LA180 DECprinter I
User's Manual

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LA180 DECprinter I

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PREFACE

The LA180 is a simple, dependable addition to your company's processing system. It was designed to maintain optimum performance for many years while keeping maintenance at a minimum. Built-in safeguards, such as an automatic protection system in the event of a head jam, protect the machine even when an operator is not present.

This user's manual is a guide to the simple procedures required to operate your LA180. However, to ensure crisp copies and maximum equipment life, the user *must* adhere to the following:

- Perform the impression adjustment (when required) as described in this manual.

- Replace the ribbon (when required) only with DIGITAL-recommended ribbons. Ribbons must be made of nylon fabric with nonabrasive inks. Carbon-based inks are extremely abrasive and should not be used.

PAPER
ADVANCE
KNOB

RIBBON SPOOLS

OPERATOR CONTROLS
- SELF TEST
- SET VFU
- LENGTH OF FORM

CARRIAGE
ADJUSTMENT
LEVER

OPERATOR CONTROLS
- HEAD OF FORM
- ON LINE/OFF LINE
- POWER

TRACTOR

TRACTOR
ADJUST
KNOB

7595-3
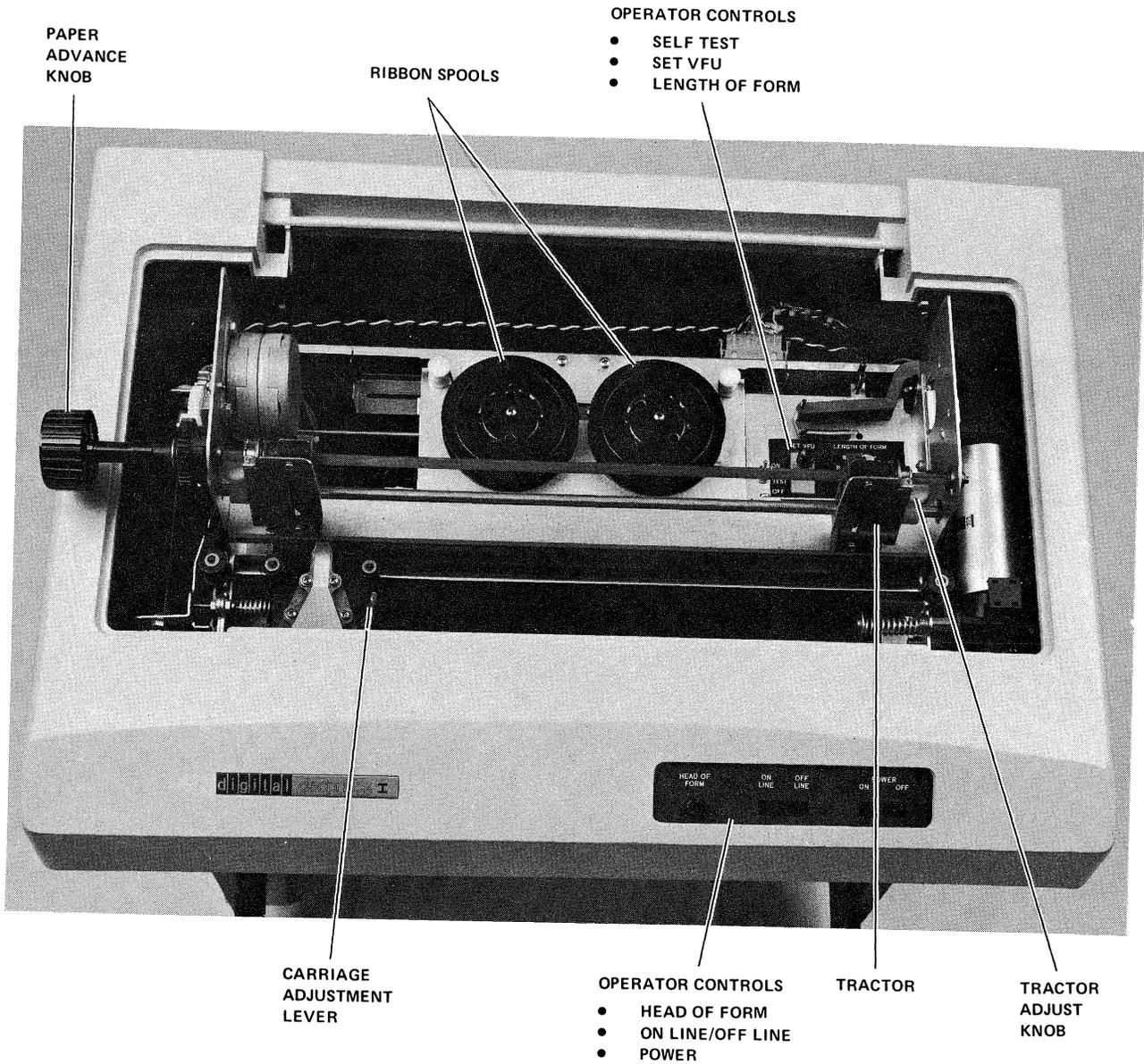
SECTION 1
OPERATOR'S GUIDE

LA180 ALARM SIGNALS

The LA180 produces three different audible alarm signals. The operator should become familiar with these alarms in order to determine the correct response.

- *Continuous Tone* — Indicates a carriage jam or failure. To turn the alarm off, set the POWER switch to OFF. Turning the POWER switch OFF, then ON, resets the alarm.

- *Repetitive Beeping* — Indicates an out of paper condition or a series of bell codes. To turn the alarm off, set the ON LINE/OFF LINE switch to OFF LINE.

- *Single Beep* — Indicates a bell code.

LA180 OPERATOR CONTROLS
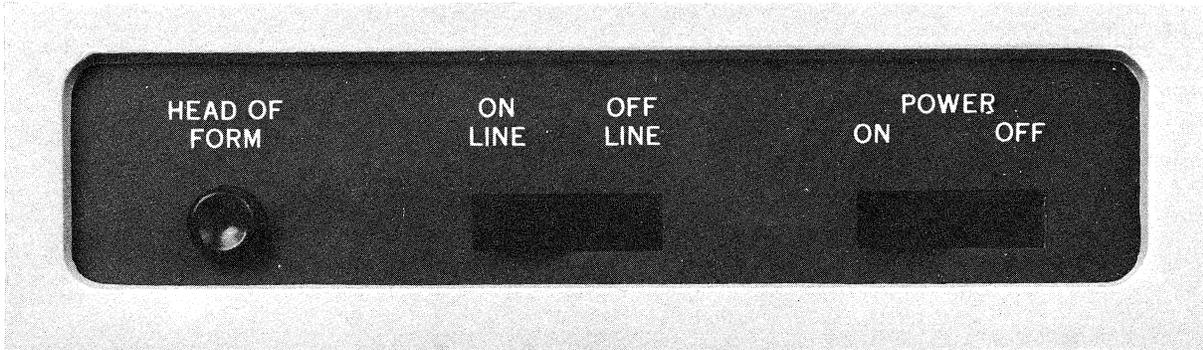
7595-9

HEAD OF FORM Pushbutton
The HEAD OF FORM pushbutton, when pressed, causes the line printer paper to advance to the top of the form, as determined by the SET VFU and LENGTH OF FORM switches. The HEAD OF FORM pushbutton is only active off-line.

ON LINE/OFF LINE Switch
The ON LINE/OFF LINE switch enables the operator to place the LA180 off-line or on-line with an operating system. When off-line, the HEAD OF FORM switch is activated.

POWER ON/OFF Switch
The POWER switch controls power application to the LA180.

1

7595-10

SELF TEST Switch

In the on-line mode, setting the SELF TEST switch to ON causes the LA180 to print out all the ASCII characters.

NOTE
When performing a self-test, 14-7/8-inch (132-column) paper must be used.

SET VFU Pushbutton
The LENGTH OF FORM switch enables the LA180 to determine the length of the forms; however, the LA180 does not know where the form begins. Pressing SET VFU establishes the starting point on the form.

LENGTH OF FORM Switch
The LENGTH OF FORM switch is set to the number corresponding to the form length in inches. To set the form length to 11 inches, set the switch to 11. (The new switch setting is delayed until one form passes through the LA180 at the old switch setting. Pressing SET VFU eliminates the 1-form delay.)

2

Paper Advance Knob

The Paper Advance knob, when turned, advances the paper one step at a time. Pressing in and turning the Paper Advance knob enables the paper to be rolled freely in either direction, and allows precise vertical forms positioning.

PUSH IN HERE AND TURN TO ADJUST PAPER VERTICALLY

PAPER ADVANCE KNOB
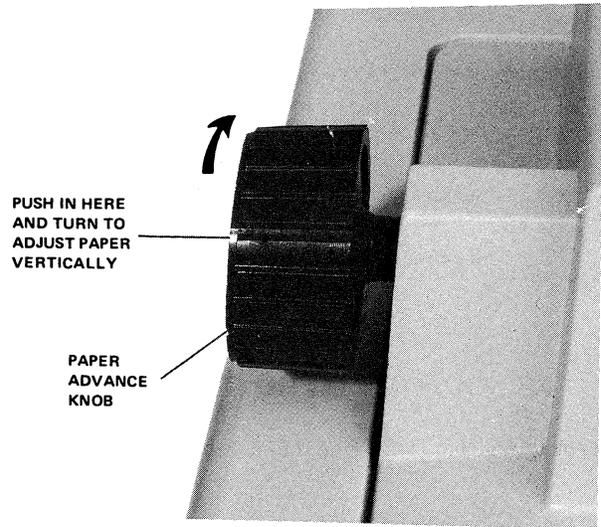
7595-4

Tractor Adjust Knobs

The Tractor Adjust knobs allow fine horizontal adjustment of forms.

TRACTOR ADJUST KNOB
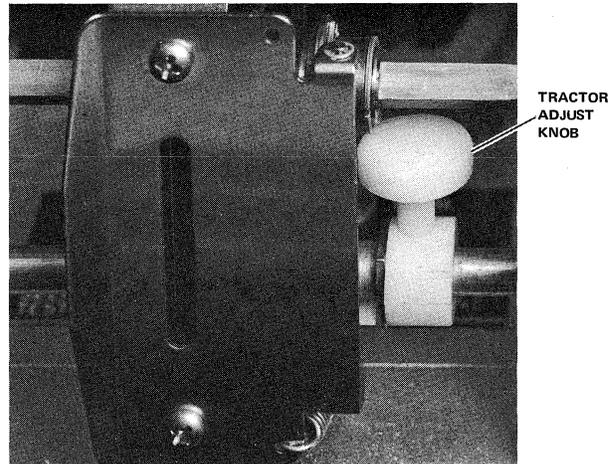
7595-7

Carriage Adjustment Lever

The Carriage Adjustment lever controls the print head gap for single or multipart forms.

NOTE

Refer to the Impression Adjustment procedure in Section 2 when setting the Carriage Adjustment lever.

CARRIAGE ADJUSTMENT LEVER

7595-11

3
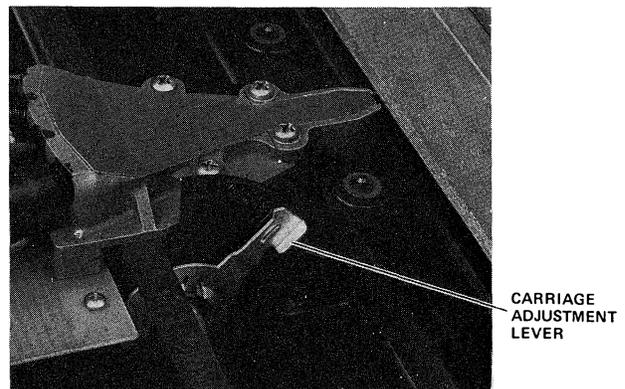
SELF-TESTING THE LA180

The following self-test procedure provides a simple and accurate method of testing the LA180.

1. Install 14-7/8-inch (132-column) paper.

2. Set the ON LINE/OFF LINE switch to OFF LINE.

3. Set the POWER switch to ON.

4. Set the SELF TEST switch to ON.

5. Set the ON LINE/OFF LINE switch to ON LINE. A sample self-test printout is shown in Figure 1.

TERMINATING THE SELF-TEST PROCEDURE

NOTE
The following steps must be performed in the order indicated or the LA180 may be inhibited from receiving data.

1. Set the ON LINE/OFF LINE switch to OFF LINE.

2. Set the SELF TEST switch to OFF.

3. Set the ON LINE/OFF LINE switch to ON LINE to resume normal operation.

SETTING THE TOP OF FORM

1. Set the POWER switch to ON.

2. Set the ON LINE/OFF LINE switch to OFF LINE.

3. Set the LENGTH OF FORM switch to the number corresponding to the form length in inches.
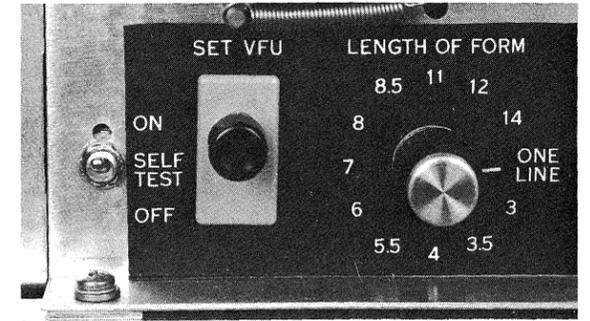
7595-10

1. Turn the Paper Advance knob until the bottom of the first line to be typed is aligned with the top of the Top of Form Bar.

2. Press the SET VFU pushbutton.

3. Press the HEAD OF FORM pushbutton several times to ensure that the forms advance to the correct position.

NOTE
If the LA180 is turned off and on, the top of form starting point must be reestablished using the SET VFU pushbutton.
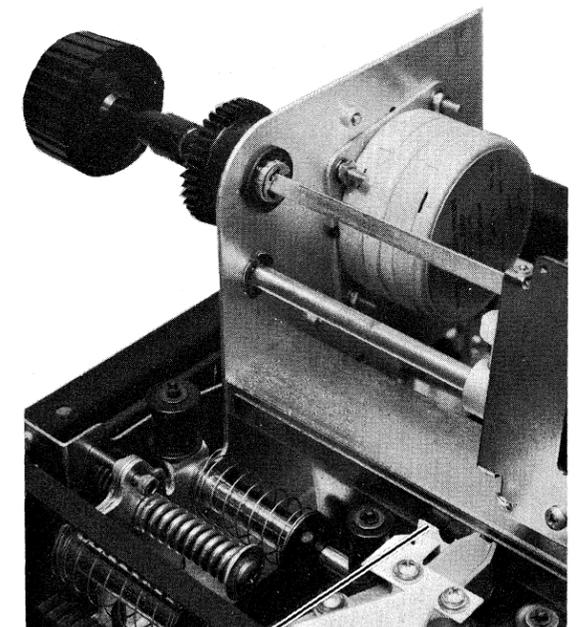
7937-37

TOP OF FORM
BAR

USING THE LA180

Using the LA180 requires almost no operator intervention. These few steps are all that may be required to place your LA180 on-line.

1.   Load the paper.

2.   Set the ON LINE/OFF LINE switch to OFF LINE.

3.   Set the SELF TEST switch to OFF.

4.   Set the POWER switch to ON.

5.   Set for top of form, if applicable.

6.   Set the ON LINE/OFF LINE switch to ON LINE.

The LA180 is now on-line and fully operational.

OPTIONS

The basic LA180 DECprinter I can be expanded to provide the user with a number of functional options for receiving and handling data. The functional options are described in the following table.

LA180 Options

Option	Name	Description
LAXX-KJ	Compressed Font Option	The compressed font option is a mechanical option. It provides the LA180 with the ability to print 132 columns on a 9-in. form with one strippable edge, or on a 9-1/2 in. form with two strippable edges.
LAXX-LD	Paper Basket Assembly	Located on the back of the LA180, the paper basket will hold up to half a box of 14-7/8-in. wide paper.
LAXX-NW	Serial Interface	Standard LA180 serial interface with 256 character buffer, EIA RS-232C signaling.
LAXX-MW		Kit of five LAXX-NWs.
LAXX-NX	Serial Interface	Standard LA180 serial interface with 20 mA current loop signaling.
LAXX-MX		Kit of five LAXX-NXs.
LAXX-NY	Serial Interface	Standard LA180 serial interface with EBCDIC to ASCII converter.
LAXX-MY		Kit of five LAXX-NYs.

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SECTION 2
LOADING PAPER AND RIBBON CHANGING

</div>

LOADING PAPER

The LA180 is a highly flexible printer which can accept multipart forms, with widths from 3 to 14-7/8 inches. When loading *new forms,* it is necessary to perform two adjustments:

1. Paper Positioning

2. Impression Adjustment

In addition, there is a horizontal positioning and vertical positioning adjustment. The horizontal positioning adjustment allows the paper to be slightly shifted left or right. This procedure is especially useful when typing on preprinted forms with defined horizontal zones. The vertical positioning adjustment enables the paper to be adjusted vertically. Once these adjustments have been performed, *reloading paper* becomes quick and simple, requiring a minimum of interruption.

LOADING NEW FORMS

PAPER POSITIONING PROCEDURE
1. Set the POWER switch to OFF.

2. Lift the cover.

3. Place the tractor-feed paper on the floor between the legs of the LA180. (The term tractor-feed refers to the holes on either side of the paper.)

<div align="center">

NOTE
</div>

Ensure that the leading edge of the forms is directly below and parallel to the feed slot.

7666-14

<div align="center">

9
</div>
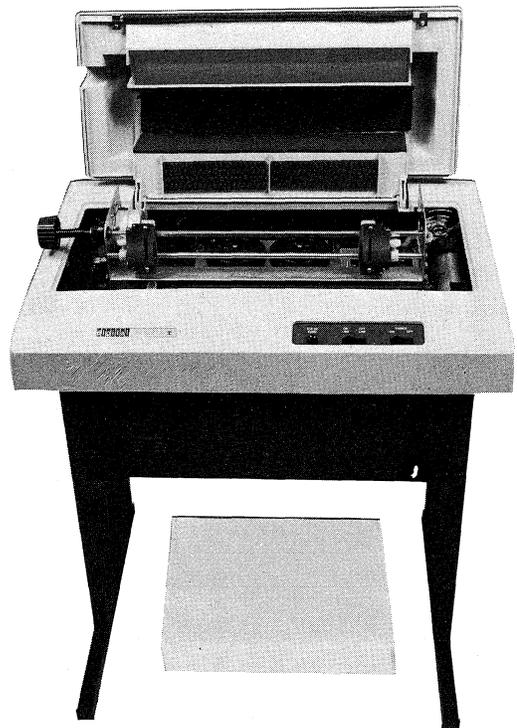
Open the left tractor cover so that the tractor pins are exposed.
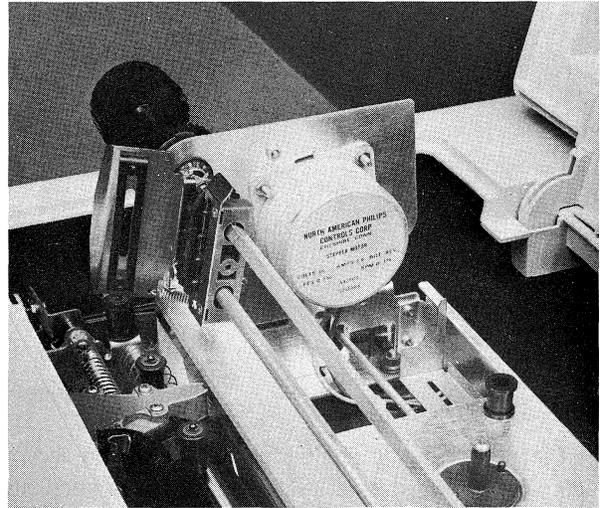
7666-32

Move the Carriage Adjustment lever to the highest number (toward operator).
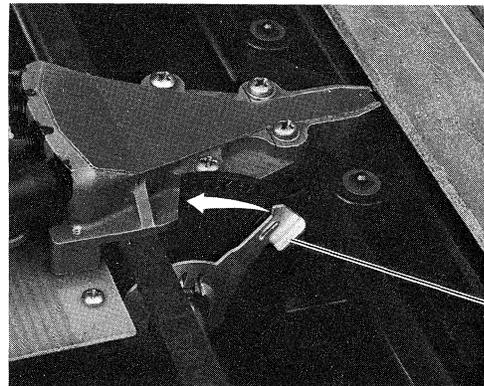
CARRIAGE
ADJUSTMENT
LEVER

7595-11

10

1. Feed the paper through the load channel under the terminal and align the left paper margin holes over the left tractor pins.

2. Close the left tractor cover.

7666 27
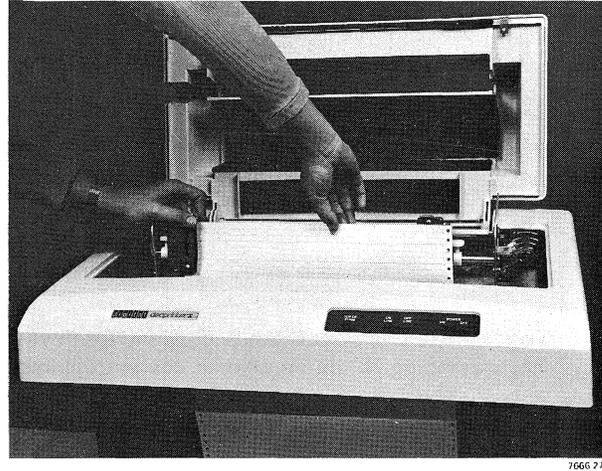
1. Loosen the Tractor Adjustment knob on the right tractor about 1/2 turn.

2. Open the right tractor cover and slide the tractor to a position where the holes on the right paper margin align directly over the tractor pins.

3. Close the tractor cover.

NOTE
Ensure that the paper does not pull against the tractor pins or bow in the middle.

4. Tighten the tractor adjustment.

5. Set the LENGTH OF FORM switch to the number corresponding to the form length and proceed to the impression adjustment.

7666-44
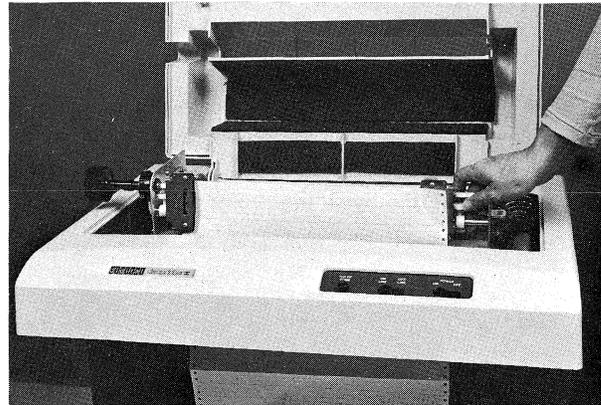
IMPRESSION ADJUSTMENT

NOTE
The Carriage Adjustment lever is normally set forward (to notch number 1) for single thickness paper. The following procedure is applicable only to multipart forms.

1. Set the POWER switch to OFF.

2. Set the Carriage Adjustment lever to the number corresponding to the number of parts in the form.

3. Turn the Paper Advance knob counterclockwise while moving the Carriage Adjustment lever forward one notch at a time until the paper smudges; then move the lever back one notch at a time until the paper no longer smudges.

4. Set the POWER switch to ON and resume operation.

NOTE
If the impression is unsatisfactory due to a worn ribbon, perform the ribbon installation procedure. A worn ribbon is indicated when the first copy in a multipart copy is poor but the remaining copies are good.
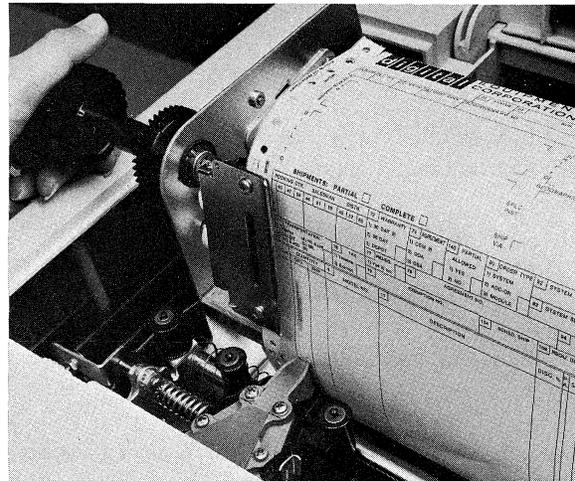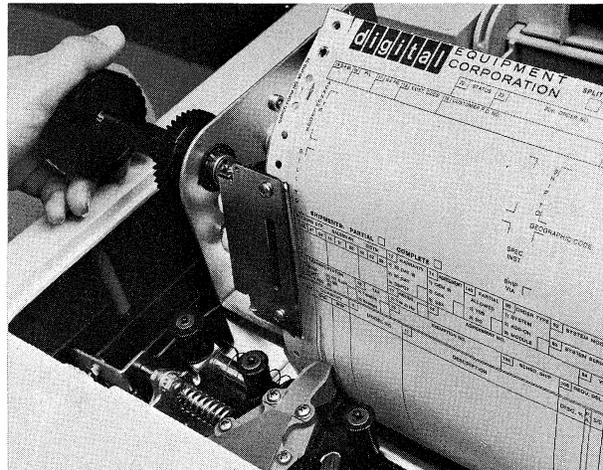
7666-26

7666-25

HORIZONTAL POSITIONING ADJUSTMENT

The horizontal positioning adjustment enables the paper to be shifted left or right (1/2 in. max.). Shifting the paper provides a simple means of aligning the type within the appropriate columns on the paper.

1. Set the POWER switch to OFF.

2. Lift the cover and loosen both Tractor Adjustment knobs about 1/2 turn.

3. Move the tractors the desired amount (1/2 in. max.) to have characters type in the appropriate columns.

4. Tighten the Tractor Adjustment knobs.

NOTE
Ensure that the paper does not pull against the tractor pins or bow in the middle.
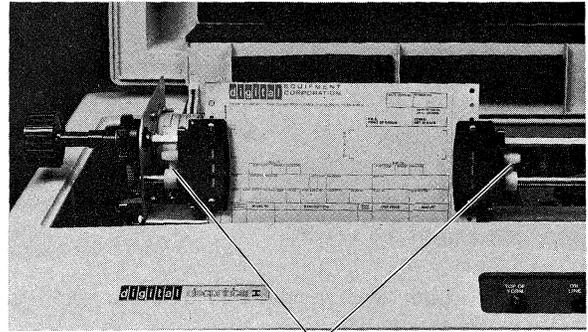
TRACTOR ADJUST KNOBS

7666-48

FINE VERTICAL POSITIONING

For fine vertical positioning, press in and turn the Paper Advance knob.

NOTE
When rolling paper backwards, ensure that paper perforations do not snag on the print head.

PUSH IN HERE
AND TURN TO
ADJUST PAPER
VERTICALLY
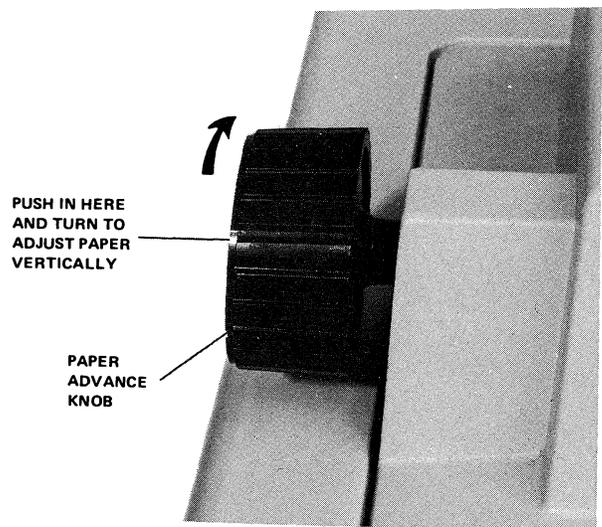
PAPER
ADVANCE
KNOB

7595-4

RELOADING PAPER

1. Set the POWER switch to OFF.

2. Lift the cover.

3. Place the tractor-feed paper on the floor between the legs of the LA180.

4. Open both tractor covers so that the tractor pins are exposed.

NOTE
Ensure that the leading edge of the forms is directly below and parallel to the feed slot.

5. Feed the paper through the load channel under the terminal and align the paper holes over the tractor pins.

6. Close the tractor covers.
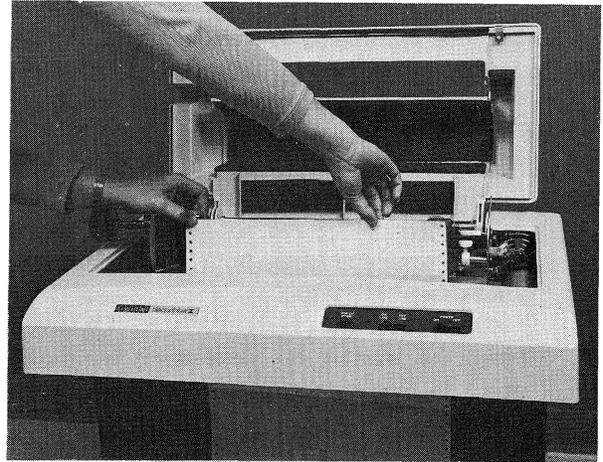
7666-31

RIBBON INSTALLATION

The printer ribbon should last for 8 to 12 hours of actual printing at 180 characters/second (about 4 million characters). After 8 hours, or when the print density becomes too light, remove both ribbon spools from their drive spindles and turn the whole assembly over so that the previous lower edge of the ribbon is now on top. After rethreading the ribbon, another 4 hours (approx.) of printing time is possible before the ink is completely used. At that time, the ribbon must be replaced by removing both spools and unthreading the ribbon. Replace with a new spool and ribbon assembly (36-12153) and an empty spool. (One of the old spools may be used if desired.)

NOTE

Use only DIGITAL-recommended ribbons (Part No. 36-12153). Use of other ribbons can cause damage and void machine warranty. Ribbons must be made of nylon fabric with nonabrasive inks. Carbon-based inks are extremely abrasive and should not be used.

1. Set the POWER switch to OFF and lift the cover.

2. Record the setting of the Carriage Adjustment lever. Move the Carriage Adjustment lever to the highest number.

3. Remove the ribbon spools and ribbon. Save one spool to be used with the new ribbon.
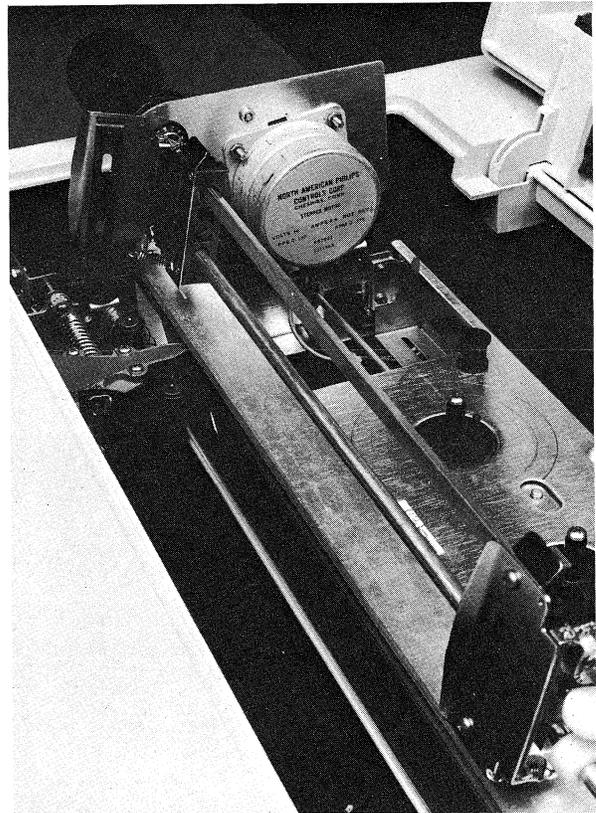
7666-32a

Connect the hook on the end of the ribbon to the empty spool.
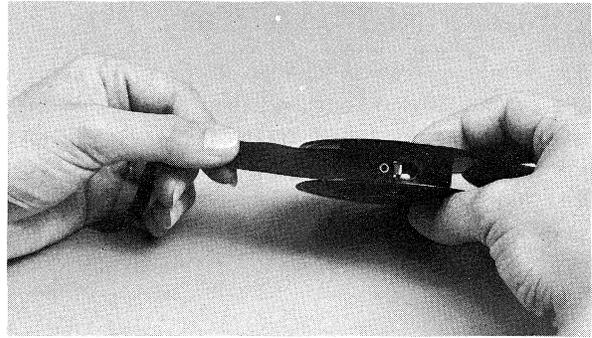
7666-17

Wind 10 turns of ribbon on the empty spool.

RIVET
7666-21

7622-22

CARRIAGE LEVER ADJUSTMENT — RIVET
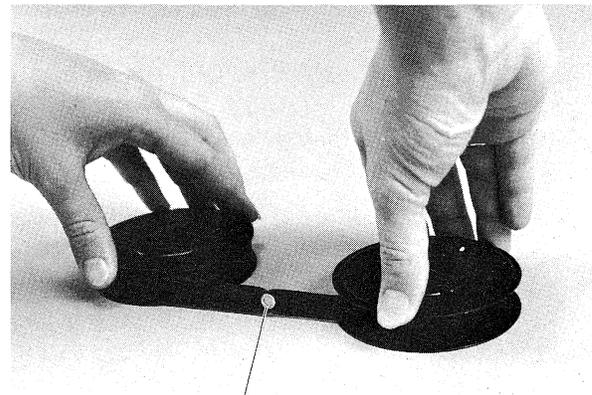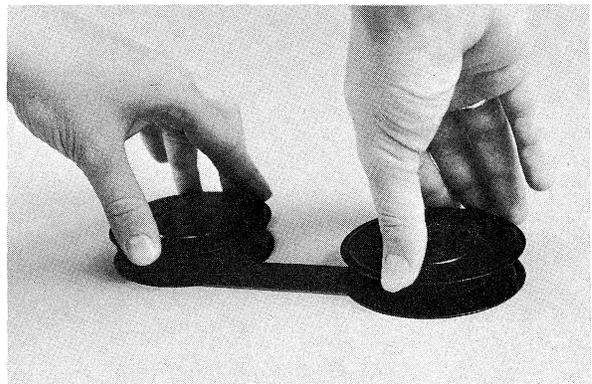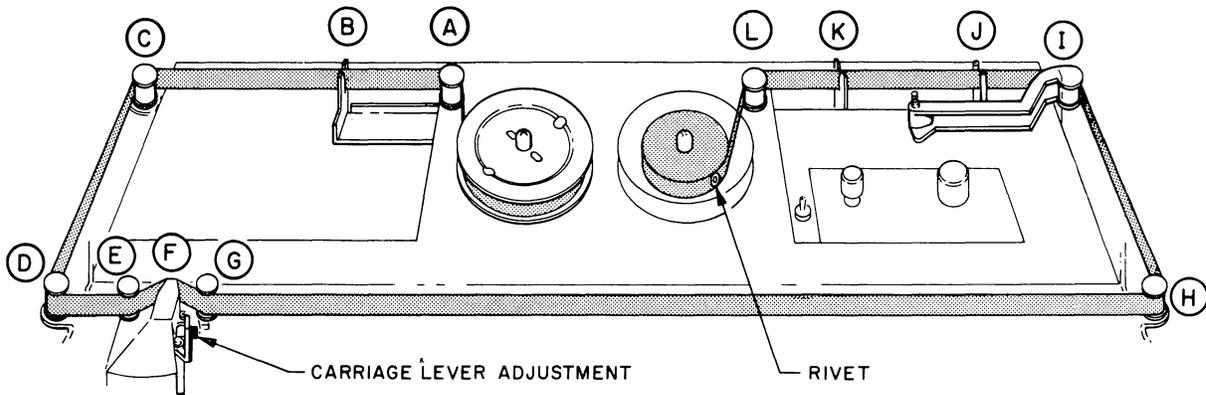
CP-2005

1. Place the full spool on the left spindle and turn clockwise until it drops into position.

2. Guide the ribbon around idler spool A through guide B, and around the outside of idler spools C through E.

3. Guide around the front of head F and idler spools G and H.

4. Guide the ribbon around tension arm I, through slots J and K (Direction Changing guide), and around idler spool L.

5. Turn the spool clockwise until it drops into position.

6. Take up the slack in the ribbon by turning the free moving spool.

7. Return the Carriage Adjustment lever to its original setting.

NOTES

The rivet located on the ribbon must be on the spool or between the spool and the Direction Changing guide.

Ribbon can be threaded in the opposite direction (from L to A).

8. Close the cover and set the POWER switch to ON.

INSTALLATION AND CONFIGURATION CHECKOUT GUIDE

GENERAL INSTALLATION INFORMATION

This section contains the step-by-step procedures for unpacking, cabling, and unit checkout to ensure that the unit was not damaged during shipment and that the unit is operating properly prior to connection to the communication system.

The LA180 DECprinter should be installed in an area that is free of excessive dust, dirt, corrosive fumes, and vapors. To ensure that the unit has proper ventilation and cooling, the ventilation openings on the side of the cabinet should not be obstructed. A minimum 4-inch clearance between units must be maintained at all times. Adequate service clearance must also be provided for servicing the unit. (Refer to Figure 2.)

DIMENSIONS	A	B	C	D	E	F
INCHES	33.5	27.5	14	21.7	*	96
MILLIMETERS	851	696	356	551	*	2440

*100 FT MAXIMUM
(2540mm)
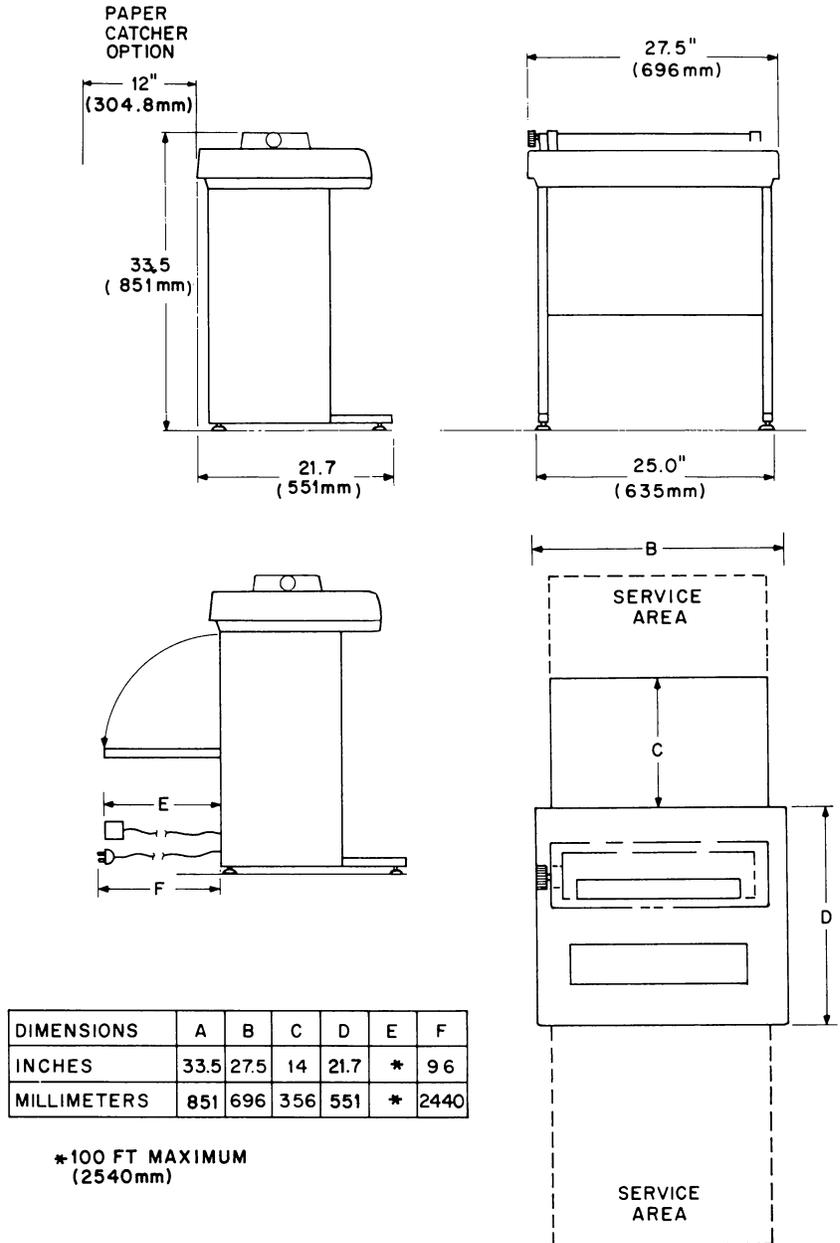
CP-2024

Figure 2   Site Considerations

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STRAPPING

FULL
TELESCOPE
CAP

STITCHED
TUBE

POLYBAG

WOOD BRACE

TERMINAL

HEX HEAD BOLTS

MICROFOAM

WOOD SKID

POLYBAG

TEE NUTS
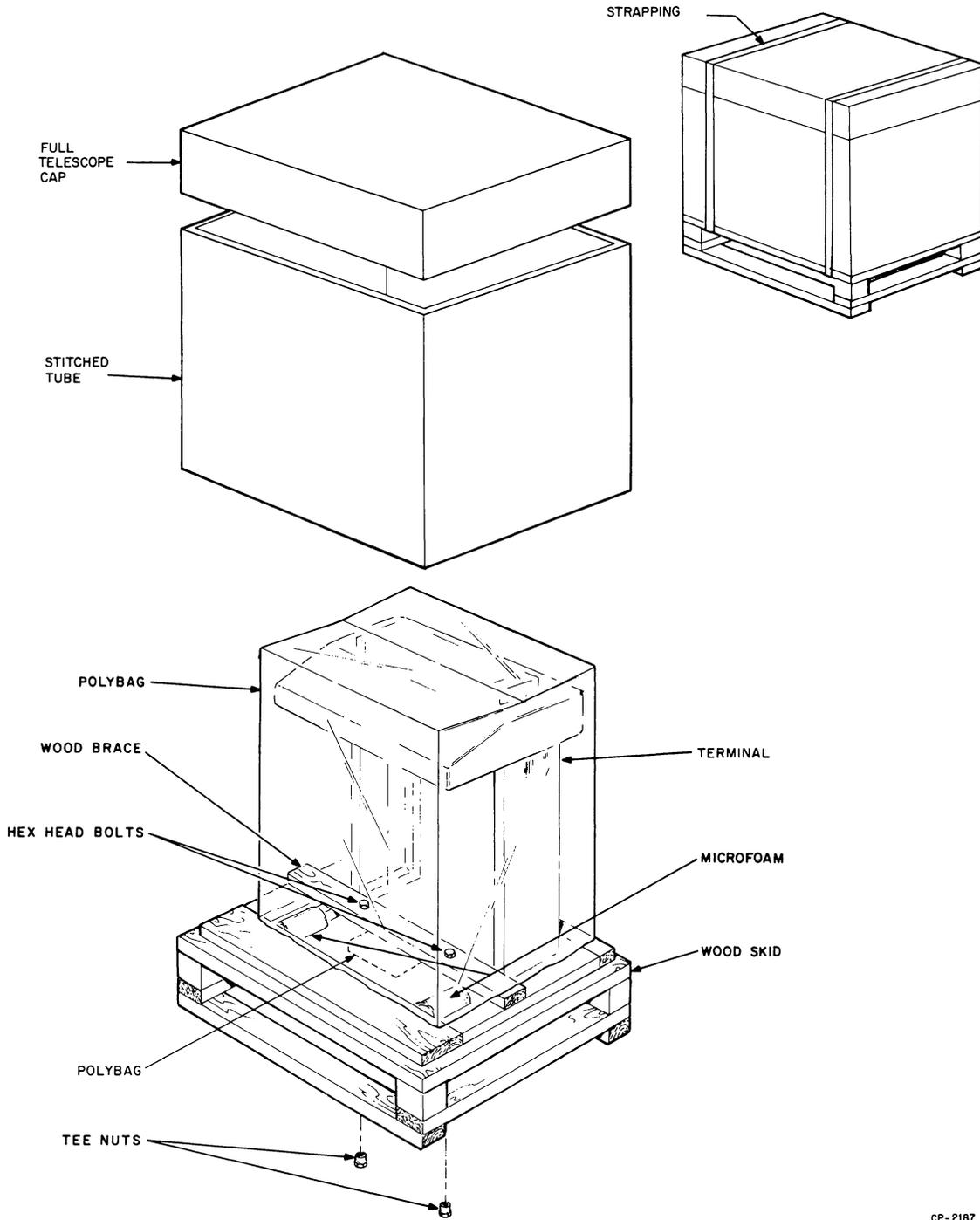
CP-2187

Figure 3   LA180 Packaging

UNPACKING AND INSPECTION

The following procedure outlines the steps required for unpacking and inspecting the LA180.

1. Cut the nylon retaining straps from around the shipping carton and discard them.

2. Remove the outer cardboard shipping container.

3. Remove all shock-absorbing material and packing from around the LA180 (Figure 3).

4. Remove the poly bag from the printer.

5. Loosen and remove the hex head bolts that secure the wood leg brace to the skid assembly. Remove microfoam from around each leg of the LA180.

6. Carefully inspect the LA180 cabinet and carriage assembly for possible shipping damage. Inspect and check the enclosed packing list for lost or missing items. Report any damaged or missing items to the local DIGITAL Field Service or Sales Office and to the local carrier.

7. Remove the printer from the wooden shipping skid and place it in the desired location.

8. Lift the LA180 top cover assembly, and clip and **remove the nylon cable tie** securing the print head assembly (Figure 4). Remove the caution tag.

9. Install and adjust the leveling feet on the LA180 legs.

10. If necessary, wipe all outer surfaces with a clean, soft, lint-free cloth.

11. Connect the interface cable to the user's equipment. (See Interface Description.)

NOTE
Site plans are not supplied by Digital Equipment Corporation. Interface logic connections must be specified and provided by the system supplier, or the customer, because each installation may be different.
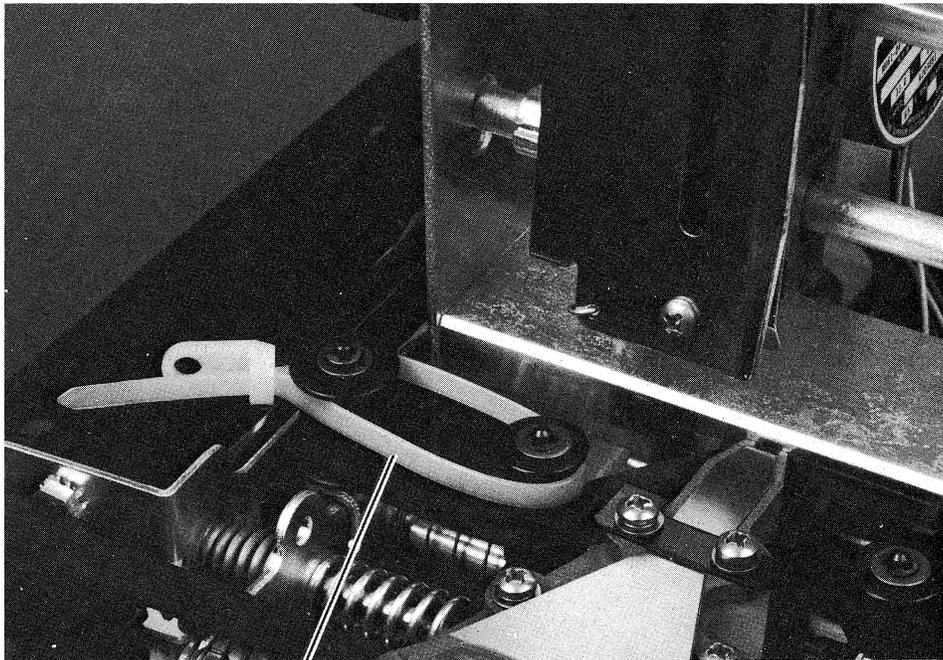
CABLE
TIE

7555-10

Figure 4 Cable Tie Location

PACKING PROCEDURES

If it becomes necessary to ship your LA180 to another location, repack it per the following procedure.

1. Remove the ribbon and paper.

2. Using a nylon cable tie, secure the print head assembly to prevent movement while in transit.

3. Pack the LA180 as shown in Figure 3.

CHECKOUT AND ACCEPTANCE PROCEDURES

Perform the following procedure. If the desired results are not achieved, refer to the troubleshooting guide in Section 5.

1. Install a ribbon per the ribbon installation procedure (Section 2).

NOTE
The LA180 must be loaded with 14-7/8-inch wide paper when performing the self-test procedure.

2. Install paper per the paper loading procedure (Section 2).

CAUTION
Before connecting the LA180 to a power source, ensure that the line voltage and frequency are compatible with the power requirements of the machine. Ensure that the POWER switch on the console is OFF.

3. Connect the LA180 line cord to the correct wall receptacle; set the POWER switch to ON. The print head automatically positions itself to the left margin.

4. Perform the self-test procedure as follows:

    a. Set the ON LINE/OFF LINE switch to OFF LINE.

    b. Open the top cover assembly and set the SELF TEST switch to ON; close the cover. Set the ON LINE/OFF LINE switch to ON LINE. The LA180 will automatically print the full complement of 96 upper and lower case alphanumeric characters (Figure 1) across the line printer paper. The printer will print continuously until either the SELF TEST or ON LINE switch is turned off.

50 Hz/60 Hz CONVERSION

The LA180 DECprinter I is configured for 50 Hz or 60 Hz. Changing frequency requires changing power transformers:

*   50 Hz Power Transformer, DEC part no. 16-12257-00

*   60 Hz Power Transformer, DEC part no. 16-12256-00.

WARNING
Changing power transformers must be performed by a qualified technician.

Refer to the *LA180 DECprinter I Maintenance Manual*, EK-LA180-MM-001, for the power transformer replacement procedure.

INTERFACE DESCRIPTONS

Using the recommended interface (Figure 5), the LA180 can be used with up to 100 ft of cable. The interface cable (Figure 6) connects to J3 on the logic board. Table 1 describes the pinning at J3.

Table 1
J3 Pinning

Pin	Signal	Pin	Signal
A	DATA STROBE	B	GND
M	DATA 1	N	GND
K	DATA 2	L	GND
U	DATA 3	V	GND
P	DATA 4	R	GND
C	DATA 5	D	GND
E	DATA 6	F	GND
S	DATA 7	T	GND
SS	DATA 8 or PARITY	TT	GND
Y	DEMAND	Z	GND
HH	ON LINE	JJ	GND
PP	BUSY	RR	GND
EE	PAPER FAULT	FF	GND
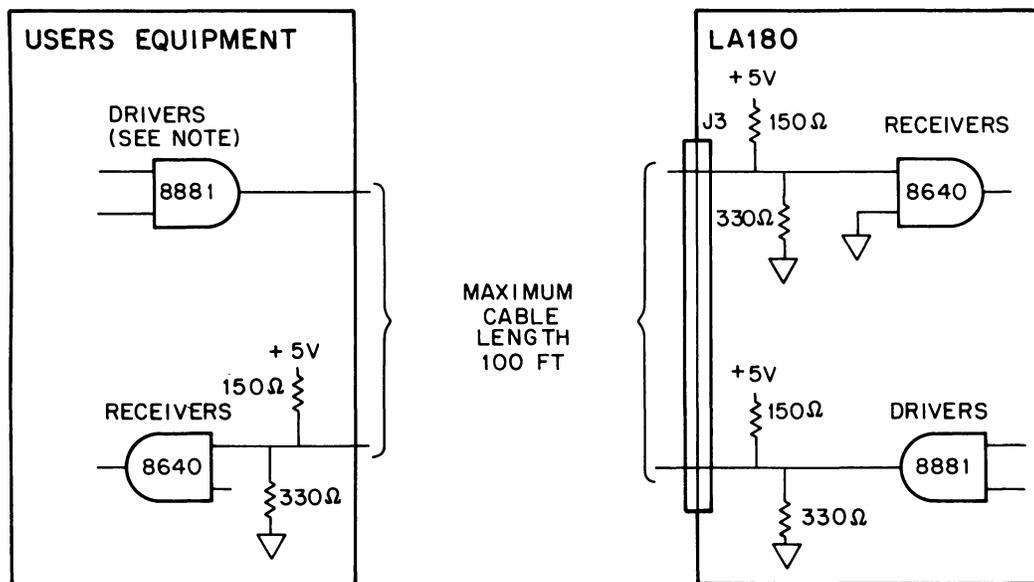
Note:
Drivers must be capable of sinking 35ma.

CP-2050

Figure 5   LA180 Interface

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BC11S Cable Pinning

COLOR	FROM CONNECTION	TO CONNECTION	COLOR	FROM CONNECTION	TO CONNECTION
BLU	P1–SS	P2–D	GRV	P1–V	P2–AA
WHT	P1–PP	P2–F	RED	P1–U	P2–BB
ORN	P1–AA	P2–V	BLU	P1–VV	P2–A
WHT	P1–EE	P2–R	BLK	P1–UU	P2–B
GRN	P1–L	P2–KK	ORN	P1–N	P2–HH
WHT	P1–K	P2–LL	BLK	P1–M	P2–JJ
BRN	P1–HH	P2–N	GRN	P1–T	P2–CC
WHT	P1–KK	P2–L	BLK	P1–S	P2–DD
GRY	P1–F	P2–PP	BRN	P1–Z	P2–W
WHT	P1–E	P2–RR	BLK	P1–Y	P2–X
BLU	P1–NN	P2–H	GRY	P1–DD	P2–S
RED	P1–MM	P2–J	BLK	P1–D	P2–SS
ORN	P1–CC	P2–T	BLU	P1–TT	P2–C
RED	P1–C	P2–TT	YEL	P1–RR	P2–E
GRN	P1–R	P2–EE	ORN	P1–BB	P2–U
RED	P1–P	P2–FF	YEL	P1–FF	P2–P
BRN	P1–X	P2–Y	GRN	P1–JJ	P2–M
RED	P1–W	P2–Z	YEL	P1–LL	P2–K
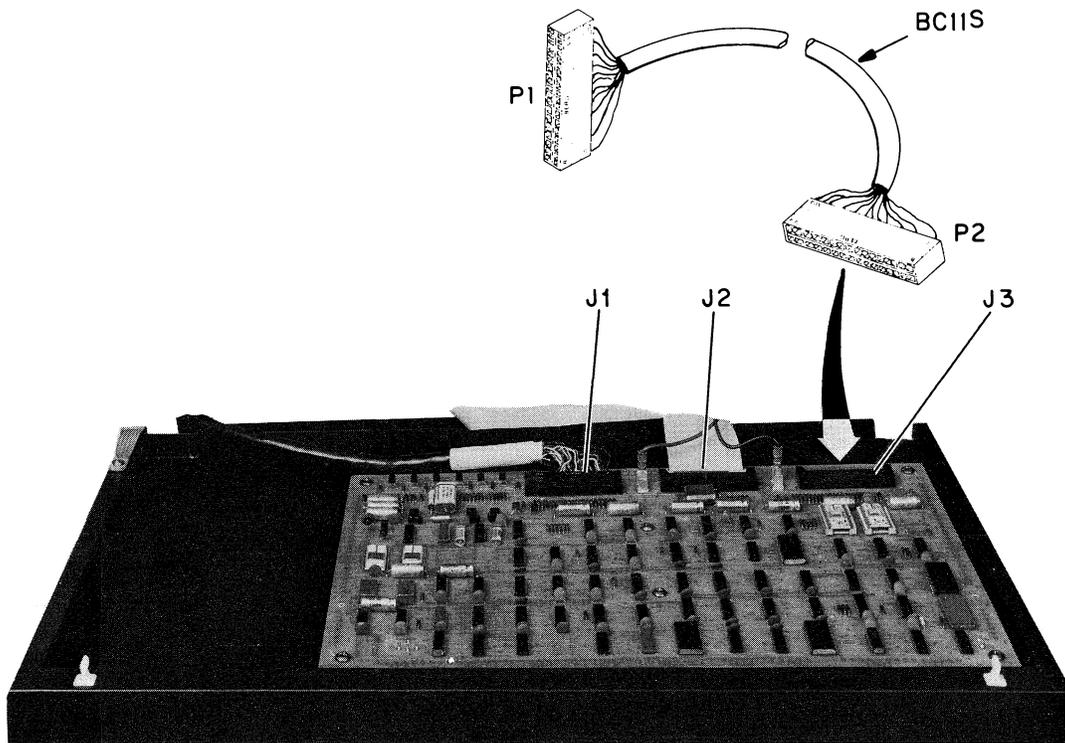
CP-2056

Figure 6   Interface Cable Connection Diagram

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INTERFACE SPECIFICATIONS

DIGITAL-Specified Cable for PDP-11/PDP-8 Interface
    BC11S

Recommended Interface Cables and Connectors for User
    36 Conductor Round
        Abbot Wire 16-000
        Brand Rex 63-000
        Studd Wire 245-000
        Mohawk WC 296-000
        DEC 9107700

    Mating Connector for J3
        Berg 65043-015
        DEC 12-10918-15

Logical 1 (True)
    +2.0 to +5.0 V at input to LA180

Logical 0 (False)
    0.0 to +0.8 V at input to LA180

Minimum Time Between Characters
    8.26 μs

Timing
    See Figure 7

For additional interface specifications, write to the following address and request *Interfacing the LA180* (Application Note No. ED 06347 76):

    Digital Equipment Corporation
    Communication Services
    Whitney Street
    Northborough, MA 01532
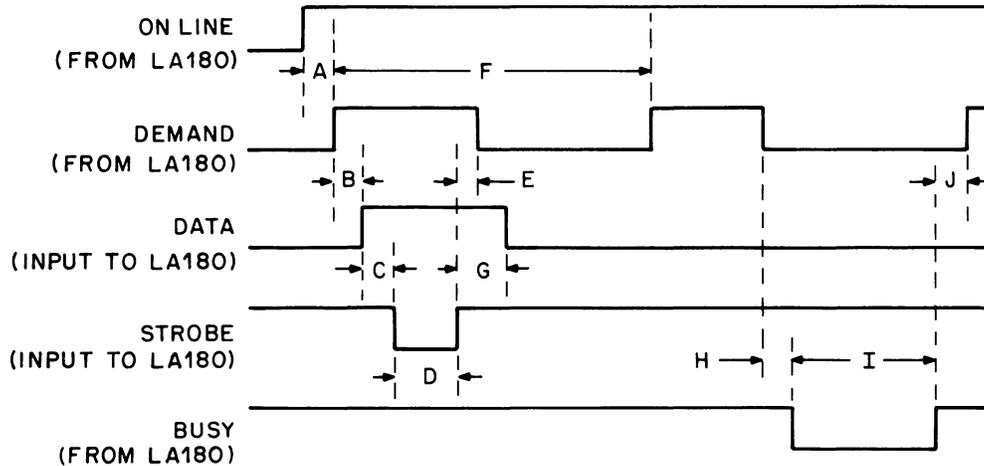
A = 0 sec min, 1 sec max
B = 0 sec min
C = 50 nsec min
D = 100 nsec min
E = 50 nsec max
F = 8.26 usec min
G = 100 nsec
H = 100 usec max
I = 60 msec min, 700 msec max (full line print)
J = 1.2 usec

Notes:

On Line;	Printer is ready to function with a controller
Demand;	Demand pulse goes high with each character request
Data;	Input data
Strobe;	Data is strobed into single character buffer
(Buffer Full)	
Busy;	Indicates existing data processing must be completed prior to accepting new data input. (Busy is an optional signal and is not normally required.)
Paper Fault	Generated by the LA180 to alert the controller that an out-of-paper condition exists. The controller cannot send data to the LA180 when this condition exists.

CP-2281

Figure 7   LA180 Timing Diagram

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LA180 JUMPER SELECTIONS

Jumper Locations
The LA180 logic board jumper locations are shown in Figure 8. These jumpers, listed in Table 2, are described in the following paragraphs.

Table 2   LA180 Module Jumper Configuration

Jumper	Function	Signal Location
W1	Speaker Volume	J1-KK
W2	Busy Signal	J3-PP
W3	-12 V Interface Voltage	J3-UU
W4	Clock (1200 baud/591 ns)	J3-LL
W5	+12 V Interface Voltage	J3-MM
W6	+5 V (Not Required)	J3-KK
W7	Katakana Character Set	
W8	Auto Line Feed	R112/T214
W11	CBA (Delete)	E4-6
W12	591 ns Clock	Pins G-F (split lugs)
W13	1200 baud Clock	Pins H-F (split lugs)
Parity	Odd, Even, No Parity	E13

JUMPER FUNCTIONS

Speaker Volume
The speaker volume can be varied by jumper W1. Removing W1 reduces the speaker volume.

Busy Signal Code
Installing W2 enables transmission of BUSY to the CPU. When transmitted to the CPU, BUSY indicates that the LA180 is printing or paper feeding and cannot accept new data.

-12 V Interface Voltage
Jumper W3 is installed when -12 V is required for interface expansion.

Clock (1200 baud/591 ns)
Jumper W4 must be installed to complete the path of the selected clock signal to the interface. The clock can be 1200 baud or 591 ns; however, 591 ns (W12) is required for the LAXX-NW, NX.

+12 V Interface Voltage
Jumper W5 is installed when +12 V is required for interface expansion.

+5 V Interface Voltage
Jumper W6 is installed when +5 V is required for interface expansion; however, this jumper is not used with the LAXX-NW, NX interface.

Katakana Character (Japanese Script) Set
Katakana is an optional character set. Jumper W7 is installed when this option is supplied with the LA180. In addition, a jumper is added between split lugs COM and K.

Auto Line Feed
Jumper W8 is removed to activate automatic line feed. This generates line feed after a carriage return. When W8 is installed, the line feed command must be part of the user's program.

Delete
The delete jumper modification exists on LA180 logic modules used with a serial interface. If delete (177) is used as a fill character, the delete jumper must be removed; this is done to ensure programming compatibility with the LA180 when using the serial interface module.

591 ns Clock

Jumper W12 (591 ns clock), when installed with W4, provides a 591 ns clock at J3-LL.

1200 Baud

Jumper W13 (1200 baud clock), when installed with W4, provides a 1200 baud at J3-LL.

Parity

Parity is determined by the jumper configuration at split lugs E, COM, and O. When parity is activated by the proper jumpers and a parity error occurs, three vertical lines will be printed (parity error printout).

- *No Parity* — Jumpers removed from split lugs E, COM, and O.

- *Even Parity* — Jumper installed between split lugs COM and E.

- *Odd Parity* — Jumper installed between split lugs COM and O.
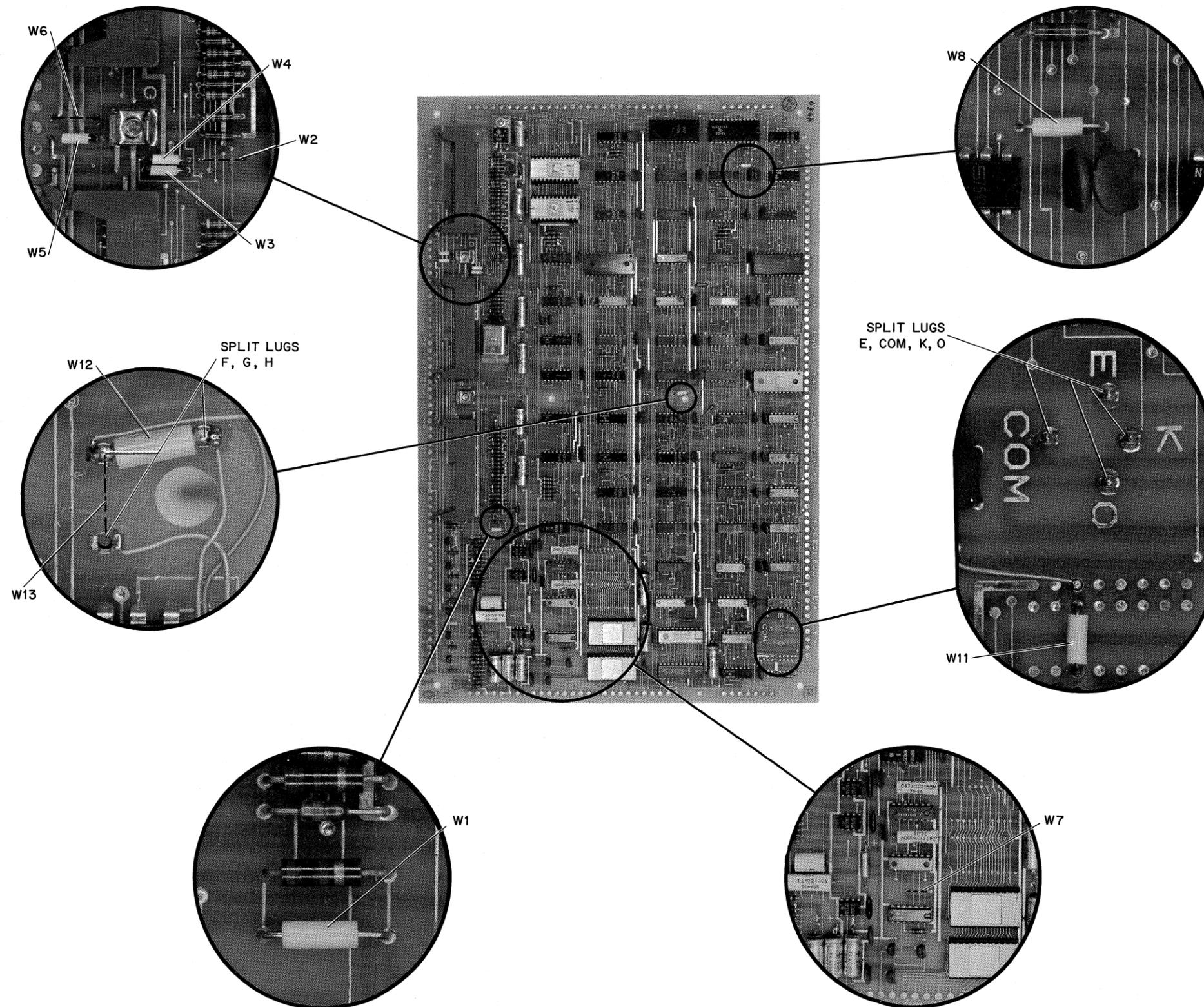
Figure 8   Logic Board Jumper Locations

RECEIVING CHARACTERS AND COMMANDS

The LA180 receives commands as well as characters to be printed, in the form of 7-bit ASCII codes. The only ASCII control codes recognized by the LA180 are:

BEL (007)   Activates alarm bell.

BS (010)   Backspace.

LF (012)   LF is a line terminator. It causes all characters in the LA180 memory to be printed, performs a carriage return, and advances paper one line.

FF (014)   FF is a line terminator. It causes all characters in the LA180 memory to be printed, performs a carriage return, and advances the paper to the first printable line at the top of the next form. Table 3 lists the number of lines associated with each LENGTH OF FORM switch position.

CR (015)   CR is a line terminator. It causes all characters in the LA180 memory to be printed and performs a carriage return.

DEL (177)   Clears memory of all data.

The following table will be useful when writing programs that interface with the LA180. Table 4 lists the 7-bit ASCII codes and indicates the operation performed by the LA180 with each specific code it receives. Figure 9 illustrates the line rate versus column width for the LA180.

Table 3
FORM LENGTH Switch Positioning

Form Length (inches)	LENGTH OF FORM Switch Setting	Printable Lines Per Form (maximum)
3	3	18
3.5	3.5	21
4	4	24
5.5	5.5	33
6	6	36
7	7	42
8	8	48
8.5	8.5	51
11	11	66
12	12	72
14	14	84

LA180 LINE RATE vs COLUMN WIDTH
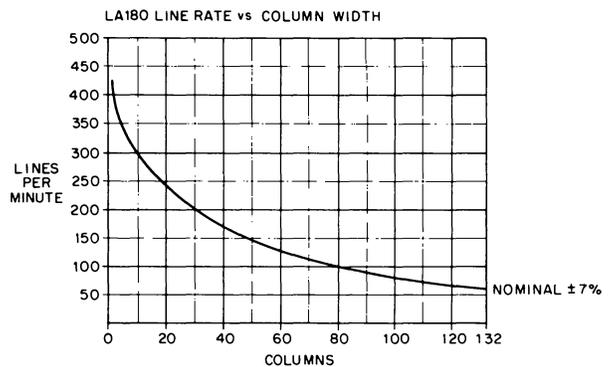
CP-2250

Figure 9   LA180 Line Rate Versus Column Width

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Table 4 ASCII Receive Operations

	RECEIVE OPERATIONS		
ASCII Code	**Character**	**Character Printed**	**Action/Description**
000	NUL	None	None
001	SOH		
002	STX		
003	ETX		
004	EOT		
005	ENQ		
006	ACK		None
007	BEL		Sound Alarm Bell
010	BS		Backspace one position
011	HT		None
012	LF		Performs a print cycle, carriage return and advances paper one line.
013	VT		None
014	FF		Performs a print cycle and a carriage return and advances the paper to the top of the next form
015	CR		Causes all characters in the LA180 memory to be printed and performs a carriage return.
016	SO		None
017	SI		
020	DLE		
021	DC1		
022	DC2		
023	DC3		
024	DC4		
025	NAK		
026	SYN		
027	ETB		
030	CAN		
031	EM		
032	SUB		
033	ESC		
034	FS		
035	GS		
036	RS		
037	US	None	None
040	SP	Blank Space	Character is recieved and stored in memory

Table 4 ASCII Receive Operations (Cont)

		RECEIVE OPERATIONS	
ASCII Code	**Character**	**Character Printed**	**Action/Description**
041	!	!	Character is received and
042	"	"	stored in memory
043	#	#	
044	$	$	
045	%	%	
046	&	&	
047	'	'	
050	(	(	
051	)	)	
052	*	*	
053	+	+	
054	,	,	
055	-	-	
056	.	.	
057	/	/	
060	0	0	
061	1	1	
062	2	2	
063	3	3	
064	4	4	
065	5	5	
066	6	6	
067	7	7	
070	8	8	
071	9	9	
072	:	:	
073	;	;	
074	<	<	
075	=	=	
076	>	>	
077	?	?	
100	@	@	
101	A	A	
102	B	B	
103	C	C	
104	D	D	Character is received and stored in memory

Table 4 ASCII Receive Operations (Cont)

RECEIVE OPERATIONS			
ASCII Code	Character	Character Printed	Action/Description
105	E	E	Character is received and stored in memory
106	F	F	↑
107	G	G	
110	H	H	
111	I	I	
112	J	J	
113	K	K	
114	L	L	
115	M	M	
116	N	N	
117	O	O	
120	P	P	
121	Q	Q	
122	R	R	
123	S	S	
124	T	T	
125	U	U	
126	V	V	
127	W	W	
130	X	X	
131	Y	Y	
132	Z	Z	
133	[	[	
134	\	\	
135	]	]	
136	∧	∧	
137	–	–	
140	'	'	
141	a	a	
142	b	b	
143	c	c	
144	d	d	
145	e	e	
146	f	f	
147	g	g	↓
150	h	h	Character is received and stored in memory

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Table 4 ASCII Receive Operations (Cont)

	RECEIVE OPERATIONS		
ASCII Code	**Character**	**Character Printed**	**Action/Description**
151	i	i	Character is received and stored in memory
152	j	j	
153	k	k	
154	l	l	
155	m	m	
156	n	n	
157	o	o	
160	p	p	
161	q	q	
162	r	r	
163	s	s	
164	t	t	
165	u	u	
166	v	v	
167	w	w	
170	x	x	
171	y	y	
172	z	z	
173	{	{	
174	‖	‖	
175	}	}	
176	≈	≈	Character is received and stored in memory
177	DEL	None	Clears the memory of all data with a parallel interface. With a seial interface 177 may be used as a full character.

AC LINE FUSE
115 V   3 A SB
230 V   1.5 A SB

SERVO FUSE
3 A SB

7937-40
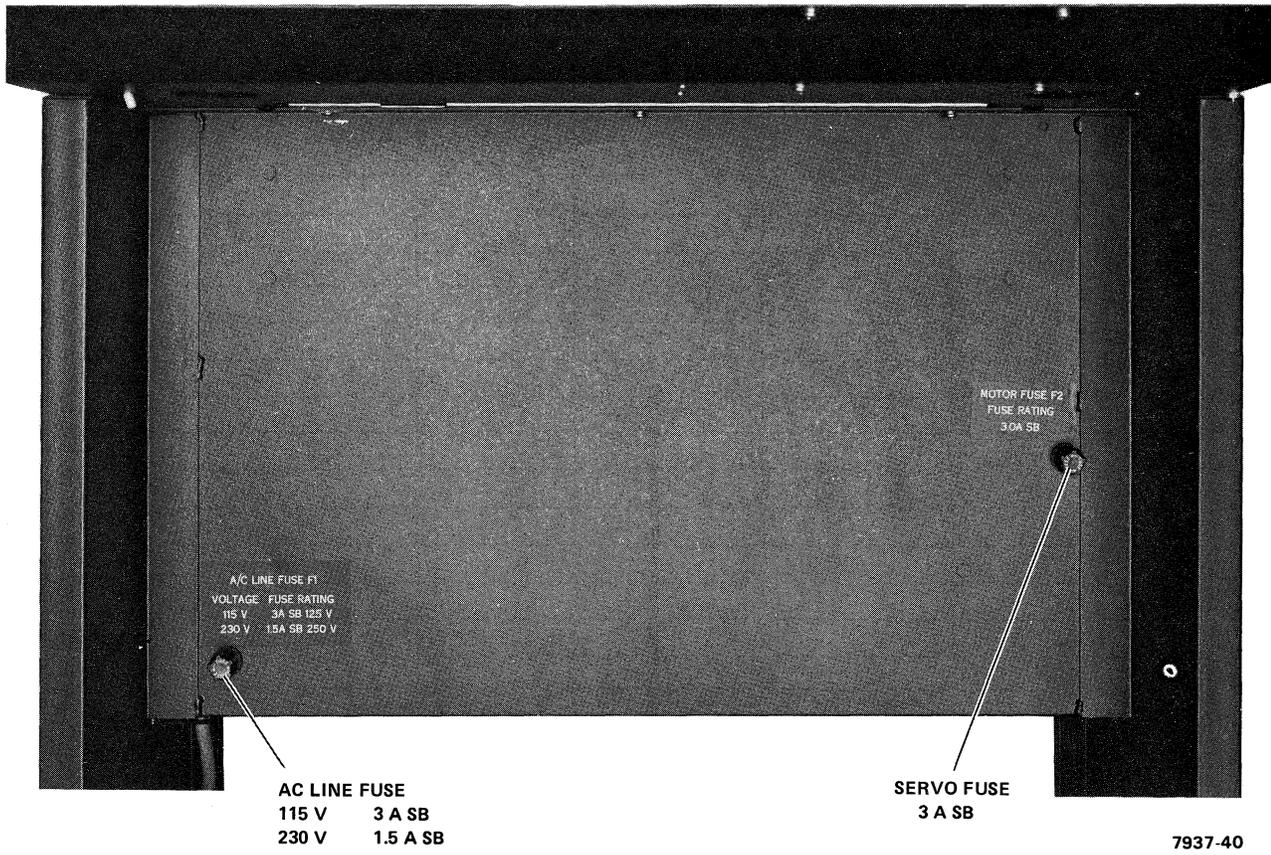
Figure 10   LA180 Fuse Locations

SECTION 5
TROUBLESHOOTING GUIDE

Symptom	Possible Cause and Corrective Action
LA180 does not turn on when POWER switch is set to ON	• AC power cord is not plugged into wall outlet; plug it in. • Current is not coming from wall outlet; check outlet with a known working electrical device (such as a lamp). • Check ac line fuse. (For fuse location, see Figure 10) • If none of the above, contact your local Field Service office.
Print head does not print characters	• Check servo fuse, which might be blown. (For fuse location, see Figure 10.) • Print head may be set too far from paper; adjust the Carriage Adjustment lever per Impression Adjustment procedure in this chapter.
Light print	• Print head may be set too far from paper; adjust the Carriage Adjustment lever per Impression Adjustment procedure in this chapter. • Ribbon ink has run out; replace ribbon. • Reverse ribbon after approximately 8 hours of continuous printing. Ribbon should be reversed only once, then changed.
Paper does not advance	• Improper loading of paper; check tractor covers to ensure that they are closed. • Holes in paper are torn; turn LA180 OFF and reload paper per paper loading procedure in this chapter. • Paper snagged or caught by box.
Paper tearing on multipart forms	• Print head is exerting pressure on paper so that paper tears when it advances; check print head position control. (Adjust Carriage Adjustment lever.) • Tension exerted on the paper by the tractors is incorrect.
Line bunching	• Horizontal tension exerted on the paper by the tractors is excessive. To correct move tractors closer together (Figure 11).

UNEVEN SPACING*

*UNEVEN SPACING (LINE BUNCHING) IS A CHARACTERISTIC OF EXCESSIVE TRACTOR TENSION

Figure 11   Line Bunching

SECTION 6
LA180 SPECIFICATIONS

Line Length
132 characters maximum

Spacing
10 characters/in. (horizontal)
6 lines/in. (vertical)

Characters
96 upper/lower case ASCII
7 X 7 dot matrix (0.07 X 0.10 in.)

Paper
Variable width: 3 to 14-7/8 in.
Single-Part:
    15 lb paper minimum
    Card stock thickness of 0.010 in. maximum
Multipart:
    2- to 6-part (see Notes)
    Thickness of 0.020 in. maximum
Tractor-drive, pin-feed

NOTES

1. Multipart forms may have only one card part. The card must be the last part.

2. NCR or 3M paper, up to 6-part, must use ribbon on top copy. First surface impact paper is not recommended.

3. Continuous-feed, fan-fold business forms with 3- or 4-prong margin crimps on both margins (multipart) are recommended. Stapled forms are not recommended and may damage tractors and other areas of the machine. Dot or line glue margins are acceptable (if line is on one margin only). Do not line glue both margins as air will not be able to escape and poor impressions will result.

4. Split forms (forms with each side containing a different number of sheets) are not recommended.

Ribbon
DIGITAL-specified nylon fabric (Part No. 36-12153)
Spool assembly: 0.5 in. wide X 60 yd long

Power
90–132 Vac or 180–264 Vac
50 or 60 Hz ± 1 Hz
400 W maximum (printing)
200 W maximum (idle)

Temperature
Operating
    10° to 40° C (50° to 104° F), noncondensing
Nonoperating
    −40° to 66° C (−40° to 151° F), noncondensing

Relative Humidity
Operating
    10 to 90% with a maximum wet bulb temperature of 28° C (82° F) and a minimum dew point of 2° C (36° F) noncondensing
Nonoperating
    5 to 95%

Dimensions
27.5 in. wide
33.5 in. high
21.7 in. deep

Weight
102 lb

SECTION 7
LAXX-NW, NX/LA180 BUFFERED SERIAL INTERFACE

GENERAL INFORMATION

INTRODUCTION
The LA180 is a parallel-input terminal that is capable of receiving 8 bits at one time. To enable the LA180 to receive one bit at a time, such as inputs from a modem, a serial interface must be used. There are two different serial interfaces that can be used with the LA180: the LAXX-NW and LAXX-NX.

- The LAXX-NW is an EIA (RS232) module. It receives serial ASCII inputs and outputs parallel ASCII to the LA180.

- The LAXX-NX is a current loop interface. It receives serial ASCII inputs and outputs parallel ASCII to the LA180. EIA (RS232) capability is also available on the LAXX-NX providing the proper interface cable is used (no physical changes to the board are necessary).

All options can operate at 300, 600, 1200, 2400, 4800, or 9600 baud. These baud rates are switch-selectable on the module. EIA operation enables automatic modem answering capability for unattended operation of type 202 modem.

NOTE
The LAXX-NW or NX must be installed in an LA180 with
a logic board (5411023) at Rev. R or higher.

GENERAL DESCRIPTION
Figure 12 shows the interface signals between the LAXX-NW, NX*, an LA180 printer, a type 202 modem, and a user's serial device. WAKE UP from the LA180 initializes the LAXX, while the 591 ns clock signal clocks the interface. EIA RECEIVED DATA is applied to the LAXX and converted to parallel ASCII and stored in a buffer. When the LA180 raises the DEMAND line, 8-BITS of PARALLEL DATA is strobed (by the STROBE line) to the LA180. Since the LA180 is a slow device (compared to the user's serial line device), the LAXX has a buffer that can store up to 256 characters. When the buffer is full, the LAXX transmits an ASCII XOFF signal to the user's serial device. XOFF signals the user's device to stop sending data. (Full is defined as 192 characters. Buffer space for 64 characters is available to allow for added characters transmitted by the user's serial device before the user's device stops transmitting.) As the LA180 removes characters from the LAXX buffer, and when the buffer is empty, LAXX transmits an ASCII XON signal to the user's serial device. XON signals the user's device to resume transmitting. XON and XOFF are not shown in Figure 12. These signals are generated internal to the LAXX-NW, NX and are available to the user.

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*For simplicity, the LAXX-NW, NX will be referred to as the LAXX in this manual.
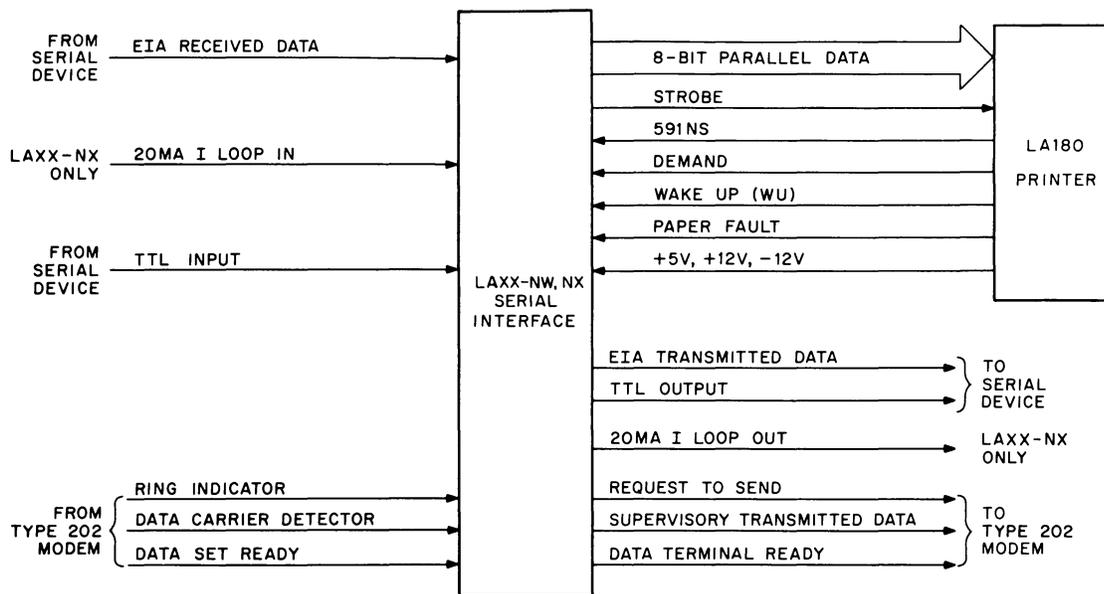
Figure 12   Serial Interface/LA180 Simplified Interface Diagram

Current Loop Operation

The LAXX-NX version has 20 mA current loop optical isolators that can be used on the serial input and serial output (XON-XOFF) lines. The use of these current loops is at the user's option.

EIA Operation

The RING INDICATOR is received from the modem and starts a 10-second timer in the serial interface. (The serial interface must respond to the "ring" within the 10-second timeout.) Serial Interface answers the "ring" with DATA TERMINAL READY. When the 202 modem receives DATA TERMINAL READY, it responds with DATA SET READY. LAXX now transmits REQUEST TO SEND to the modem. The modem then transmits data to the LAXX for subsequent outputting to the LA180 printer. This assumes that a proper DATA CARRIER DETECTOR signal has been received by the LAXX and that reverse channel operation (SUPERVISORY TRANSMITTED DATA) is not controlling the sending modem. Data will be printed by the LA180 until the sending modem terminates the transmission or the LAXX generates SUPER-VISORY TRANSMITTED DATA. A PAPER FAULT from the LA180 will also terminate the transmission by removing DATA TERMINAL READY.

SPECIFICATIONS

The following specifications and particulars are for informational purposes only and are subject to change without notice.

Physical	Double-height, single-width, extended-length module
Dimensions	25.40 cm long X 1.27 cm wide X 13.34 cm high (10 in long X 5-1/4 in wide X 0.5 in high)
Weight	170 g (6 oz)

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Maximum Cable Length

    Current Loop Operation

The total maximum length of the BC05F and BC05M cables should not exceed 304.8 m (1000 ft).

    EIA Operation

BC05C maximum length 15.24 m (50 ft).

User Input Connections

Two 40-pin connectors; one to interface to the user's device, the other to interface to the LA180. Interface cables are supplied with the LAXX-NW, NX.

Mounting Requirements

The module mounts on the rear door of the LA180 printer. It is secured to the door's four mounting bosses by four screws.

Electrical

All input power is supplied by the LA180.

Logic Power Requirements

+5 V @ 820 mA
+12 V @ 10 mA
−12 V @ 10 mA

Interfaces

EIA Interface

The signals for the EIA interface conform to the EIA RS-232-C standard.

LA180 Interface

Outputs from the LAXX-NW, NX are open collector drivers capable of sinking 40 mA. LAXX inputs are high-impedance, high-threshold receivers. All LAXX input and output lines are terminated in the LA180 with 150 Ω to +5 V and 330 Ω to ground, except for wakeup.

20 mA Current Loop Interface
(LAXX-NX only)

This interface converts a 20 mA current loop to TTL signals for use by the LAXX-NX and also converts TTL signals (from LAXX-NX) to 20 mA current loop.

Modem Interface

The modem control functions on the LAXX module conform to the EIA RS-232-C standard and are compatible with type 202 modems.

Baud Rates

All modules can operate at 300, 600, 1200, 2400, 4800, or 9600 baud. The baud rate is switch selectable (Table 5).

Module Types

LAXX-NW

Accepts EIA RS-232-C serial ASCII input and outputs parallel ASCII to the LA180. LAXX-NW does not have the 20 mA current loop.

LAXX-NX

Same input and output as the LAXX-NW, but in addition has input/output 20 mA current loops.

Environmental

Temperature

Storage: −40° to 66° C (−40° to 150° F) noncondensing
Operating: 10° to 40° C (50° to 104° F) noncondensing

Relative Humidity

10 to 90% noncondensing

RELATED LITERATURE

The following list of documents contain useful information for installing, operating, and maintaining the LAXX option. Documents published by DEC may be ordered from the nearest Digital Equipment Corporation Sales Office.

Document Title	DEC Document No.
EIA Standard RS-232-C	
Bell System Technical Reference Data Sets 202C and 202D Interface Specification PUB41202	
LA180 DECprinter I User's Manual	EK-LA180-OP-002
LA180 DECprinter I Maintenance Manual	EK-LA180-MM-002

INSTALLATION AND CONFIGURATION

GENERAL
Installing and configuring the LAXX-NW, NX requires performing the following steps, which are described in detail in the following paragraphs.

1. Installing the module on the door of the LA180
2. Connecting the cables to the module
3. Configuring the switches on the module for the appropriate usage (EIA, current loop)
4. Configuring the jumpers on the LA180 logic board

NOTE
The LA180 logic board (54-11023) must be a CS Rev. R or higher.

MODULE INSTALLATION

CAUTION
Remove the LA180 line cord from the wall socket when installing and configuring the LAXX-NW, NX.

The LAXX-NW or NX module mounts on the rear door of the LA180 printer cabinet. Four screws are used to secure the module to the mounting bosses on the door. Position the module with the input/output connectors (J2/J1) facing the bottom edge of the door (Figures 13 and 14). Insert and tighten the four mounting screws (6-32 X 1/2) to 8 ± 1 in.-lb.

C

6"-8"
(15-23 CM)

8-32 SCREW,
WASHER, LOCK-WASHER

COVER PLATE

STRAIN RELIEF

20mA or EIA
CABLE

TWISTED PAIR
(+5V and GND)

P2

A

J2

J1

A

SERIAL
INTERFACE
MODULE

J1

J2

J3

BCO8S-2 CABLE
SEE DETAIL
C

CABLE
CLAMP   MODULE   SCREW   DOOR

MOUNTING
BOSS   1/4"
          SPACER

VIEW A
DOOR WITH 4 MOUNTING BOSSES

MOUNTING
BOSS

1/4"
SPACER   9/16"
              SPACER

VIEW A
DOOR WITH 2 MOUNTING BOSSES
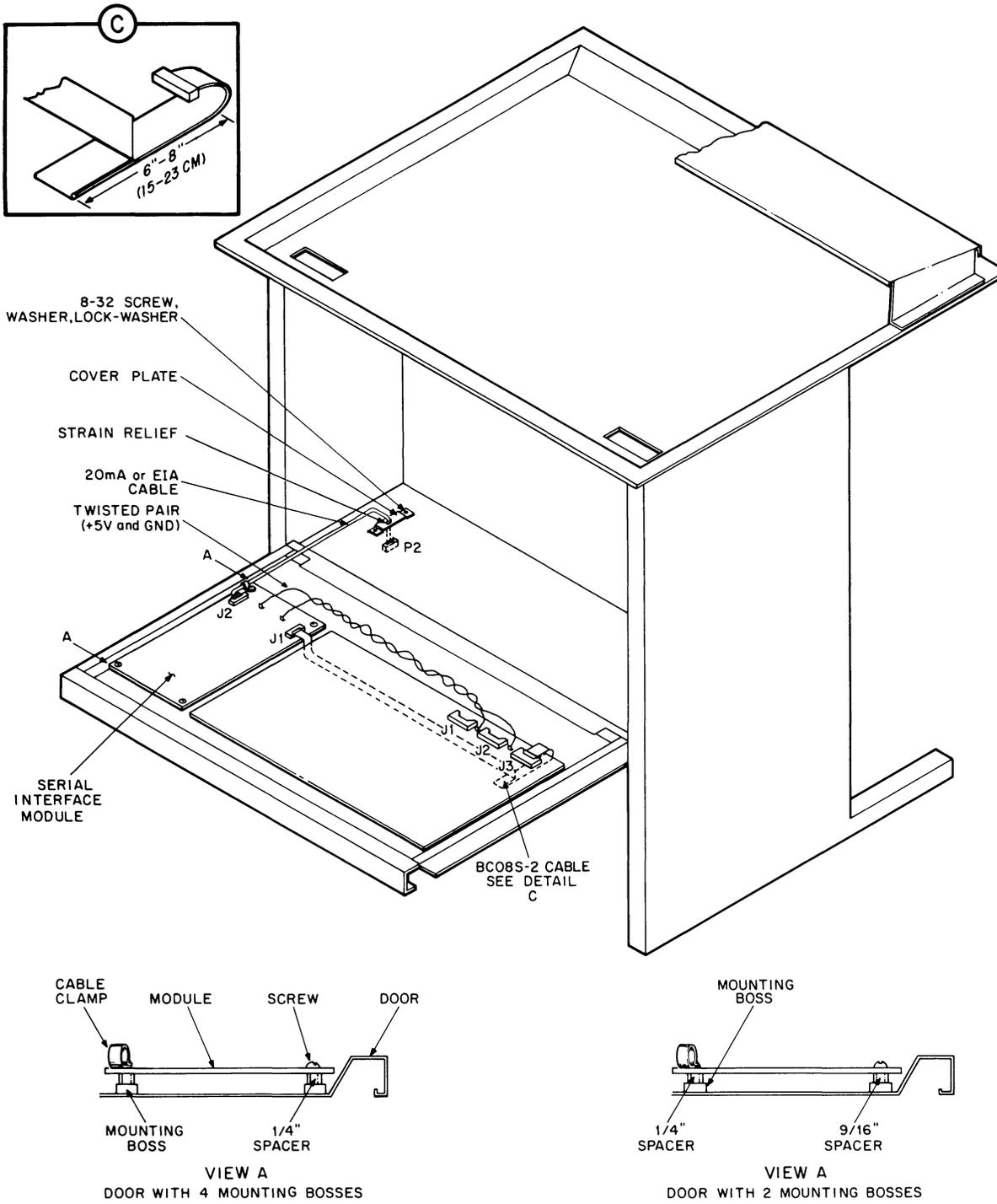
CP-2862

Figure 13   Module Installation on LA180 Rear Door

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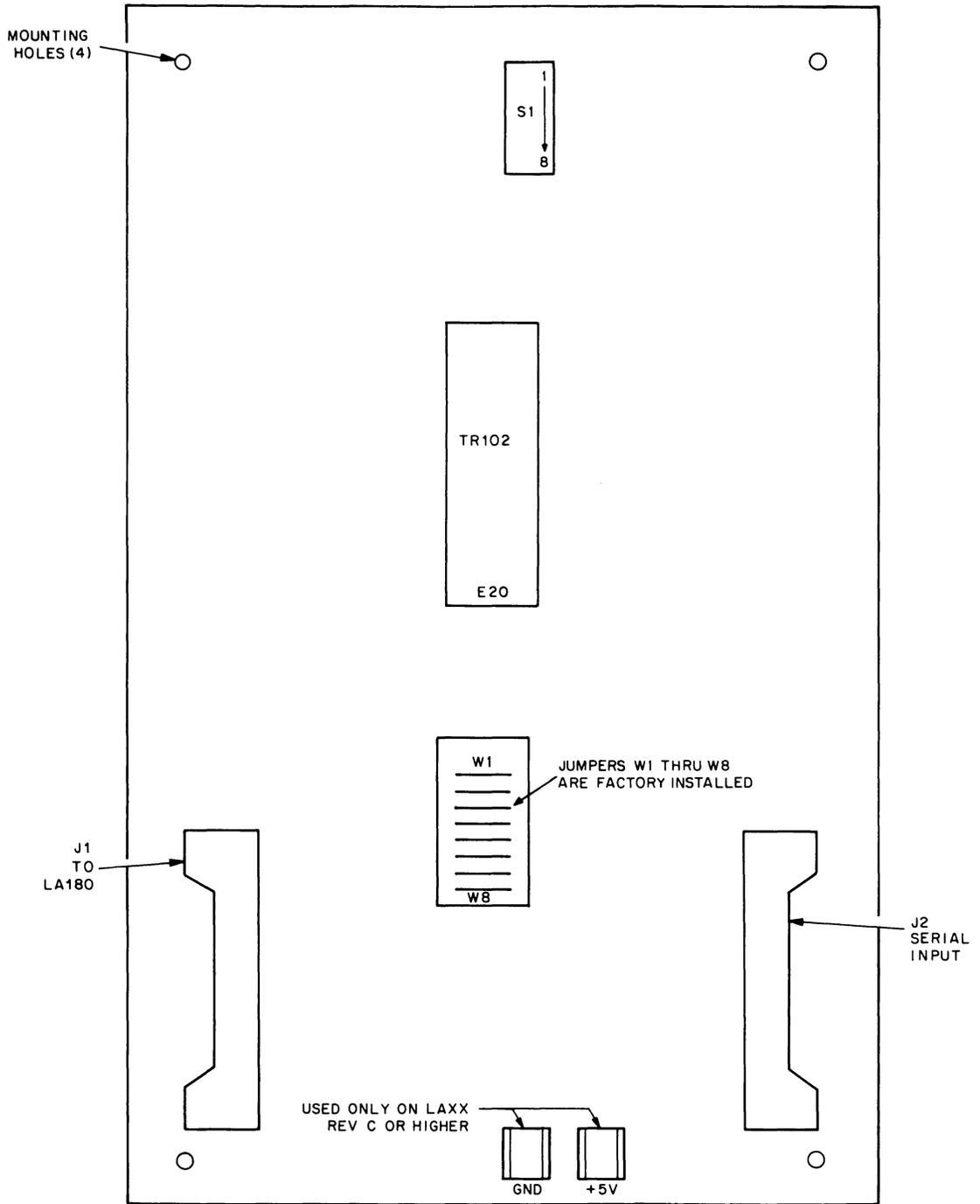
Figure 14   Serial Interface Component Location

EIA CABLE CONNECTIONS

Two cables are required (Figure 15) for EIA operation. These cables can be used on both the LAXX-NW and NX modules; however, the cables are supplied only with the LAXX-NW. Connect the cables as shown in Figure 15. Make the appropriate folds and bends in the BC08S-2 cable and ensure that the smooth side of the cable is up when connected to J1 and the ribbed side is up when connected to J3. Position the cable in the cable runway of the LA180 rear door (Figure 13).

WARNING
The BC08S-2 cable and the LAXX module will be damaged if the BC08S-2 cable is not properly installed.
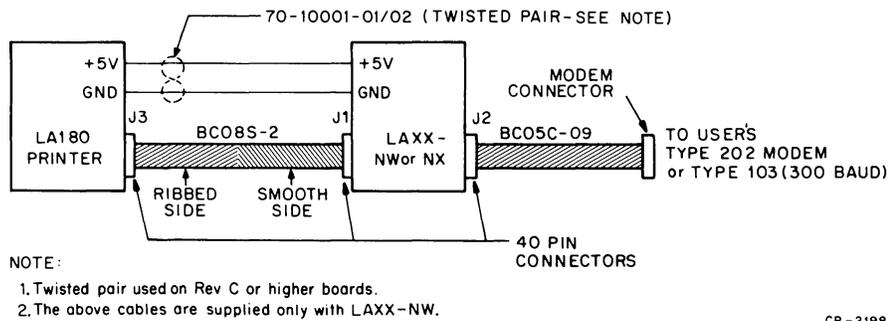
Figure 15   EIA LAXX-NW, NX Cabling

The cable pinning is shown in Figure 16.

In addition to the cables just described, a twisted-pair cable is used to supply +5 V power to the LAXX-NW or NX module from the LA180 logic module. The twisted-pair is only required for modules of revision C or higher.

CURRENT LOOP CABLE CONNECTIONS

To cable the LAXX-NX for current loop operation, refer to Figure 17. Make the appropriate folds and bends in the BC08S-2 cable and ensure that the smooth side of the cable is up when connected to J1 and the ribbed side is up when connected to J3. Position the cable in the cable runway of the LA180 rear door (Figure 13).

WARNING
The BC08S-2 cable and the LAXX module will be damaged if the BC08S-2 cable is not properly installed.

The three tables required are supplied with the module. The cable pinning is shown in Figure 16.

In addition to the cables just described, a twisted-pair cable is used to supply +5 V power to the LAXX-NW or NX module from the LA180 logic module. The twisted-pair is only required for LAXX-NW or NX modules of revision C or higher.

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J2 LAXX INPUT CONNECTOR

TTL RECEIVED DATA — EIA TRANSMITTED DATA — EIA RECEIVED DATA

20MA RCVR +

20MA RCVR −

REQUEST TO SEND
RING INDICATOR
DATA SET READY
DATA CARRIER DETECTOR
DATA TERMINAL READY
SUPERVISORY TRANSMITTED DATA

20MA XMTR +

20MA XMTR −

TTL TRANSMITTED DATA

TO/FROM
USER'S SERIAL
DEVICE
(20MA CURRENT
LOOP APPLIES
ONLY TO
LAXX-NX)

TO/FROM
USER'S SERIAL
DEVICE

J1 LAXX OUTPUT CONNECTOR
J3 LA180 INPUT CONNECTOR
(SEE NOTES)

P STROBE L
P 05 H
P 06 H
WU H
P 02 H
P 01 H
P 04 H
P 07 H
P 03 H

P DEMAND H

PAPER FAULT

+ 5V

+ 12V

P 08 H
− 12V

TO/FROM
LA180
PRINTER

1200
BAUD/
591NS

FROM
LA180
PRINTER

NOTES:
1. Signal flow arrows are shown for LAXX J1.
   Arrows are reversed for LA180 J3.

2. LAXX JI-LL: 591ns

3. LA180 J3-LL: 1200 baud/591ns

CP-2204

Figure 16   LAXX-NW, NX and LA180
Connector Pin Assignments
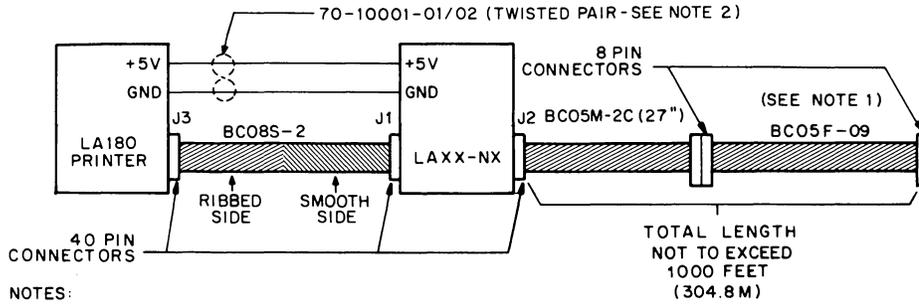
47

Figure 17 Current Loop LAXX-NX Cabling

EIA SWITCH CONFIGURATION

Switches S1-1 through 3 (Figure 14) are used for baud rate selection. Switches S1-4 through 8 are used for selecting various modem control functions. The baud rate selection switches are described in Table 5. The appropriate modem control functions can be obtained using the switches described in Table 6. Table 7 contains a summary of all the switch functions.

NOTE
There are two types of switch packs used in the manufacture of modules.

1. Switch packs by CTS – These switches are ON when the switch slides are adjacent to the switch position number.

2. Switch packs by AMP – These switches are ON when the switch toggles are down adjacent to the switch position number.

Table 5 Baud Rate Selection

| Switch | | | Selected |
S1-1	S1-2	S1-3	Baud Rate
ON	ON	ON	300 baud
ON	OFF	OFF	600 baud
OFF	OFF	OFF	1200 baud
ON	OFF	ON	2400 baud
OFF	ON	ON	4800 baud
OFF	ON	OFF	9600 baud
ON	ON	OFF	None
OFF	OFF	ON	None

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Table 6 Typical EIA Switch Configurations

Signal Line	Switch Configuration	Function

SUPERVISORY
TRANSMITTED DATA
    (J2-FF* high indicates buffer is
    full).
	S1-4 OFF
	S1-5 OFF
	S1-7 OFF
	S1-8 OFF
		This configuration is used with a manual control 202 modem with reverse channel.

SUPERVISORY
TRANSMITTED DATA
and
DATA TERMINAL READY
    (J2-FF* high indicates buffer is
    full. J2-DD* high indicates
    LA180 is ready to accept data.)
	S1-4 ON
	S1-5 OFF
	S1-7 OFF
	S1-8 ON
		This configuration is used with an auto-answer 202 modem with reverse channel. The SUPERVISORY TRANSMITTED DATA signal is used to indicate a full buffer. The DATA TERMINAL READY signal is used to indicate that the LA180 is ready to accept data.

EIA TRANSMITTED DATA
    [X ON (DC1)
    X OFF (DC3)
    J2-F*]
	S1-4 OFF
	S1-5 ON
	S1-7 OFF
	S1-8 OFF
		Standard signal for DIGITAL software.

DATA TERMINAL READY
    (J2-DD* low indicates buffer is
    full.)
	S1-4 ON
	S1-5 OFF
	S1-7 ON
	S1-8 OFF
		Typically used when the LA180 is hard-wired to another terminal.

*J2 on LAXX module.

Table 7 LAXX-NW, NX Switch Functions

Switch	Function	Description
S1-1 S1-2 S1-3	Baud Rate Selection	S1-1, 2, 3 are used to select baud rates from 300 to 9600 baud. Refer to Table 5 for baud rate selection.
S1-4	Conditions DATA TERMINAL READY	When set to ON, DATA TERMINAL READY can be set (high) by RING INDICATOR or the state of the LAXX character buffer. The set conditions are determined by switches S1-5, 6, 7, and 8. Refer to the text for a complete description of S1-4 functions. When set to OFF, DATA TERMINAL READY is always set (high).

Table 7   LAXX-NX, NW Switch Functions (Cont)

Switch	Function	Description
S1-5	Conditions REQUEST TO SEND and SUPERVISORY TRANSMITTED DATA	When set to ON, REQUEST TO SEND is set (high) at all times and SUPERVISORY TRANSMITTED DATA is inhibited (remains low). When set to OFF, REQUEST TO SEND is low at all times and SUPERVISORY TRANSMITTED DATA is controlled by the LAXX character buffer. S1-5 also controls DATA TERMINAL READY providing S1-7 is ON. Refer to the text for a complete description of S1-5 functions.
S1-6	Conditions PAPER FAULT	When set to ON, allow PAPER FAULT to clear DATA TERMINAL READY providing S1-4 and 8 are ON and S1-7 is OFF. When set to OFF, PAPER FAULT has no effect on DATA TERMINAL READY. Refer to the text for a complete description of S6 functions.
S1-7	Allows control of DATA TERMINAL READY by LAXX character buffer	When set to ON, and providing S1-5 is OFF and S1-4 is ON, the state of the LAXX character buffer will control DATA TERMINAL READY. When the buffer is full DATA TERMINAL READY goes low. DATA TERMINAL READY goes high (sets) when the buffer is less than full. When set to OFF the buffer cannot control DATA TERMINAL READY. Refer to the text for a complete description of S1-7 functions.
S1-8	Allows control of DATA TERMINAL READY by RING INDICATOR, DATA SET READY, or PAPER FAULT	When set to ON, and providing S1-4 is ON and S1-7 is OFF, RING INDICATOR will cause DATA TERMINAL READY to set (high). When set to OFF, RING INDICATOR will not set nor will PAPER FAULT or DATA SET READY clear DATA TERMINAL READY. Refer to the text for a complete description of S1-8 functions.

CURRENT LOOP SWITCH CONFIGURATION

Switches S1-1 through 3 (Figure 14) are used for baud rate selection. Switches S1-4 through 8 do not affect current loop operation as indicated by Table 8. Table 5 describes baud rate selection. Table 7 contains a summary of all the switch functions.

Table 8   Current Loop Switch Configuration

Signal Lines (JZ, Figure 15)	Switch Configuration
20 mA RCVR + (J2-K) 20 mA RCVR − (J2-S) 20 mA XMTR + (J2-AA) 20 mA XMTR − (J2-KK)	S1-4 through 8: Don't care

NOTE
See Table 5 for baud rate selection.

LAXX-NW, NX JUMPER CONFIGURATION

Jumpers W1 through W8 (Figure 14) are factory installed and must remain in place for field usage.

LA180 LOGIC BOARD JUMPER CONFIGURATION

The LA180 logic board jumpers (Figure 18) must be configured as described in Table 9, when a serial interface is installed. Some of the jumpers are optional and can be altered by the user as described in the following paragraphs.

NOTE
Two different colored jumpers are used on the LA180 logic board. One is white, the other is brown with a black strip.

Table 9   LA180 Module Jumper Configuration with LAXX-NW or NX Installed

Jumper	Configuration	Function	Signal Location
W1	Optional	Speaker Volume	J1-KK
W2	Removed	Busy Signal	J3-PP
W3	Installed*	−12 V Interface Voltage	J3-UU
W4	Installed	Clock (1200 baud/591 ns)	J3-LL
W5	Installed*	+12 V Interface Voltage	J3-MM
W6	Removed	+5 V (Not Required)	J3-KK
W7	Removed	Katakana Character Set	
W8	Optional	Auto Line Feed	R112/T214
W11	Optional	CBA (Delete)	E4-6
W12	Installed	591 ns Clock	Pins G-F (split lugs)
W13	Removed	1200 baud Clock	Pins H-F (split lugs)
Parity	Optional	Odd, Even, No Parity	E13

*Jumpers W3 and W5 must be installed on site.

Figure 18   LA180 Logic Module
Jumper Locations

7455-1

Speaker Volume

The speaker volume can be varied by jumper W1. Removing W1 reduces the speaker volume.

Busy Signal Code

Installing W2 enables transmission of BUSY to the CPU. When transmitted to the CPU, BUSY indicates that the LA180 is printing or paper feeding and cannot accept new data.

–12 V Interface Voltage

Jumper W3 is installed when –12 V is required for interface expansion.

Clock (1200 baud/591 ns)

Jumper W4 must be installed to complete the path of the selected clock signal to the interface. The clock can be 1200 buad or 591 ns; however, 591 ns (W12) is required for the LAXX-NW, NX.

+12 V Interface Voltage

Jumper W5 is installed when +12 V is required for interface expansion.

+5 V Jumper

+5 V jumper (W6) is not required. This voltage is supplied to the serial interface via a twisted pair.

Katakana Character (Japanese Script) Set

Katakana is an optional character set. Jumper W7 is installed when this option is supplied with the LA180. In addition, a jumper is added between split lugs COM and K.

Auto Line Feed

Jumper W8 is removed to activate automatic line feed. This generates line feed after a carriage return. When W8 is installed, the LINE FEED command must be part of the user's program.

CBA (Delete Function)

Jumper W11 Installed

Jumper W11 is installed on the LA180 logic module to delete the delete code (177). The delete code resets the character address register on the LA180 logic module to zero. This clears all data between a line terminator and the delete code. A line terminator is defined as any of the following: carriage return (CR), line feed (LF), or form feed (FF).

Input to LA180	Printout
Example 1	
ABCDEFG <CR>	ABCDEFG
HIJK <DEL>LMNOP	LMNOP
Example 2	
"THE QUICK BROWN FOX <CR>	"THE QUICK BROWN FOX
LEAPED <DEL> JUMPED OVER"	JUMPED OVER"

Jumper W11 Removed

When jumper W11 is removed, the delete code (177) is used as a fill character. This is done to ensure programming compatibility with the LA180 when using the LAXX module.

Example

Input	Printout
ABCD <DEL> EFG	ABCDEFGH

591 ns Clock
Jumper W12 (591 ns clock) is required for the serial interface (Table 9).

1200 Baud
Jumper W13 (1200 baud clock) must be removed when the serial interface is installed.

Parity
Parity is determined by the jumper configuration at split lugs E, COM, and O. When parity is activated by the proper jumpers and a parity error occurs, three vertical lines will be printed (parity error printout).

However, in order to implement parity checking at the LA180, the transmitting device must be configured to transmit seven data bits plus one parity bit. A 9-bit data pattern (eight bits of data plus one parity bit) cannot be checked for parity by the LA180 because the parity bit (ninth bit) is not transferred to the LA180 (the LA180 is an 8-bit device).

- *No Parity* – Jumpers removed from split lugs E, COM, and O.
- *Even Parity* – Jumper installed between split lugs COM and E.
- *Odd Parity* – Jumper installed between split lugs COM and O.

NOTE
If the LA180 uses the extended character set, a jumper will
be installed between split lugs COM and K.

WAKE UP SIGNAL (WU H)
WAKE UP is a 700-ms pulse. It initializes the logic (LA180 logic as well as the LAXX) before the microprocessor on the LA180 logic module starts to run. During power-up, WU is at a logic zero level. After one time constant (aproximately 700 ms), WU goes to a logic one level and the microprocessor starts to run. The WAKE UP signal is available at J3-H on the LA180 logic module.

PARTS LIST

Table 10 lists the parts supplied with the LAXX/LA180 Buffered Serial Interface by part number, description, and quantity.

Table 10   Parts List

Part No.	Description	Quantity†
LAXX*	Serial interface module	1
BC08S-2	2-ft interface cable (supplied with all module options)	1
BC05C-09	9-ft EIA interface cable (supplied with LAXX-NW)	1
BC05F-09	9-ft extension interface cable (supplied with LAXX-NX module option)	1
BC05M-2C	27-in. 20-mA current loop cable (supplied with LAXX-NX module option)	1
70-10001-08	Cable, twisted-pair	1
90-06800	1/4 in – no. 6 spacer	4
90-06024-1	6-32 X 1/2 in screws	4
90-09534	9/16 in – threaded (L-32) spacer	2
CS-5412166-0-1	Brint Set	1 set
EK-LAXXN-OP-003	LAXX User's Manual	1
74-11607	Plate Cover	1
90-08509	Strain Relief	1
90-06037-1	Screw	2
90-08072-0	Washer	2

* The module part number can be LAXX-NW or -NX depending on user requirements. The same modules are available in kits of five modules. Kit designations are LAXX-MW or MX.

† Kits contain 5 modules, 5 cables of each type, and 20 screws, 20-1/4 in spacers, and 10-9/16 in spacers.

SECTION 8
LAXX-KJ COMPRESSED FONT OPTION KIT

INTRODUCTION

The compressed font option is a mechanical option that provides the LA180 with the ability to print 132 columns on a 9-in. form with one strippable edge, or on a 9-1/2 in. form with two strippable edges. Once installed, no operator intervention is required.

INSTALLATION

The compressed font option kit contains the following:

Quantity	Item	Part Number	Item No. (Figure 19)
1	30-Tooth Timing Pulley	1212446-00	4
1	15-Tooth Timing Pulley	D-MD-7414908-0-0	3
1	Pulley Clamp	C-MD-7414951-0-0	5
1	Timing Belt	1211583-02	2
1	Socket Head Cap Screw (#10-32 X 1 in.)	9006350-8	6
1	Hex Socket Set Screw (#1/4-20)	9007722-10	7
2	Kep Nuts	9006565-00	6

The following tools are required for installation: socket head wrenches, Phillips screwdriver, feeler gauges, alignment gauge, and a torque-type Phillips screwdriver. Use Figures 19—22 and the following procedure as installation guides.

1. Remove power from the LA180 by disconnecting the ac plug.

2. Remove the printer paper and printer cover.

NOTE
Do not remove bezel or fan screws when removing printer housing.

3. Remove eleven 6-18 screws and flat washers that secure the printer housing to the cabinet base (Figure 19) and set aside.
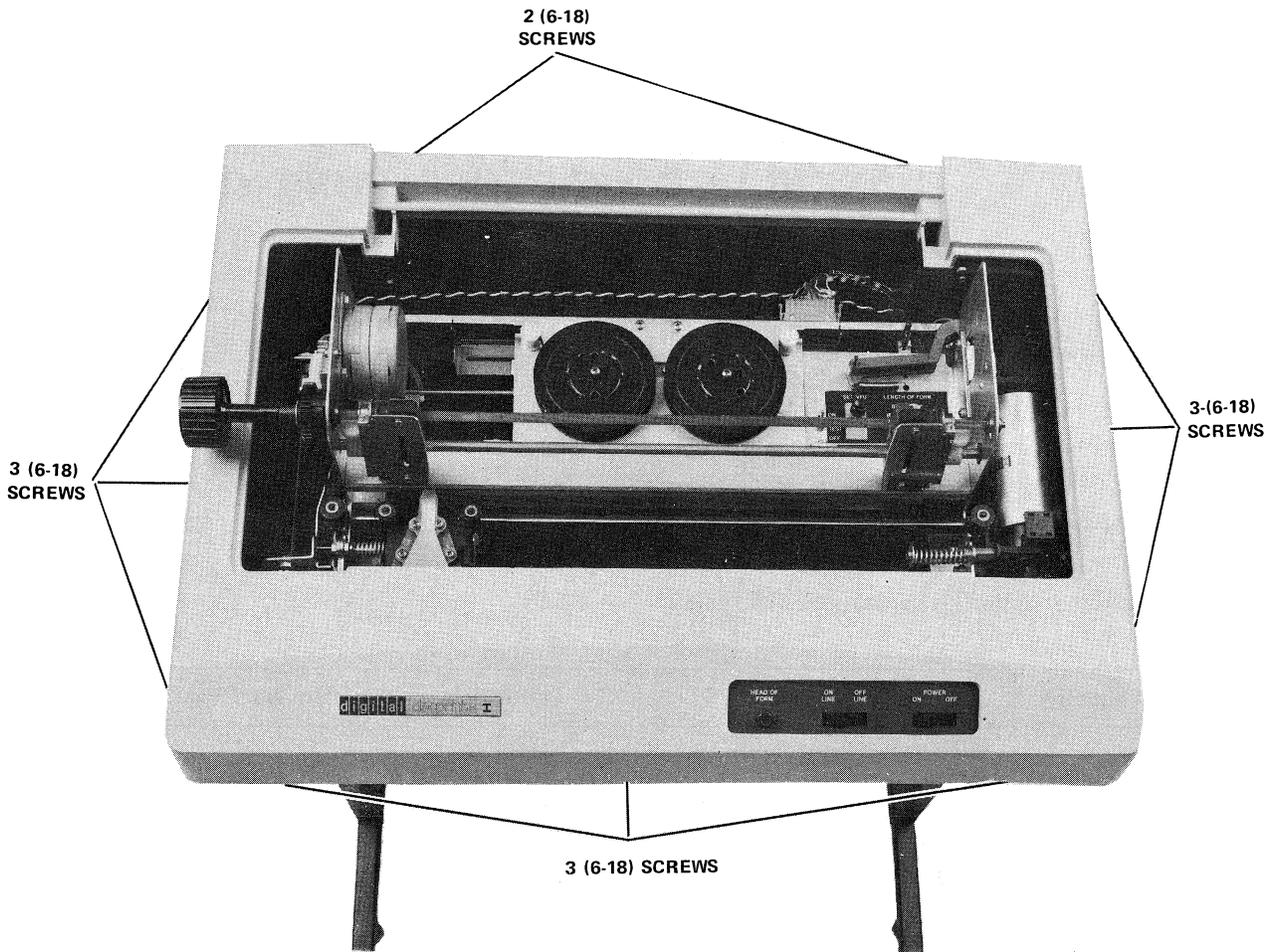
Figure 19   Printer Housing Removal

4. Remove the ribbon spools and ribbon.

5. Remove the four 6-32 screws, lockwashers, and flat washers that secure the print head to the carriage and remove the print head and the ribbon cable (Figure 20).

6. Push the carriage assembly to the extreme left. Slip the timing belt off the dc motor pulley while turning the pulley clockwise; remove the belt.
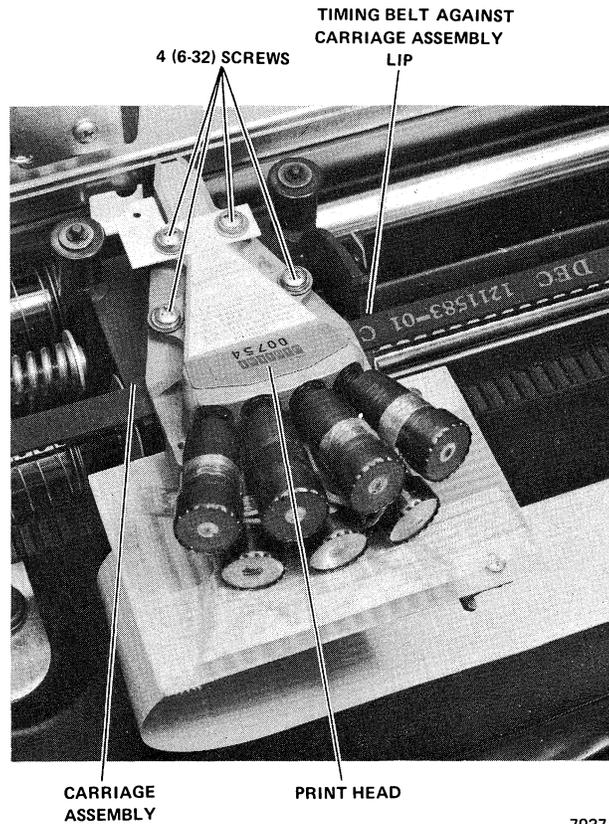
Figure 20   Print Head Removal

7. Using a socket head wrench, loosen the set screw (item 7 in Figure 21) in the pulley clamp (5) until the existing timing pulley (3) can be removed from the motor shaft. This pulley clamp can be discarded.

8. Loosen the set screw in the other pulley clamp (4) then remove and save this pulley.

9. Assemble the cap head screw and Kep nuts, then insert through the left side bracket as shown in (6), Figure 21.

10. Install the new 30-tooth timing pulley on the ribbon drive shaft (4). The side of the pulley with the flange should be positioned toward the front of the machine. Position the pulley so that there is 0.29 ± 0.03 in. clearance between the back of the pulley and the mounting hardware for the shaft bearing. Secure the new 30-tooth pulley using the previously removed pulley clamp.

11. Install the new 15-tooth pulley on the motor shaft and secure, using the new pulley clamp provided.
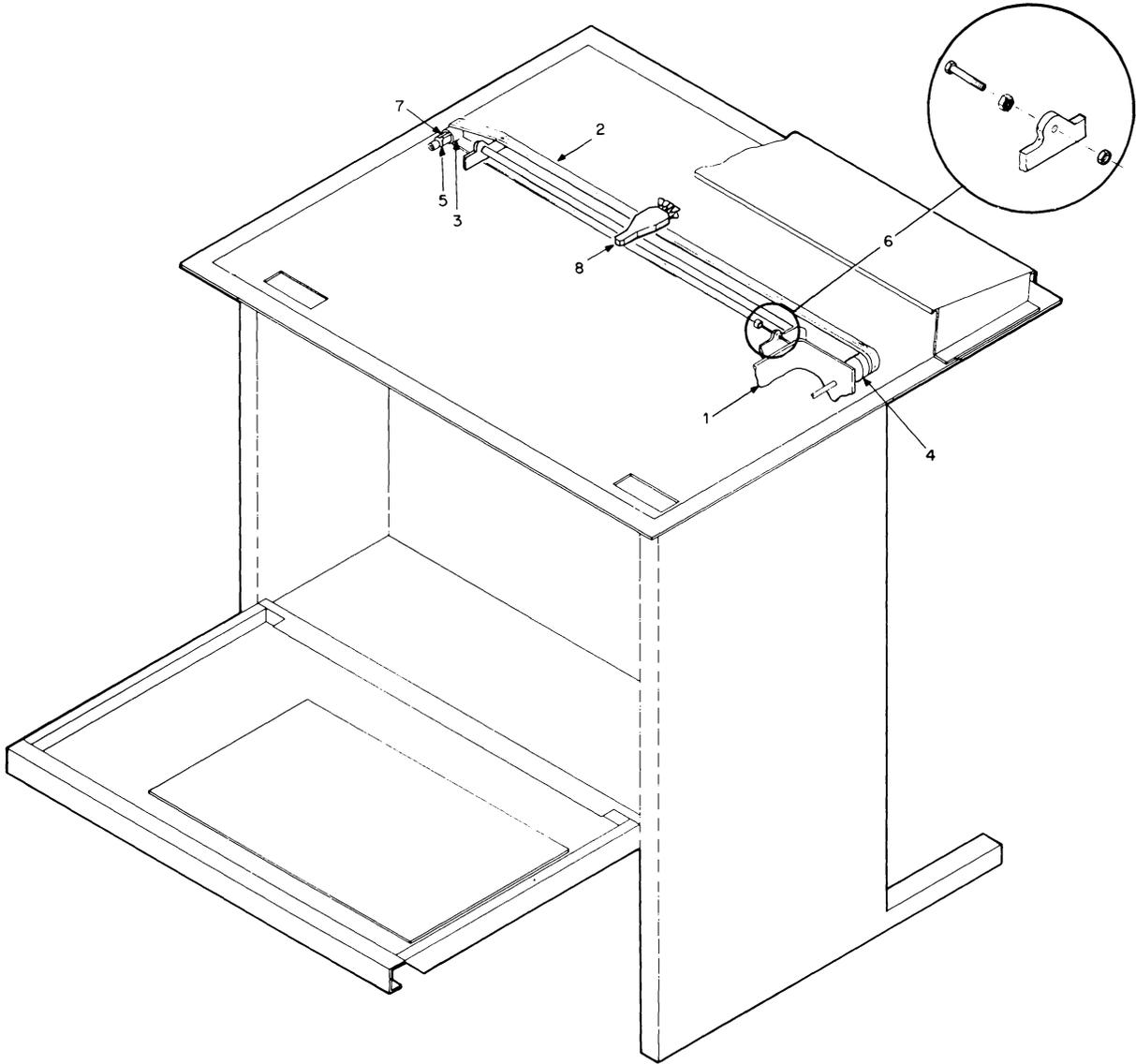
Figure 21   Installation of Compressed Font Option Kit
(LAXX-KJ)

CP-2285

12. Set the alignment gauge on the right side of the carriage shafts (Figure 22).

13. Set the alignment gauge to zero by rotating the gauge bezel (Figure 22).

7937-8

RIGHT
SIDE OF
CARRIAGE
SHAFTS

DC MOTOR

+0.0005 +0.001 +0.0015
0
-0.0005
-0.001
-0.0015

ALIGNMENT
GAUGE

7937-31
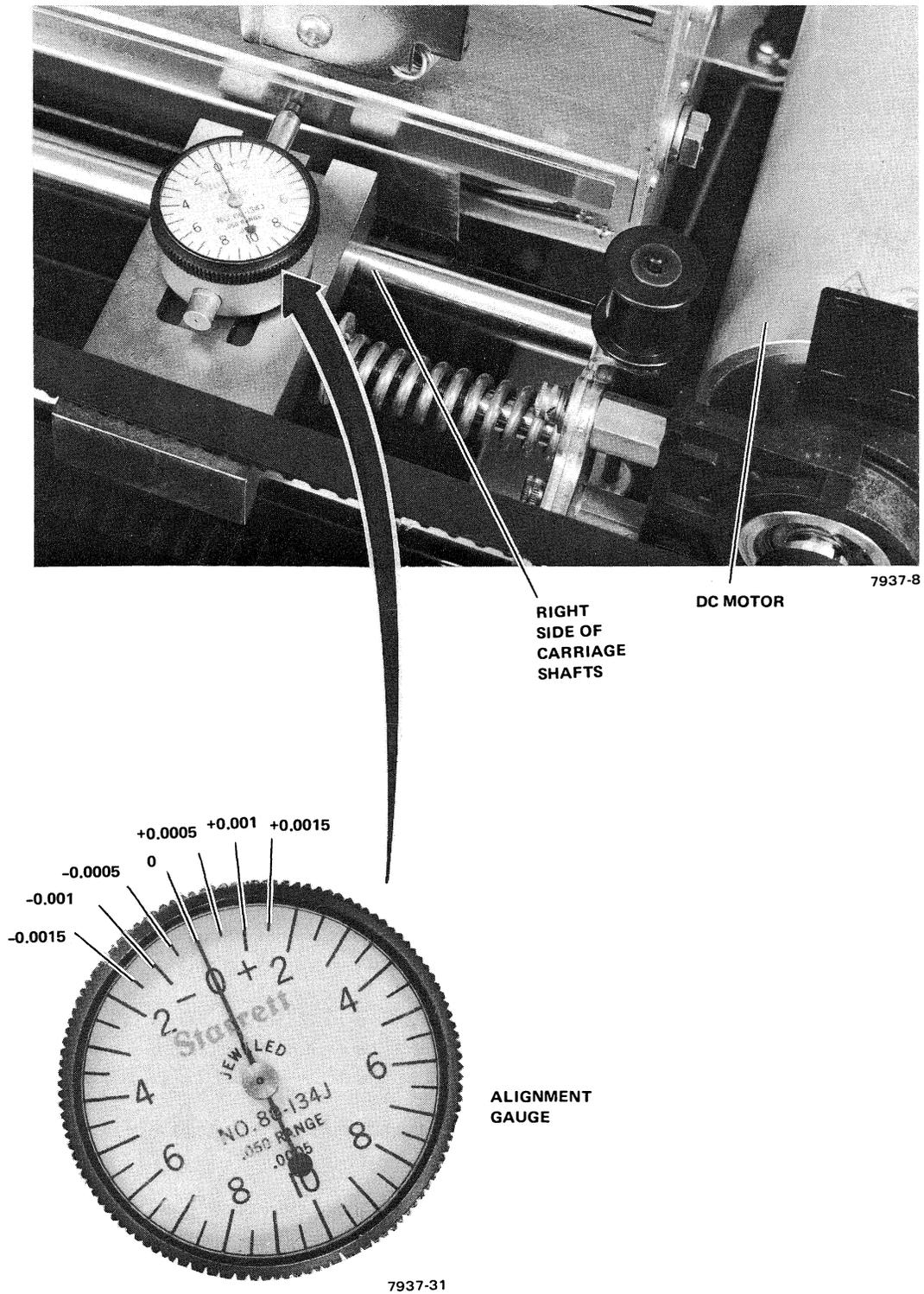
Figure 22   Alignment Gauge Positioning

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14. Slide the alignment gauge along the total length of the carriage shafts:

- The maximum allowable deviation along the carriage shaft is 0.0015 (total indicator reading) with the two ends of the carriage shaft being equal within 0.0005. If these values cannot be obtained, refer to the LA180 Maintenance Manual.

15. With the belt tension spring (Figure 23) in place, press the left-hand pulley against the printer mechanism and slip on the new timing belt.
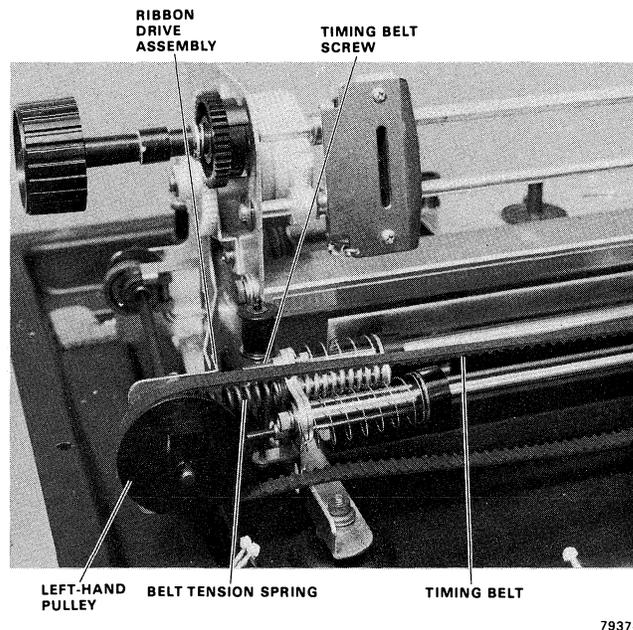
Figure 23   Belt Tension Spring Location

16. Rotate the timing belt screw (Figure 23) until it just touches the ribbon drive assembly. The screw should not exert pressure on the ribbon drive assembly.

17. Secure the print head and TOP OF FORM indicator to the carriage with the four 6-32 screws, lockwashers, and flat washers, ensuring that the timing belt is against the plastic lip (Figure 20). Make the screws finger tight.

18. Set the Carriage Adjustment lever to the minimum gap position (detent closest to the print bar).

CAUTION
It is possible to set the Carriage Adjustment lever beyond the minimum gap position. If this is done, the correct head gap adjustment cannot be made.

19. Slide the alignment gauge along the carriage shaft to the point where the most positive reading on the gauge is obtained. Mark the high spot on the print bar with a pencil (Figure 24).
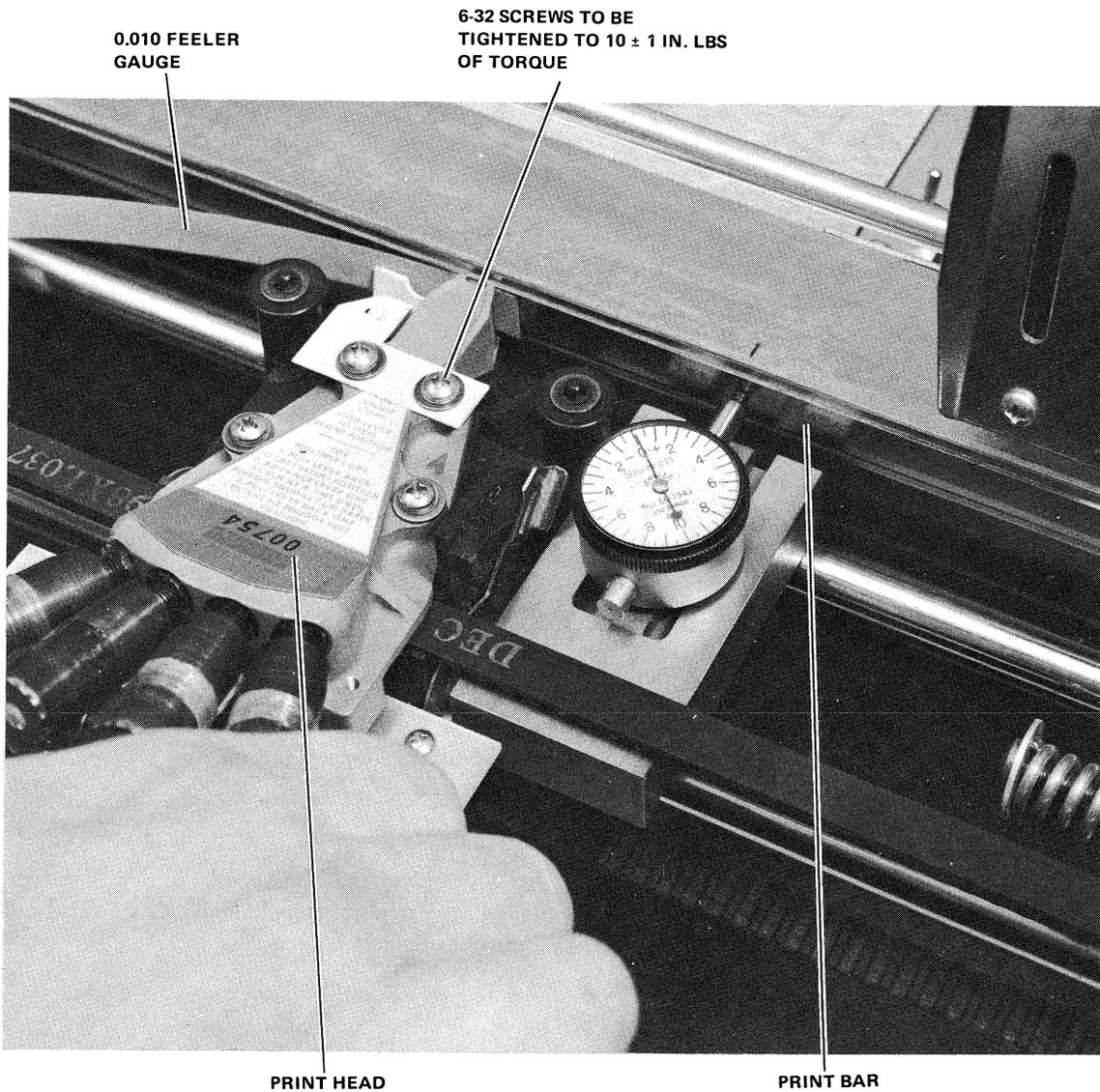
0.010 FEELER
GAUGE

6-32 SCREWS TO BE
TIGHTENED TO 10 ± 1 IN. LBS
OF TORQUE

PRINT HEAD

PRINT BAR

CAUTION
ENSURE THAT FEELER GAUGE IS INSERTED
BETWEEN THE PROTRUSIONS ON THE
PRINTHEAD. FAILURE TO DO SO WILL RESULT
IN IMPROPER CLEARANCE AND SHORTEN
THE LIFE OF THE PRINTHEAD.

7937-3

Figure 24   Print Head Adjustment

20. Move the Carriage Assembly directly in front of the spot marked on the print bar.

21. Place the alignment gauge in the center of the carriage shaft. Set the gauge to zero.

22. Place the 0.010-in. flat feeler gauge between the print head jewel and the front surface of the print bar. Push the print head snug enough against the feeler gauge to cause the indicator to move, but no more than 0.0005 (Figure 24).

CAUTION
Ensure that the feeler gauge rides between the protrusions on the print head. Do not exert excessive force on the print head when making the adjustment; it will cause the carriage shaft to bow, resulting in more than 0.010 in. of clearance.

23. Ensure that the print head is aligned parallel with the print bar; tighten the four 6-32 screws to 10 ± 1 in.-lb of torque.

CAUTION
Do not apply more than the recommended torque when tightening the print head screws or the molded inserts in the carriage assembly may be damaged.

24. Remove the 0.010-in. feeler gauge while looking at the alignment gauge. The needle must move, but not more than 0.0005 in.

NOTE
If the needle does not move or moves more than 0.0005 in., the head must be loosened and the procedure repeated. It may take several tries to adjust the head correctly.

25. Replace the ribbon and ribbon spools.

26. Slide the carriage assembly along the carriage shaft to ensure that nothing is binding. Check to ensure that the ribbon is not rubbing against the line indicator (adjust if necessary).

27. Install the printer housing.

TEST AFTER INSTALLATION

1. Load the LA180 with paper that is at least 9 in. (22.86 cm) wide.

2. Set the ON LINE/OFF LINE switch to OFF LINE.

3. Set the POWER switch to ON.

4. Set the SELF TEST switch to ON.

5. Set the ON LINE/OFF LINE switch to ON LINE for a self-test printout.

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CUT OUT ON DOTTED LINE

— — — — — — — — — — — Fold Here — — — — — — — — — — — —

— — — — — — — — Do Not Tear - Fold Here and Staple — — — — — — — —

digital