on the other capacitor terminal toward the front of the Printer. Make certain that the capacitor wires do not touch the jackshaft.

POWER TRANSFORMER

(See Figure 5-29)

1. Remove the Printer from its case.
2. Follow the TXPC board removal instructions but do not remove the TXPC cable at the Mother Board.
3. Lay the TXPC board back on the bustle frame.
4. Remove the cover and the hold down brackets from the two capacitors directly in front of the paper roll.
5. Remove the motor wires going to the small starting capacitor, and remove the motor starting capacitor.
6. Remove the Hammer Driver Converter (HDC) board.
7. Remove the four screws from the bottom of the frame which holds the transformer (see Figure 5-27). Hold the transformer while removing the screws.

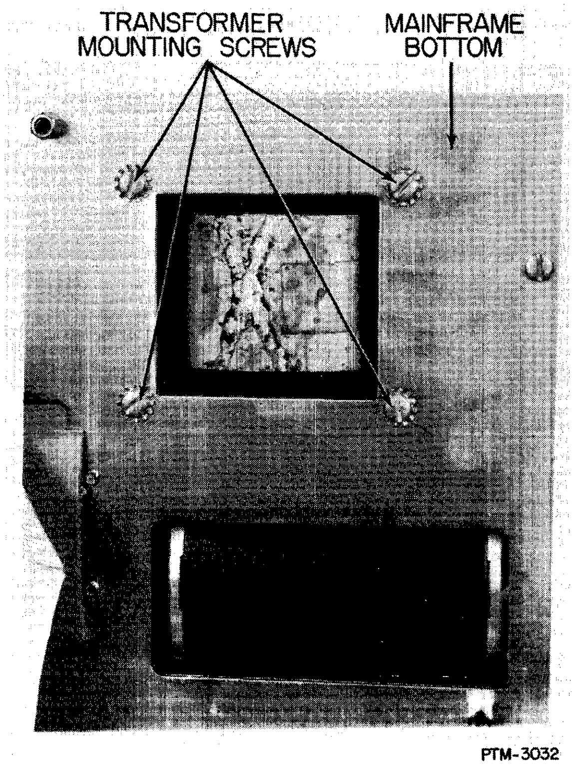


Figure 5-29. Power Transformer Mounting.

8. Move the transformer toward the left side of the frame and remove the transformer from the Printer.

9. To reassemble, reverse steps 1 through 8.

HAMMER DECODER (HDC BOARD)

(Figure 5-30)

1. Remove Printer main frame from casting.

2. Remove two screws securing the hammer bank connector clamp to brackets.

3. Disconnect 100V lead to keyboard.

4. Remove the two top bustle screws.

5. Disconnect cables to photocell PCB and Mother Board.

   a. The Ribbon Cables to the Mother Board are labeled PCA and DEC.

   b. The Photocell PCB cable is coded with a yellow dot on the connector and on the Photocell PCB.

6. Disconnect Hammer Bank connectors from HDC PCB.

7. Remove six 6-32 x 1/4 pan head screws securing HDC board to main frame.

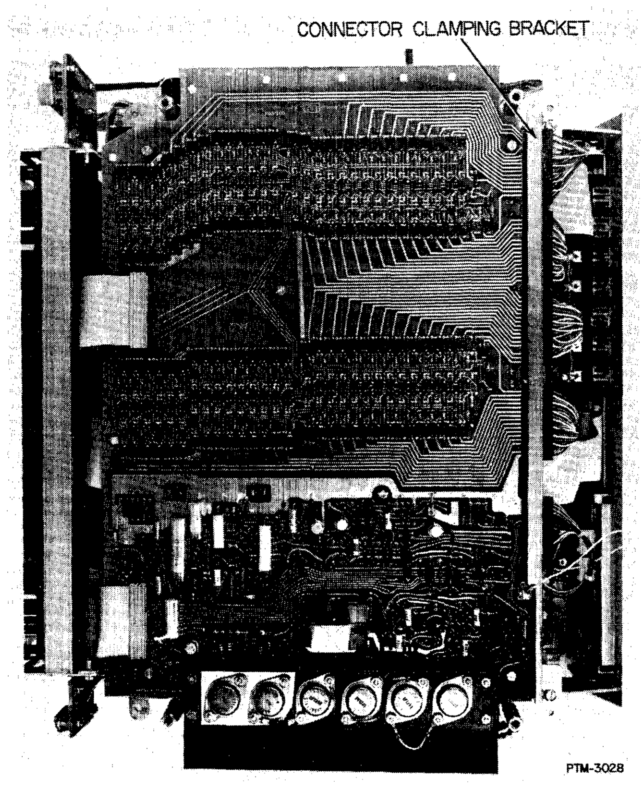


Figure 5-30. HDC Board.

8. Replace HDC by reversing procedure. Observe the yellow dot coding on the Photocell PCB and on the connector. Be sure to use the 6-32 x 1/4 hardware, to secure the board.

NOTE

It is <u>very important</u> that you reinstall the fish paper insulator between the HDC and ribbon cables when you reinstall the HDC board. Replace it in the same position as it was at removal.

CONTROL PANEL

(See Figure 5-31)

1. Remove Printer from casting.

2. Remove HDC PCB.

3. Disconnect two control panel cable plugs (marked DAT and LDI) from the Mother Board.

4. Remove two screws located on each side of the Control Panel.

5. Remove Control Panel from frame.

6. Replace Control Panel by reversing procedure.

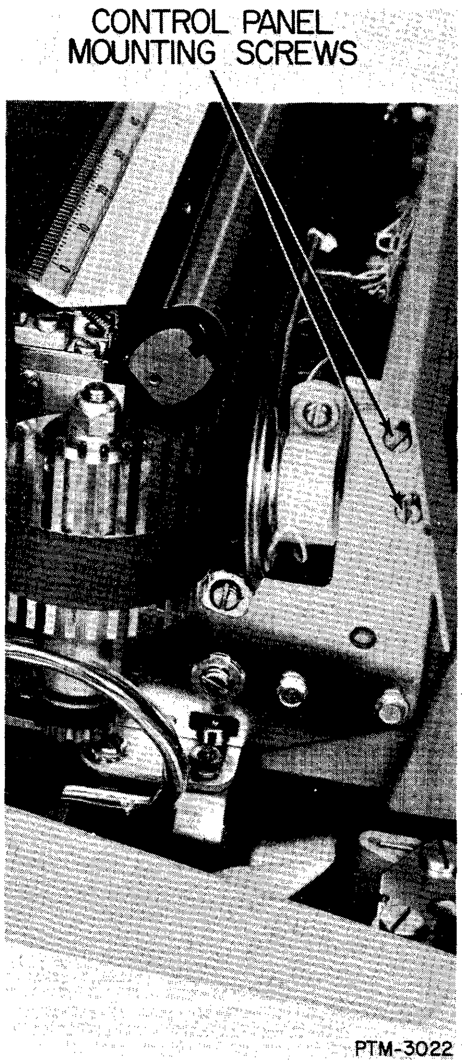


Figure 5-31. Control Panel Mounting.

FLUORESCENT COPY LAMP REPLACEMENT

1. Gently twist the lamp about 30° toward the front of the Printer.

2. Lift the lamp toward the front of the Printer in a slightly upward direction until it is free of its sockets.

3. Remove the light shield and rubber grommets from the defective lamp.

4. Put the grommets on the new lamp and install the lamp.

5. Orient the shield in relation to the lamp so that light will be directed toward the platen, and install the shield.

HAMMER BANK AND PRINT BELT ASSEMBLY

1. Remove the Control Panel mounting hardware and drop the Control Panel forward.

2. Remove the ribbon from the Printer.

3. Remove the keyboard.

4. Remove the connector clamping bracket from under the Printer (see Figure 5-30).

5. Disconnect the connector cable plugs from the Hammer Driver Converter board (HDC), the Photocell board Plug and the fluorescent lamp plug.

6. Remove the left drive belt by pushing down on the belt at the lower front pulley and rotating the print belt.

7. Remove the three screws on each side of the frame holding the Hammer Bank Assembly. Notice that the rear screw on the left side holds the spring for the photocell preamplifier.

8. Grasp the pulley shaft and the lower portion of the casting and lift the assembly up and forward (see Figure 5-32).

9. Reverse steps 1 through 8 to install the assembly. Make certain of the following things:

   - The Spring Clip under the left rear Hammer Bank mounting screw must be in a vertical position after the hardware is tightened in place.

   - The Hammer Bank must seat firmly into the Hammer Bank alignment bar (Figure 5-33).

NOTE

Hammer bank alignment bar is factory adjusted. DO NOT MOVE.

   - After installing the Hammer Bank, check distance between platen and hammer faces. Distance should be 0.180 to 0.190 inches (4.5 to 4.75 mm). If distance is out of tolerance, loosen the screws holding the hammer bank and make sure hammer bank alignment bar is firmly seated in the mating parts of the frame. Check distance again.

10. Reinstall the Left Drive Belt.

CLEVIS AND PLUNGER

(See Figures 5-34 and 5-35)

REMOVAL

1. Raise cover and remove the platen.

2. Remove the paper pan and front pressure rollers.

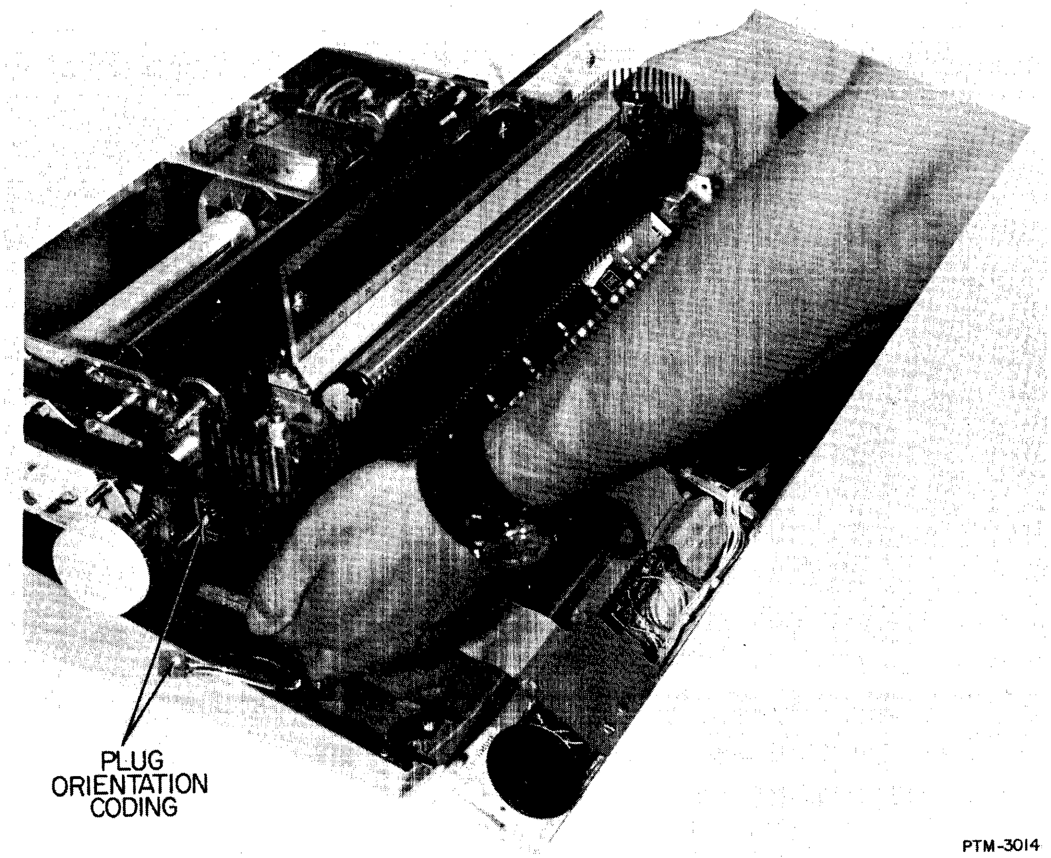


Figure 5-32. Hammer Bank Removal.

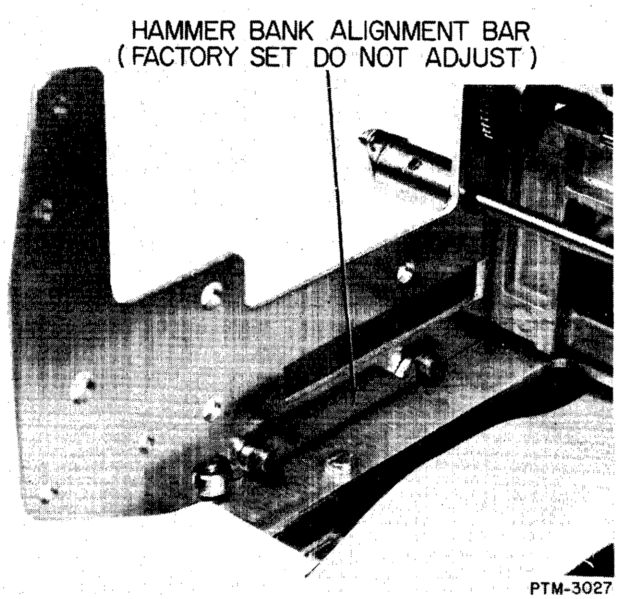


Figure 5-33. Hammer Bank Alignment Bar.

3. Loosen rear belt guide and remove the print belt.

4. Remove both front and rear belt guides.

5. Remove the rebound bar assembly.

6. Select the clevis to be removed and move the attached hammer forward until the clevis disconnects.

7. Twist the clevis 45° to 90° (in either direction) and pull the clevis and plunger assembly out of the hammer bank. Remove clevis assembly toward rear of Printer.

CAUTION

Be careful not to damage the adjacent clevis assemblies when removing the damaged clevis and plunger.

INSTALLATION

1. Insert the plunger into the appropriate coil position from the rear side of the hammer bank.

2. Rotate the clevis until the pin drops through the metal tab on the hammer bank.

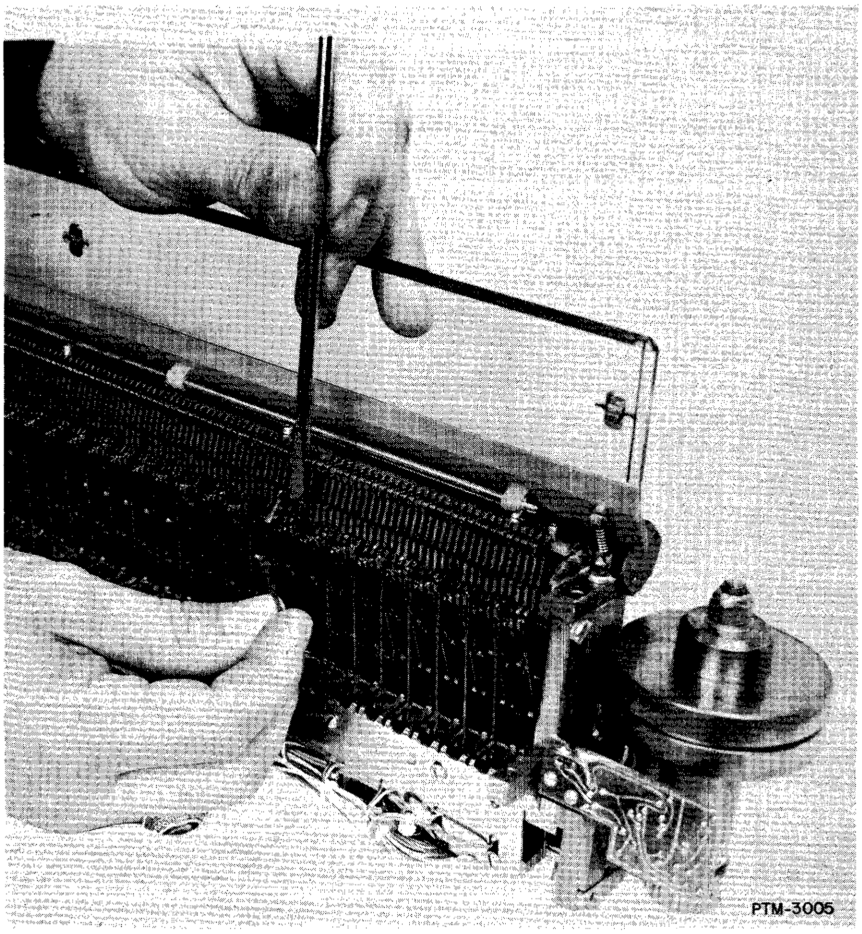


Figure 5-34. Clevis Disconnect.

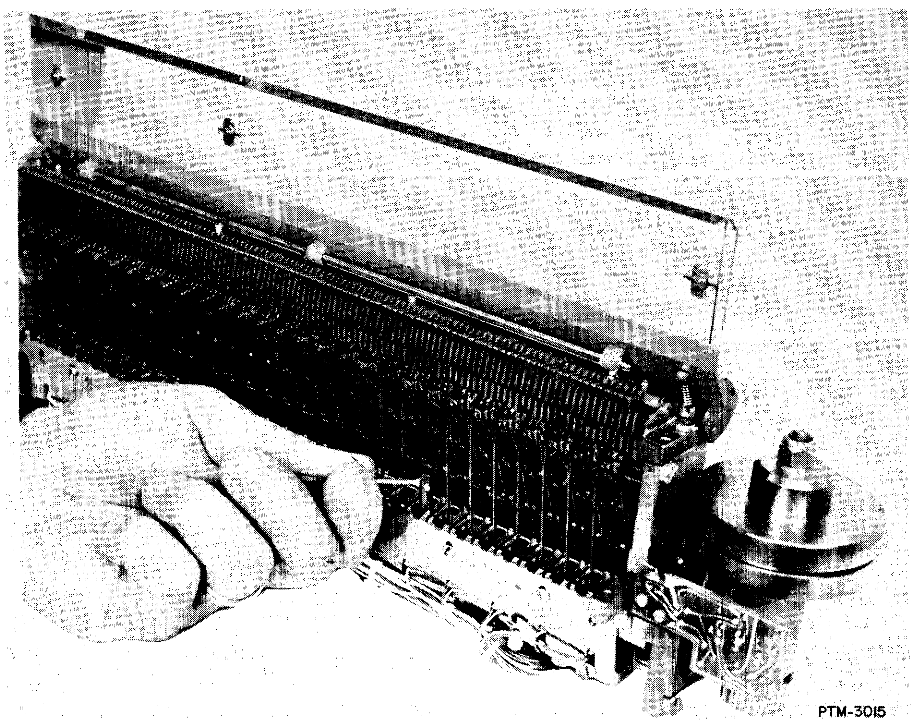


Figure 5-35. Clevis and Plunger Removal.

3. Rotate clevis assembly 45° to 90°.

4. Push the appropriate hammer forward and hook the clevis onto the hammer.

5. Install and adjust front belt guide.

6. Install print belt.

7. Install and adjust rear belt guide.

8. Install and adjust rebound bar.

9. Install rollers, paper pan, and platen.

10. Check hammer throw adjustment.

PHOTOCELL ADJUSTMENT

PRELIMINARY SETTING (Figure 5-36)

The photocell is initially adjusted via the following procedure:

1. Loosen the vertical mounting screw.

2. Turn the horizontal adjusting screw approximately 2 1/2 turns until the required clearance, .050 in. (1.3 mm), is obtained between the photocell block and the left end of the Hammer Bank.

3. After this clearance is established, proceed with the final adjustment procedure.

FINAL SETTING

The final photocell timing is accomplished by using a timing gauge (44A410619-G01) as illustrated in Figure 5-37. The procedure is as follows:

1. Print out at least 23 random characters on the paper.

2. Turn off the Printer and place the timing gauge over the hammers on the left end of the hammer bank. Position the slots on the underside of the gauge over the hammers. (The top part of the gauge should be against the printed characters on the paper.)

3. Check the centering of these characters appearing between the hairlines on the gauge. If these characters

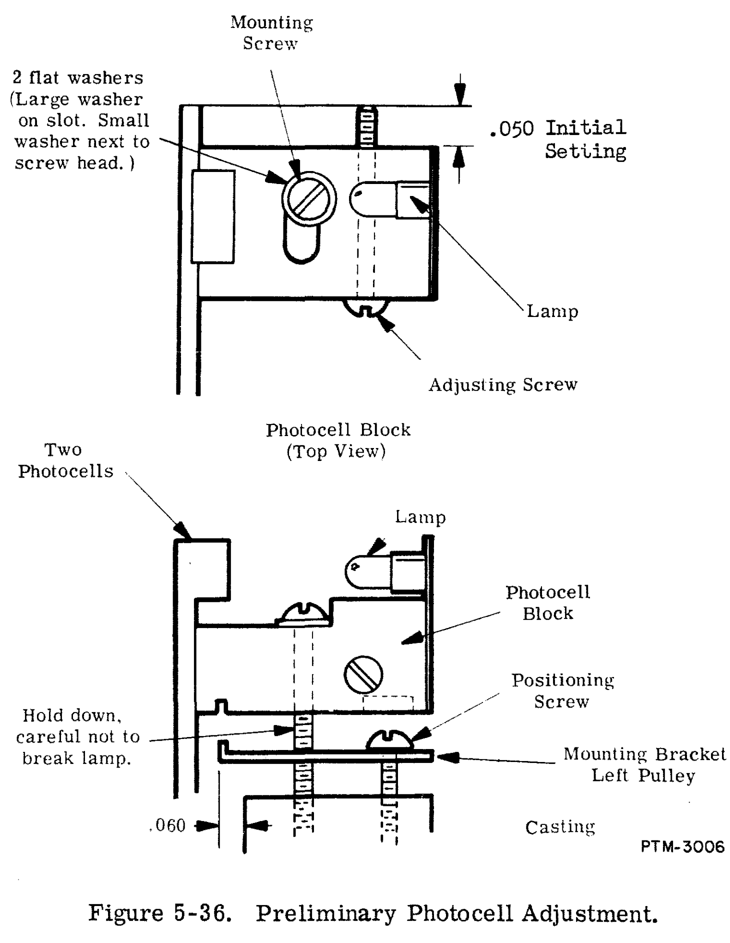


Figure 5-36. Preliminary Photocell Adjustment.

are consistently to the right or the left of the distance between the hairlines, the timing should be adjusted as follows:

a. Loosen the vertical mounting screw on the photocell block and turn the horizontal photocell adjusting screw as required.

b. If the characters between the hairlines are <u>too far to the left,</u> turn the screw <u>counterclockwise.</u>

c. If the characters between the hairlines are <u>too far to the right,</u> turn the screw <u>clockwise.</u>

d. Tighten the vertical mounting screw on the photocell block.

e. Turn on the Printer and repeat Steps 1 through 3.

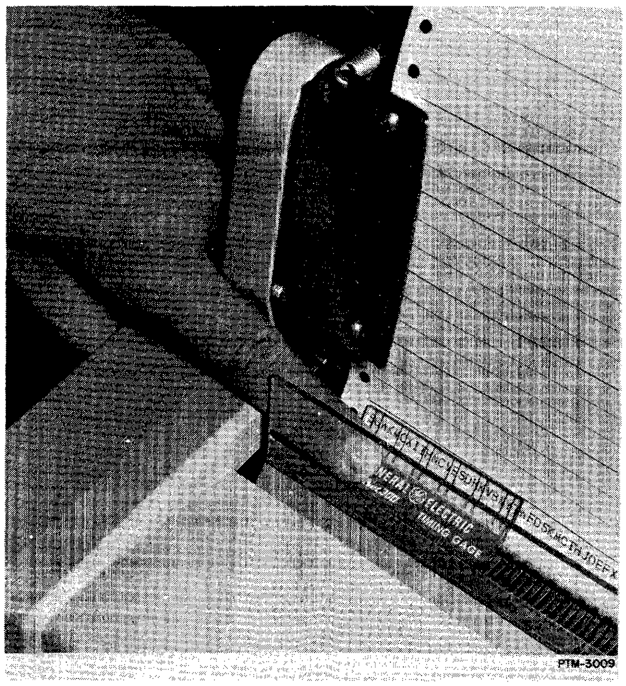


Figure 5-37. Final Photocell Adjustment.

ELECTRICAL ADJUSTMENTS

The TermiNet 300 Printer requires very few electrical adjustments. While various printed boards do contain coils and potentiometers, most of these variable components have been set in the factory and <u>must not</u> be readjusted in the field. Those controls which are considered field adjustable are detailed below:

<u>PROC BOARD</u>

1P - (Speed Protection). To adjust, set scope at .5 msec/cm., sync positively with probe on TP2 (PCA). The observed signal width should be approximately 2.7 msec. By applying a drag on the print belt, the signal will expand. The Printer should cut off when the signal width is at 3.0 msec. The pulse width can be increased by adjusting the control counterclockwise.

2P - (Voltage Protection). To adjust, the Printer must be typing at rate 30 (from tape) and be powered from a variable AC line source. An accurate voltmeter must be used. Starting at 117 volts, slowly decrease voltage. Printer should go to STANDBY at 100 ± 1 volts. The trip point voltage can be lowered by adjusting the control counterclockwise.

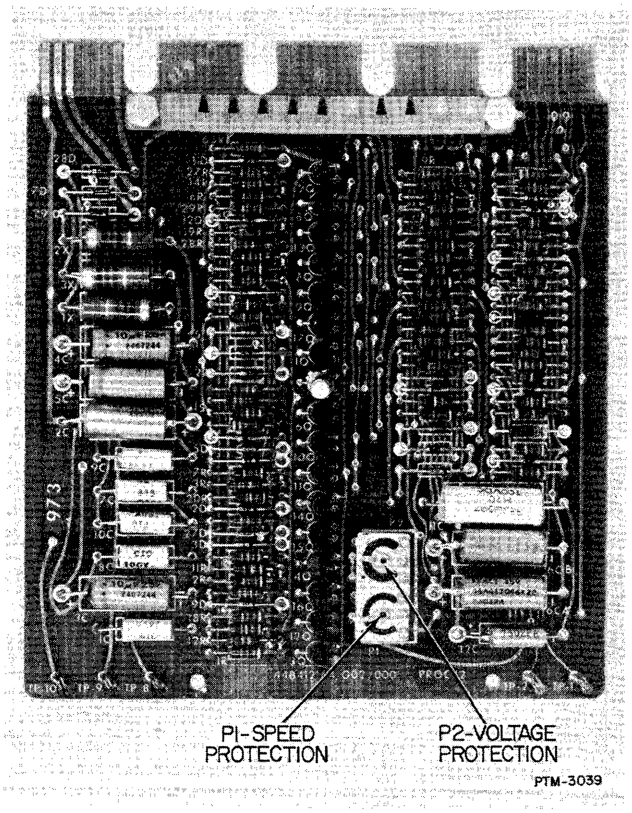


Figure 5-38. PROC Board Adjustments.

<u>T&A BOARD</u>

1P - This control sets the loudness of the alarm beep. Adjust the control unitl an alarm beep can be heard above any normal room background noise.

2P - This control sets the loudness of the keyboard beep. Adjust the control until a keyboard beep can be heard above any normal room background noise.

OPTIONS

The following discussions do not cover all options available for the TermiNet 300 Printer. Only those

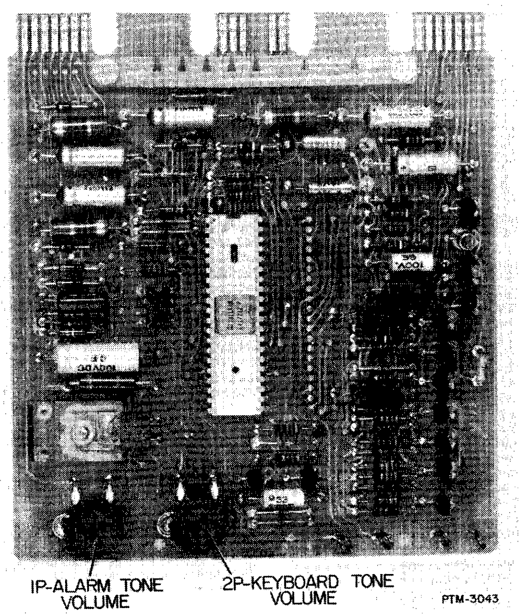


Figure 5-39. T&AC Board Adjustments.

options which require a special setting or critical adjustment are included in this subsection.

ANTI-SNAG DEVICE ADJUSTMENT (Figure 5-40)

Printers which have the Forms Tractor paper advance option are equipped with an Anti-Snag assembly. Tc set this assembly for proper operation follow these steps.

1. Loosen the Allen screw in the bar adjustment slot.

2. Adjust the Paper Guide bar tension until the Paper Guide has a light contact fit with the Platen, over the entire use range of the Platen.

3. Seat the Allen screw but do not overtighten.

Once this adjustment is made the assembly can be detached from the Printer without disturbing the tension setting.

EXTERNAL PAPER HANDLING SYSTEM

WIDE ROLL PAPER HANDLER (See Figure 5-41)

The clearance between the collar on the left side of the Printer and the inside of the bracket should be 0.93 inches (23.25 mm).

MOUNTING BRACKETS AND BUMPERS (See Figure 5-42)

1. The cross bars should be approximately 1.06" (26.5 mm) above top of the bustle cover. If necessary, adjust mounting brackets.

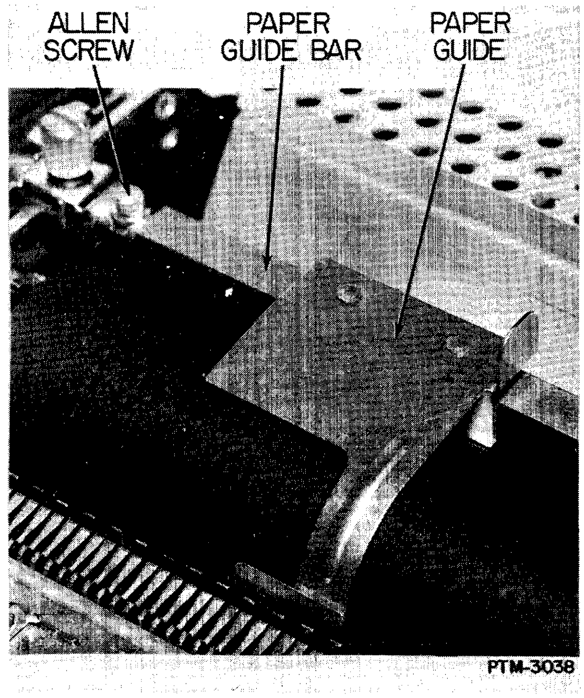


Figure 5-40. Anti-Snag Assembly.

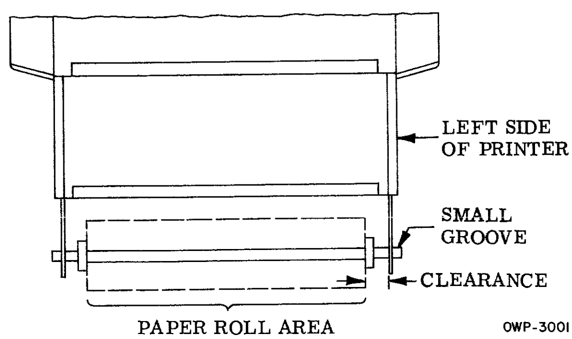


Figure 5-41. Wide Roll Paper Handler.

2. The bumpers should be set so that the front edge of paper rack clears the platen by 1/16" (1.55 mm).

TWO COLOR RIBBON OPTION

For Printers which have a red/black ribbon, several adjustment settings are different from a standard Printer.

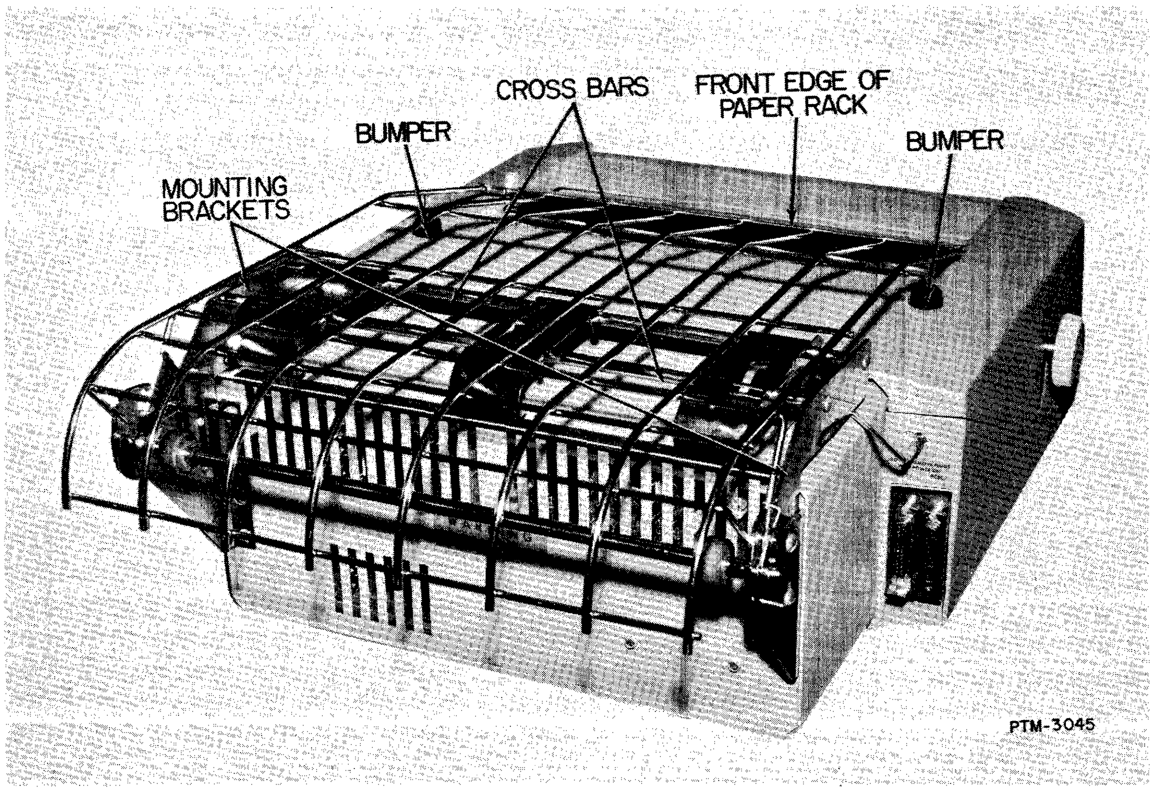


Figure 5-42. External Paper Handling System.

RIBBON LIFT SOLENOID ADJUSTMENT

Follow the procedure outlined on page 5-12 except gauge the setting to the following spec. The gap should be set at .128 to .137 inches (3.20 to 3.43 mm).

RIBBON HEIGHT ADJUSTMENT

Follow the procedure outlined on page 5-13 except gauge the setting to the following spec. Adjust the ribbon height so that the top edge of the ribbon is .039 ± .010" (.975 ± .250 mm) above the top of the print fingers when the solenoid is in its de-energized position.

NOTE

> While adjusting the height of red/black option, make certain that the ribbon is resting at the highest position in the ribbon guides.

VERTICAL TAB AND FORM FEED (VTFF)

1. Punch a programmable disk with two consecutive VT and FF holes (see Figure 5-43) and install disk on disk wheel.

2. Line-feed Printer until the lamp filament is between the two consecutive FF and VT holes. The range between holes being "A" of Figure 5-43.

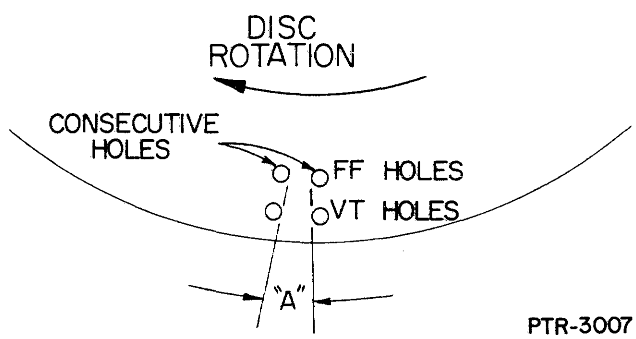


Figure 5-43. VTFF Adjustment Range "A" on Disk.

3. Connect negative lead of voltmeter to test point 8 on the VTFF printed circuit board; and connect positive lead to frame of Printer.

4. Scribe or pencil a mark at the end of the radial arm (see Figure 5-44).

5. Loosen radial arm screw.

6. Position ruler as shown in Figure 5-44.

7. Move the radial arm in one direction until the voltmeter reads -20V DC. Note the ruler reading as indicated by the mark on the radial arm.

8. Move the radial arm in the opposite direction until the voltmeter reads 0V and drops to -20V DC

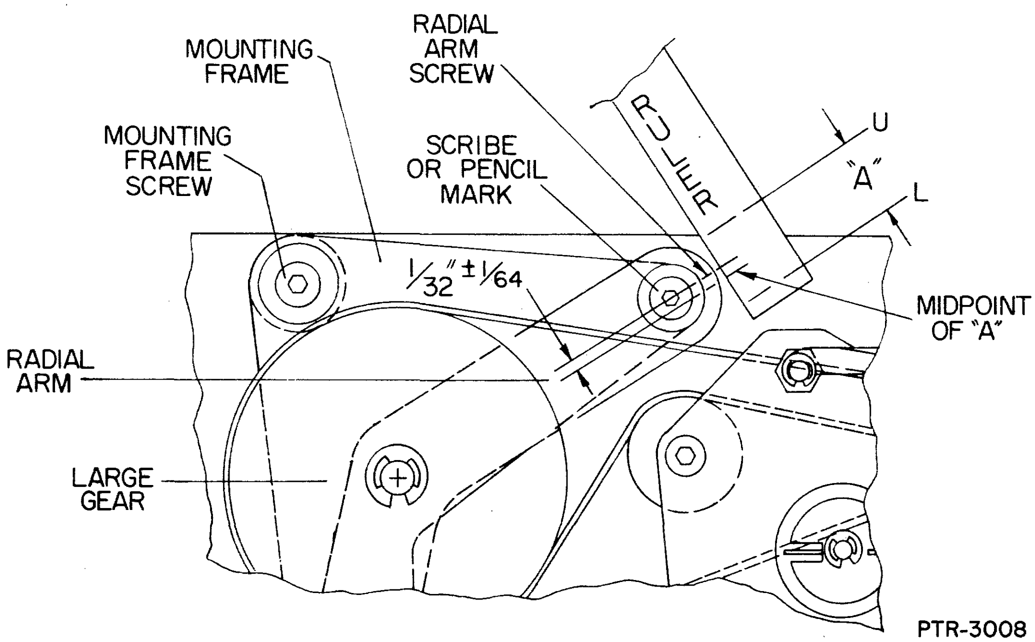


Figure 5-44. VTFF Adjustment Mechanics.

and again note the ruler reading. These readings establish the range of "A" as shown in Figures 5-43 and 5-44. If "A" cannot be established go to step 10.

9. Position radial arm above mid-point of "A" by 1/32" ± 1/64 (.78 mm ± .4 mm) and tighten radial arm screw.

10. If the range of "A" cannot be established, the larger gear must be slipped a tooth as follows:

- If the voltage at test point does not drop to -20V DC when approaching U (Upper) end of "A" slip gear in the clockwise direction.
- If voltage does not drop to -20V DC when approaching the L (Lower) end of "A", slip gear counterclockwise.
- To slip belt, mark position of mounting frame and loosen mounting frame screw. Move mounting frame in a clockwise direction to provide enough slack in belt to slip gear. Return mounting frame to original marked position and tighten screw.
- Check belt tension by applying two (2) ounces (56g) of pressure at mid-point of the longest span (top) of the belt. Belt should deflect .100" ± .031 (2.5 mm ± .78 mm). To adjust belt tension, loosen mounting frame screw and move mounting frame.
- Repeat steps 5 through 8 and perform step 9 if "A" is established.

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GENERAL ELECTRIC