QUAD HEAD
MATRIX PRINTER

Model: 2261W

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INTRODUCTION

1.1 SCOPE

This maintenance manual describes the Model 77 Quad Head Matrix Printer manufactured by Wang Laboratories Incorporated.

General information, theory of operation, and maintenance routines are included to enable Customer Engineering personnel and operators to maintain the printer.

The manual is arranged in the following manner:

SECTION 1 - INTRODUCTION: Contains the specifications and a description of the printer.

SECTION 2 - INSTALLATION: Contains procedures for unpacking, setting up, and checking out the printer. Operator controls are described in this section.

SECTION 3 - OPERATION: Describes VFU operations, paper loading, and ribbon changing. Contains the basic 2200 CPU operations for outputting data.

SECTION 4 - THEORY OF OPERATION: Contains detailed electronic descriptions of the printed circuit boards.

SECTION 5 - ADJUSTMENTS, REMOVAL AND REPLACEMENT PROCEDURES.

SECTION 6 - MAINTENANCE: Includes diagnostics, preventive maintenance and troubleshooting tables.

SECTION 7 - ELECTRICAL SCHEMATICS: Contains a complete set of schematics, wiring and interconnection diagrams.

1.2 DESCRIPTION

The Model 77 (marketed as the 2261W) is a microprocessor controlled, 240 line per minute, matrix impact printer designed to be used with the Wang series of 2200 computers. The high printing speed is made possible by using four print heads and the bidirectional printing technique. The printer has dual pitch (10 and 12) and selectable line spacing (6 lines/in. and 8 lines/in.).
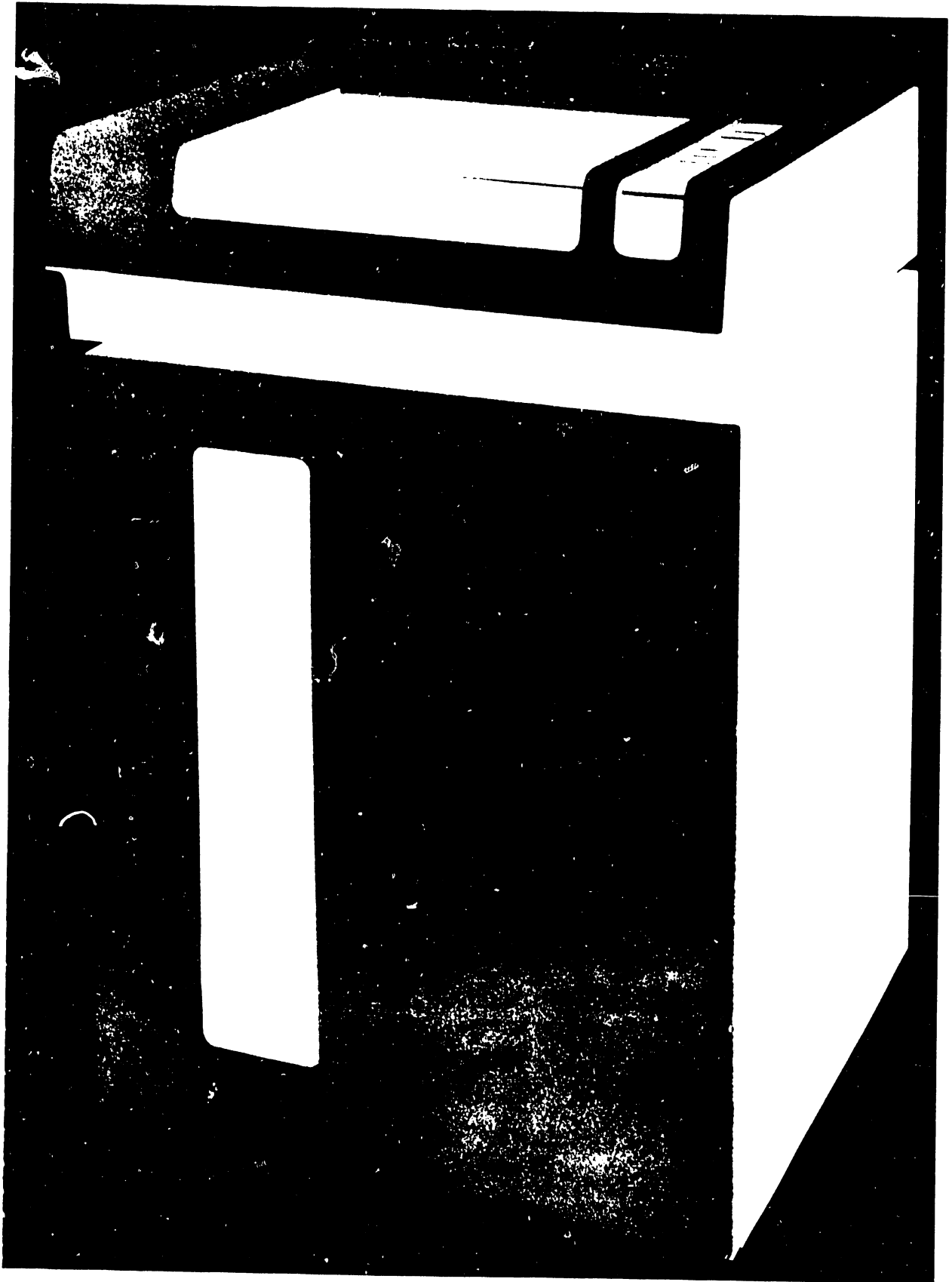
Figure 1-1. Model 77 Quad Head Matrix Printer

Printing Technique

Four matrix print heads are mounted on a single carriage assembly, and each print head handles one quarter of the character line. The print heads operate in unison, printing in both the forward and reverse direction (bidirectional). The individual characters are composed of an 11 x 8 dot matrix at 10 pitch (9 x 8 at 12 pitch). The line length is 136 characters at 10 pitch and 160 characters at 12 pitch. The printer has an expanded character feature which doubles the character width with the code HEX(0E).
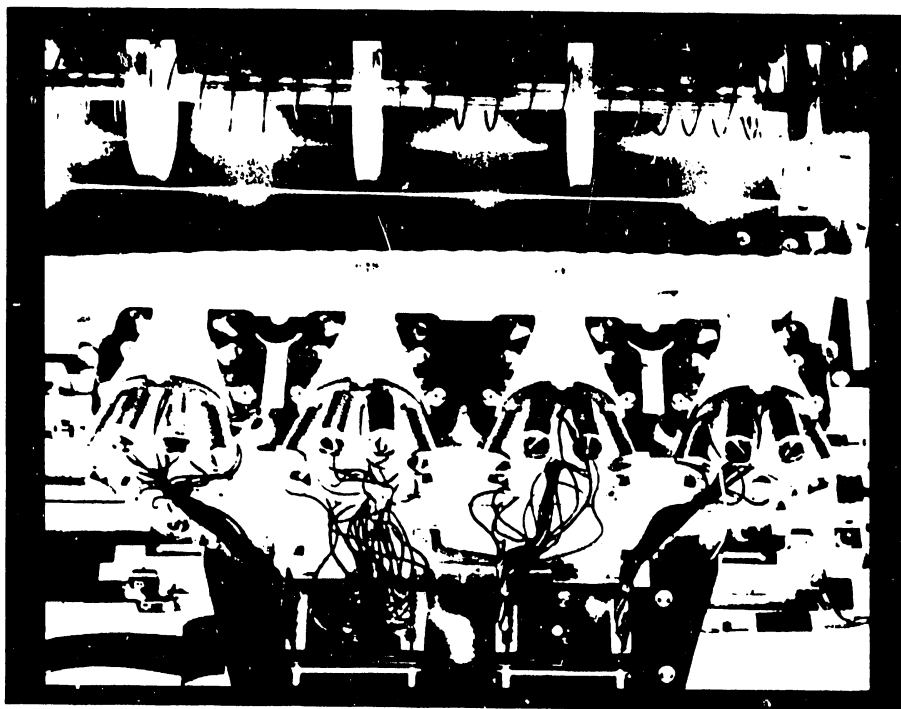
Figure 1-2. Four Print-Head Carriage

Standard Features

Standard features of the printer include a clear switch, alarm lamp and tone, manual line feed, adjustable print head carriage for multiple paper forms, vertical format control with punched tape loop, paper feed control with pin-feed units, bottom-loading paper feed with concealed tray (front panel access), full line buffer, and a Select/Deselect switch to enable the printer to receive data from the 2200 System or to halt printing temporarily without causing loss of data.

1.3 MODEL 77 SPECIFICATIONS

Printer Size:

Height	36 in. (91 cm)
Depth	26 in. (66 cm)
Width	27 in. (68.6 cm)

Weight:

210 lb (94.5 kg)

Speed:

240 lines/min. independent of line length.

Character Configuration:

11 x 8 and 9 x 8 dot matrix (dots not in adjacent columns of same row).

10 char/in. (4 char/cm) or 11.76 char/in. (4.6 char/cm), selectable.

6 lines/in. (2.4 lines/cm) or 8 lines/in. (3.1 lines/cm), selectable.

Character Set:

full ASCII, 96 characters, both uppercase and lowercase

Line Width:

136 characters, maximum with 10 pitch
   (68 characters, expanded)

160 characters, maximum with 12 pitch
   (80 characters, expanded)

Ribbon:

Nylon double spool, reversable
   1 1/2 in. (3.8 cm) wide
   64 yd (58.5 m) long

Switches/Lamps:

ON/OFF, SELECT, PITCH, LINE/IN., LINE FEED, TOP OF FORM, CLEAR, FORM OVERRIDE, paper out alarm and lamp, power on lamp, select lamp, and alarm tone.

Control Codes:

Audio Alarm HEX (07), Line Feed HEX (OA), Vertical Tab HEX (OB), Form Feed HEX (OC), Expanded Print HEX (OE), and Delete (to clear buffer of partial line) HEX (7F).

Vertical Format Control:

>   3-channel, std – 1 inch wide (2.54 cm) tape. Vertical Tab,
>   Top of Form, Page Eject.

Paper Size:

Maximum width	14.9 in. (37.8 cm)
Minimum width	5.0 in. (12.7 cm)
Paper width settings adjustable	
Maximum form length	11 in. (27.9 cm)

>   Up to four copies plus original can be printed.

Cable:

>   6 ft (1.8 m) to power source
>   12 ft (3.7 m) to controller

Controller:

>   Line Printer Controller must be ordered separately to attach
>   to 2200A, B or C or to drive more than one printer/plotter on
>   2200S, 2200T, WCS and 2200VP. The printer interfaces directly
>   with the PCS and the Work Station.

Power Requirements:

>   115 or 230 VAC ± 10%
>   50 or 60 Hz ± 1 Hz
>   460 watts

Fuses:

>   7A (SB) for 115 VAC
>   3A (SB) for 230 VAC
>   10A (SB) for solenoid driver circuit

Operating Environment:

>   50 to 90°F (10 to 32°C)
>   40 to 80% relative humidity, non-condensing, allowable
>   40 to 65% recommended.

SECTION
2
INSTAL-
LATION

SECTION 2
INSTALLATION

2.1 SITE CONSIDERATIONS

The dimensions of the printer, with all cabinet doors closed, are listed in Section 1. When selecting a location for the Model 77, leave sufficient room around the printer to open the front and rear access doors and the top cover. In this way, it will not be necessary to move the printer during routine operations such as ribbon changing and paper loading.

Clearances

1.   Allow approximately 27" in front of the printer to open the front access door (paper compartment).
2.   Allow approximately 26" in the rear of the printer to open the rear access door (service access area).
3.   Allow approximately 34" above the printer to open the top cover (access to printer mechanism).

The Model 77 must be located within 12 feet (standard I/O cable length) of the system 2200 CPU. Cable extensions are available to permit the printer to be located as far as 50 feet from the CPU. The standard AC line cord is 6 feet long.

Ambient air is drawn in through a vent in the bottom of the printer cabinet. The air is circulated throughout the printer by three cooling fans, and then exhausted through a vent in the rear door. To ensure adequate cooling of the Model 77, do not obstruct the air flow around the base of the unit. See Figure 2-1.

For the purpose of estimating room air conditioning requirements, note that the printer heat dissipation is rated at 1572 BTU per hour maximum, and the normal operating environment is from 50°F to 90°F (10°C to 32°C) at relative humidities from 40% to 80%.

EXHAUST
FANS

AIR INTAKE
FILTER
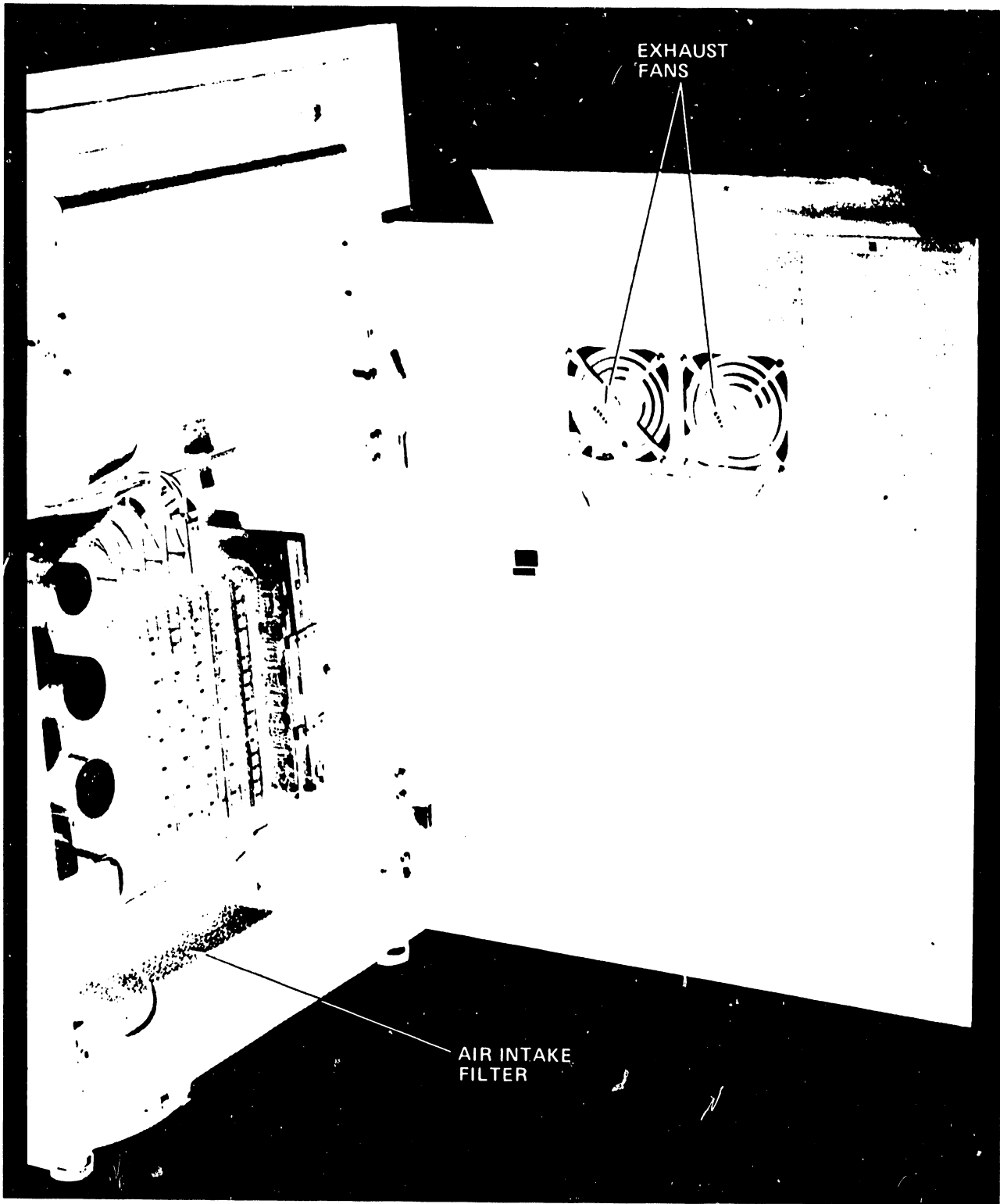
Figure 2.1. Printer Cooling

2.2 UNPACKING AND REPACKING

2.2.1 *UNPACKING (SEE FIGURE 2-2)*

1. Cut the two plastic straps around the printer packing container.

2. Pry the corrugated cardboard away from the wooden base.

3. Lift off the packing box and Instapack.

4. Remove the plastic bag that covers the printer.

5. Remove the tape that secures the front and rear doors and the top cover.

6. Remove the four 7" bolts from the bottom of the wooden shipping base. This operation will require the opening of the printer access doors. The rear door is held closed by a latch at its upper left corner. Loosen the latch locking bolt (accessible in the top compartment near the right hinge) and slide it to the left.

7. Lift the printer off its wooden shipping base.

8. Open the printer top cover. Remove the shipping tape from the left and right tractor feed mechanisms and the left and right ribbon assemblies.

9. Temporarily remove the print head shield (4 screws, 2 each side); then, remove the right and left rubber tubing retainers from the carriage shaft.

10. Locate the I/O cable and line cord (shipped in jiffy bags and stored inside the printer).

11. The packing materials should be retained for use in reshipping or storing the printer.

COLLAR

PLASTIC
STRAPS

CORRUGATED CARDBOARD
NAILED TO CLEATS
AROUND INSTAPACK

INSTAPACK AROUND
PRINTER

PRINTER COVERED
BY PLASTIC BAG

WOODEN BASE

7-INCH BOLTS
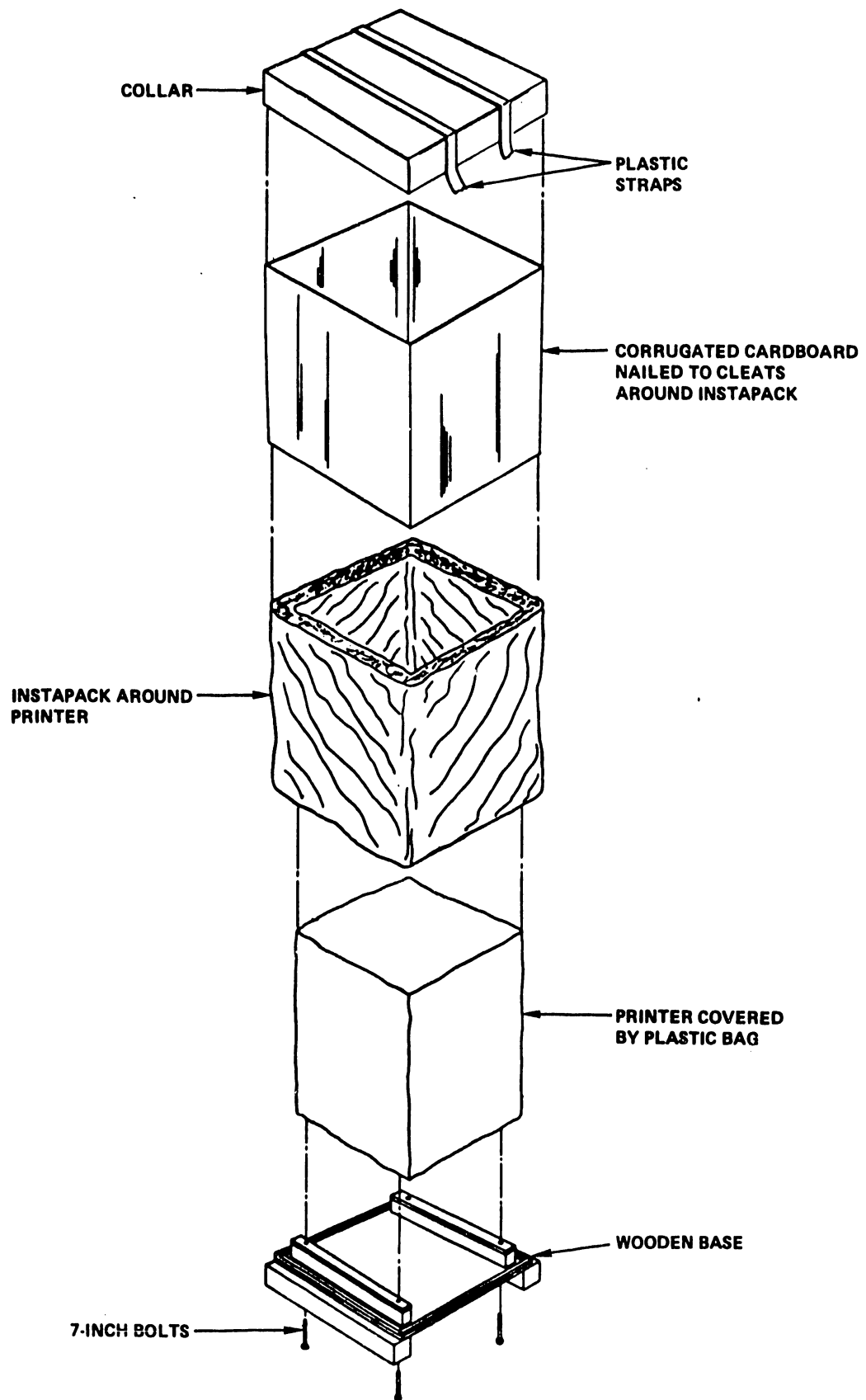
Figure 2-2. Unpacking the Printer

2.2.2 *REPACKING*

Reverse steps 2 through 9 of the unpacking procedure, section 2.2.1.

2.3 UNIT SET UP AND INSPECTION

1.   Check that the paper guide/static eliminator on the rear door
      of the printer is properly installed. See Figures 2-3 and 2-4.
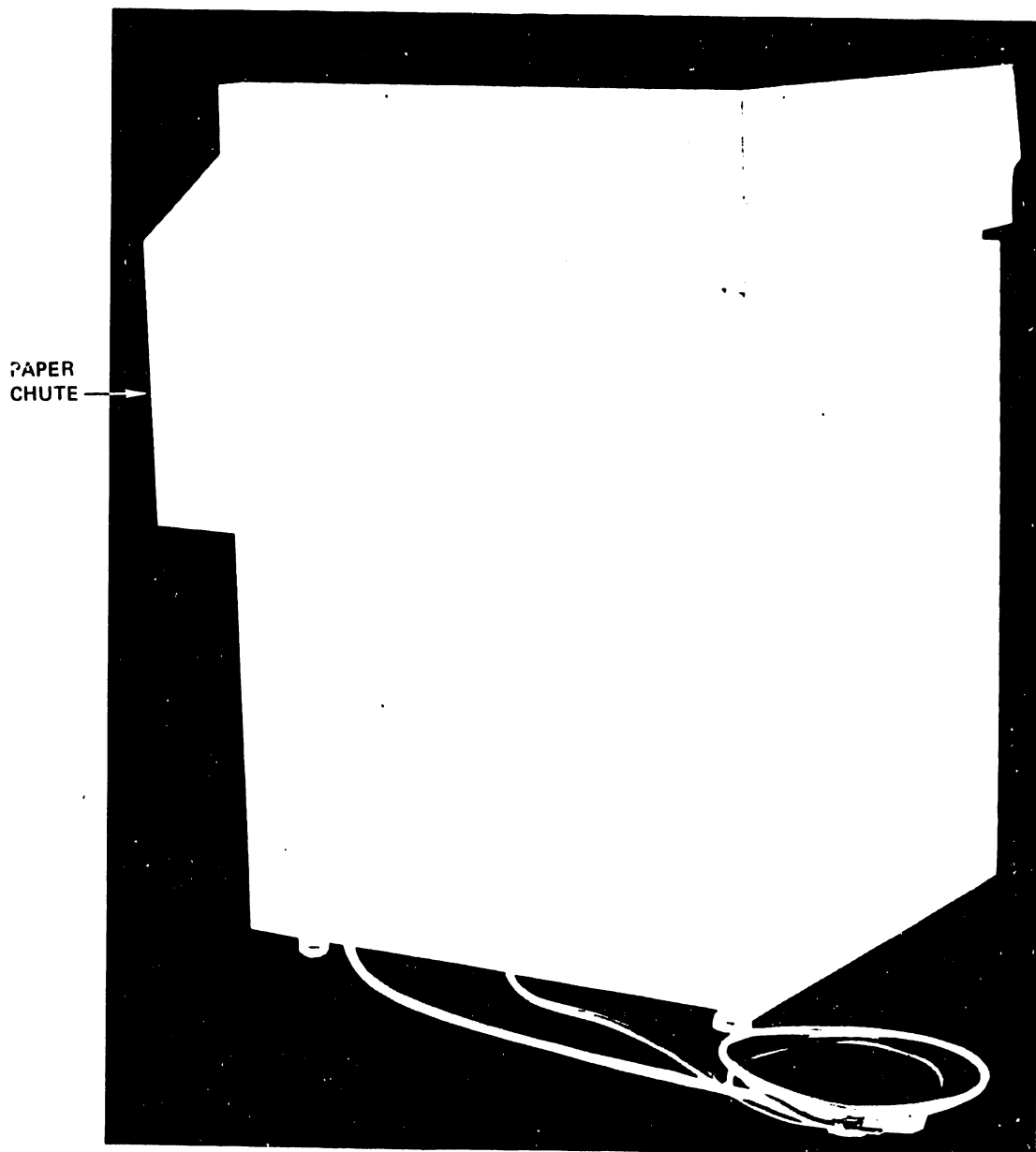
PAPER
CHUTE

Figure 2-3. Model 77 Rear View

REAR PAPER GUIDE

STATIC ELIMINATOR
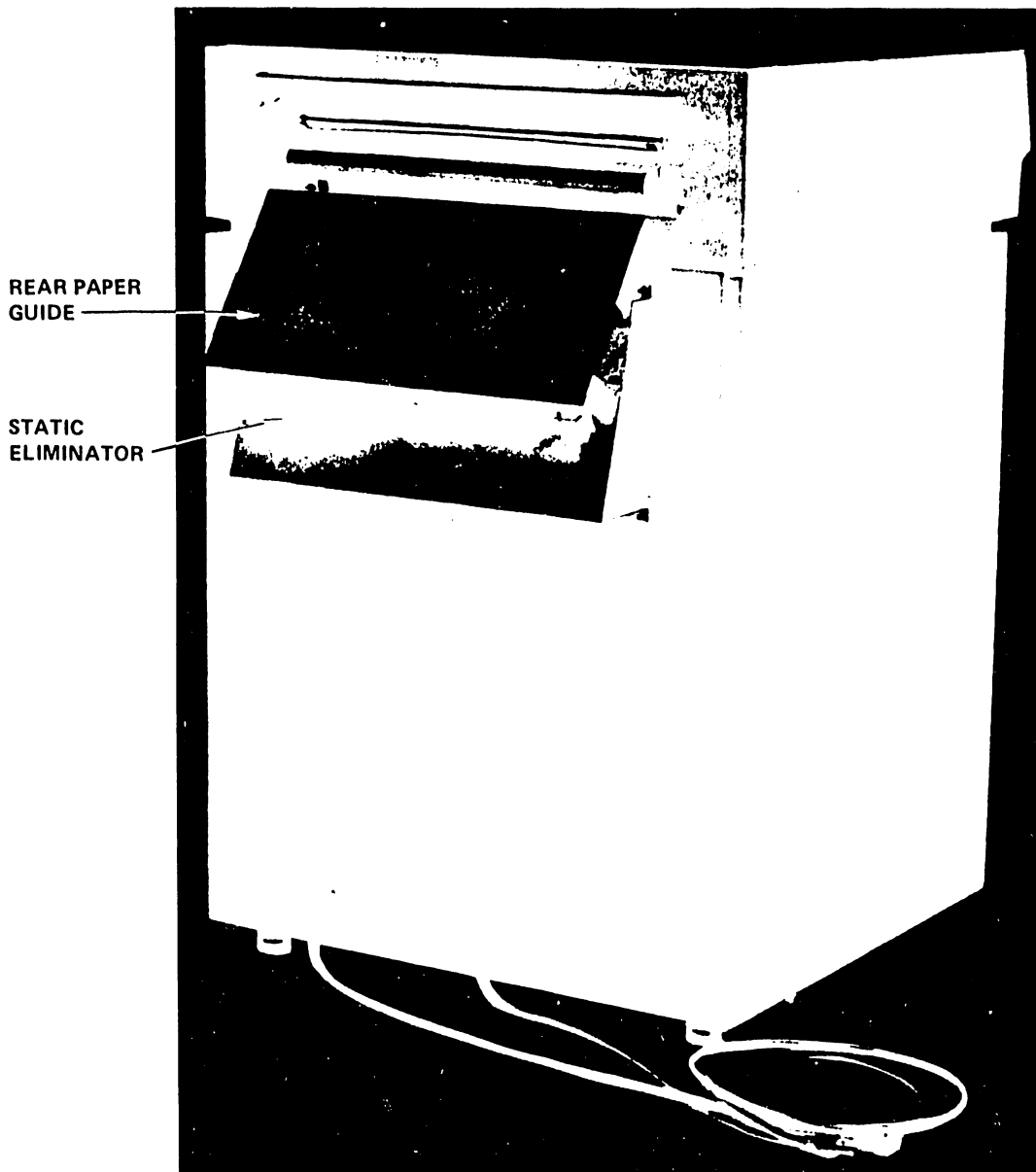
Figure 2-4. Rear View/Paper Chute Removed

2. Open the printer top cover, remove the print head shield, and inspect the carriage assembly. Manually slide the carriage back and forth along the carriage shaft and check that it moves freely, without binding. See that the print head fingerboards are seated properly in their connectors. See Figure 2-5.

3. Check that the two encoder fences do not contact the photo-couplers as the carriage is moved back and forth. Visually check the encoder fences for scratches.

CARRIAGE ASSEMBLY

LEFT PIN
FEED SPROCKET

RIGHT PIN
FEED SPROCKET

FRONT RIBBON
GUIDE (LEFT)

FRONT RIBBON
GUIDE (RIGHT)

12 PITCH
ENCODER FENCE

CARRIAGE
SHAFT

HEAD
CABLES

HEAD ADJUSTMENT
ARM

FINGERBOARD
CONNECTOR
MOUNT

10 PITCH
ENCODER FENCE
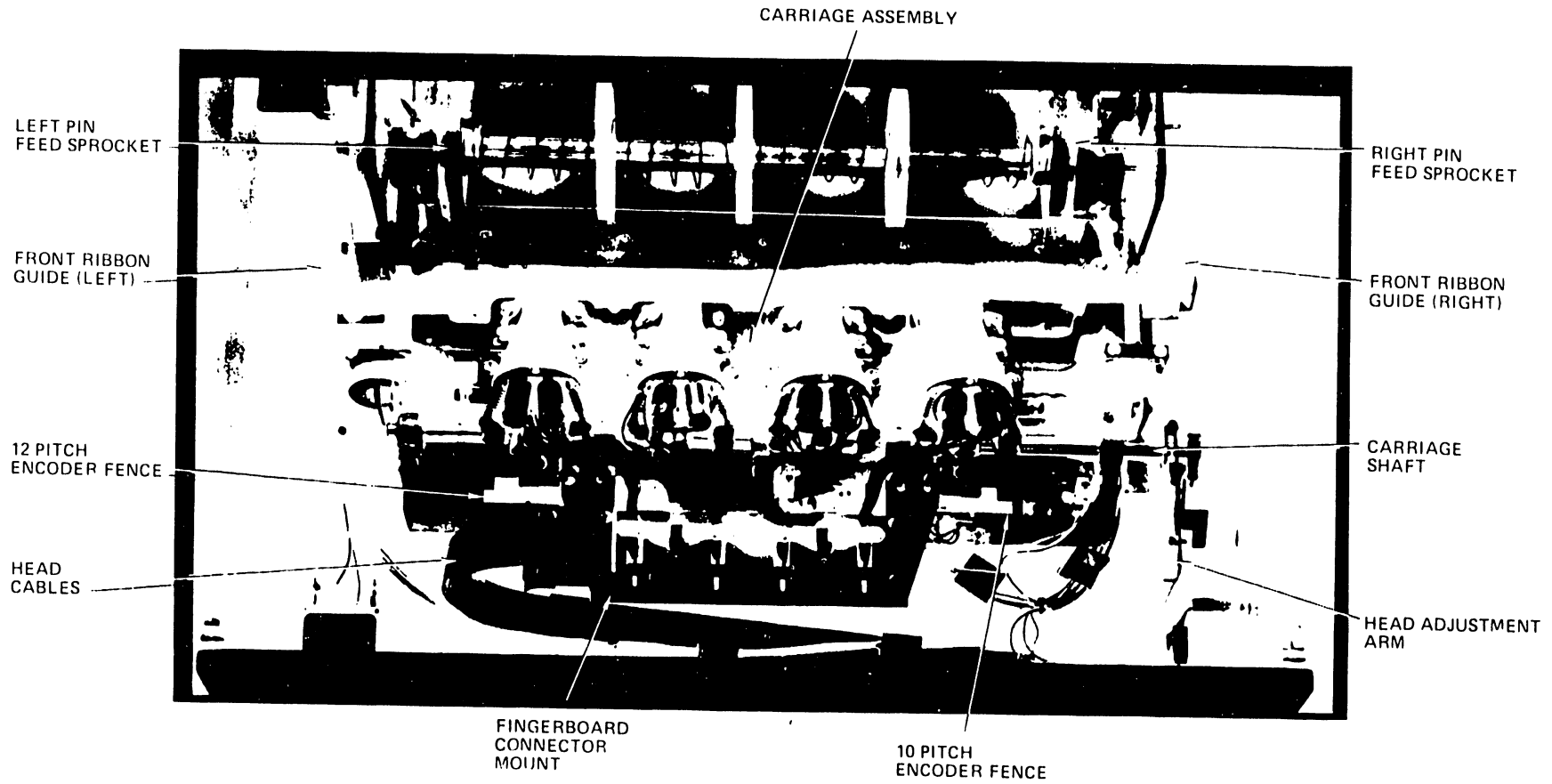
Figure 2-5. Printer Assembly/Print Head Shield Removed

4. Inspect the left and right ribbon drive assemblies. See that the ribbon is properly installed around the front ribbon guides. Manually wind the ribbon spools to take up any slack.

5. Check the paper feed mechanism by manually turning the Vertical Vernier knob. The two pin feed sprockets should turn along with the sprocket in the VFU tape reader. Next, press in the Vernier knob and turn it again; the VFU sprocket should now be disengaged.

6. The Vertical Format Tape is shipped already installed in the tape reader. Inspect the vertical format unit (at the left of the printer mechanism) and see that the format tape is properly seated.

7. Open the front access door and locate the head adjustment arm, under the right edge of the printer. Move the adjustment arm forward and back while observing the print heads. See that the print head movement is not obstructed in any way.

8. Open the rear access door of the printer. Check all the printed circuit boards for proper seating. See that the four ribbon cables to the solenoid driver boards are seated in their connectors. Check the tightness of all the chassis screws that hold the power regulator (7136) and the four solenoid driver boards (7035). Note that the chassis swings out on a hinge to allow easy access to the printer electronics.

2.4 OPERATOR CONTROLS AND INDICATORS (SEE FIGURES 2-6 AND 2-7)

ON/OFF SWITCH AND POWER LAMP

This switch, the main power control for the printer, is located on the front control panel, behind the front access door. When the ON/OFF switch is turned to the ON position, the POWER lamp on the main control panel will light. Turning the switch to the OFF position will shut off the main power to the printer.
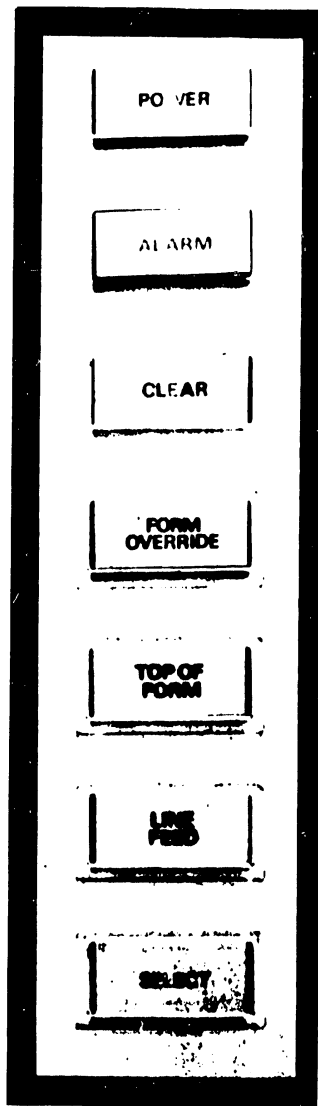
Figure 2-6. Main Control Panel

SELECT

The SELECT pushbutton puts the printer in a ready state for receiving data from the 2200 CPU. The SELECT button lights when the printer is in the SELECT MODE (ready to receive data). When the button is pressed a second time, the printer is deselected and the lamp turns off.

LINE FEED

Pressing this pushbutton (on the main control panel) will advance the print paper one linespace. When the switch is held down, the paper advances continuously. The LINE FEED button operates only when the printer is deselected.

TOP OF FORM

Pressing the TOP OF FORM pushbutton will advance the paper to the
next top of page. This button operates only when the printer is dese-
lected. Note that the paper advance is controlled by the Vertical Format
Tape.

FORM OVERRIDE

When an out of paper condition is sensed by the paper out switch,
the printer stops printing, an audible tone is sounded, and the FORM
OVERRIDE pushbutton lights. Press and hold down the FORM OVERRIDE
button to complete the printing of the current line or page. Reload
the printer with paper before resuming normal operation.

CLEAR

This control clears the printer line buffer when the printer is
deselected.

ALARM

If a paper or ribbon jam prevents the free movement of the carriage,
the circuit breaker for the carriage servo will trip, an audible alarm
tone will sound for one second, and the ALARM lamp will light continuously.

Inspect the paper drive and ribbon drive to correct the malfunction,
and then reset the servo circuit breaker.

The ALARM feature is programmable using the code HEX (07). This
HEX code will light the ALARM lamp and generate a two second tone in
the speaker.

PITCH

The Pitch toggle switch is located on the front panel of the printer.
The switch is labeled 10 and 12. To select 10 characters per inch, turn
switch to 10; to select 12 characters per inch, turn switch to 12.

PAPER MARGIN KNOBS

VERTICAL VERNIER
KNOB

VERTICAL FORMAT
TAPE READER

HORIZONTAL VERNIER
KNOB

FORM SCALE

PRINT HEAD
SHIELD

HEAD POSITION
INDICATOR

ON OFF SWITCH

SERVO MOTOR
CIRCUIT BREAKER

HEAD ADJUSTMENT
ARM

VERTICAL LINE
SPACING SWITCH

PITCH CONTROL
SWITCH
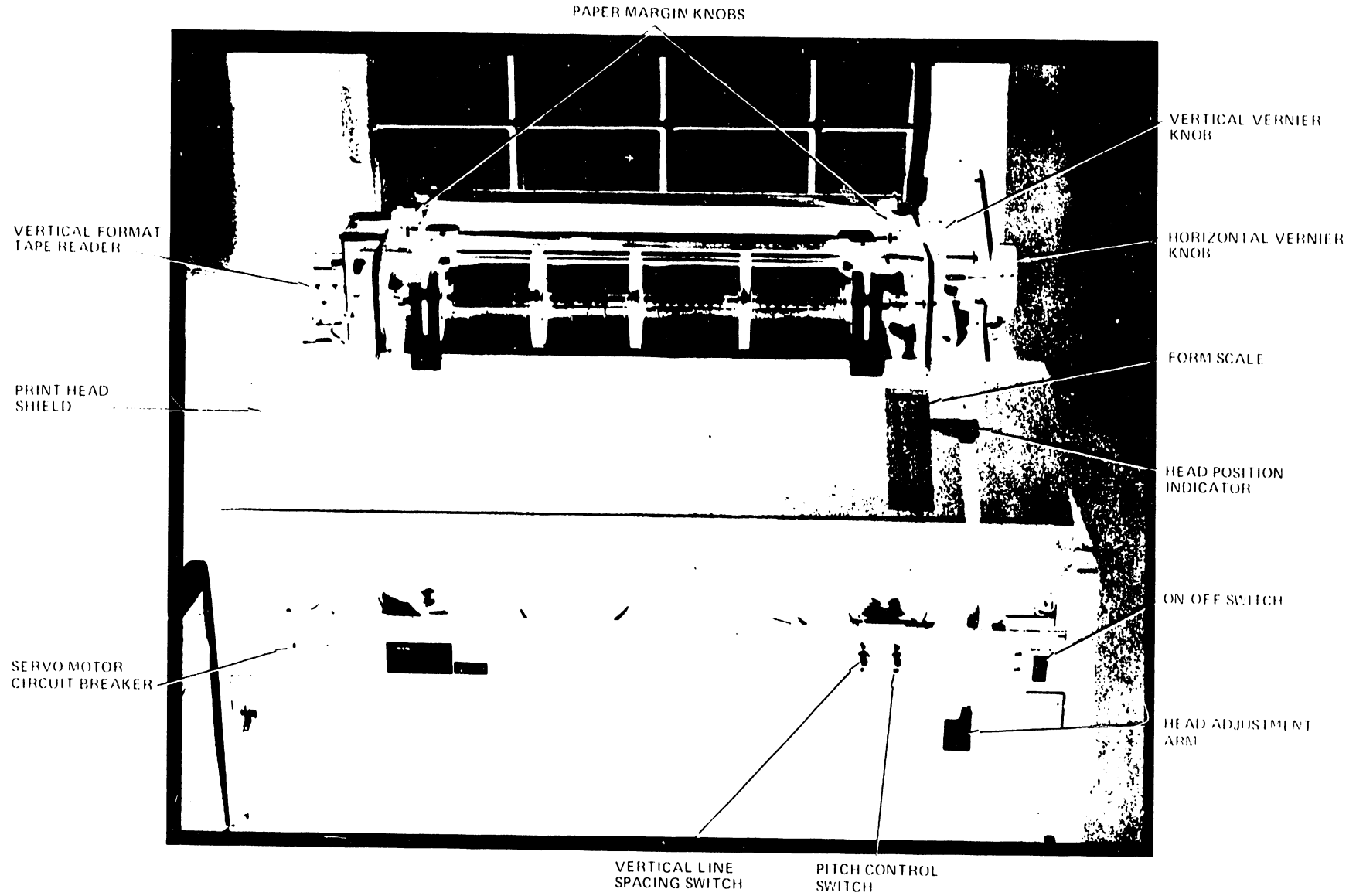
Figure 2-7. Operator Controls

VERTICAL LINE SPACING SWITCH

The Vertical Line Spacing toggle switch is located on the front panel of the printer. The switch is labeled 6 and 8. To select 6 lines per inch, turn switch to 6; to select 8 lines per inch, turn switch to 8.

SERVO CIRCUIT BREAKER

This resettable breaker switch opens when the carriage servo current exceeds the breaker limit (7.5 amps). When the breaker opens, the alarm tone sounds and the ALARM lamp lights. The servo breaker is located on the front control panel, behind the front access door.

HEAD ADJUSTMENT ARM

This lever is located inside the front access door, directly under the right side of the printer mechanism. It links to the carriage shaft and controls the distance between the print heads and the striker bar. The lever is adjusted to accommodate various thicknesses of print paper. Each detent represents approximately .002" of print head movement.

A form scale, on the right side of the printer mechanism, indicates the position of the adjustment arm. When the print heads are fully forward, the indicator should read 0.

VERTICAL VERNIER KNOB

This knob is used for aligning the paper forms with the Vertical Format Tape. When the knob is pressed in, the paper advance stepper motor and the VFU are disengaged. The knob can then be turned to advance the print paper only.

HORIZONTAL VERNIER KNOB

This knob is used for fine horizontal adjustment of the print paper.

PAPER MARGIN KNOBS

These two knobs are used for adjusting the pin feed sprockets to the paper form width. Loosen these locking knobs and move the pin feed units to the correct form width.

MAIN FUSE

The main AC power fuse is located at the bottom left of the electronics chassis (as viewed from the rear of the printer). It is rated at 7 amps for 115 VAC or 3 amps for 230 VAC.

SOLENOID DRIVER FUSE

A 10 amp SLO BLO fuse is located on the reverse side of the motherboard; this fuse protects the 40V power supply for the solenoid driver boards.

The LED mounted on the top side of the 7136 regulator board should light whenever AC power is supplied to the printer. If the LED does not light, the solenoid driver fuse is blown.

115/230 VOLT SELECTION SWITCH

This switch must be set to the user's line voltage. It is located at the bottom left of the electronics chassis, near the main fuse.

ELAPSED TIME METER (IN LATER MODELS)

An AC time meter, calibrated in hours, is mounted near the top left corner of the electrical chassis. It keeps an accurate record of printer use by recording the total operating time of the main carriage servo motor.

2.5 DYNAMIC CHECKOUT

1. Set the voltage selection switch, located at the lower left of the electrical chassis, to the user's line voltage, 115 VAC or 230 VAC.

2. Connect the power cord to an electrical outlet.

3. Connect the 36 pin I/O cable from the printer to the 2200 CPU. In the printer, the I/O fingerboard plugs into the top I/O connector on the motherboard. Check that it is properly seated. At the CPU, the I/O cable connects to a 7079 Matrix Printer Controller. The triple controllers (7042, 6742, 6741) can also be used.

4. Turn on the main power switch (a one second tone will sound).

5. Check that all the cooling fans are running.

6. See that the LED on the regulator board (7136) is lit.

7. Check for $+5 \pm .1V$ VRSW at connector pin 12_3 of the 7136 PCB. Adjust this voltage to its correct level by R-32 on the 7136 PCB. See Section 5 for component locations.

8. Check for +12 to +12.5 VRSW at connector pins A_1 and 1_1. Adjust to the correct level by R-37.

9. Load paper as described in section 3.2.

10. Move the print heads forward (position 0) using the head adjustment arm.

11. Check the operation of all controls on the main panel and front panel.

12. Select the unit and run the printer diagnostic in Section 6.

13. Perform the timing adjustment checks described in Section 5.2.2.

14. Record the initial reading of the elapsed time meter (top left corner of electrical chassis). The time meter will later be used to determine preventive maintenance schedules.

SECTION
3
OPERA-
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SECTION 3

OPERATION

3.1 VERTICAL FORMAT UNIT

3.1.1 *OPERATION OF THE VFU*

The Vertical Format Unit (VFU), located on the left side of the
printer mechanism, uses the same 3 channel tape reader found in the
Wang Models 61 and 72 matrix printers. It has the added feature of
vertical line spacing at both 6 lines/inch and 8 lines/inch. Line
spacing selection is controlled by a toggle switch on the front panel,
near the main power switch. See Figure 3-1.

PUNCHED TAPE

PHOTOTRANSISTOR   COVER/LED HOUSING
HOUSING
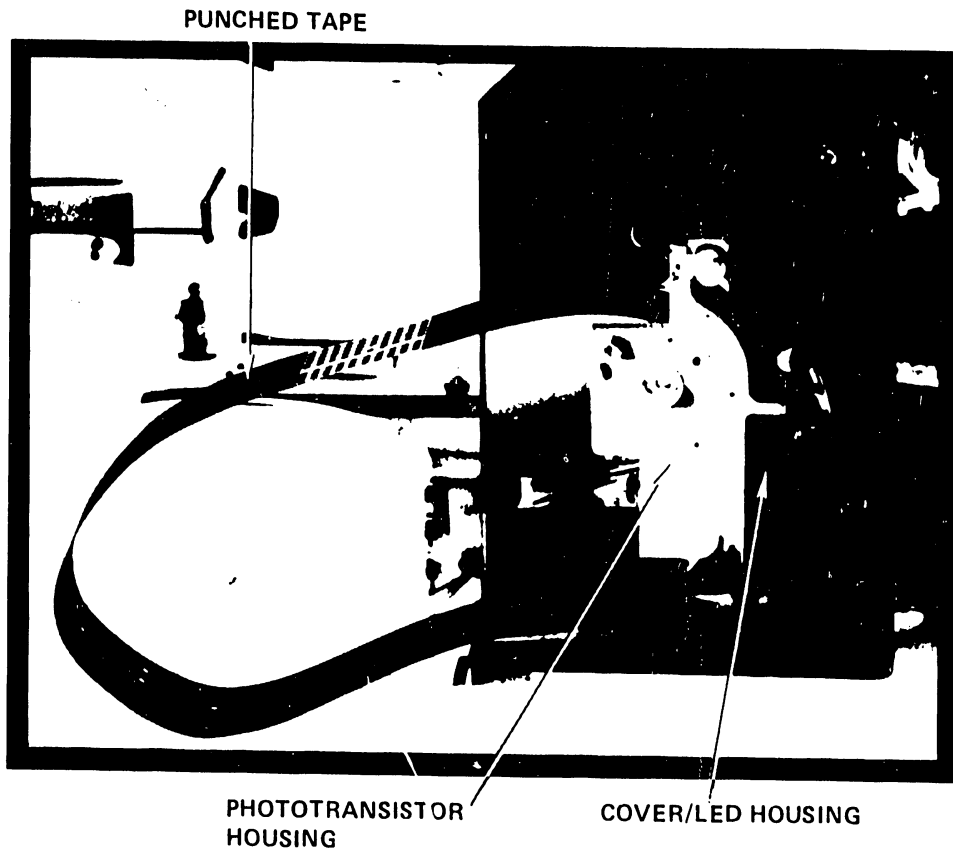
Figure 3-1. Vertical Format Tape Reader

The VFU reads a standard one inch wide, eight channel tape with 1/10 inch pitch sprocket holes located between channels 3 and 4. Paper or Mylar tape can be used, as long as it is opaque.

The tape reader contains four pairs of LED's and phototransistors, positioned to sense punched holes in the format tape. Three pairs are channel detectors: Channel 2 is used for Paper Eject (end of document), Channel 5 is used for Vertical Tab, and Channel 7 is used for Top of Form. No other tape channels are recognized by the VFU. See Figure 3-2.

TOP OF FORM
(CHANNEL 7)

VERTICAL TAB
(CHANNEL 5)

SPROCKET
HOLES

PAPER EJECT
(CHANNEL 2)
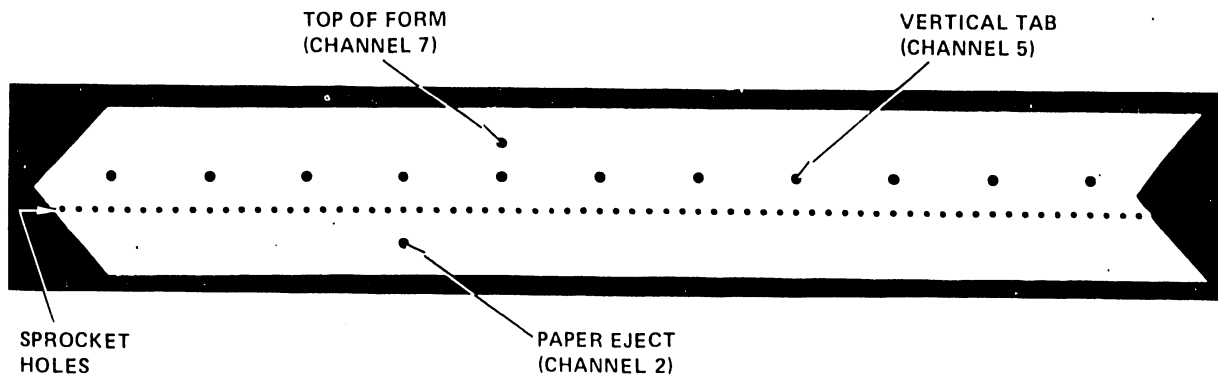
Figure 3-2. Vertical Format Tape

The fourth LED/phototransistor pair is the sprocket hole detector. As the sprocket holes move past the detector, a strobe signal (SKTH) is generated. This signal is used for gating and phasing the Paper Eject, Vertical Tab, and Top of Form functions of the VFU.

The VFU is mechanically linked to the paper feed stepper motor, which advances the print paper by one line for each sprocket hole in the format tape. The VFU will produce 6 or 8 print lines per inch dependent upon the setting of the vertical line spacing toggle switch.

When the printer receives a *vertical tab* code, HEX (0B), the format tape advances to the next hole in channel 5, and the print paper advances accordingly.

When the printer receives a *form feed* code, HEX (OC), or when the *top of form* switch is pressed, the format tape advances to the next hole in channel 7, and the print paper advances accordingly.

The *paper eject* (end of document) feature uses channel 2 of the format tape. When a hole is sensed in channel 2, the tape advances to the next punched hole in channel 7, and the print paper advances over the tear line to the next top of form.

On the standard VFU format tape, Vertical Tab holes are punched six sprocket holes apart (corresponding to a one inch tab - 2.54 cm or 6 lines). The Form Feed holes are punched 66 sprocket holes apart corresponding to an 11 inch (27.9 cm) form.

3.1.2 *COPYING A VERTICAL FORMAT TAPE*

To produce a copy of the tape supplied with the printer, either a Teletype or a manual punch can be used. On a Teletype, insert master tape in the reader and lock it in; turn the switch to START.

1. Turn LOCAL switch to extreme clockwise position.
2. Turn PUNCH switch ON.
3. Pr· s the HERE IS key several times (to generate leader).
4. For a Vertical Tab hole (in channel 5), press and hold CONTROL key, then press P. For a Vertical Tab and Top-of-Form holes (in channels 5 and 7), press P key alone. To generate sprocket holes (one space at a time) press and hold CONTROL and SHIFT, then press P for each hole.
5. For an End-of-Document hole (in channel 2), press and hold the CONTROL key, then press B.
6. When new tape is complete, press the HERE IS key to generate ending trailer; remove tape from reader.

FUNCTION DESIRED	CHARACTER OR FUNCTION ON TELETYPE WHICH CORRESPONDS
VERTICAL TAB	CONTROL P
END OF DOCUMENT	CONTROL B
TOP OF FORM	SHIFT P
SIMULTANEOUS VERTICAL TAB AND TOP OF FORM	P
SIMULTANEOUS END OF DOCUMENT AND VERTICAL TAB	CONTROL R
SPACING BETWEEN FUNCTIONS	CONTROL SHIFT P

NOTE:

Holes punched anywhere other than channels 2, 5, and 7 are ignored by the VFU.

To splice prepared format tape, cut a piece of 1" opaque paper tape at least 15" long. (This length will provide two *top-of-form* functions.) Determine exactly where the tape is to be spliced by counting sprocket holes and vertical tab holes. Overlap the tape ends, mark the tape accurately, and cut the tape so that the ends abut evenly. Trim as necessary and then splice the ends using splicing squares Part #660-0176 on both sides of tape to prevent catching or breaking of the splice. See Figure 3-3.
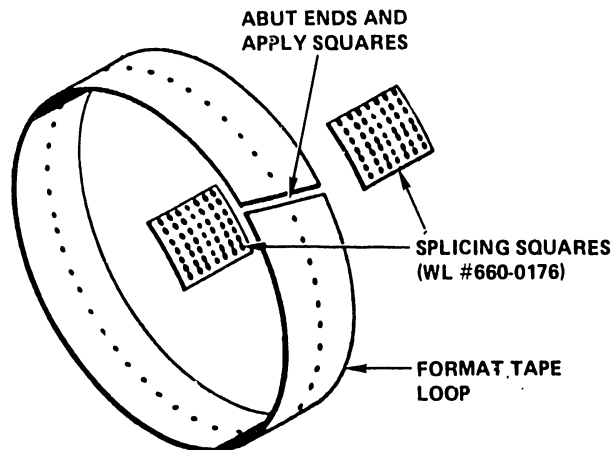
Figure 3-3. Splicing The Format Tape

3.1.3 *REPLACING A VERTICAL FORMAT TAPE*

1. Open the top cover of printer to gain access to the tape reader, on the left side of the printer mechanism.

2. Open the tape reader cover and install the format tape in the tray, ensuring that the sprocket teeth protrude through the tape. The channel 7 punched holes must be closest to the tape reader mounting plate, and the channel 2 punched holes must be farthest away. See Figure 3-4.
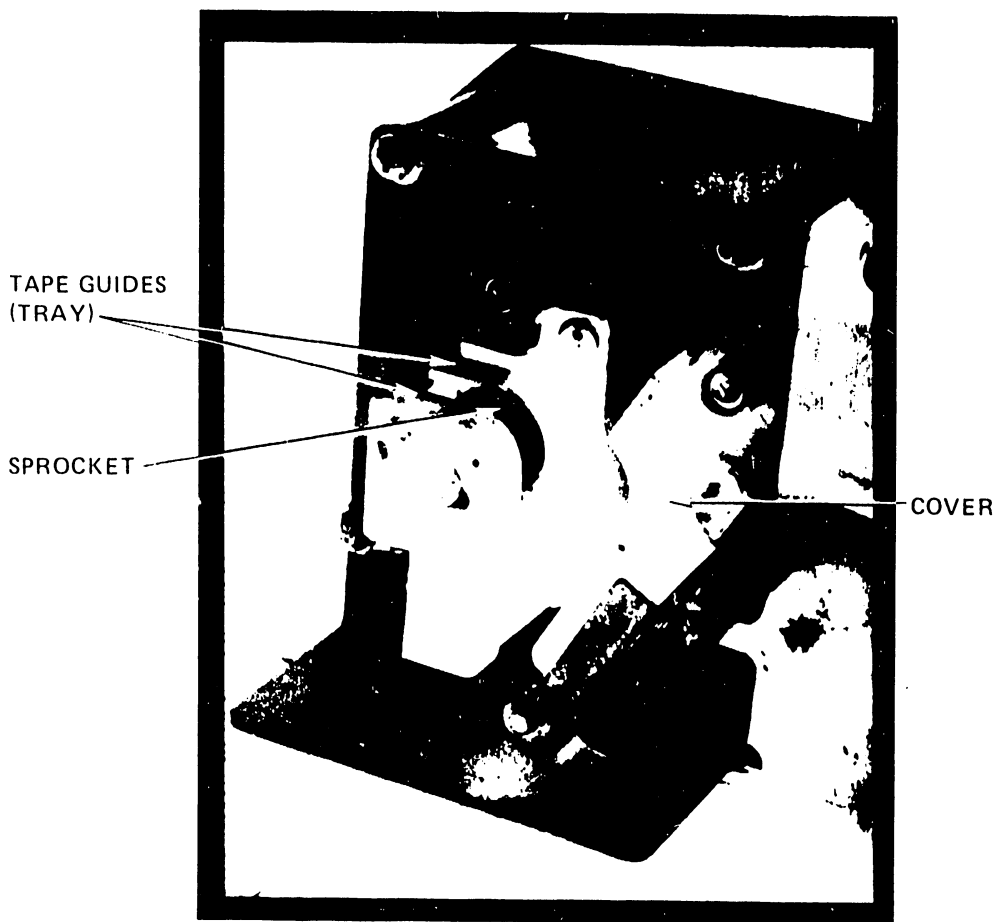
Figure 3-4. Tape Reader/Cover Open

3. Close the tape reader cover.

4. Align the print paper with the format tape as described in the following section; then, check the VFU for proper operation.

NOTE:

If no tape is installed in the VFU, the printer will
single space every line at either 6 lines per inch or
8 lines per inch. Conversely, if any LED's are burned
out or permanently blocked, the printer will perform
a continuous form feed.

3.2 PAPER LOADING

1. Open the front panel door to gain access to the paper storage compartment.

2. Position a box of continuous forms paper in the paper compartment, under the paper guides.

3. Pull the front paper guide back and channel the end of the paper up, through the bottom of the printer.

4. Loosen the locking knob on the right paper sprocket mechanism and move the mechanism left or right for the correct paper width. Tighten the locking knob.

5. Raise the spring loaded covers on both paper feed sprockets.

6. Insert the paper evenly on both sprocket wheels, with the margin holes over the sprocket pins. Close the sprocket covers.

7. Use the Vertical Vernier knob, at the right side of the printer mechanism, for aligning the paper forms with the VFU tape. When the Vernier knob is turned, both paper feed sprockets turn simultaneously, along with the Vertical Format Unit sprocket. If the Vernier knob is pushed in, the VFU sprocket will be disengaged.

8. Using the head adjustment arm, move the print heads forward.

9. Close the top cover of the printer. Turn the power switch ON; this will light the POWER lamp on the main control panel.

10. Press the LINE FEED switch to advance the paper through the printer.

11. Press the TOP OF FORM switch; this will advance the paper until the Vertical Format Unit senses a TOP OF FORM hole in the vertical format tape.

3.3 RIBBON REMOVAL AND REPLACEMENT

Removal

1. Turn the main power switch off.
2. Open the top cover to gain access to the ribbon drive mechanisms.
3. Set the head adjustment arm to the ribbon load position (heads all the way back).
4. Lift the left and right ribbon spools off the spindles. Remove the ribbon from the tension arms, reverse actuators, and ribbon guides.

Replacement (Refer to Figure 3-5)

1. Obtain a new ribbon. Separate the two 4" ribbon spools approximately 20" and thread the exposed part of the 1 1/2" wide ribbon around the two front ribbon guides, through the reverse actuators, and behind the tension arms.
2. Set the ribbon spools on the left and right spindles.

NOTE:
The ribbon must feed from the inner side of each spool. The left ribbon spool must unwind by clockwise movement (as viewed from the top of the printer); the right ribbon spool must unwind by counterclockwise movement.

3. One of the two metal ribbon rivets should be visible near the empty ribbon spool. Ensure that this rivet is behind the reverse actuator to prevent it from moving in front of the print heads during printer operation. See Figure 3-6.

REAR RIBBON GUIDE (LEFT)

LEFT RIBBON TENSION ARM

RIGHT RIBBON TENSION ARM

REAR RIBBON GUIDE (RIGHT)

RIBBON REVERSE ACTUATOR (LEFT)

4-INCH RIBBON SPOOLS

RIBBON REVERSE ACTUATOR (RIGHT)
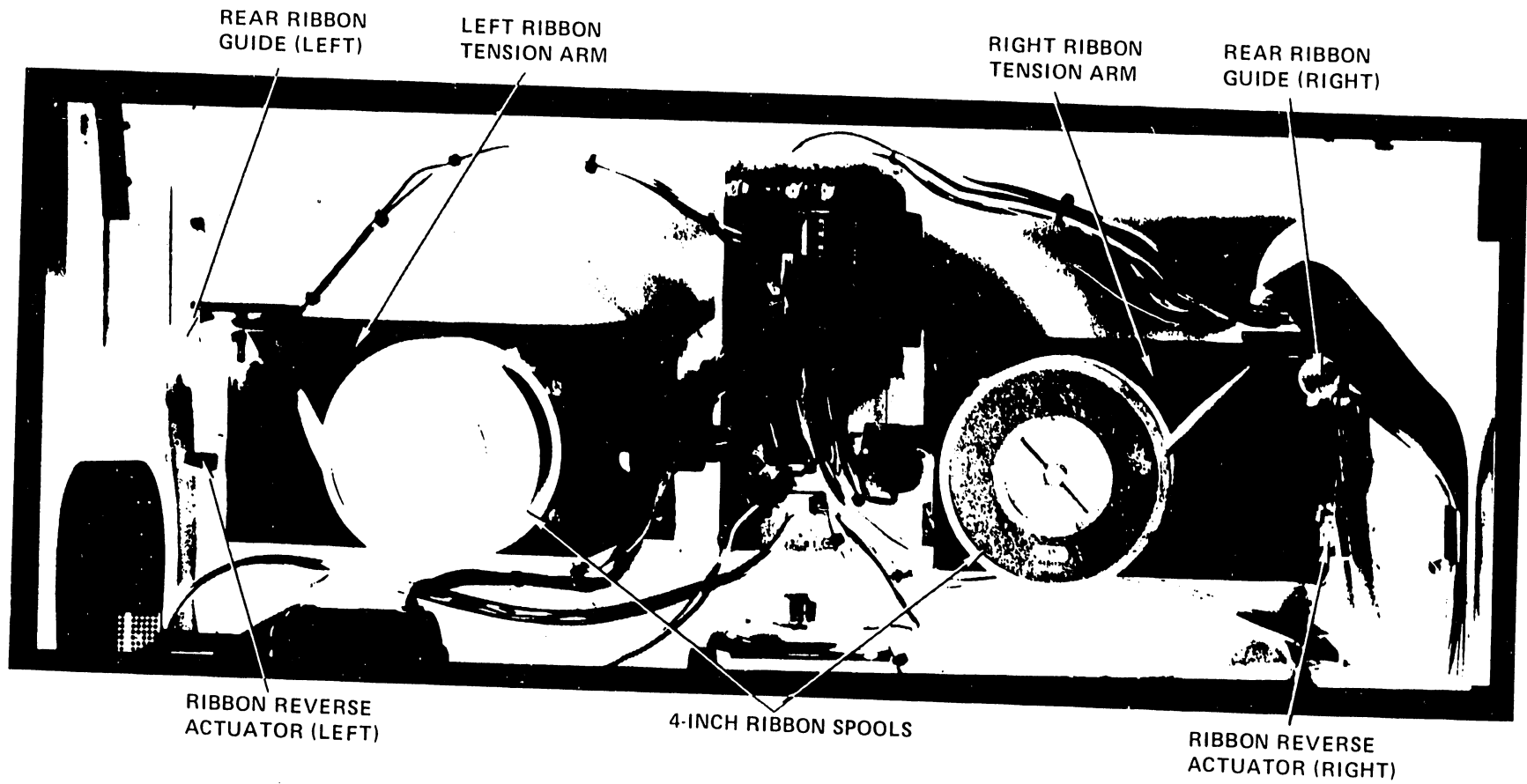
Figure 3-5. Ribbon Replacement

4. Manually turn the ribbon spools to take up any slack.

5. Move the head adjustment arm back to its original forward position.

6. Check for proper ribbon operation prior to closing the top cover. See section 5 for ribbon drive adjustment procedures.

CAUTION:

Do not operate the printer when the head adjustment arm is in the ribbon load position (heads all the way back).
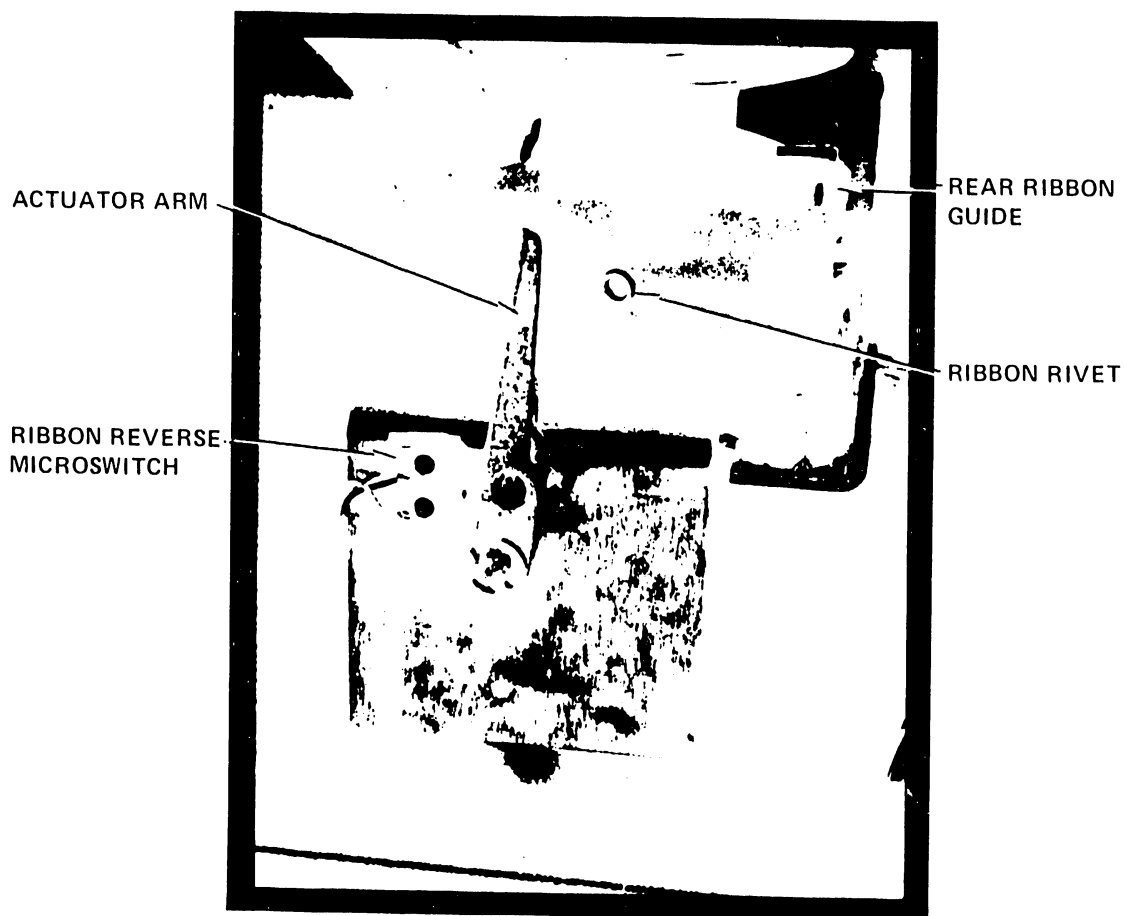
Figure 3-6. Ribbon Reverse Actuator

3.4 PROGRAMMING WITH THE 2200

3.4.1 *THE SELECT STATEMENT*

The SELECT statement is used to select the printer as the output device. A SELECT statement can be used either in the Immediate Mode or as a statement within a program. When used with the Model 77, the SELECT statement must contain the BASIC verb PRINT, LIST or CO, and a Device Type and Unit Address Code. Line length can also be specified. Each of these SELECT parameters is described below.

Example:

```
100 SELECT PRINT 215 (160)
        Device Type ⌐   ↑        ↑
        Unit Address ⌐          
        Line Length ⌐           
```

If line length is not specified in a SELECT statement, then the line length defaults to the standard width of the CRT, either 64 or 80 columns.

Device Type Codes

Each peripheral attached to a Wang system is assigned a three-character Device Selection Code. The Device Selection Code is in the form (xyy), where x is the Device Type and yy is the Unit Address. The Device Type (x) determines which internal system I/O routines are used to control the printer. The Model 77 automatically executes a line feed following the execution of a carriage return (carriage reverse); it is thus usually selected with a device type of 2 (see device types below). Generally, carriage return commands are initiated from the Wang system CPU. The printer automatically prints characters in the buffer and reverses printing direction at the end of a full character line (136 or 160 characters).

NOTE:

The Model 77, because of its bidirectional printing
technique, reverses the direction of carriage travel
upon receiving the standard carriage return code,
HEX (0D).

Type	Operation

0   This Device Type addresses devices that do not automatically execute a line feed after a carriage return; therefore, with this Device Type, the CPU supplies a line feed after each system-generated carriage return. When this Device Type is selected for the Model 77, output which is normally single spaced is double spaced.

2   This Device Type addresses devices that automatically execute a line feed after a carriage return; this is the Device Type normally used with the printer. With this Device Type, output is single spaced.

NOTE:

This is the standard Device Type used with the
Model 77.

4   This Device Type normally addresses devices such as plotters which do not have an automatic carriage return. When addressing a printer it suppresses the character count in the CPU and the automatic carriage return issued by the CPU at the end of PRINT, PRINTUSING and HEXPRINT statements that contain no trailing punctuations. Normally when the number of characters in the buffer equals the line length in a SELECT statement, a carriage return is executed. Device Type 4, however, suppresses this feature by not executing a carriage return when the number of characters equals the line length. The carriage return is not executed until the print buffer is full (and a line is printed) or when the carriage return code HEX (0D) is encountered in the program.

The unit address (yy) of the Model 77 Printer Controller is preset to 15 before the unit is shipped, and must be the address used in SELECT statements dealing with the printer. If a second printer is used on the same CPU, it is assigned device address 16.

3.4.2 *LINE LENGTH*

Line Length is a CPU system parameter which specifies the number of characters to be sent to the printer before the system automatically sends a carriage return and resets the internal line count. The value of line length is normally less than the width of the paper in the printer. The maximum number of characters per line that can be printed in the Model 77 is 160 at 12 pitch. In the SELECT statement, line length is indicated in the parentheses following the Device Selection Code.

        SELECT PRINT 215(160)   (Selects the Model 77 for printing and sets
                                 line length to 160)

If a line length is not specified for PRINT, LIST or CO, the last line length selected for these operations is used. Note: the default line length set during Master Initialization is 64 characters (80 characters with an 80 column CRT). The maximum line length which can be specified in a SELECT statement is 255. However, the use of a line length greater than the physical carriage width of the printer is not recommended. A shorter line length initiates a carriage return when the line count is exceeded.

Characters are received and stored in the printer's buffer until the CPU issues a print command. The print command is a carriage return code.

The line length setting is used to generate an automatic carriage return when a line exceeds the specified line length and when no carriage return is supplied by the program. This prevents the printout from being

lost. As a line of output is printed on the Model 77, the system CPU
keeps a count of the number of characters sent (line count). If this
line count equals the current value of the line length before the out-
put line is complete, a carriage return is transmitted by the CPU to
the printer, the line count is reset to zero, and the unfinished output
is continued on the next line.

Example:

        :10 SELECT PRINT 215(5)
        :20 PRINT "THIS IS A SAMPLE OF THE MODEL 2261W LINE PRINTER OUTPUT."

the following output is produced at execution time:

```
THIS
IS A
SAMPL
E OF
THE M
ODEL
2261W
 LINE
 PRIN
TER O
UTPUT
```

If the output is completed and a carriage return is transmitted
before the line count equals the line length, the system automatically
resets the line count to zero for the start of a new line (a PRINT
statement with no trailing comma or semicolon causes a carriage return
to be executed at the end of the output).

The line count is reset to zero under any one of the following
conditions:

1.   The line count equals the line length.

2.   A carriage return is outputted when a PRINT, PRINTUSING or HEX-
     PRINT statement is executed.

3. The system is RESET.

4. A CLEAR command is executed.

5. The system is Master Initialized.

6. Whenever a SELECT PRINT statement is executed.

3.4.3 *PRINT*

    :SELECT PRINT 215(40)

    This statement selects the printer with Device Type Code 215 for
all program output resulting from the execution of PRINT, PRINTUSING
or HEXPRINT statements. Printout resulting from PRINT statements en-
tered in the Immediate Mode appear on the CRT unless the printer is
selected for CO (see SELECT CO 215).

                            NOTE:

        When the system is first turned on, PRINT oper-
        ations are seen on the CRT, the primary device
        for such operations. Therefore, it is necessary
        to execute a SELECT statement in the program to
        direct the output of PRINT statements to the
        PRINTER. Also, the Printer SELECT switch must
        be depressed.

Example:

    :10 SELECT PRINT 215(40) or   :SELECT PRINT 215(40)
    :20 PRINT "N", "2 to the Nth" :20 PRINT "N","2 to the Nth"
    :25 PRINT   :25 PRINT
    :30 FOR X=0 TO 8   :30 FOR X=0 TO 8
    :40 PRINT X, 2↑X   :40 PRINT X, 2↓X
    :50 NEXT X   :50 NEXT X

When this program is executed, the printer output is:

            N   2 to the Nth

            0   1
            1   2
            2   4
            3   8
            4   16
            5   32
            6   64
            7   128
            8   256

3.4.4 LIST

```
:SELECT LIST 215
```

This statement selects the printer with Device Type Code 215 for all program listings (LIST operations).

NOTE:
The default address for LIST operations is 005, the CRT.

Example:

To list the program in the example above on the printer, key in as Immediate Mode statements:

```
:SELECT LIST 215
:LIST
```

The printed output is:

```
10 SELECT PRINT 215(40)
20 PRINT "N", "2 to the Nth"
30 FOR X=0 TO 8
40 PRINT X, 2↑X
50 NEXT X
```

3.4.5 CO (CONSOLE OUTPUT)

```
:SELECT CO 215
```

This statement selects the printer with Device Type Code 215 for all console output. This includes all system displays, such as the READY message, output from STOP and END statements, any data keyed in on the keyboard and entered into the CPU, and all output from Immediate Mode operations, TRACE statements, and error messages.

Example:

Key in as an Immediate Mode statement SELECT CO 215, touch the
RETURN/EXECUTE key and touch the RESET key. The output on the printer is:

:READY

All information entered into the CPU via the keyboard is now printed
on the printer.

3.4.6 *SPECIAL TECHNIQUES*

The normal Device Type used with the Model 77 is type 2. When the
printer is selected with this device type for LIST, PRINT, or CO, normal
single spaced output is produced. Device Type 0 can also be used with
the Model 77. In this case, printed output is double spaced. This is
because both the CPU and the printer execute line feed commands following
each system generated carriage return.

Device Type 4 is intended for use with Wang plotter peripherals
and has limited application with other types of peripherals. It can
be of use with the Model 77 printer in the production of special double
spaced program listings.

When LISTing a program with Device Type 4, a program statement
which overlaps onto more than one print line is single spaced; however,
each new program statement is double spaced. Thus, a more readable
double spaced output is achieved with Device Type 4. (See example
below.) However, for normal printing of a program, output Device Type
4 should not be used.

With the exception of using Device Type 4 for listing, it is rec-
ommended that the Model 77 normally be selected with Device Type 2 or
0 for PRINT, LIST, and CO operations.

3.4.7 *COMBINED PARAMETERS*

It is possible to combine parameters in a SELECT statement.

Example:
        SELECT PRINT 215(100), LIST 215(80), CO 215(112)

However, it is not possible to select two output devices with the same parameter.

For example, the statement
        SELECT LIST 215, LIST 005

produces a listing of programs on the CRT only.

3.4.8 *DESELECTING THE MODEL 77*

To deselect the printer, use one of the following methods:

1.   Select another device for PRINT, LIST or CO by using the SELECT statement.
2.   Master Initialize (turn Power Supply OFF, then ON). Master Initialization selects the CRT for all LIST, PRINT and CO operations.
3.   Key in CLEAR and touch the RETURN/EXECUTE key. PRINT and LIST operations are returned to the device currently selected for Console Output (CO). If the printer is currently the CO device, either method 1 or 2 must be used to deselect it.
4.   Turn the SELECT push button off.

3.4.9 *ZONES*

When the 10 pitch format is selected, the Model 77 has a Line Length of 136 characters which is divided into eight zones of 16 characters each and one zone of 8 characters. The zones constitute columns 0-15, 16-31, 32-47, 48-63, 64-79, 80-95, 96-111, 112-127, 128-135, respectively.

When the 12 pitch format is selected, the Model 77 has a Line Length of 160 characters which is divided into ten zones of 16 characters each. The zones constitute columns 0-15, 16-31, 32-47, 48-63, 64-79, 80-95, 96-111, 112-127, 128-143, and 144-159, respectively.

If commas separate elements in a PRINT statement, then each element begins at the start of a new zone. If semicolons separate elements in a PRINT statement, the output appears in packed format, with no spaces between items.

NOTE:

In zone printing on the Model 77, it is important to make sure that information supplied to the last zone does not exceed the legal length of the last zone (either 8 or 16 characters long depending on pitch selection). For instance, in a 10 pitch format, if the information for the last zone exceeds 8 columns, then that zone is omitted and the information is presented in the first zone of the next line.

3.4.10 *EXPAND FUNCTION: HEX (ØE)*

The regular characters, 10 or 12 per inch, can be expanded to double width by the following statement:

    PRINT HEX (ØE)

The expand function expands only one line of print. Assuming a line limit of 136 characters in the Model 77, when more than 68 characters are to be printed with the expand function, only the first 68 are printed; the Model 77 performs a carriage return and all other characters are lost. If a line limit of less than 68 characters is selected, and the number of expanded characters exceeds the line length, the expanded characters are printed up to the line limit, the printer carriage returns and prints the remaining characters on the next line(s) in regular size.

Example:

```
:SELECT PRINT 215 (160)
:10 PRINT HEX(OE), "THIS IS EXPANDED PRINT"
:RUN
```

PRINTOUT:

THIS IS EXPANDED PRINT

The HEX code (OE) can also be used with the PRINTUSING statement. For example, the following program

```
:10 A$ = HEX(OE)
:20 PRINTUSING 30, A$
:30 CODE NO. = ####
```

prints 'CODE NO. = ' in expanded print.

3.4.11 *THE TAB(FUNCTION*

The TAB(function is used in the same manner with the printer as it is used with the CRT. When a PRINT statement containing a TAB(function is executed, the Model 77 prints at the column specified by the integer portion of the TAB(expression.

If the value of TAB(expression is greater than the selected line length, the printer moves to the next line and completes the PRINT statement starting at column 0.

Example:

```
:SELECT PRINT(160)
:10 PRINT TAB(75); "MASTER SCHEDULE"
:20 PRINT :PRINT
:30 PRINT TAB(40); "EMPLOYEE"; TAB(70);
"DEPARTMENT";  TAB(110); "SHIFT";
TAB(140); "OVERTIME"
:RUN (EXECUTE)
```

Output:

                        MASTER SCHEDULE

EMPLOYEE   DEPARTMENT   SHIFT

When using the TAB(function to print numeric values, an additional column (to the left of the value) is allocated for the sign (+ or -). If not used (for positive numbers), actual printing begins at the column specified plus one.

3.4.12 *THE HEX FUNCTION*

The HEX function is used in a BASIC program to output characters on the printer (those that appear and do not appear on the standard keyboard) and to output special Printer Control Codes. The HEX function has the form:

    HEX (hh [hh][..].)

where h = a hex digit 0 to 9 or a letter A to F. An even number of hex digits must always appear in a HEX function; spaces are not allowed. (See the Wang BASIC Reference Manual for hexadeciaml characters and codes.) HEX codes for characters and/or printer control can be combined. For example, the following program in memory,

```
:10 SELECT PRINT 215
:20 PRINT HEX(410D0A42)
:RUN
```

produces: A
         B

when run, since the code for 'A' is HEX(41), 'carriage return' is HEX(0D),
'line feed' is HEX(0A), and 'B' is HEX(42).

3.4.13 CONTROL CODES

When the Model 77 Printer receives a hex code for a printable char-
acter, it simply places the code into its buffer. Unless the buffer is
full, no immediate action is taken. However, certain special hex codes
do not enter the buffer, and instead cause immediate action by the printer.
These special codes are the printer control codes.

The special Control Codes for the Model 77 are:

FUNCTION	HEX CODE	DESCRIPTION
ALARM	HEX(07)	Generates an audible tone about two seconds in duration from the speaker at the rear of the printer.
LINE FEED	HEX(0A)	Advances paper one line.
VERTICAL TAB	HEX(0B)	Advances paper until the next hole in channel 5 of the Vertical Format Unit paper tape is reached.
FORM FEED	HEX(0C)	Advances paper until the next hole in channel 7 of the Vertical Format Unit paper tape is reached.

CARRIAGE RETURN	HEX(0D)	Causes the line of characters stored in the printer buffer to be printed. An automatic line feed occurs after the line has been printed.
ELONGATED CHARACTER	HEX(0E)	Prints a line up to 80 characters as expanded (double-width) characters.
DELETE	HEX(7F)	Clears the buffer of characters sent before the '7F'.

NOTE:

When hex codes are combined in a single statement line, control codes are executed first.

HEXADECIMAL CODES

FOR

MODEL 77

HEX CODE	PRINTER CHARACTER	HEX CODE	PRINTER CHARACTER	HEX CODE	PRINTER CHARACTER
HEX(07)	Alarm	HEX(3F)	?	HEX(63)	c
HEX(0A)	Line Feed	HEX(40)	@	HEX(64)	d
HEX(0B)	Vertical Tab	HEX(41)	A	HEX(65)	e
HEX(0C)	Form Feed	HEX(42)	B	HEX(66)	f
HEX(0D)	Carriage Return	HEX(43)	C	HEX(67)	g
HEX(0E)	Elongated Character	HEX(44)	D	HEX(68)	h
HEX(20)	Space	HEX(45)	E	HEX(69)	i
HEX(21)	!	HEX(46)	F	HEX(6A)	j
HEX(22)	"	HEX(47)	G	HEX(6B)	k
HEX(23)	#	HEX(48)	H	HEX(6C)	l
HEX(24)	$	HEX(49)	I	HEX(6D)	m
HEX(25)	%	HEX(4A)	J	HEX(6E)	n
HEX(26)	&	HEX(4B)	K	HEX(6F)	o
HEX(27)	'	HEX(4C)	L	HEX(70)	p
HEX(28)	(	HEX(4D)	M	HEX(71)	q
HEX(29)	)	HEX(4E)	N	HEX(72)	r
HEX(2A)	*	HEX(4F)	O	HEX(73)	s
HEX(2B)	+	HEX(50)	P	HEX(74)	t
HEX(2C)	,	HEX(51)	Q	HEX(75)	u
HEX(2D)	—	HEX(52)	R	HEX(76)	v
HEX(2E)	.	HEX(53)	S	HEX(77)	w
HEX(2F)	/	HEX(54)	T	HEX(78)	x
HEX(30)	0	HEX(55)	U	HEX(79)	y
HEX(31)	1	HEX(56)	V	HEX(7A)	z
HEX(32)	2	HEX(57)	W	HEX(7B)	ь
HEX(33)	3	HEX(58)	X	HEX(7C)	£
HEX(34)	4	HEX(59)	Y	HEX(7D)	è
HEX(35)	5	HEX(5A)	Z	HEX(7E)	ç
HEX(36)	6	HEX(5B)	[	*HEX(7F)	Clear Buffer
HEX(37)	7	HEX(5C)	β		
HEX(38)	8	HEX(5D)	]		
HEX(39)	9	HEX(5E)	↑		
HEX(3A)	:	HEX(5F)	←		
HEX(3B)	;	HEX(60)	o		
HEX(3C)	<	HEX(61)	a		
HEX(3D)	=	HEX(62)	b		
HEX(3E)	>				

*ASCII DEL, a non-printable
control character

SECTION 4

THEORY OF OPERA-TION

SECTION 4

THEORY OF OPERATION

4.1 INTRODUCTION

This part of the manual is divided into two sections. The General section gives an overview of the Model 77, briefly describing each pc board and electromechanical assembly. The Electrical Theory section describes the major pc assemblies in more detail. The major pc assemblies are plugged into the #7030 Motherboard in the main electronics compartment of the printer.

4.2 GENERAL

4.2.1 *PCB DESCRIPTION*

The Model 77 contains the following pc assemblies:

210-7030 MOTHERBOARD
DESCRIPTION: provides power and signal interconnections to each of the major pc assemblies.
LOCATION: main electronics compartment.

210-7035 SINGLE HEAD SOLENOID DRIVERS (4)
DESCRIPTION: contains eight solenoid drivers for a single print head.
LOCATION: main electronics compartment.

210-7129 OPTICAL SCANNER BOARDS (2)
DESCRIPTION: optical signal amplifiers for the timing (WS) photo-couplers.
LOCATION: mounted on the printer base casting near each timing photocoupler.

210-7130   IOP CONTROL PANEL

DESCRIPTION: provides switch interconnections for the main control panel.

LOCATION: mounted on the underside of the printer top cover.

210-7131   LINE BUFFER, CHARACTER GENERATOR & PROGRAM MEMORY

DESCRIPTION: contains the INTEL 8080A microprocessor, two 2108 RAMs for the line buffer, two 2708 (or 8708) PROMs for the micro-program, and four 2708 PROMs for the character generators (four sets).

LOCATION: main electronics compartment.

210-7132   OPTICAL SIGNAL, PAPER FEED & MOTOR CONTROL

DESCRIPTION: contains the carriage motor drive circuits, the ribbon motor drive circuits, the vertical format unit control, two window scanning circuits, and the buffer for Status Byte #3.

LOCATION: main electronics compartment.

210-7133   INTERCONNECTION ACCESS BOARD

DESCRIPTION: terminal board that consolidates the power and signal lines in the printer mechanism compartment for simpler routing to the main electronics compartment.

LOCATION: mounted between the ribbon drive motors, behind the printer casting.

210-7134   FOUR HEAD FIRING REGISTER

DESCRIPTION: contains the firing buffers for all four print heads; processes the output codes x'00' through x'07'.

LOCATION: main electronics compartment.

210-7136   P.S. REGULATOR & DC MOTOR DRIVE & PAPER FEED

DESCRIPTION: contains the power regulator, the carriage motor power driver, and the line feed power driver.

LOCATION: main electronics compartment.

210-7137   8080A I/O INTERFACE

   DESCRIPTION: contains the I/O circuitry to the 2200 CPU, the
   buffers for Status Bytes #1 and #2; processes the output codes
   x'08' through x'0F'.
   LOCATION: main electronics compartment.

210-7174   PHOTOTRANSISTOR BOARD

   DESCRIPTION: contains four phototransistors for the vertical for-
   mat tape reader.
   LOCATION: mounted in the format tape reader.

210-7175   LIGHT EMITTING DIODE BOARD

   DESCRIPTION: contains four LEDs for the vertical format tape
   reader.
   LOCATION: mounted in the format tape reader.

4.2.2 *CONTROL LOGIC*

   The control logic of the Model 77 Line Printer is similar to that
of the earlier Model 72 Matrix Printer. The major difference is the
addition of the 8080A microprocessor chip that supplies most of the
control signals previously generated by independent logic and electro-
mechanical means. The 8080A and its associated circuitry allow the
2200 CPU to communicate with the Model 77 by way of a bidirectional
data bus and a unidirectional group of address lines that identify a
particular memory location or I/O device. The 8080A checks the status
of all the printing operations of the Model 77 by three status bytes
for I/O which are buffered and then read under program control. The
assignment of data bits in these status bytes are illustrated in
Figure 4-1.

   Sixteen output control signals are designated for the 8080A micro-
processor. Their functions are as follows:

   OUT x'00' - The ODD row of the firing buffers enable
   OUT x'01' - The EVEN row of the firing buffers enable
   OUT x'02' - Clear the first stage of the firing buffers

```
OUT x'03' - Count head counter one step up
OUT x'04' - Not presently used
OUT x'05' - Not presently used
OUT x'06' - Enable RAM controlled by 8080
OUT x'07' - Set BUSY to 8080
OUT x'08' - Set READY to 8080
OUT x'09' - Start moving carriage motor
OUT x'0A' - Stop carriage motor
OUT x'0B' - Line feed strobe
OUT x'0C' - Generate a clear signal
OUT x'0D' - Start line feed, apply +18V to stepper motor
OUT x'0E' - Clear LFM, FFM, and apply +9V to stepper motor
OUT x'0F' - Clear LF, VT, and FF buffer
```

4.2.3 CARRIAGE MOVEMENT

The carriage assembly contains four print heads, each handling one quarter of a printed line. Printing is performed by selectively firing the solenoids of each print head as the carriage moves from left to right then right to left (bidirectional printing), all under 8080A control.

The carriage movement and printing operation is synchronized by one of two encoder fences (10 or 12 pitch, operator selected) and a corresponding timing photocoupler. The encoder fences are mounted on the lower front of the carriage assembly and move through the photocouplers as the carriage moves. Each individual encoder fence has opaque, horizontal timing marks evenly spaced along its length. As the carriage assembly moves, these marks interrupt the light from the LED to the phototransistor in each timing photocoupler assembly, thereby generating an analog signal; this signal, in turn, is used to generate a strobe for print timing.

A tachometer is mechanically linked to the carriage servo drive motor for maintaining constant servo speed and stability. At the end of carriage travel in each direction, two flexible stop springs have

STATUS BYTE #1 — READ IN BY INX'00'

(1 TOP OF FORM) FF ─────────

IF (1:LINE FEED) ─────────

(1:LINE BUFFER FULL) FF ─────────

F/R (0:REVERSE PRINT 1: FORWARD PRINT) ─────────

D7	D6	D5	D4	D3	D2	D1	D0

(1:CARRIAGE RETURN) CR ─────────

10/12 (0:12 PITCH) (1:10 PITCH)

(1:VERTICAL TAB) VT ─────────

EC (1 EXPANDED MODE)
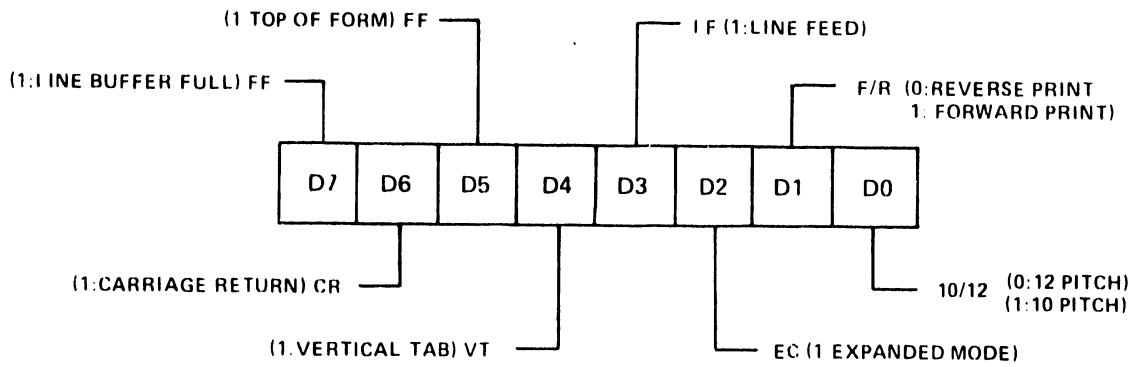
STATUS BYTE #2 — READ IN BY INX'01'

PS (1:AT LEAST ONE PRINTABLE CHARACTER)

(1:MALFUNCTION) $\overline{MF}$ ─────────

PO (1:PAPER OUT) ─────────

D7	D6	D5	D4	D3	D2	D1	D0

SL (1:SELECTED)

CO (1:COVER OPEN)
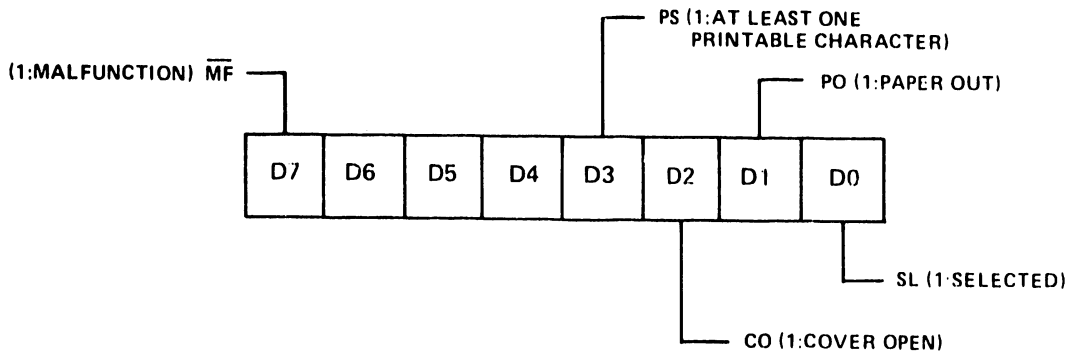
STATUS BYTE #3 — READ IN BY INX'02'

(SPROCKET CHANNEL) SKTH ─────────

VTH (VERTICAL TAB CHANNEL SIGNAL)

(LINE FEED ENABLE) LFE ─────────

FFM (1:TOP OF FORM MANUAL) ─────────

D7	D6	D5	D4	D3	D2	D1	D0

(1:6LPI, 0:8LPI) 6/8 ─────────

LFM (1:LINE FEED MANUAL)

(PAPER EJECT CHANNEL) PEJH ─────────

FFH (TOP OF FORM CHANNEL SIGNAL)
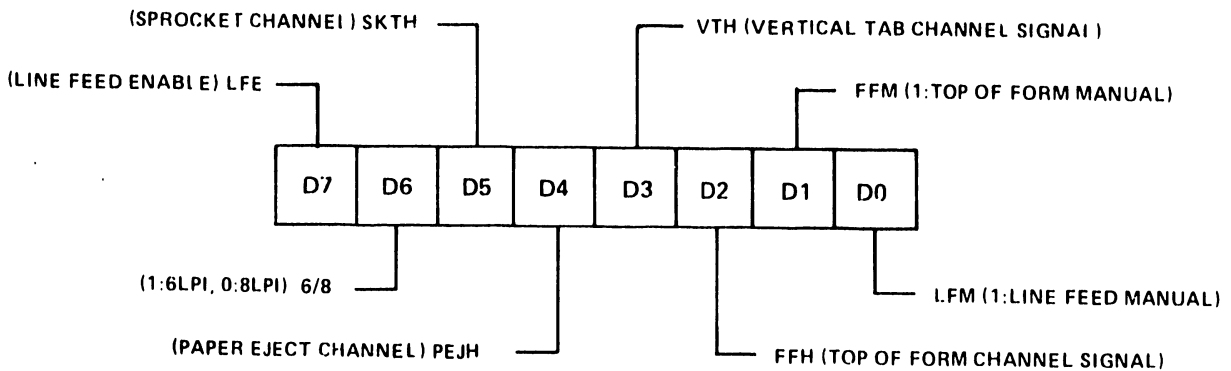
Figure 4-1. Status Bytes

been installed to slow down the carriage and assist in its initial move-
ment. Adjustable locking screws on either end of the carriage assembly
are used for adjusting the maximum carriage travel between the stop
springs.

Two margin detect photocouplers are mounted on the front of the
printer base casting. These photocouplers reverse carriage motion by
controlling the forward and reverse logic for the main carriage servo
motor. The photocouplers are activated by the 10 pitch encoder fence
when the carriage assembly reaches each margin.

4.2.4 *PAPER MOVEMENT*

Paper movement can be originated by three separate operations: line
feed, vertical tab, and form feed. Each of these operations will activate
the paper feed stepper motor. For vertical tab and form feed, the motor
will increment until the vertical format tape reader detects a hole in
the appropriate channel of the vertical format tape.

The Vertical Format Unit (VFU) uses the same three channel optical
tape reader found in earlier Wang matrix printers. The paper tape reader
is mechanically linked to the gear train that feeds the paper. It reads
channels 2, 5, and 7 of the standard eight-channel wide paper tape with
three LED/phototransistor pairs. It also performs vertical line spacing
at both 6 lines/inch and 8 lines/inch. The tape reader contains a fourth
LED/phototransistor pair used in generating the strobe signal SKTH for
gating and phasing the paper feed operations.

The three line feed operations are described separately in the
following paragraphs.

LINEFEED

The two vertical line spacing selections, 6 lines per inch and 8
lines per inch, are controlled by a front panel switch. The vertical
line spacing switch selects the number of pulses to be fed to the paper

feed stepper motor for each line feed operation, eight pulses for 6 lines per inch or six pulses for 8 lines per inch. The pulse count coincides at every 1/2 inch of the print paper. To keep the lines/inch selection in phase, the vertical format unit monitors the linefeed operation. The Vertical Format Tape Reader has been equipped with a fourth LED/photo-transistor pair that checks the sprocket hole count, providing feedback to the paper feed logic (one sprocket hole corresponds to one line feed).

A line feed can be generated by any of the following three operations:

a) Automatic line feed after each carriage return.
b) Receiving a line feed code HEX (0A) via the function decoder.
c) Pressing the LINE FEED key on the main control panel of the printer. In this case, the printer must be deselected.

VERTICAL TAB

A vertical tab can be generated only by receiving a vertical tab code HEX (0B), which will advance the print paper until a punched hole is sensed in channel 5 of the vertical format tape.

FORM FEED

A form feed can be generated by any of the following three operations:

a) Receiving a form feed code HEX (0C) via the function decoder.
b) Pressing the TOP OF FORM key on the main control panel. The printer must be deselected.
c) Detecting an end of document hole in channel 7 of the vertical format tape.

4.2.5 *RIBBON MOVEMENT*

The Model 77 uses a 1 1/2 inch wide fabric ribbon. Ribbon movement (bidirectional) is controlled by two triac driven 26 VAC gear motors,

one for each direction. Each ribbon motor assembly consists of a gear motor and a hold-in solenoid. When the printer power is off, both ribbon drive motors are disengaged and actually drop down from their gear boxes. When power is applied to the printer, however, the solenoid of the selected motor becomes activated, pulling the motor up to engage the gears.

Only one motor is active at any one time. When an end of ribbon condition is detected by one of the ribbon reverse actuators, the driving motor turns off and the opposite motor is activated. The ribbon reverse actuators are microswitches which are tripped by the rivets in each end of the ribbon. As the ribbon reaches the end of its travel, the rivet catches and pulls the reverse actuator arm. The actuator arm closes an attached microswitch which toggles a flip-flop and thereby reverses the ribbon control logic.

RIBBON DRIVE AND GUIDE POST ARRANGEMENT

The ribbon drive motors are mounted to the rear of the main printer casting and are arranged so that the plane of ribbon travel is at an angle of approximately 4 degrees to the plane of print head carriage assembly. This rake angle is maintained by having the left front and left rear ribbon guides mounted at a lower height than the right side guides. This rake angle permits the use of over 80% surface area of the 1 1/2 inch wide ribbon. The front ribbon guides are mounted on adjustable brackets which can be moved vertically to obtain the correct rake angle for the ribbon. The front guide posts are also positioned outwardly to keep the ribbon against the print heads instead of the striker plate.

4.3 ELECTRICAL THEORY

4.3.1 *PCB #7132 OPTICAL SIGNAL, PAPER FEED & MOTOR CONTROL*

Printed circuit board 7132 contains the carriage motor drive circuits, the ribbon motor drive circuits, the vertical format unit control, the two window scanning circuits, the logic for controlling the input

optical signals generated by the photocouplers, and the buffer for
Status Byte #3. The photocouplers are used for controlling the print
head carriage movement and the VFU paper feed movement. Also included
on this board are the manual switch inputs for 10 pitch and 12 pitch
and the control for the vertical line spacing selection of 6 lines/inch
or 8 lines/inch. The 8080 signal lines that are wired to this board
control the DC motor, speaker audio, and initial carriage movement.
See Figures 4-2 and 4-3.
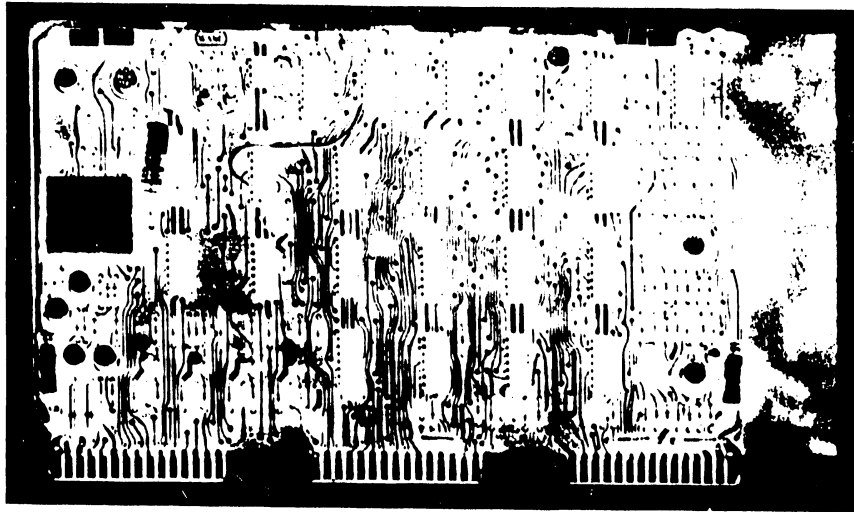
Figure 4-2. 7132 PCB Optical Signal Paper Feed & Motor Control

PRINT HEAD CARRIAGE MOVEMENT

Power is applied to the printer via the main power switch on the
front control panel. Carriage movement will not begin until the main
control panel button CLEAR is pressed and the printer undergoes a power
on reset (POWER PRIMED). The printing process will begin when the
SELECT latch pushbutton is pressed and the 8080A microprocessor takes
over control.

Forward or reverse movement of the carriage is initiated by the
F/R flip-flop, L25, which receives inputs from the two margin detect
photocouplers. The F/R flip-flop sends a forward/reverse signal to
the 8080A (see Status Byte #1). A logic high is for forward print and
a logic low is for reverse print.
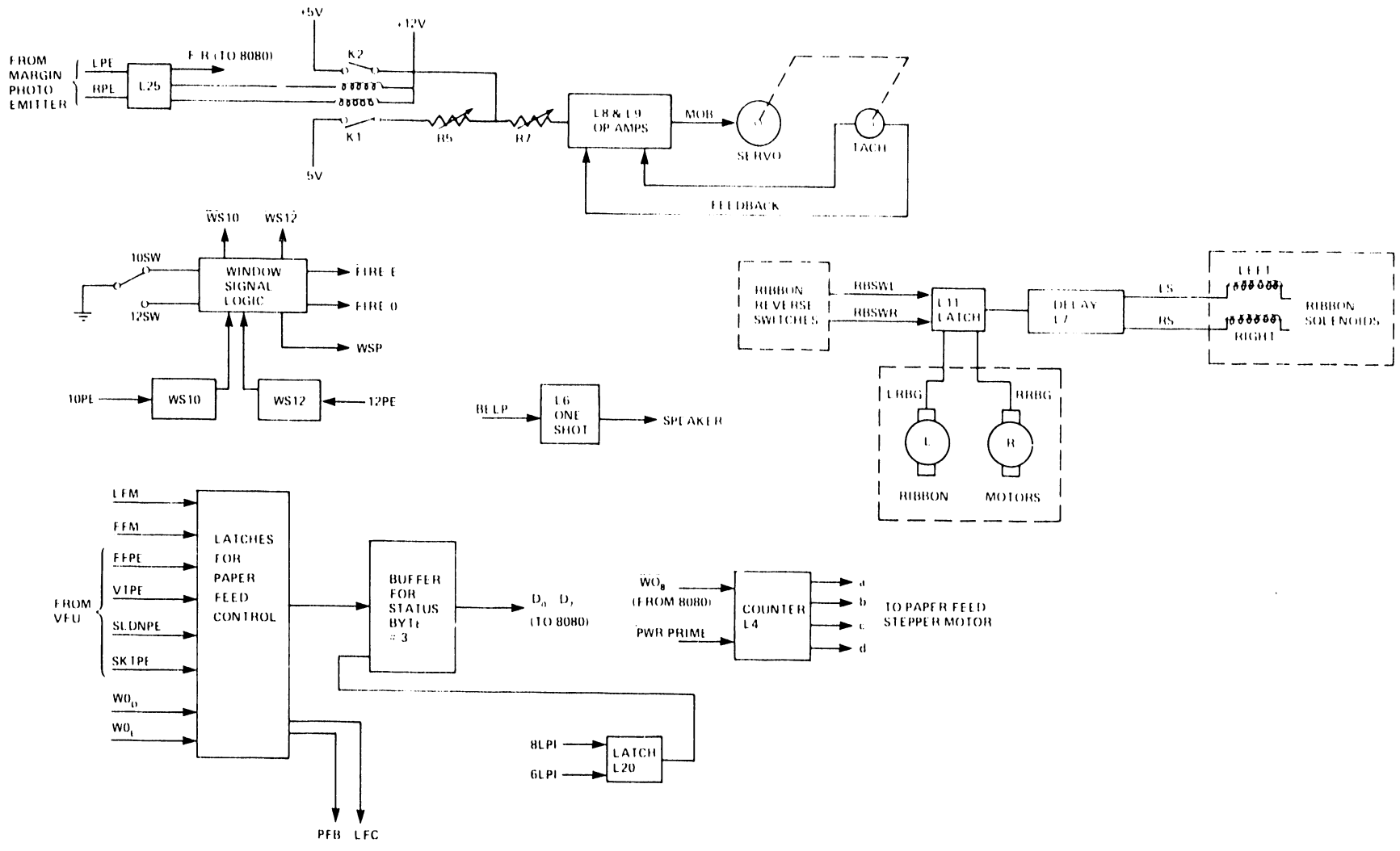
Figure 4-3. 7132 PCB Optical Signal Paper Feed & Motor Control

When the printer is first initialized, in the special case when
the carriage assembly in the center of its travel, the output state of
the F/R flip-flop is indeterminate. Dependent on this initial output
state, the carriage assembly may be driven to either the left or the
right margin to start the bidirectional printing. At this point, the
8080A program has already loaded data into the output buffer for printing.

The left or the right margin photocoupler senses the margin posi-
tion of the carriage and generates an optical signal which is then amp-
lified and applied to the F/R flip-flop. These margin photocoupler
signals, LPE (left) and RPE (right), command the carriage to reverse
printing direction. Each time a margin limit is reached, an automatic
line feed command is generated by the 8080A, indexing the print paper
to the next line. The F/R flip-flop directs current flow to the for-
ward or reverse relay coil, K1 or K2, and a reed switch inside the
selected relay closes, applying +5VR to the summing junction of a servo
amplifier (L8 & L9). The servo amplifier then drives the base of the
forward or reverse power transistor that drives the carriage servo motor.

The carriage servo motor is connected by pulley and belt to a tach-
ometer that provides negative feedback to the summing junction of the
servo amplifier to maintain constant speed of the carriage. Two poten-
tiometers, R5 and R7, are provided for adjusting and matching the for-
ward and the reverse carriage speeds.

10 AND 12 PITCH SELECTION

The Model 77 has dual pitch capability, 10 characters per inch or
12 characters per inch. The print timing for each pitch format is pro-
vided by separate encoder fences mounted on the lower front of the carriage
assembly. Each encoder fence is a transparent plastic strip that has
opaque timing marks spaced evenly along its length.

As the carriage moves, the attached fences pass through stationary
photocouplers mounted on the carriage base casting. These timing (WS)
photocouplers consist of an LED and phototransistor built into a single
device. The opaque timing marks of the encoder fences block the light
between the LEDs and phototransistors and thereby generate analog sig-

nals. The spacing between the timing marks is slightly greater for the 10 pitch fence than for the 12 pitch fence, producing a lower output frequency. These signals are amplified by the 7129 optical scanner boards mounted near the two timing photocouplers. The analog signals are then routed to the 7132 PCB and become signals 10 PE and 12 PE, respectively.

These signals are then fed to the inverting inputs of two operational amplifiers, L16 and L23, and are converted from sine waves into rectangular waves. The output of each operational amplifier is fed to a separate NAND gate (L18) which is latched with the manual pitch control select switch by way of flip-flop L25. The inputs from the pitch control switch are 10SW and 12SW.

The pitch selections are as follows:

136 columns (10 pitch), 68 columns EXPANDED
160 columns (12 pitch), 80 columns EXPANDED

The selected rectangular pulses are gated forward to become the window signals ($\overline{\text{WS 10}}$ and $\overline{\text{WS 12}}$). Two potentiometers, R30 and R49, are provided for adjusting the 10 PE and 12 PE window signal generators. Each window signal shoudl have a 50% duty cycle, which is the ideal timing for firing the print head solenoids. The print head solenoids are fired in an even ($\overline{\text{FIRE E}}$) and odd ($\overline{\text{FIRE O}}$) arrangement.

RIBBON MOVEMENT

Ribbon movement is performed by two triac controlled, 26 VAC motors. The ribbon movement is bidirectional with one motor engaged at any one time. The controlling logic for ribbon movement is contained on the 7132 pcb. When power is applied to the printer, the ribbon reversing F/F, L11, assumes an undetermined condition. The enabling ribbon drive signal (LRBG or RRBG) is controlled by the output of the ribbon reversing F/F which enables one of two NAND gates. When the output of either gate goes low, it turns on a transistor (Q5 or Q6) which applies +5V through a resistor to the collector of a triac (Q14 or Q15, 7136 pcb); the triac conducts, causing the corresponding motor to operate.

When the ribbon approaches the end of the spool for either direction of ribbon travel, a rivet in the ribbon catches on one of the two reverse actuator arms and closes one of the ribbon reverse microswitches. This selected switch applies a logic low (signals RBSWL or RBSWR) to the corresponding input of the ribbon reverse F/F, causing the outputs to reverse. The power transistor in the opposite motor circuit conducts and turns on the corresponding ribbon motor.

When either output of the ribbon reverse F/F goes high, its associated one-shot multivibrator triggers. These one-shots (L7 chip) control the ribbon motor solenoids and provide a signal delay. When the ribbon reverses, the selected solenoid engages the corresponding ribbon drive motor by drawing up the clutch engagement arm thereby forcing the motor into the gearbox. The outputs from the one-shots are gated with the output of the ribbon reverse flip-flop and turn on the selected solenoid driver transistor (Q12 or Q13). The driver transistors generate the left and right ribbon solenoid signals, LS and RS; these signals energize the selected solenoid.

PAPER MOVEMENT

The paper feed stepper motor is a phase switched DC motor that moves in discrete increment of 1.8 degrees for 200 steps of revolution. The stepper motor and tractor are geared so that 24 steps of the motor moves the paper tractor through a distance of 1/2 inch.

The Model 77 has a vertical line spacing selection of 6 or 8 lines per inch. To move the print paper one line space at 6 lines per inch, the stepper motor must increment 8 steps. Similarily, to move the paper one line space at 8 lines per inch, the stepper motor must increment 6 steps.

The paper feed operation is controlled by the 8080A microprocessor through its I/O control bus. The 8080A buffered data bus reads and processes Status Byte #3, which contains all the selected paper functions.

Status Byte #3 monitors the vertical line spacing selection, the line
feed manual, and all the functions of the vertical format unit. Status
Byte #3 is buffered through L22 and L27. The 8080A then "writes" the
required number of steps (pulses) to the stepper motor for the selected
paper feed operation. The 8080 write signal ($\overline{WOB}$) is generated in groups
of 6 or 8 pulses (setting of the vertical line spacing switch).

4.3.2 PCB #7137 8080A I/O INTERFACE

The 8080A I/O Interface PCB has been designed to allow the Model
77 printer to interface with the 2200 system with a cable length of 50
feet. The 7137 receives data from the 2200, decodes the printer func-
tions, acknowledges the receipt of data, and indicates to the 2200 when
it is busy or ready to receive more data. See Figures 4-4 and 4-5.

Data from the 2200 is transferred to the 8080A in ASCII code a line
at a time. The direct memory access (DMA) system, used for inputting
data directly into RAM memory, is controlled by this board. The selected
number of characters to be printed per line is sent from the 2200 to RAM
memory while the 8080A microprocessor is held in a WAIT state. After
receipt of the data, the 8080 microprocessor is released from the WAIT
state; it then proceeds to load the data into the output buffer and
control the printing process.
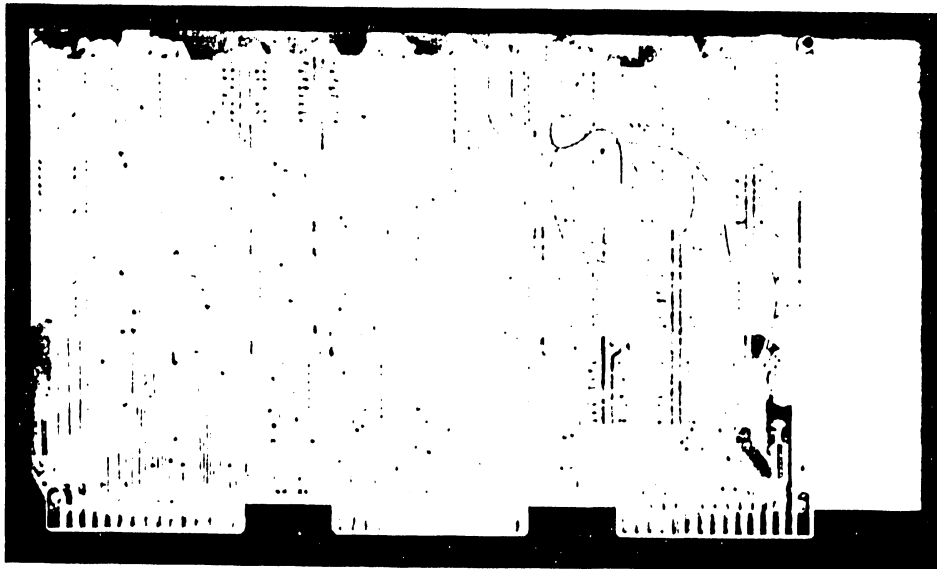
Figure 4-4. 7137 PCB 8080A I/O Interface
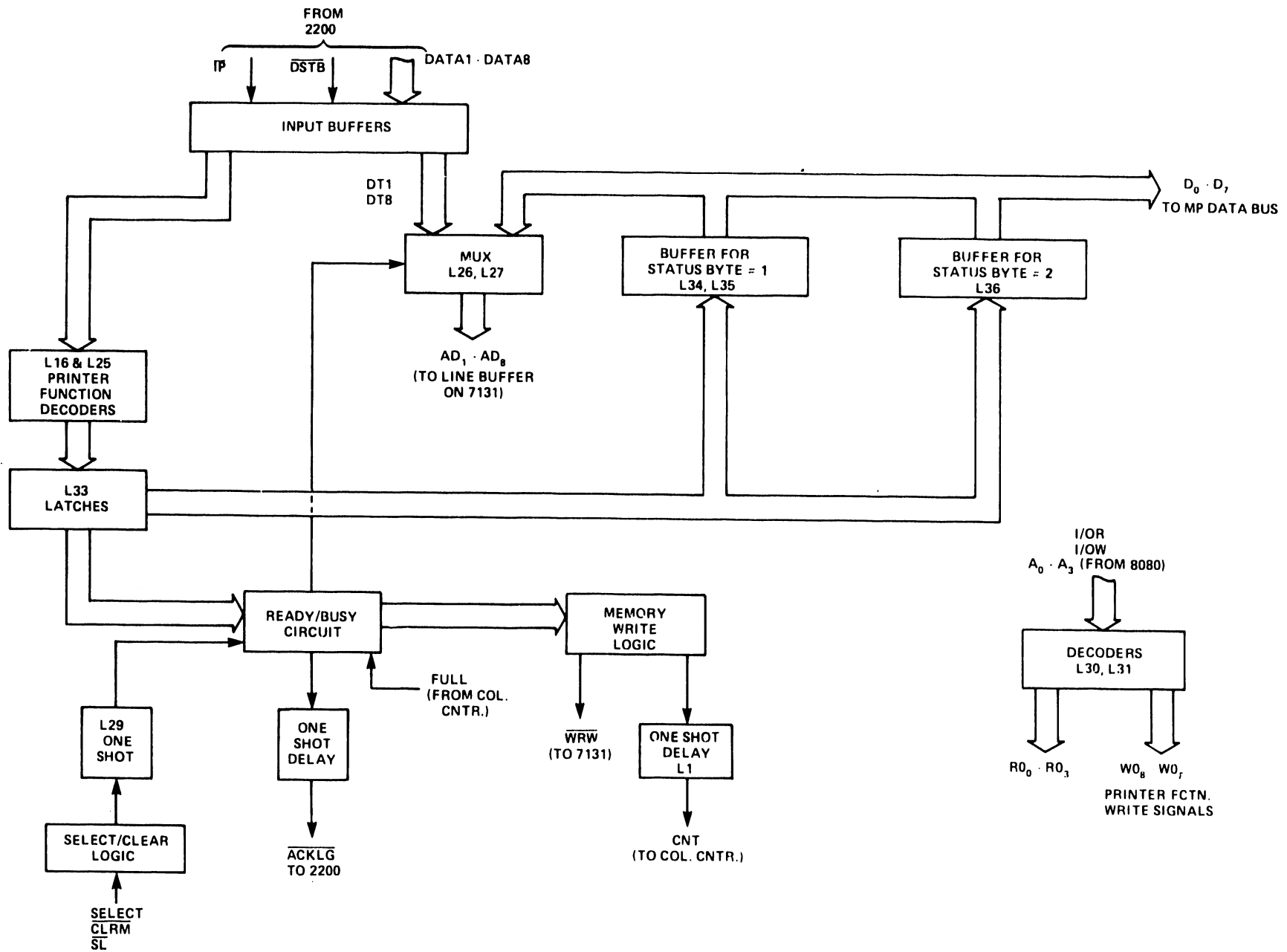
Figure 4-5. 7137 PCB 8080A I/O Interface

BASIC OPERATION

Data bits ($DATA_1$ through $DATA_8$) are received in the input buffer. At the buffer output, the data bits (DT_1 through DT_8) are routed to the BCD to decimal decoders, L16 and L25, where they are monitored for decoding the printer functions. When a printer function is decoded, the control logic sets the READY/BUSY circuit to BUSY and initiates the print cycle. The printer functions are routed to hex buffers wired to the 8080A data bus for scanning.

When the READY/BUSY circuit is READY, a logic high, it selects data bits D_1 through D_8 from the 2200 system. When the circuit is not ready ($\overline{BUSY}$), a logic low, the 8080A data bus is selected. The outputs of the multiplexers L26 and L27 represent ASCII data bits AD_1 through AD_8. The printer function latches are reset by an 8080 OUT command after a complete data line has been printed.

POWER PRIME

The Model 77 can be initialized by pressing the main control panel pushbuttons CLEAR (signal $\overline{CLRM}$) or SELECT (signal $\overline{SL}$). It can also be initialized remotely from the 2200 CPU by a HEX (7F) code or by reset command (signal $\overline{IP}$). Any of these operations will trigger the one-shot multivibrator L29 and generate a $\overline{PWR\ PRIME}$ and a clear (CLR) signal to all internal control registers. CLR is also generated by the 8080 output command OUT x'0C'.

SELECT CIRCUIT

Before the printer can receive any data, it must be selected manually from the main control panel. The printer can be selected and deselected alternately by pressing the SELECT button on the main control panel. The select latch (L7-3) is cleared by POWER PRIME when the printer is initialized.

PRINT BUFFER LOADING

Data bits DT_1 through DT_8 are buffered at the interface prior to being loaded into the DMA multiplexer registers (L26 & L27) and the function decoders (L16 & L25) of the interface board. The function decoders process the special printer commands that have high order bits D_5-D_8 equal to logic zero: alarm (HEX 07), line feed (HEX 0D), and others. The decoded outputs are gated by the Data Strobe ($\overline{DSTB}$), a signal which accompanies each byte of character data sent from the 2200 CPU.

All printer functions decoded at the interface and gated with $\overline{DSTB}$, automatically set the READY/BUSY circuit to $\overline{BUSY}$, releasing the 8080A microprocessor to process and print the data while the 2200 system is held in the busy state.

ASCII characters are loaded into RAM memory (line buffers on the 7131 board) while the 8080A is held in a WAIT state; it is then released for processing the printing operation.

READY/BUSY CIRCUIT

The READY/BUSY circuit is a handshaking device used to control time sharing between the 2200 CPU and the printer microprogram.

The BUSY circuit indicates to the sending device (system 2200) that a printing operation is in process. It also delays the acknowledge pulse ($\overline{ACKLG}$) long enough for the printer to prepare for more data. Each byte of data is acknowledged by the signal $\overline{ACKLG}$ from the printer.

The READY/BUSY circuit is set to $\overline{BUSY}$ when a full buffer signal (FULL) is received from the 7131 PCB, indicating that a full line of data is stored in RAM memory (136 to 160 characters depending on the pitch setting). The full buffer signal is also sent to the 8080 data bus buffer. The READY/BUSY circuit can be reset by the 2200 CPU, the 8080, or manually by the CLEAR one-shot. The 8080 program sets the circuit to READY after a complete line of data is printed.

INTERFACE CONTROLS FOR THE ASCII CHARACTER MEMORY (RAM)

The READY/BUSY circuit is set to $\overline{BUSY}$ when a printer function from the 2200 CPU is decoded, and reset after each function is performed. The ASCII character data from the 2200 is strobed through the interface multiplexers. The data lines AD_1 through AD_8 carry the data bits to the RAM memory on the 7131 pcb. Two 2101 static MOS RAM chips store one complete print line of characters (136 or 160 character bytes). The interface controls for loading characters into RAM are as follows:

Each character sent from the 2200 is accompanied by a strobe $(\overline{DSTB})$ which generates a WRITE/READ $(\overline{WRW})$ signal. The strobe also triggers the one-shot multivibrator L1 that generates the signal count (CNT). Together, these two signals control the loading of the ASCII character bytes into RAM.

The RAM line buffers on the 7131 are sequentially addressed by a column counter. This counter (on the 7131 board) is triggered by the delayed signal CNT and sets up the next sequential RAM address before the next character byte is clocked into memory with signal $\overline{WRW}$.

Dependent upon the setting of the pitch control toggle switch, a column count of 136 or 160 characters will generate the signal FULL (full buffer) which sets the READY/BUSY circuit to $\overline{BUSY}$ and restores control to the 8080A microprocessor.

4.3.3 PCB #7131 LINE BUFFER, CHARACTER GENERATOR, AND PROGRAM MEMORY

The 7131 PCB contains the 8080A microprocessor, the 8224 clock generator and driver, the 8228 system controller and bus driver, two 2708 PROMs for the microprogram, four 2708 (or 8708) PROMs for the character generator, and two 2101 RAMs for the line buffer. The character generators L1 and L4 are for 12 pitch characters and L6 and L8 are for the 10 pitch. The line buffer comprises two static RAM chips (L9 and L10) for storing the ASCII characters from the 2200 CPU. The 8080A microprogram is stored in PROMs L21 and L22. See Figures 4-6 and 4-7.

8080A MICROPROCESSOR

17.1 MHz XTAL

LINE BUFFER RAMS

10 PITCH CHARACTER GENERATOR PROMS

12 PITCH CHARACTER GENERATOR PROMS

8224 CLOCK GENERATOR AND DRIVER

8228 SYSTEM CONTROLLER

2708 PROMS FOR 8080 MICROPROGRAM
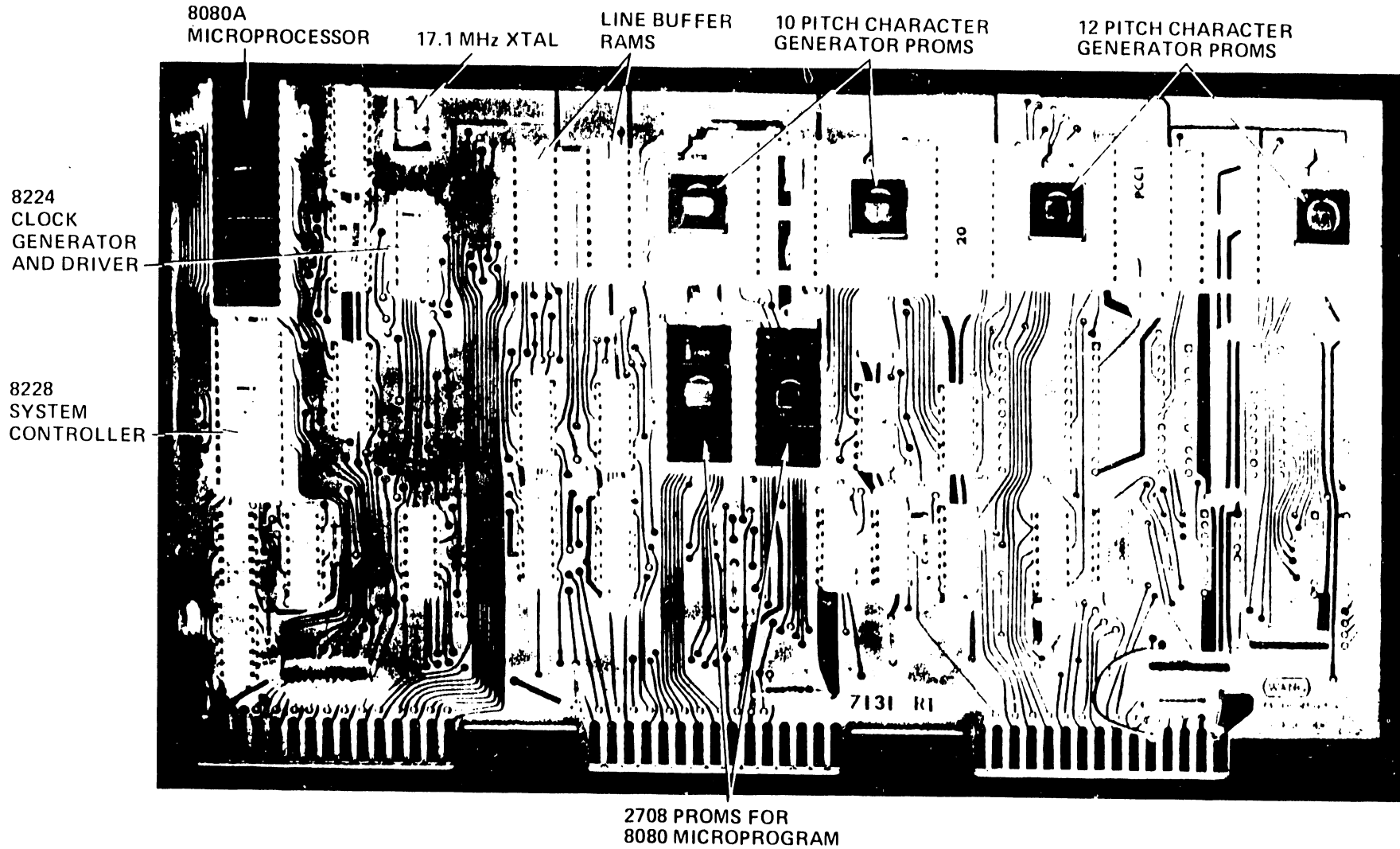
Figure 4-6. 7131 PCB Line Buffer, Character Generator and Program Memory

<u>7131 PCB PROMS</u>

L1 #378-2064

L4 #378-2063

L6 #378-2061

L8 #378-2062

L21 #378-2086

L22 #378-2087

DATA TRANSFER AND 8080 STEP CONTROL

The 8080A microprocessor chip, L13, controls all printer operations except the transfer of data into RAM memory. During the data transfer operation, the 8080A is held in a WAIT state while ASCII data is routed directly to the RAM line buffers, L9 and L10.

Two separate signals are used to force the 8080A into a WAIT state:

1)   Signal RB07 issued by the 8080A.

2)   Signal $\overline{\text{WSP}}$ generated by the encoder fence Window Signal (WS).

In each case, the WAIT REQUEST signal is routed to the 8224 clock generator and driver, L11. The 8224 input RDYIN (ready input) presents the asynchronous WAIT REQUEST to an internal D-type flip-flop. An internal clock sets the flip-flop and produces a synchronized $\overline{\text{READY}}$ output (logic low) which forces the 8080A into the WAIT state.

Each byte of character data transferred from the 2200 CPU is accompanied by a data strobe pulse $\overline{\text{DTSB}}$. This pulse fires the one-shot multivibrator L1 (on the 7137 pcb) and thereby generates the signal CNT (count). Signal CNT is routed to the column counter, L33 and L34 on the 7131 board.

The column counter sequentially addresses the line buffer RAMs, L9 and L10, allowing each byte of ASCII data $AD_1 - AD_8$ to be entered into RAM memory directly from the 2200 CPU. Each time the column counter increments by one, the memory write signal ($\overline{\text{WRW}}$) goes low to permit the
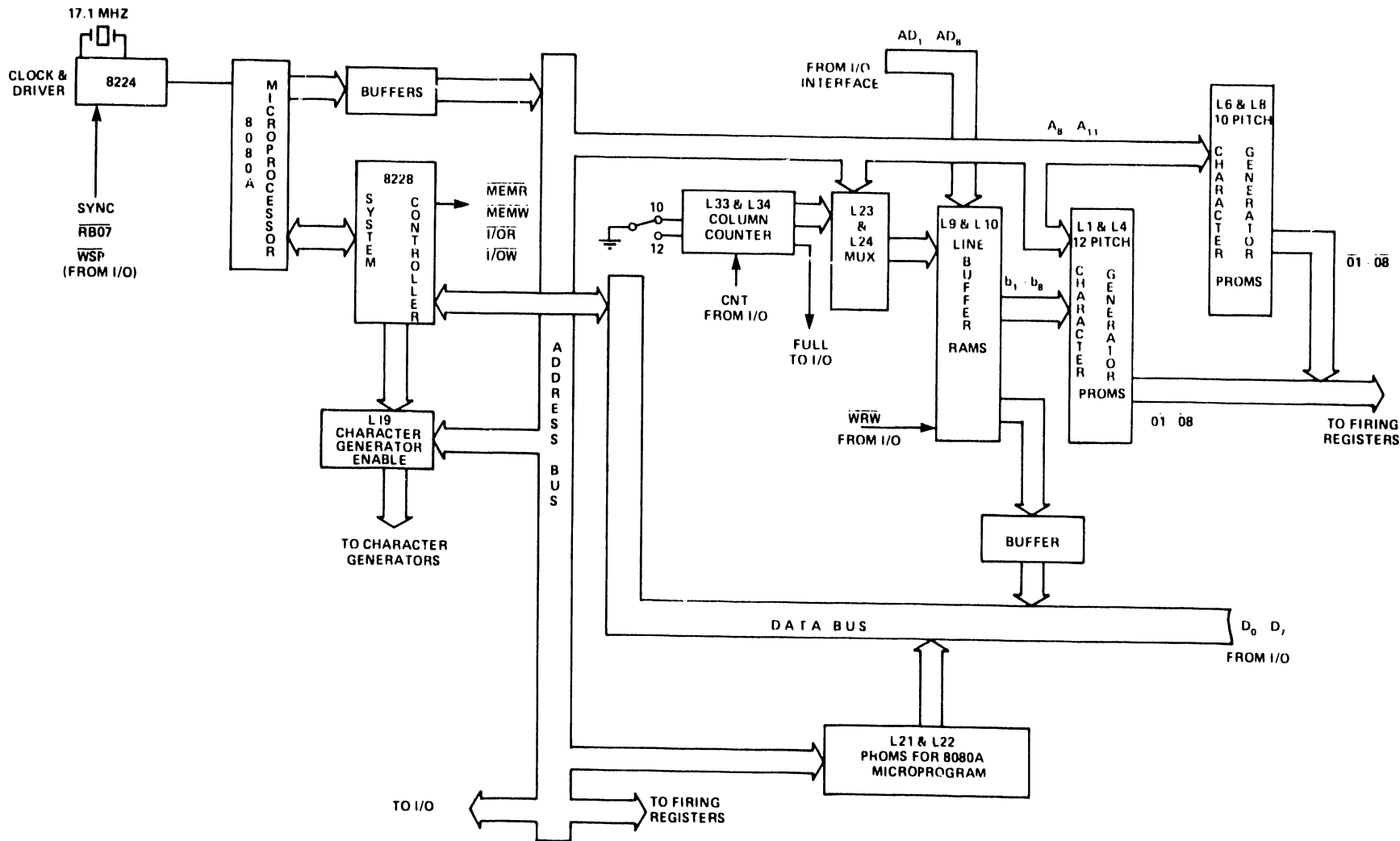
Figure 4-7. 7131 PCB Line Buffer Character Generator & Program Memory

4-21

next byte of data to be written into RAM. The column counter is controlled by the pitch selection switch. At 10 pitch, the maximum column count is 136; at 12 pitch the maximum column count is 160.

When the column counter reaches its maximum count, the signal FULL (full buffer) is generated and routed back to the 7137 pcb. The signal FULL resets the READY/BUSY circuit, releasing the 8080A from the WAIT state. The 8080A is then free to read the data from RAM and proceed with the printing of the received data.

8080A MICROPROCESSOR

After each complete line of data is received by the printer and stored in the line buffer RAMs, the 8080A takes control of the printing operation. The 8080A executes program subroutines initiated by the three Status Bytes; the control program is stored in two PROMs, L21 and L22. The 8080A reads the ASCII character data from the line buffer RAMs in four character increments (one character per print head) and proceeds until an entire line of characters is printed. This ASCII data is used to address the character generator PROMs (L1, L4, L6, L8) which generate the print solenoid addresses, 01 - 09. At 10 pitch, each print head prints 34 characters for a full line of 136.

At the completion of a printed line, the signal $\overline{WSP}$ forces the step control logic to set the 8080A READY line low (WAIT state) for the period of time necessary for the 2200 CPU to load another line of characters into RAM memory.

4.3.4 *PCB #7134 FOUR-HEAD FIRING REGISTER*

All the firing registers for the four printing heads are contained on this pc board. See Figures 4-8 and 4-9.

The firing registers have two stages. The first stage consists of eight 5-bit shift registers, L9 through L16, grouped in pairs to handle eight bits of data for each print head. All eight registers are loaded
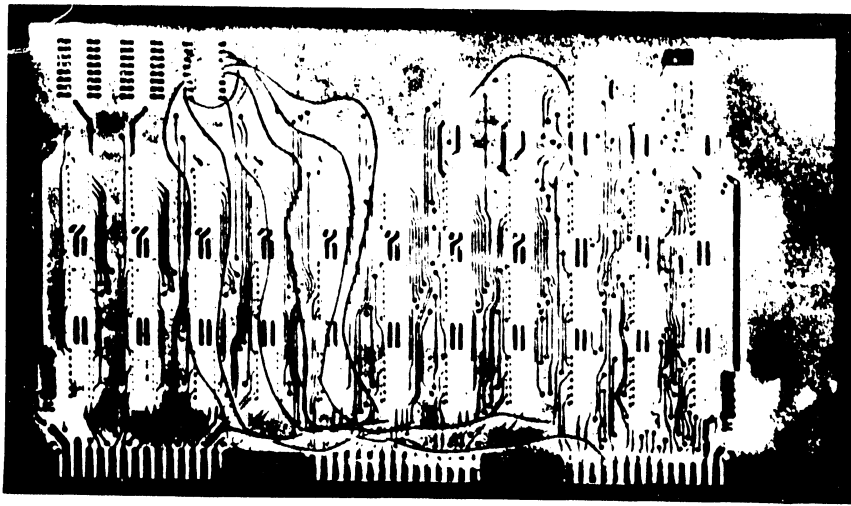
Figure 4-8. 7134 PCB Four Head Firing Register

in parallel. These first stage registers are loaded and cleared by 8080A
output control signals WO_0-WO_3. An ODD and EVEN firing arrangement is
used for the solenoids of each print head, much the same way as in the
Model 72 Matrix Printer.

The characters are loaded into the first stage registers by means
of a flip-flop, a 4-bit counter, and two BCD to Decimal decoders. The
flip-flop, L2, receives the 8080A I/O commands WO_0-WO_1 and controls the
ODD and EVEN selection of the first stage registers. The 4-bit head
counter, L1, enables the selected ODD or EVEN registers for the data to
be stored; it is controlled by 8080A I/O command WO_3.

The 8080A microprocessor, having control of the printing process,
reads the data out of the line buffer RAMs on the 7131 pcb and transfers
this data to the buffered input of the 7134 pcb. When the first stage
registers are loaded, the character data is ready on the lines to the
second stage firing registers. The firing registers are D-type flip-flops
clocked by the FIRE E and FIRE O signals to load data into the EVEN and
ODD firing registers.

A one-shot multivibrator, L17, delays a 425 us trigger for both
the EVEN and ODD solenoid firings. The first stage registers are cleared
by 8080A OUT command WO_2 before the solenoids are fired, thus allowing

4-23
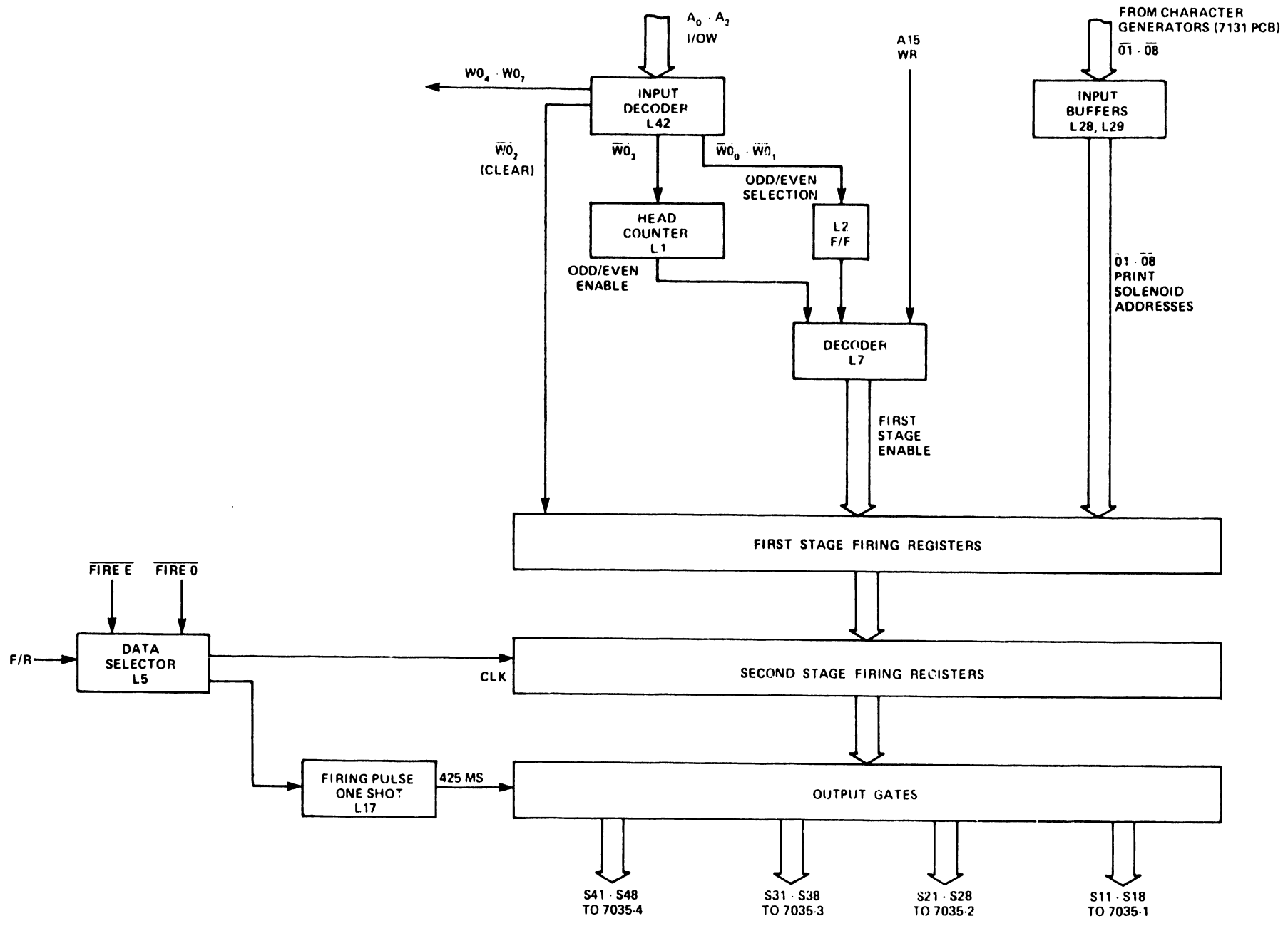
Figure 4-9. 7134 PCB Four Head Firing Register

the 8080A to process the next four characters for printing. The process
continues until a full line is printed and the RAM memory is emptied.
A READY condition then signals for another line of characters to be
transferred from the 2200 CPU.

The output signals to the four solenoid driver boards (7035) are
designated S1 through S49.

4.3.5   PCB #7035 SINGLE HEAD SOLENOID DRIVER (4)

The four solenoid driver boards receive the outputs S11 through S49
from the four head firing register. Each board has eight signal inputs
and handles only one print head. The input signals are applied to the
base inputs of the driver transistors, Q9 through Q16. Each board gener-
ates eight driver signals, one for each solenoid in its corresponding
print head. The driver signals are routed from the J1 connectors at
the top of the boards, through the print head ribbon cables, to the
print head finger boards on the front of the carriage assembly. See
Figure 4-10.
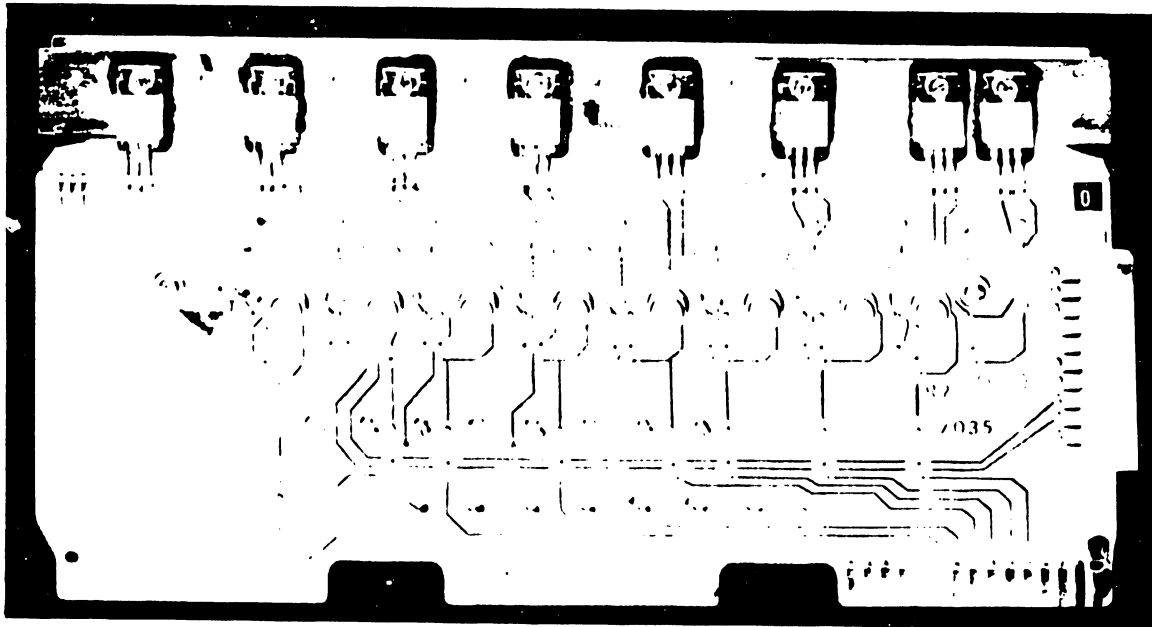
Figure 4-10.   7035 PCB Single Head Solenoid Driver

SECTION
5
ADJUSTMENT, REMOVAL AND REPLACEMENT PROCEDURES

SECTION 5

ADJUSTMENT, REMOVAL, AND REPLACEMENT PROCEDURES

5.1 INTRODUCTION

Section 5 is divided into two parts: a electrical section and a mechanical section.

The electrical section contains voltage and timing adjustment procedures plus a listing of all the electrical component boards used in the Model 77.

The mechanical section contains adjustment checks, adjustment procedures, and removal/replacement procedures for each major mechanical assembly in the Model 77.

For easy access to the electrical chassis, the rear access door may be easily removed as shown in Figure 5-1. To remove the rear door, first unplug the exhaust fans and the grounding lead; then lift the door up, off the hinges.

Also note that the electrical chassis swings out on a hinge, allowing access to its reverse side. See Figure 5-2. The chassis is bolted to an A-type bracket at its upper right corner. Remove the chassis retaining bolt and swing the chassis out.

5.2 ELECTRICAL ADJUSTMENTS

5.2.1 *VOLTAGE ADJUSTMENTS*

NOTE:

Perform the following voltage checks on the reverse side of the motherboard.

210-7136 PCB POWER SUPPLY BOARD

1. Check for $\pm 0V$ (LOGIC) at connector pins J_1 and 8_1.

REAR DOOR LATCH
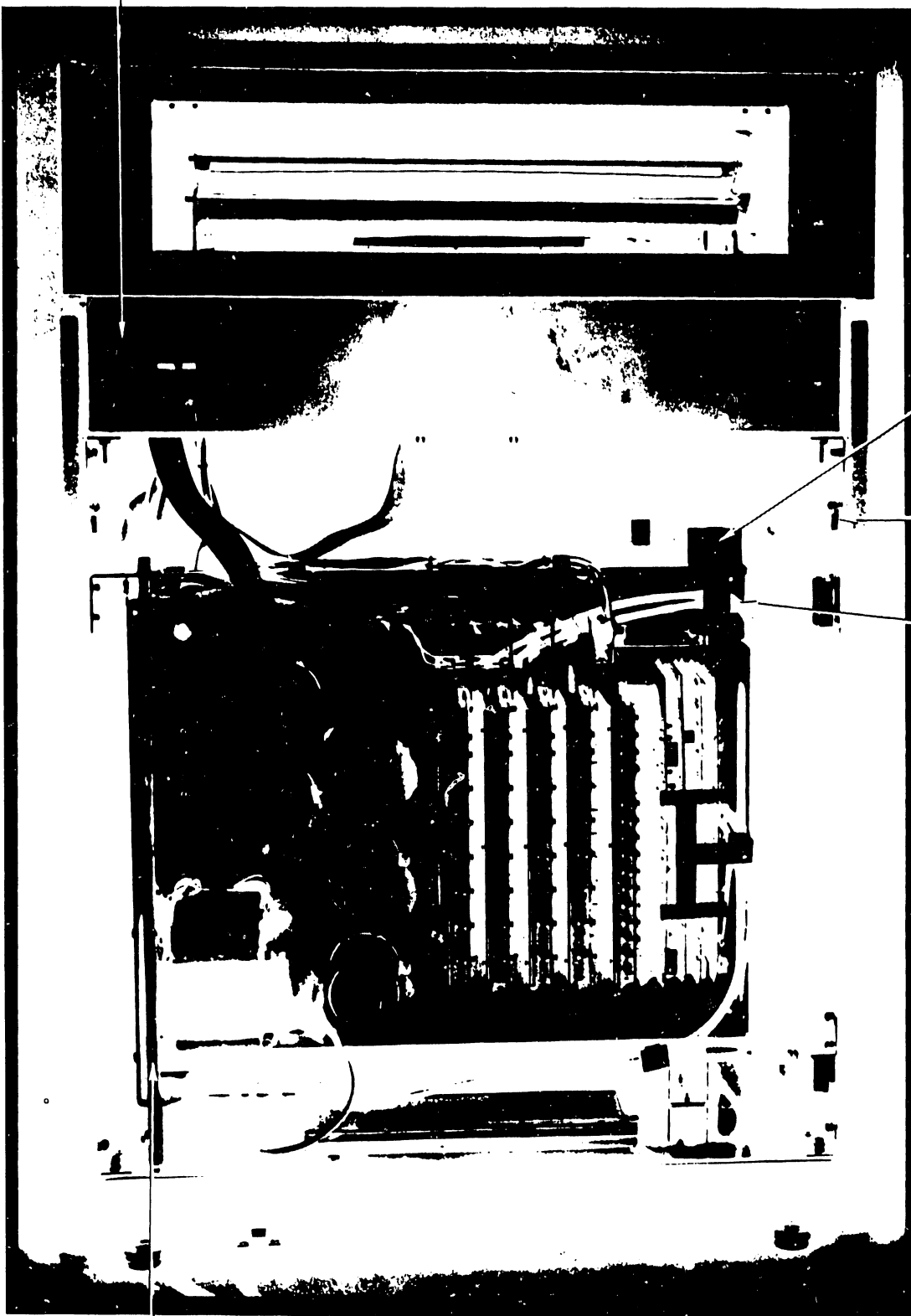
CHASSIS
RETAINING
BOLT

GROUNDING
LEAD

EXHAUST
FAN
CABLES

HINGE BAR

Figure 5-1. Model 77 with Rear Access Door Removed

Figure 5-2. Model 77 with Chassis Swung Out (Service Position).

2. Check for $+5 \pm .1V$ VRSW at connector pin 12_1. Adjust this voltage to the correct level by R-32. See Figures 5-3 and 5-4.

3. Check for +12 to +12.5 VRSW at connector pins A_1 and 1_1. Adjust to the correct level by R-37. See Figures 5-3 and 5-4.
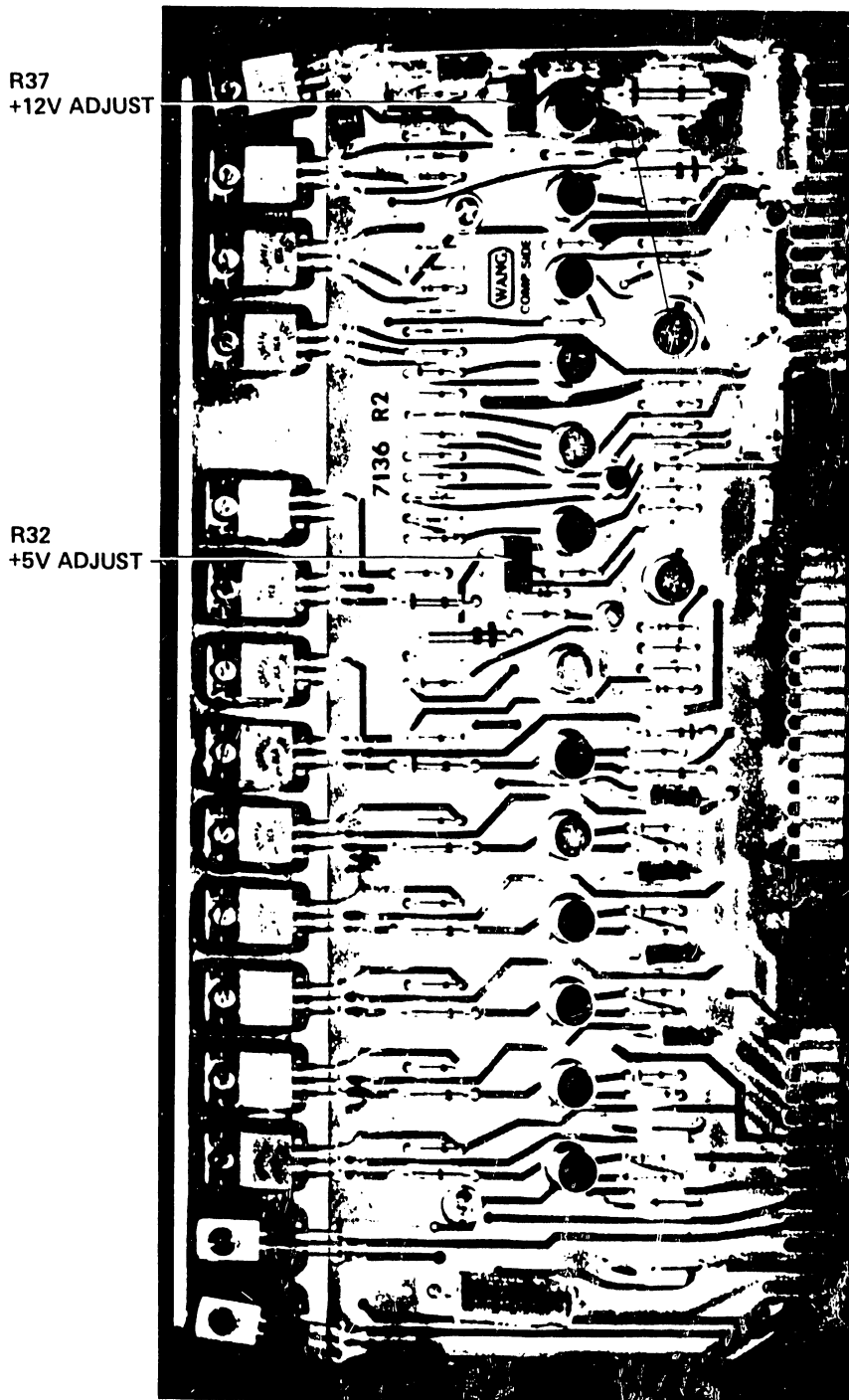
Figure 5-3. 7136 PCB — Voltage Adjustments
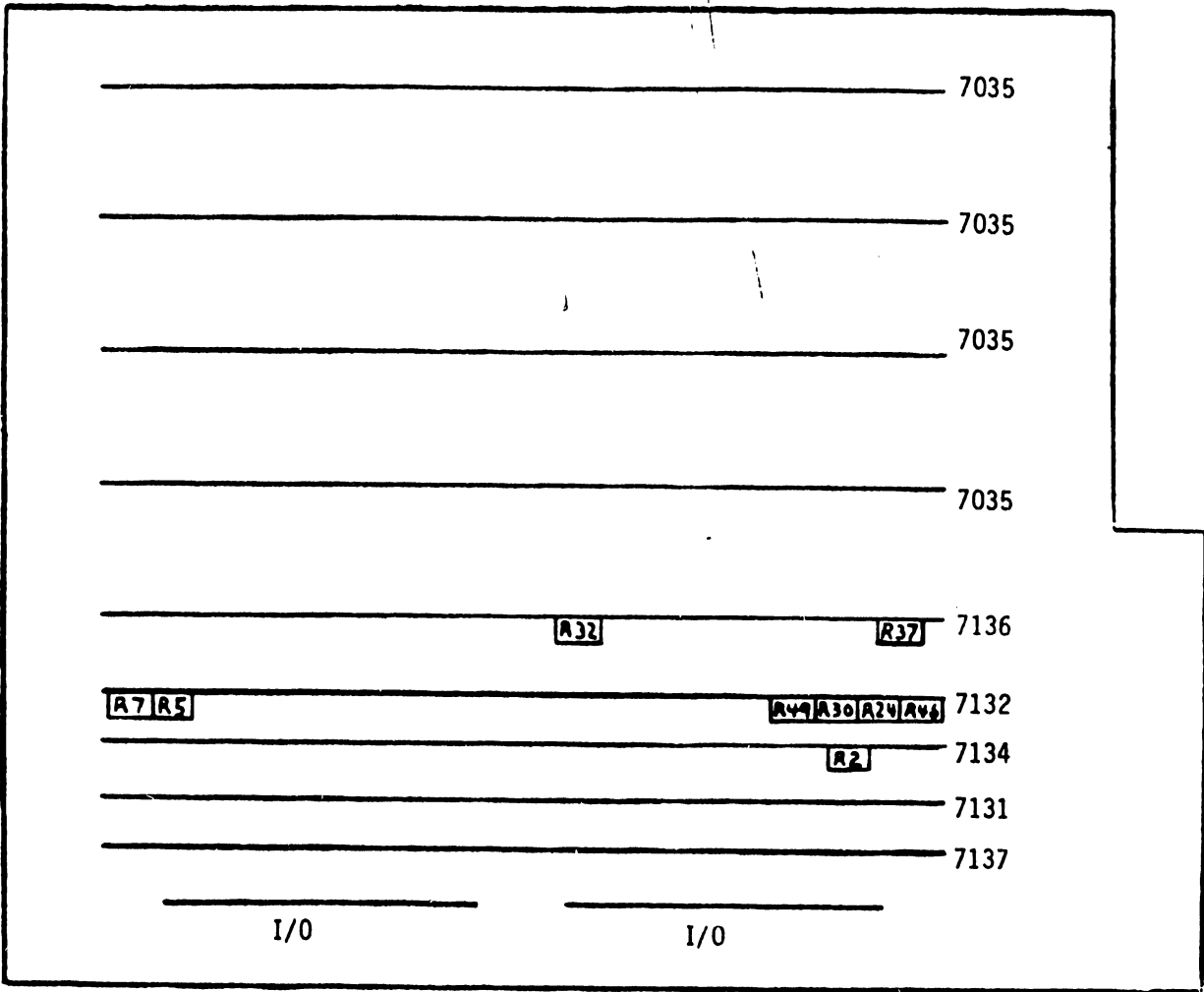
Figure 5-4. Location of Adjustment Pots with PCBs
Installed in Motherboard

4. Check the following voltages:

Voltage	Test Points (Connector Pins)
-5 volts	R_1 & 14_1
-12 VSW	4_1
+20 V	D_1
+40 V	E_1
-20 V	H_1 & 7_1
+5 VRB	P_1
+5 VR1	13_1
+12 V	S_1
-12 V	15_1

5.2.2 *TIMING, SERVO, AND OPTICS ADJUSTMENTS*

CAUTION:

The electrical adjustments that follow must be performed in the same order as they are given. Before proceeding with these electrical adjustments, ensure that all mechanical photocoupler adjustments have been made as per Section 5.3.5. Refer to Figures 5-4 through 5-9.

1. Servo Speed (Forward and Reverse) 7132 PCB.

NOTE:

For this adjustment, use spacing rather than character printing, to prevent damage to the solenoids.

Forward Speed - Set the pitch control to 12 pitch. While monitoring WS at L18 pin 9, and while spacing in the forward (left to right) direction, adjust R7 to obtain a full cycle width of 900 µs. See Figure 5-6A.

Reverse Speed – While monitoring L18 pin 9, and while spacing in the
reverse (right to left) direction, adjust R5 to obtain a full cycle
width of 900 µs.

R46
12 PITCH
LED INTENSITY

R24
10 PITCH LED
INTENSITY

R30
10 PITCH WS
DUTY CYCLE

R49
12 PITCH WS
DUTY CYCLE

R5
REVERSE SERVO
SPEED ADJUST

R7
FORWARD SERVO
SPEED ADJUST
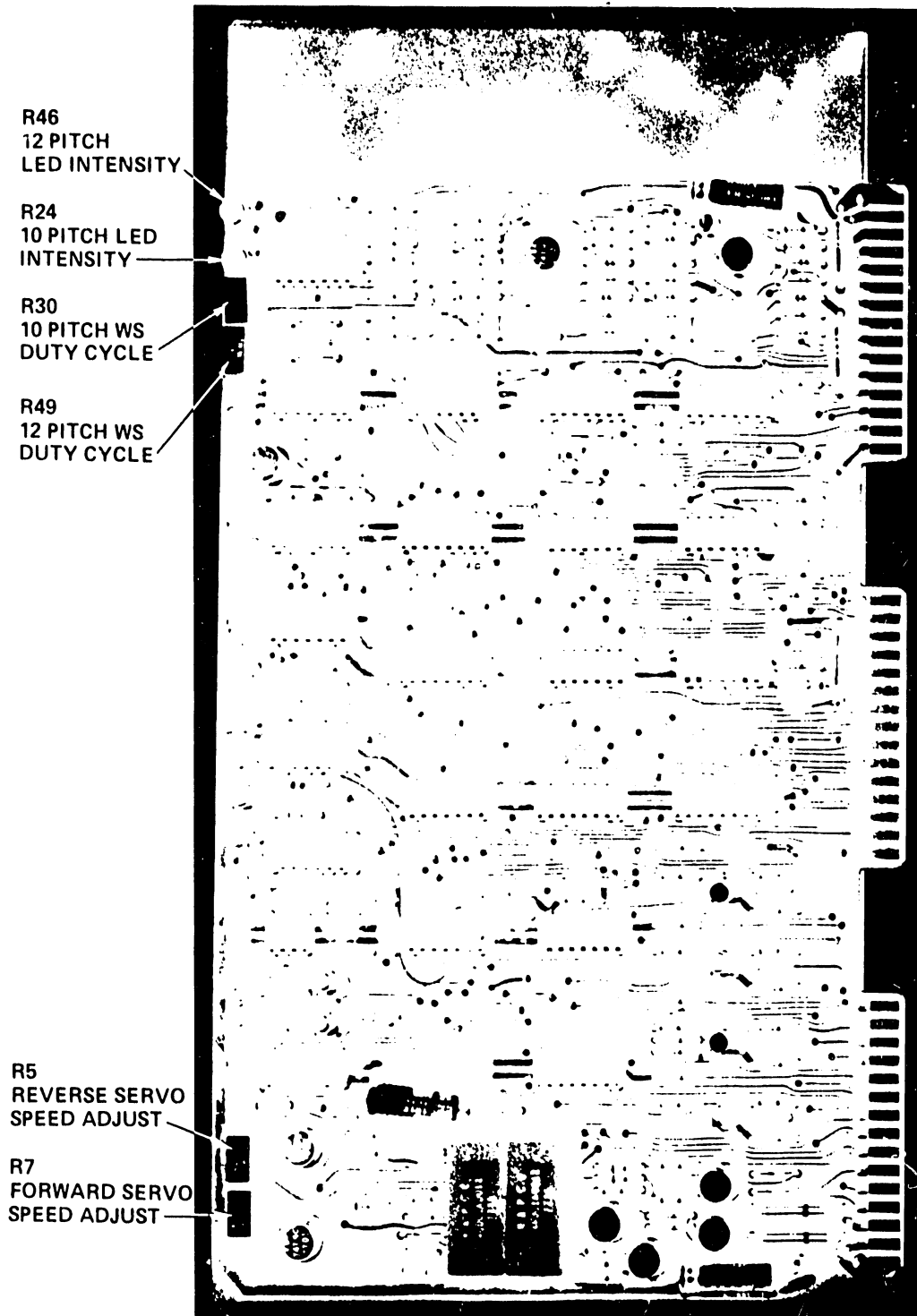
Figure 5-5. 7132 PCB Timing, Servo, and Optics Adjustments

A) SERVO SPEED

← 900 μs →

B) WS 50% DUTY CYCLE 12 PITCH

← 450 μs → ← 450 μs →

C) WS 50% DUTY CYCLE 10 PITCH

← 456 μs → ← 456 μs →

CHANNEL 1

D) CHAN. 2   INDEX TO WS DELAY

← 5-6 ms →

E) FIRING TIME

← 425 μs →
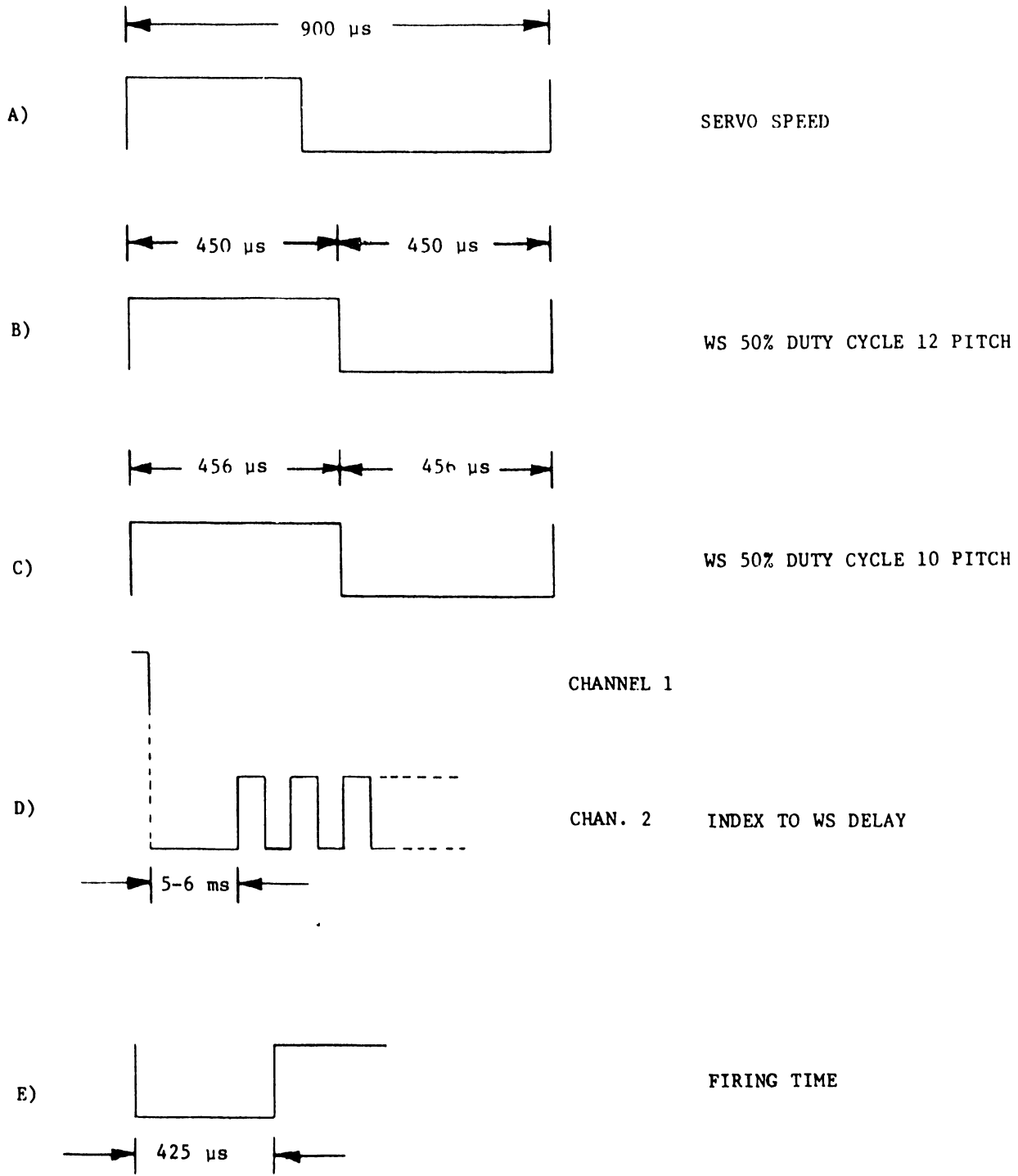
Figure 5-6.

2. Window Signal Duty Cycle 7132 PCB.

   a. 12 Pitch Duty Cycle - Set the pitch control to 12 pitch. Adjust R49 to obtain a 50% duty cycle at L18 pin 9. The positive and negative periods of WS should each be 450 µs. See Figure 5-6B.

   If the 50% duty cycle cannot be obtained by adjusting R49, the photocoupler amplifier could be saturated. If this is the case, adjust R46 slightly clockwise to lower the intensity of the LED. On newly manufactured boards, the R46 pot is set completely counterclockwise for maximum LED intensity. Turn R46 slightly clockwise to reduce the LED intensity, then re-attempt the duty cycle adjustment. If the LED intensity is decreased too much, WS will drop out.

   b. 10 Pitch Duty Cycle - Set the pitch control to 10 pitch. Adjust R30 to obtain a 50% duty cycle at L18 pin 9.

   If the 50% duty cycle cannot be obtained, decrease the LED intensity with R24, using the same method as in step a. See Figure 5-6C.

3. Index to Window Delay 7132 PCB.

   The gap from the trailing edge of the Index Pulse (signal PFB at connector pin 11_3) to the first window signal should be 5-6 ms. This measurement should be made with the line spacing switch set to 6 lines/inch, and with the carriage moving forward and then reverse.

   Set up the scope as follows:

   a. Channel 1 on connector pin 11_3 of the 7132 PCB.
   b. Channel 2 on L24 pin 8 of the 7132 PCB.
   c. Trigger NEGATIVE, CHANNEL, CHOPPED.

SPRING & BACKSTOP   BUMPER SCREWS   SPRING & BACKSTOP
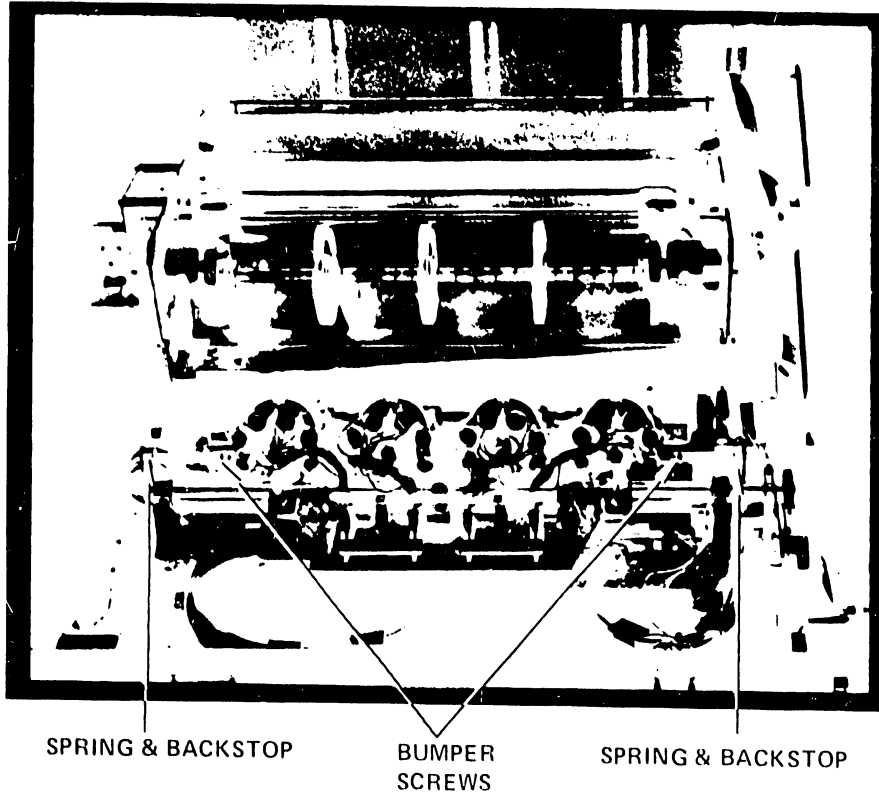
Figure 5-7. Location of Bumper Screws

Adjust the bumper screws in or out until the 5-6 ms gap is obtained. To widen the gap, adjust the bumper screws out, toward the margin springs. See Figures 5-7 and 5-8.

If it seems necessary to turn the screws out so far that a margin spring is forced against its fixed backstop, the corresponding margin photocoupler will need adjustment. Turn the bumper screws back in, then loosen the photocoupler bracket screws and move the photocoupler slightly toward the carriage. Retighten the bracket screws and then readjust the bumper screws.

RIGHT CARRIAGE
RETURN BUMPER

CARRIAGE
SPRINGS

CARRIAGE
STOP

RIGHT MARGIN PHOTOCOUPLER
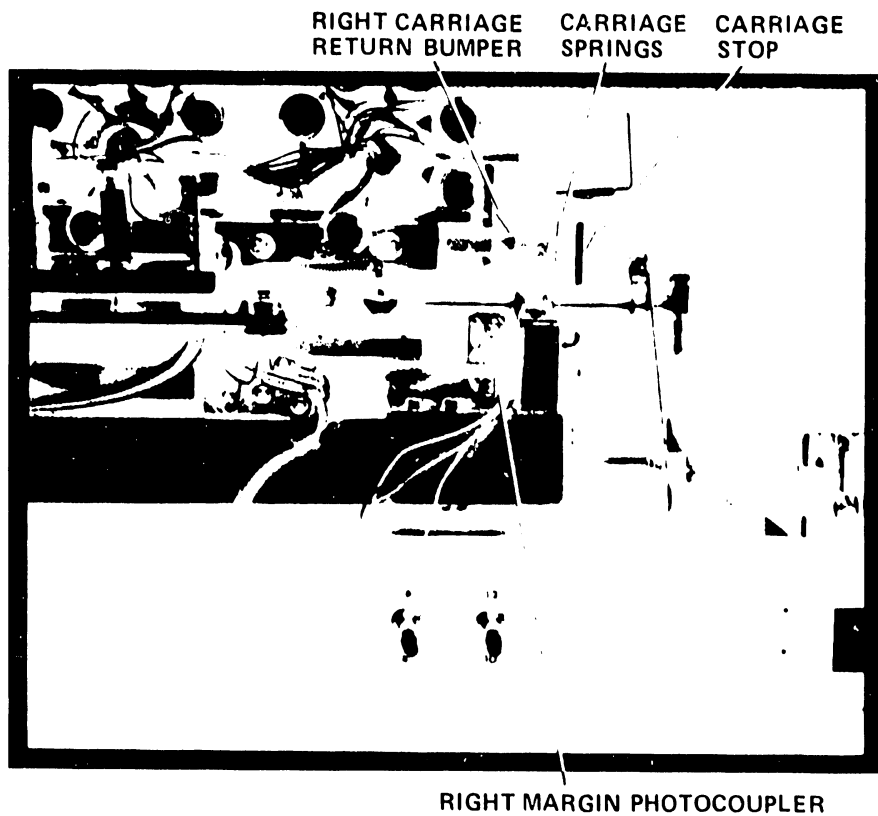
Figure 5-8A. Bumper Screw Adjustment

STANDOFF
#462-0290

10-32 ADJUSTMENT
SCREW

10-32 LOCK NUT

CARRIAGE RETURN
BUMPER #655-0248

CARRIAGE
SPRINGS #465-1661

CARRIAGE STOP
#458-0413

ADJUSTMENT ARM
SPRING BRACKET
#451-4512

ADJUSTMENT
ARM SPRING
#465-1662

SPRING SUPPORT
#458-0419
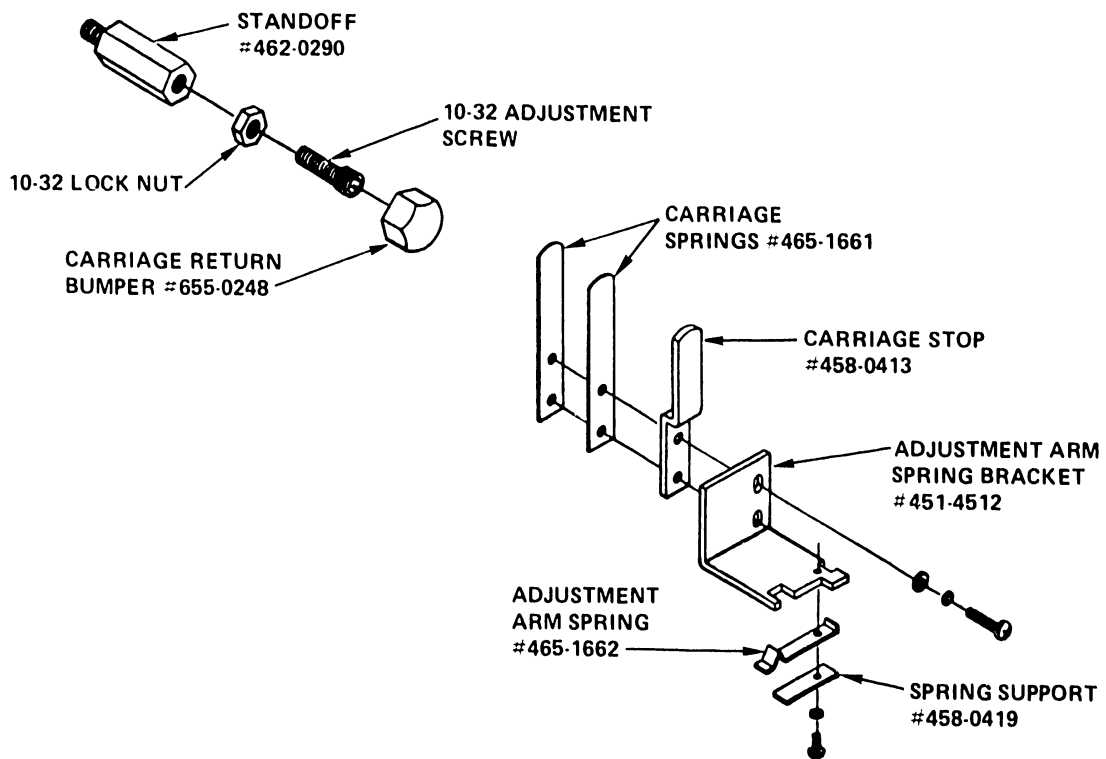
Figure 5-8B. Bumper & Carriage Stop Assembly

4.   Firing Time 7134 PCB.

   a.   Connect the channel 1 scope probe to L17 pin 7.

   b.   Trigger the scope on Internal.

   c.   Adjust R2 to obtain a 425 µs pulse on L17 pin 7.   See Figures
        5-6E and 5-9.

R2
FIRING TIME
ADJUSTMENT
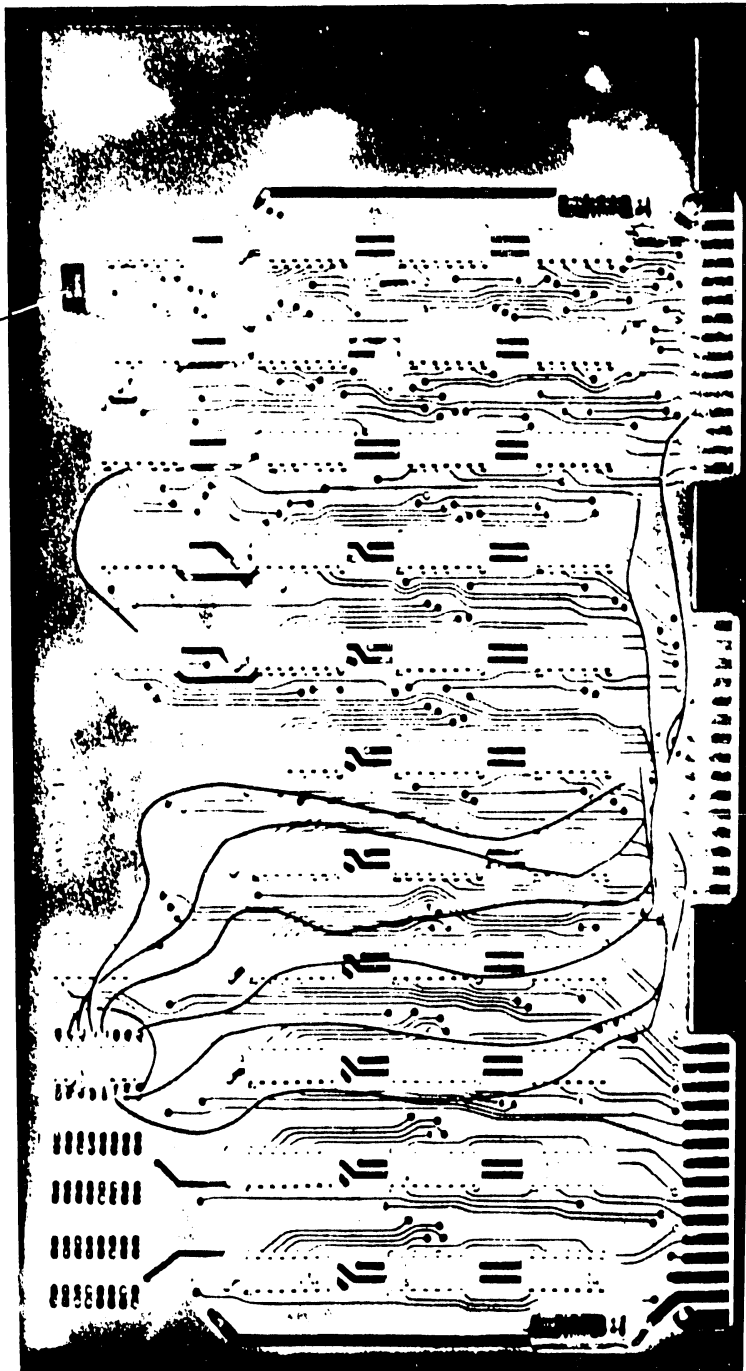
Figure 5-9. 7134 PCB

5.2.3 *PRINTED CIRCUIT BOARDS AND POWER SUPPLY*

The complement of electronic circuit boards used in the Model 77
is listed in the table below. Refer to Figure 5-10 for locating the
position of PCB's on the electrical chassis assembly.

MODEL 77 PRINTED CIRCUIT BOARDS

TITLE	WANG LABS #
Motherboard	210-7030
(4) Single Head Solenoid Drivers	210-7035
(2) Optical Scanner Boards	210-7129
Line Buffer, Character Generator, & Program Memory	210-7131
Optical Signal, Paper Feed, & Motor Control	210-7132
Interconnection Board	210-7133
Four Head Firing Register	210-7134
P.S. Regulator & D.C. Motor Drive & Paper Feed	210-7136
8080 I/O Interface	210-7137
Phototransistor Board	210-7174
Light Emitting Diode Board	210-7175

The main power supply components mounted on the chassis are shown
in Figures 5-11 and 5-12.
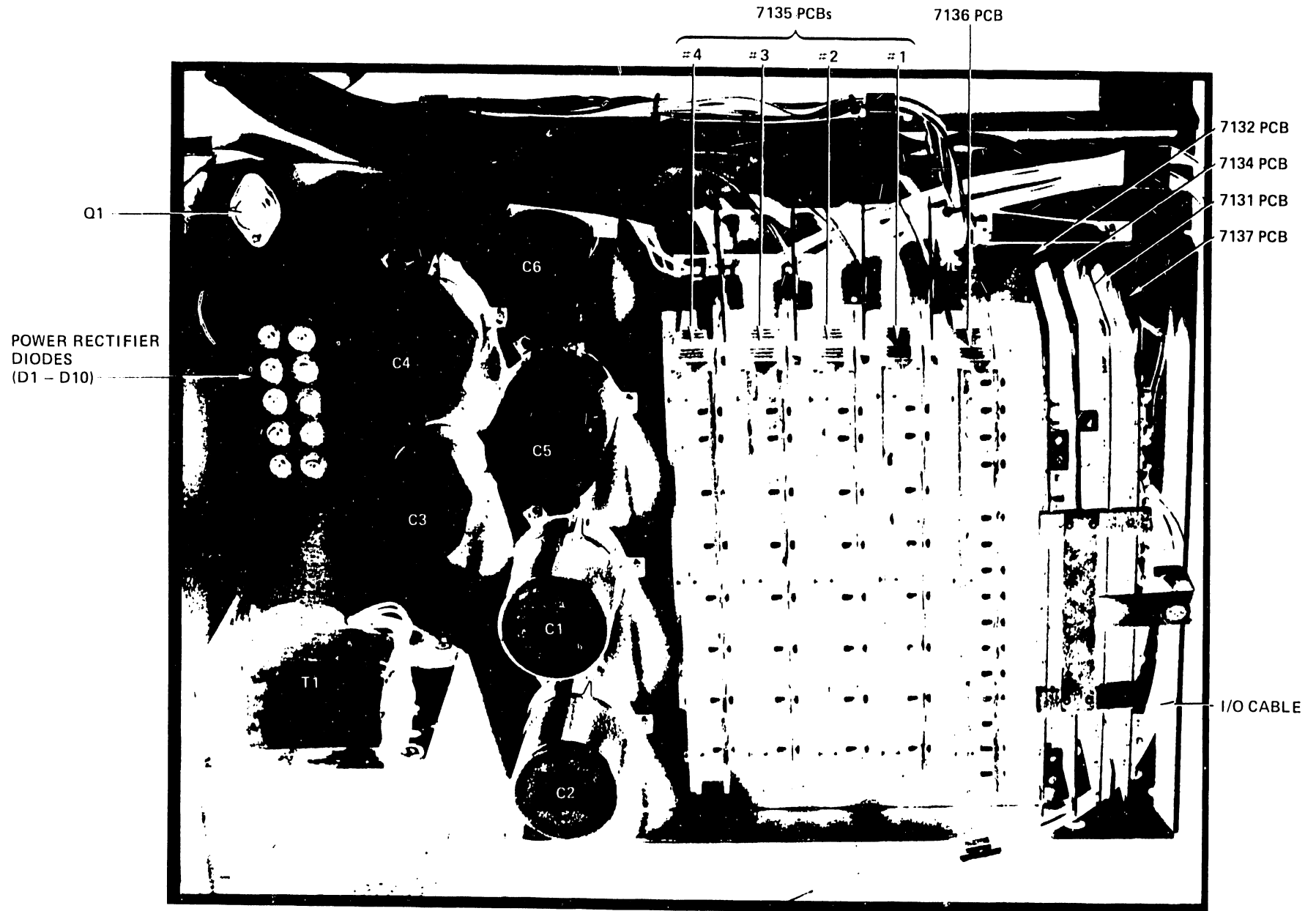
Figure 5-10. Electrical Chassis
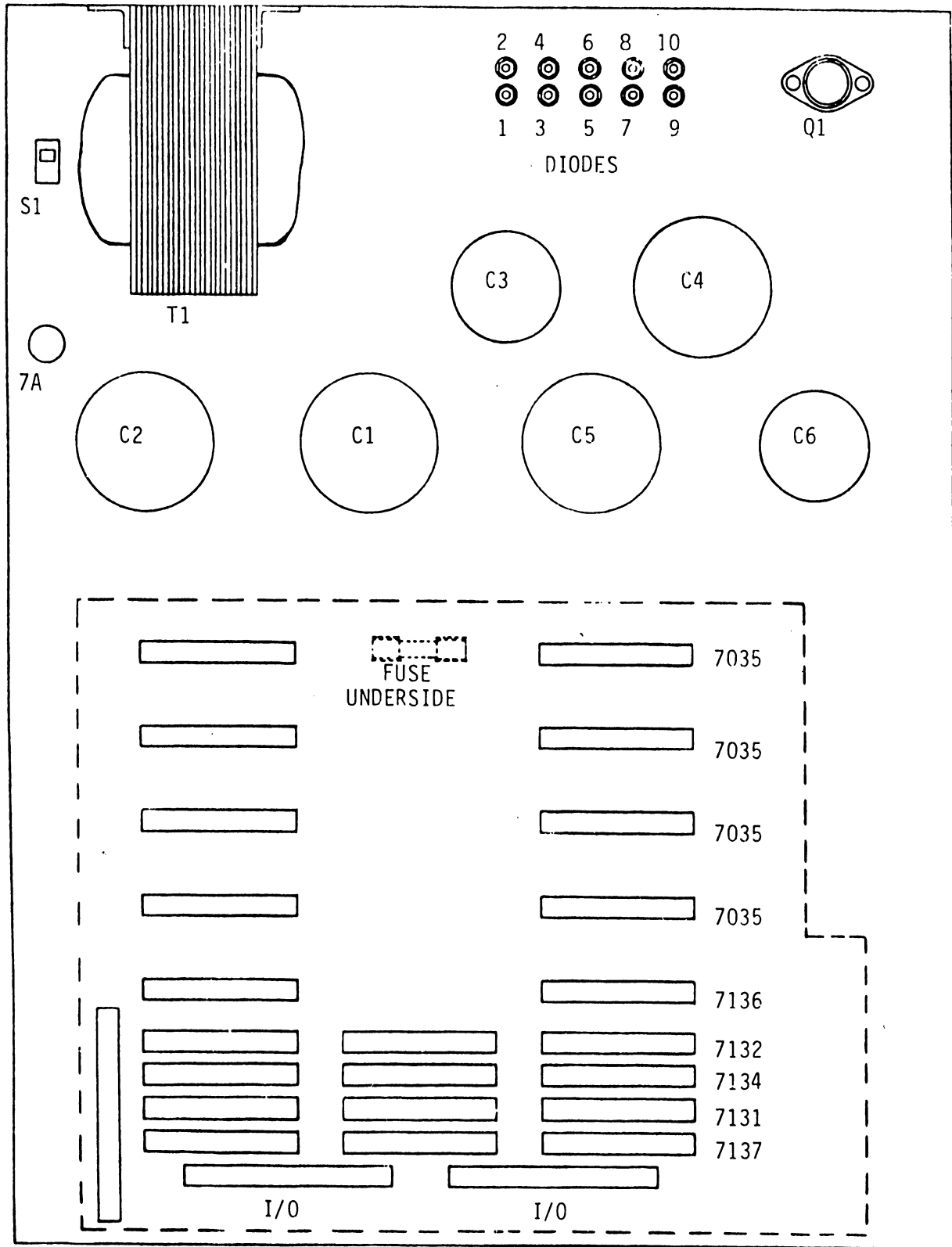
Figure 5-11. Electrical Chassis Component Locations

RESISTORS FOR
PAPER FEED
STEPPING MOTOR

+18 VTR

+18 V

'OV

-18V

Q1

7030 PCB
MOTHERBOARD

DIODES
D1 – D10

M2 CONNECTOR

+9 V

SOLENOID DRIVER
FUSE 10A

LINE FILTER

+40 V
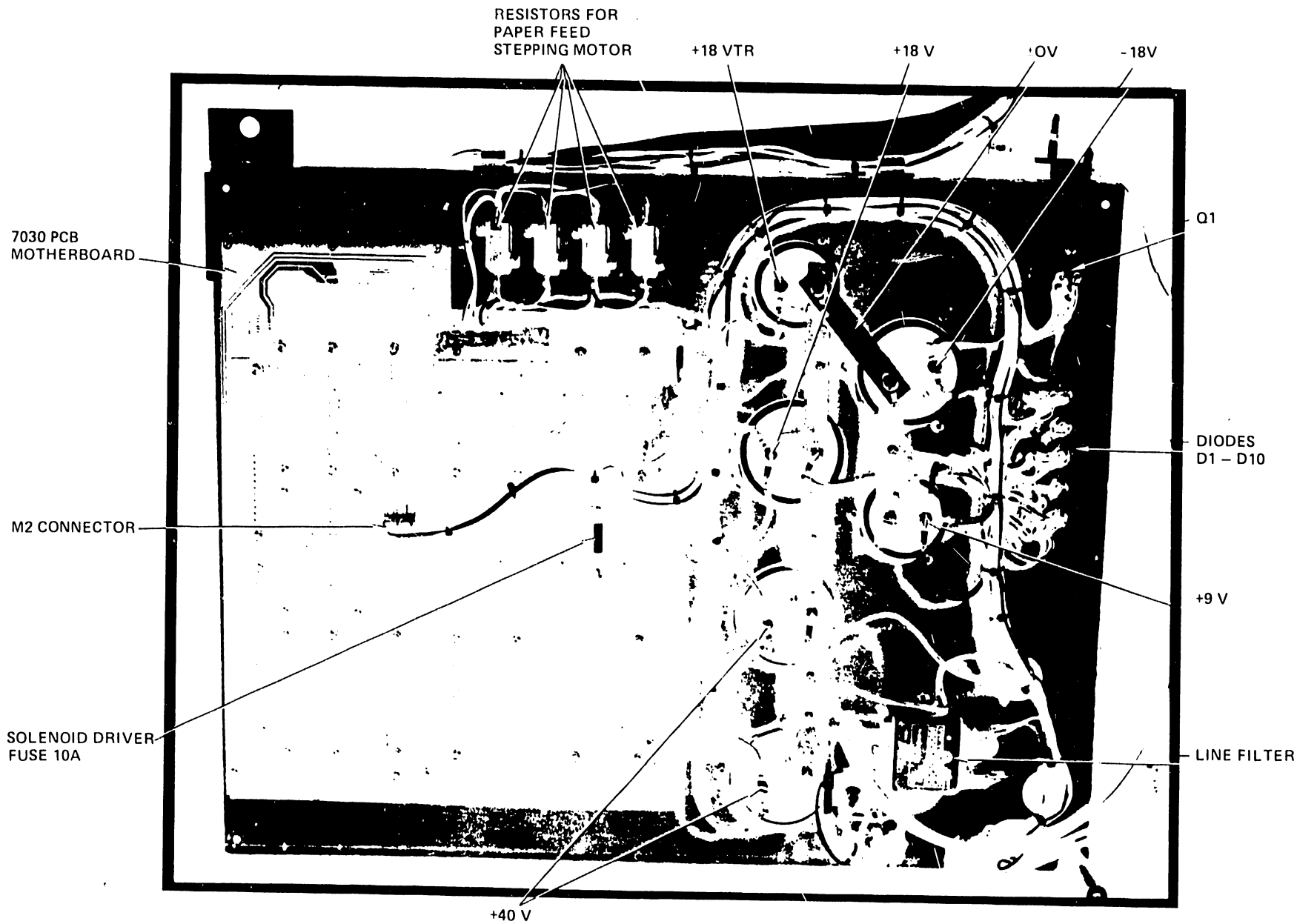
Figure 5-12. Electrical Chassis Rear View

5.3 INDEX TO MECHANICAL AND ELECTROMECHANICAL ADJUSTMENT, REMOVAL, AND REPLACEMENT PROCEDURES

5.3.1 *STRIKER PLATE*

Adjustment Check

The striker plate should not need adjustment unless it is removed, then reinstalled. At the factory, the striker plate is aligned with a special micrometer to be exactly parallel to the carriage shaft. If it is not parallel, the print intensity (lightness or darkness of characters) will vary from one margin to the other. The special micrometer tool is not presently available for field use, but a coarse adjustment check can be made using a feeler gauge.

Proceed as follows:

1. Turn the power off and remove the print head shield (4 screws, 2 each side).

2. Remove the ribbon as per Section 3.3.

3. Set the head adjustment arm to the maximum penetration position (heads all the way forward).

4. Move the carriage assembly to the left margin.

5. Using a feeler gauge, measure the gap from print head bearing #1 to the striker plate. This gap will measure approximately .006" (.15 mm). Note the exact measurement and continue with the next step. See Figure 5-13.

6. Move the carriage assembly to the right margin. Again measure the gap from print head bearing #1 to the striker plate. The second measurement should be within .001" (.025 mm) of the first.

7. Repeat this procedure for the remaining three print heads. For each individual print head, the difference in gaps at the left and right margins should not exceed .001". If the gaps vary significantly, proceed with the striker bar alignment.

When performing the striker plate adjustment, check
each print head separately. Different print heads
may yield slightly different gap readings due to
incorrect print head alignment. But as each in-
dividual print head moves from margin to margin,
the gap between the striker plate and print head
bearing should remain constant. Do not adjust the
print heads at this time! Print head adjustments
are covered in a separate section.

Striker Plate Adjustment

1. Loosen the two Allen head screws at each end of the striker plate.

2. Move the striker plate forward or back (the rear paper guide will
    also move) until it is parallel to the main carriage. Tighten the
    Allen head lock screws and perform the striker plate alignment check.
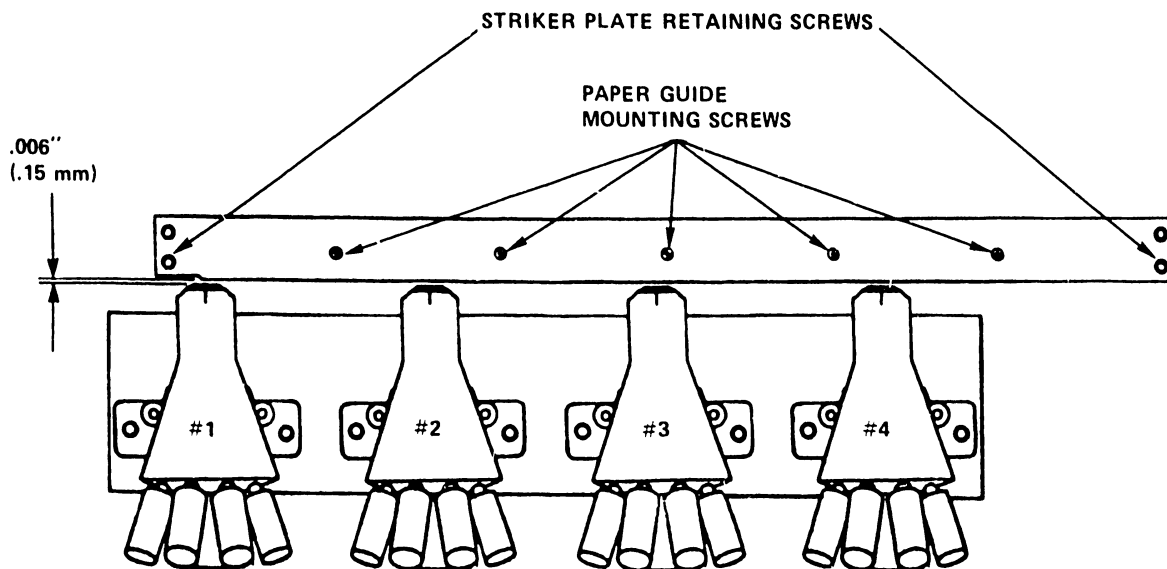
Figure 5-13. Striker Plate Adjustment

3. Repeat steps 1 and 2 until the striker plate to print head gap changes less than .001" as each print head moves from margin to margin.

Striker Bar Replacement Procedure

1. Turn the power off and remove the print head shield.

2. Move the head adjustment arm to the ribbon load position (heads back) and remove the ribbon.

3. Remove the four Allen head retaining screws that hold the striker bar (2 each end).

4. Remove the two paper out switch retaining screws.

5. Lift out the striker plate and rear paper guide.

6. Separate the striker plate from the rear paper guide by removing the 5 Phillips mounting screws along the top of the striker plate.

7. To install a new striker plate, remount the paper guide on the striker plate first; then reverse the above procedure.

8. Perform the striker plate alignment, the paper guide alignment, and the print head alignment check. Adjust the paper out switch.

5.3.2 *RIBBON GUIDE POSTS*

Alignment Check (left and right)

1. Turn the main power switch off.

2. Remove the print head shield (4 screws, 2 each side).

3. Move the carriage assembly to the left margin.

4. Move the head adjustment arm to the ribbon load rosition (minimum head penetration).

5. Manually wind the right ribbon spool to take up any slack in the ribbon.

6. Using a small scaled ruler, measure the distance, at print head #1, from the top of the print head bearing to the top edge of the ribbon. This measurement should be approximately .1 inches (.25 cm). If it is not, the left ribbon guide post must be adjusted. See Figure 5-14.

7. Move the carriage assembly to the right margin.

8. At print head #4, measure the distance from the bottom of the print head bearing to the bottom edge of the ribbon. This measurement should also be approximately .1 inches (.25 cm). If it is not, right ribbon guide post must be adjusted. See Figure 5-14.

PRINT HEAD BEARING #1
AT LEFT MARGIN

.1"(.25 cm)

STRIKER PLATE

RIBBON

.1"(.25 cm)

PRINT HEAD BEARING #4
AT RIGHT MARGIN
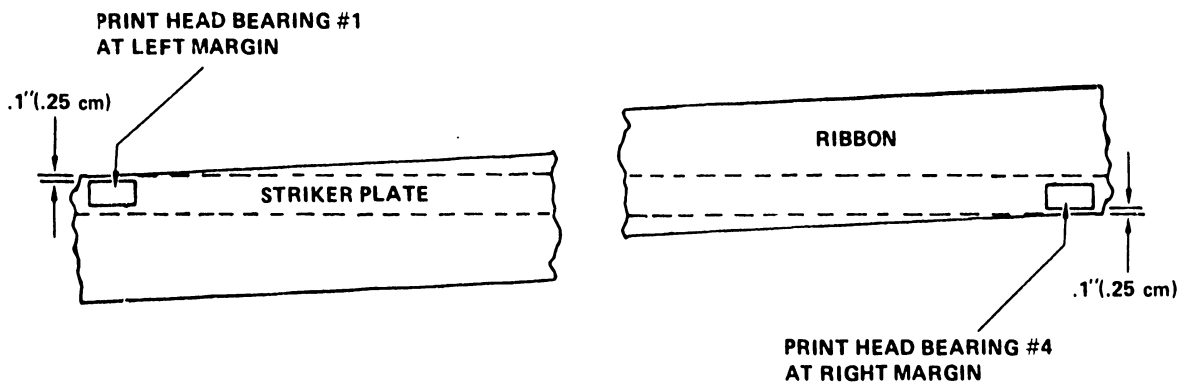
Figure 5-14. Ribbon Guide Post Adjustment

1.   Move the carriage assembly to the left margin.

2.   Loosen the two mounting screws on the left ribbon guide bracket.
     See Figure 5-15.
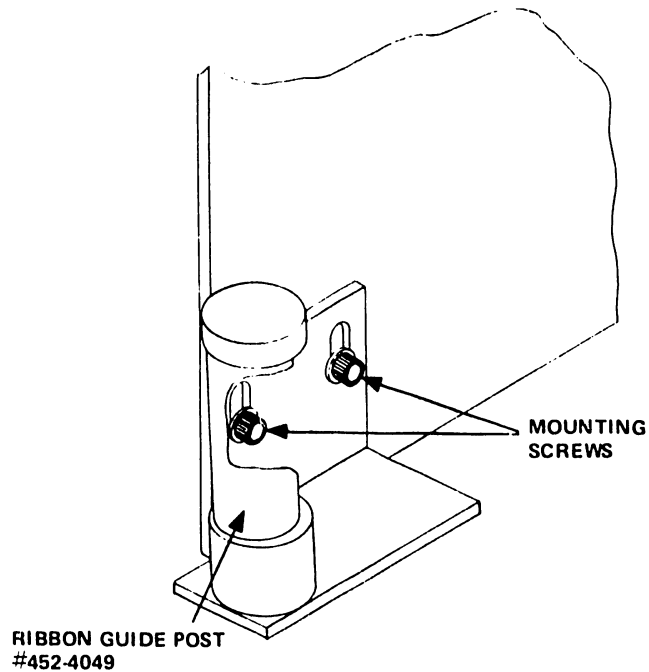
Figure 5-15. Ribbon Guide Replacement

3.   Move the left ribbon guide up or down to obtain the .1 inch (.25
     cm) measurement from the top of print head bearing #1 to the top
     edge of the ribbon.

4.   Tighten the right ribbon guide mounting screws.

5.   Move the carriage assembly to the right margin.

6.   Loosen the two mounting screws on the right ribbon guide bracket.

7.   Move the right ribbon guide up or down to obtain the .1 inch (.25
     cm) measurement from the bottom of print head bearing #4 to the
     bottom edge of the ribbon.

8.   Tighten the left ribbon guide mounting screws.

Ribbon Guide Post Removal and Replacement

1. Turn the main power switch off.

2. Remove the print head shield (4 screws, 2 each side).

3. Move the head adjustment arm to the ribbon load position (minimum head penetration).

4. Remove the ribbon as per section 3.3.

5. Remove the two mounting screws from the left ribbon guide bracket.

6. Remove the left ribbon guide post and mounting bracket.

7. Separate the ribbon guide post and the mounting bracket by removing the single holding screw on the bottom of the guide post.

8. Follow the above procedure to remove the right ribbon guide post.

9. Replace by reversing this procedure. When remounting a guide post on the bracket, align the guide post so that its flanged surface faces outward to support the ribbon. The guide posts should hold the ribbon against the print head bearings to avoid ink smudging on the paper.

10. Reinstall the ribbon.

11. Perform the ribbon guide post adjustment.

5.3.3 *RIBBON DRIVE ASSEMBLY*

Adjustment Checks

1. The solenoid height adjustment check must be performed with the power on. The ribbon tension arm adjustments should be performed only when the main power is off.

2. Solenoid Height - At the left and right ribbon drive motors, check
    the gap, with a feeler gauge, between the gear engagement arm and
    the motor shaft. The gap should measure .005 inches (.13 mm); if
    the gap is incorrect, perform a solenoid height adjustment. See
    Figure 5-16.

3. Ribbon Tension Arms - Manually wind one ribbon spool several turns.
    After winding, release the spool and observe which tension arm comes
    to rest last. The tension arm on the side which is pulling should
    stop last. If the ribbon was being wound, for example, on the left
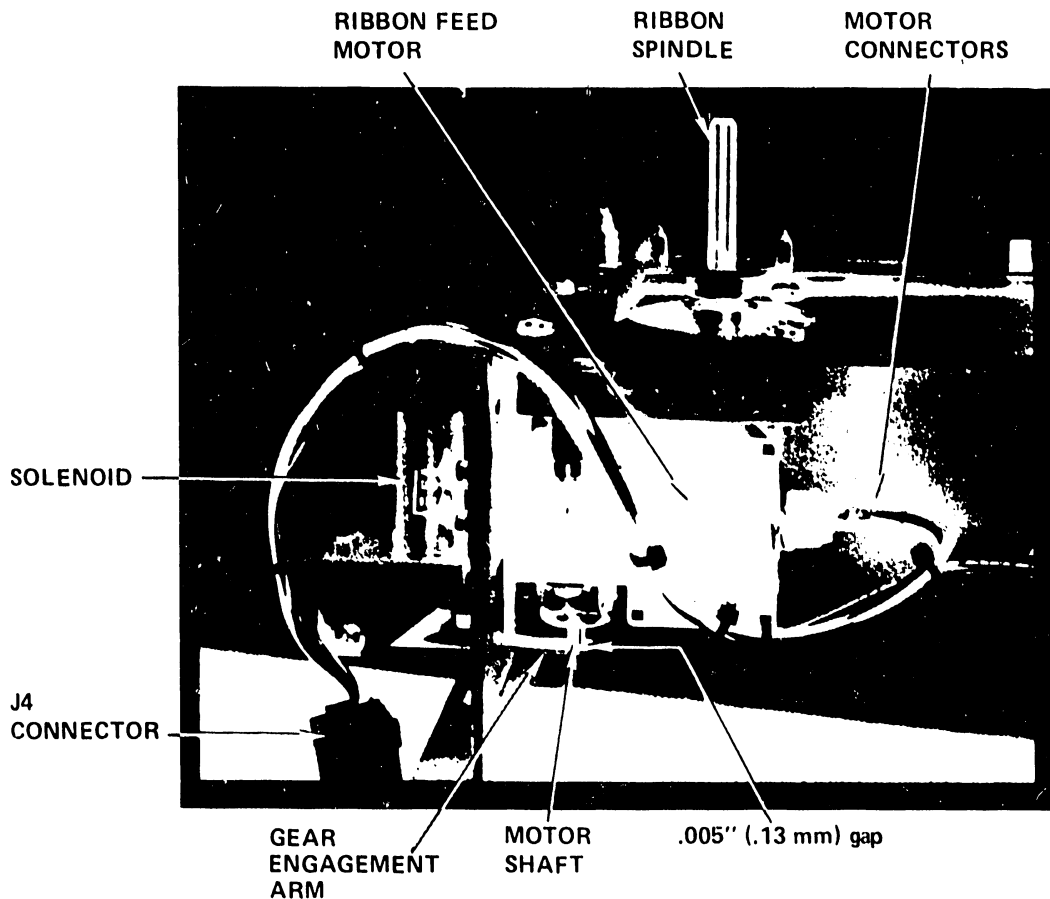
Figure 5-16. Ribbon Drive Assembly Solenoid Height Check

RIBBON TENSION ARM
#458-411

RIBBON TENSION ARM
#458-412

RIBBON REVERSE
ACTUATOR
#458-300

RIBBON REVERSE
ACTUATOR
#458-300

RIBBON
GUIDES
#452-4049

RIBBON
GUIDES
#458-4049
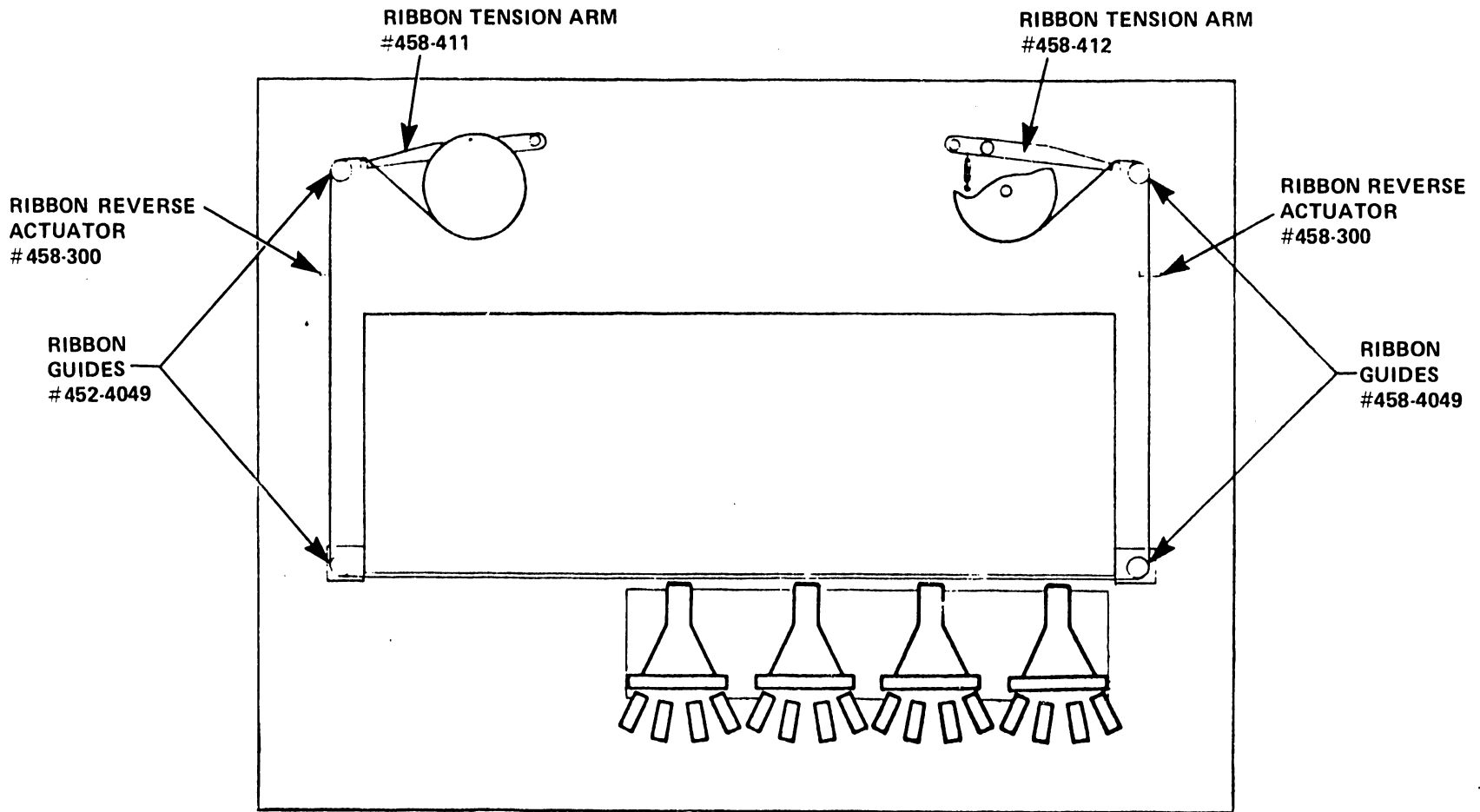
Figure 5-17. Location of Ribbon Drive Components

spool then suddenly released, the left tension arm would stop moving after the right one. If it does not, perform the ribbon tension arm adjustment. Check the opposite ribbon tension arm the same way. See Figure 5-17.

Ribbon Drive Assembly

Adjustment Procedure

1. Turn the main power switch off for the ribbon tension arm adjustment.

2. Solenoid Height

    a) Loosen the two holding screws on the solenoid bracket. See Figure 5-18.
    b) Move the solenoid up or down to obtain a gap of .005 inches (.13 mm) between the gear engagement arm and the motor shaft.
    c) Tighten the two holding screws.

3. Ribbon Tension Arms

    a) If a tension arm comes to rest too early, as described in the adjustment check, adjust the corresponding ribbon tension eccentric. See Figure 5-19.
    b) Recheck the ension arm adjustment on the opposite side.

Ribbon Drive Assembly Removal and Replacement

1. Remove the ribbon as described in section 3.3.

2. Unplug the connectors from the ribbon feed motor.

3. Remove the 4 Phillips screws attaching the assembly to the side frame and base. See Figure 5-20.

4. Reverse this procedure to reassemble.

5. Reinstall the ribbon as described in section 5.3.

6. Perform the adjustment checks for the solenoid height and ribbon tension arms.

Figure 5-18. Solenoid Adjustment

Figure 5-19. Tension Arm Adjustment
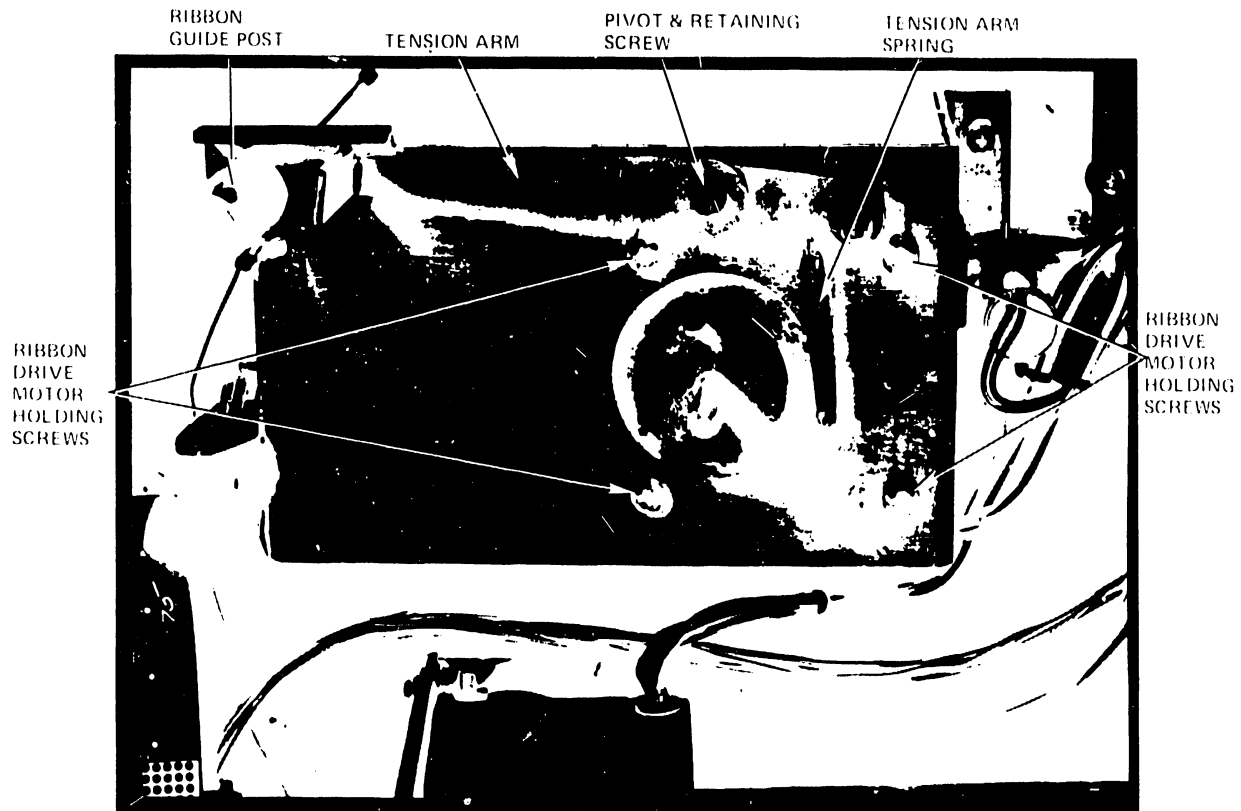
Figure 5-20. Ribbon Drive Motor Removal

5.3.4 *PAPER GUIDES*

1. Two paper guides, an inner and an outer, channel the paper in front
    of the striker plate. The outer (front) paper guide is adjustable;
    it must be set parallel to the striker plate to prevent paper binding.
    If paper binding does occur, perform the paper guide parallel adjust-
    ment.

2. The outer (front) paper guide is attached to a spring and bracket
    which pulls the two paper guides together, putting even tension on
    the paper forms. Spring tension is set to medium at the factory
    to accommodate single and multi-part forms; however, if the forms
    are too thick or thin for the paper guide setting, they may tear
    or bow out against the print heads and smear the print. If these
    conditions exist, perform the paper guide spring tension adjustment.

Paper Guide Parallel Adjustment

1. Loosen the lock screws on the left and right pivot blocks. See
    Figure 5-21.

2. Move the pivot blocks in or out until the front paper guide is
    parallel to the striker plate.

3. Tighten the lock screws on the pivot blocks.

4. Feed paper through the printer and check for paper binding.

Paper Guide Spring Tension Adjustment

1. Loosen the two retaining screws on the spring mounting bracket
    (located on the underside of the printer frame). See Figure 5-21.

2. Pull the spring bracket away from the paper guide to increase pressure
    for light forms, or push the bracket toward the paper guide to decrease
    pressure for thick forms.
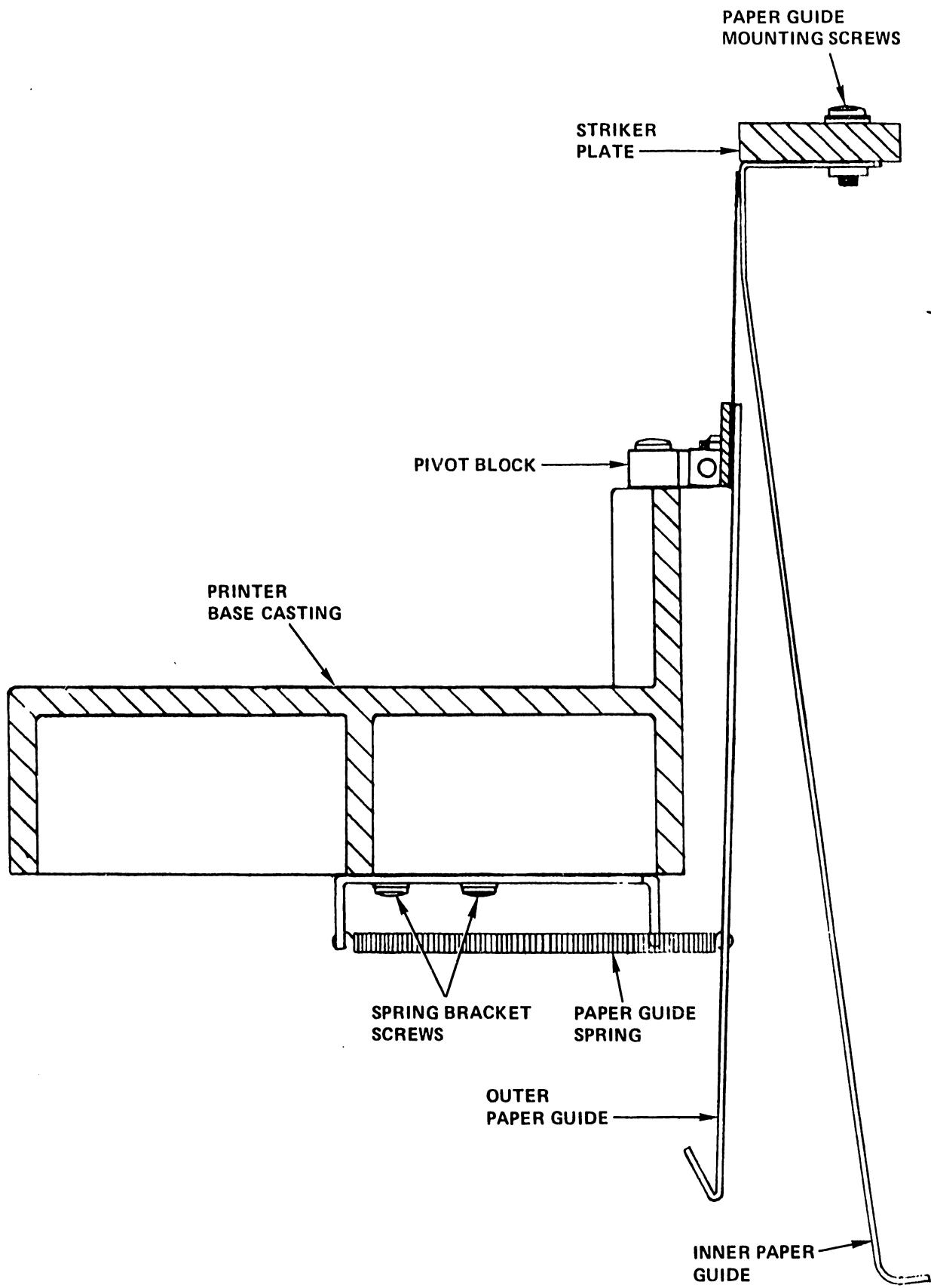
Figure 5-21. Paper Guide

3.   Tighten the bracket retaining screws.

4.   Recheck the spring tension by feeding paper through the printer.

Paper Guide Removal Procedure

1.   Turn the main power switch off.

2.   Remove the print head shield (4 screws, 2 each side).

3.   Move the carriage to the left margin.

4.   Remove the paper guide tension spring, located on the underside of
     the printer frame (the spring connects to the outer paper guide).

5.   Remove the two lock screws on the pivot guide blocks (left and right).
     The front paper guide will now pull free from under the frame.

6.   Remove the paper out switch mounting screws (2).

7.   Remove the five mounting screws (Phillips) that secure the inner
     (rear) paper guide to the striker plate. The paper guide will now
     pull free.

8.   Replace the paper guides by reversing this procedure.

9.   Perform the paper guide parallel adjustment and spring tension ad-
     justment. Then, adjust the paper out switch.

5.3.5 *ENCODER FENCES AND PHOTOCOUPLERS*

     Two encoder fences, 10 pitch and 12 pitch, are mounted on the lower
front of the carriage assembly. As the carriage moves, the 10 pitch
fence passes through one timing photocoupler and two margin detect pho-
tocouplers (left and right); the 12 pitch fence passes through a timing
photocoupler only. All four photocouplers are mounted in adjustable

brackets on the printer base casting. See Figure 5-22. The fences
must move parallel to the phototransistor masks at the correct distance.
Check these alignments by the following procedure.

CAUTION:

When performing the following adjustments, ensure
that the encoder fences and the photocouplers do
not contact each other while the carriage is in
motion, or damage to the fences or couplers may
result. Also, take care not to scratch the fences
during the adjustment checks or adjustments. When
possible, use plastic shim stock for measuring the
gaps specified.

MARGIN
PHOTOCOUPLERS

12 PITCH WS
PHOTOCOUPLER

10 PITCH WS
PHOTOCOUPLER
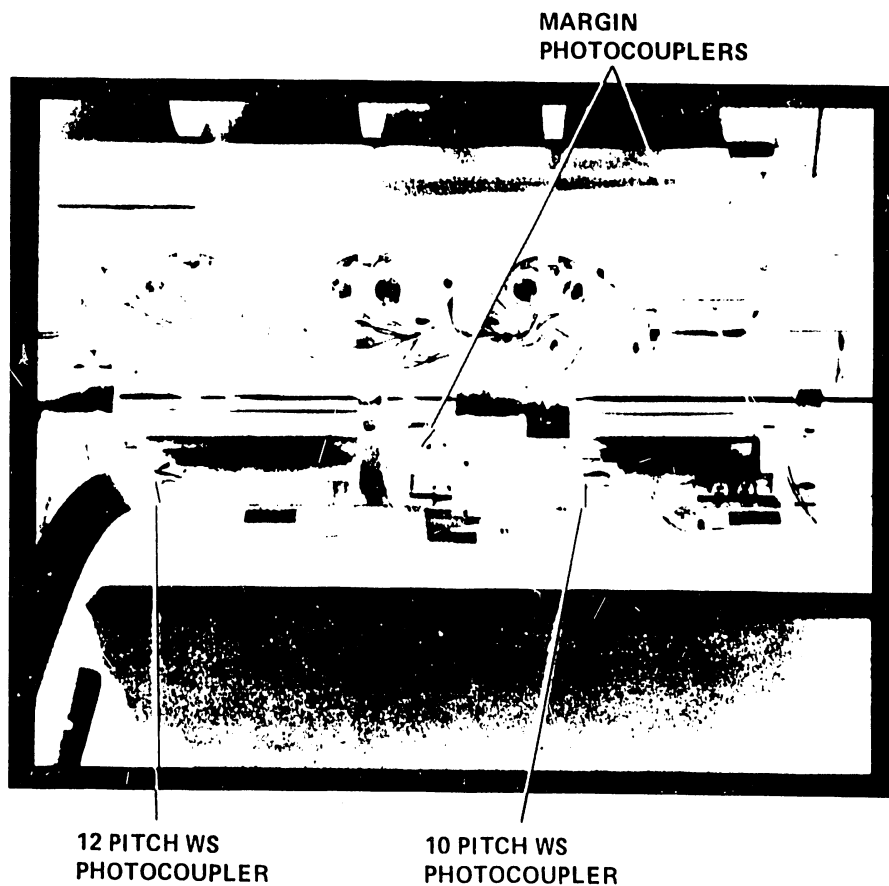
Figure 5-22. Location of Photocouplers
(Carriage Partially Disassembled)

1.   Photocoupler and Encoder Fence Clearance

The two encoder fences are mounted on separate aluminum blocks which are attached by Phillips head screws to the left and right bearing brackets of the carriage. A metal pin, located in a notch between each aluminum block and bearing bracket, acts as a pivot to allow a leveling adjustment of each fence. By selectively tightening and loosening the Phillips holding screws, the encoder fences can be leveled, making them parallel to the photocouplers. The photo-couplers, in turn, can be moved vertically in their adjustable brackets to obtain the correct gap between the couplers and the fences. See Figure 5-23.

a.   Timing (WS) Photocoupler Height - Move the carriage assembly to the middle of its track and position the pivot pins directly behind the alignment slits of the timing photocouplers. This will center both encoder fences, eliminating the possibility of checking the gap at a non-level point on a fence. Using a feeler gauge (Mylar, if available), check the clearance be-tween the timing photocouplers and encoder fences (top surface at midpoint); the gap should measure .005" to .010". Adjust the photocouplers vertically to obtain the correct gap. See Figure 5-24.

b.   Encoder Fence Parallelism - While moving the carriage slowly from side to side, check the clearance between the top of each encoder fence and its respective timing (WS) photocoupler. Take caution not to strike the margin photocouplers with the edges of the fences. The clearance at the ends of each fence should be the same as the clearance in the center of the fence, .005" to .010". For this adjustment check, it may be helpful to have a Mylar shim of the proper thickness positioned between the top of the encoder fence and the photocoupler mask while the carriage is moved back and forth. If binding occurs, the fence is not level and will require adjustment.

LEFT MARGIN
PHOTOCOUPLER

12 PITCH
ENCODER FENCE

RIGHT MARGIN
PHOTOCOUPLER

10 PITCH
ENCODER FENCE

ENCODER FENCE
LEVELING SCREWS

10 PITCH WS
PHOTOCOUPLER
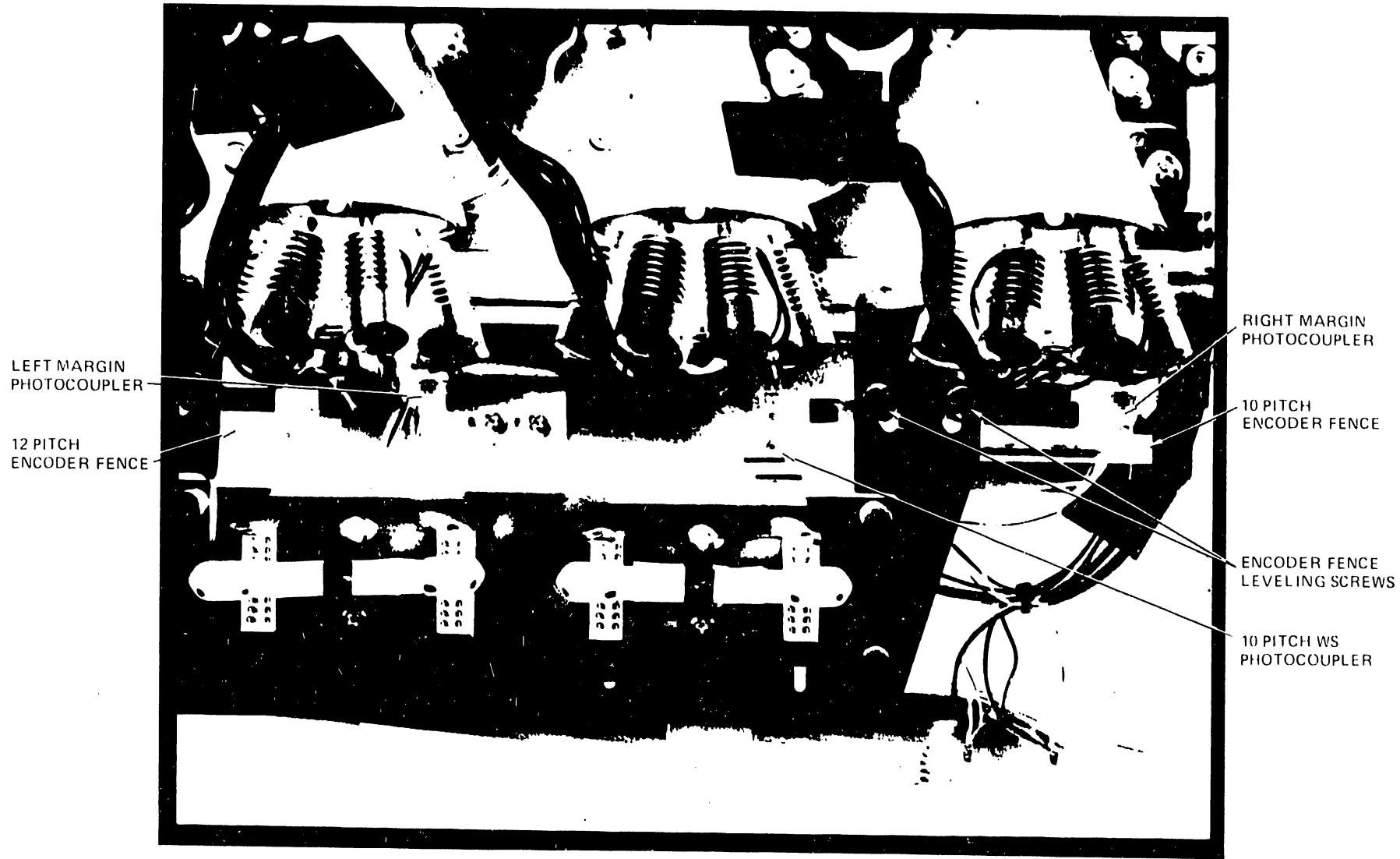
Figure 5-23. Encoder Fence Adjustment

TOP VIEW

ALIGNMENT MARK

ALIGNMENT MARK

10 PITCH
ENCODER FENCE

ALIGNMENT
MARK

12 PITCH
ENCODER FENCE

12 PITCH WS
PHOTOCOUPLER

LEFT MARGIN
PHOTOCOUPLER

10 PITCH WS
PHOTOCOUPLER

RIGHT MARGIN
PHOTOCOUPLER

FRONT VIEW

12 PITCH
LEVELING SCREWS

10 PITCH
LEVELING SCREWS

PIVOT PIN

.005" — .010"

PIVOT PIN
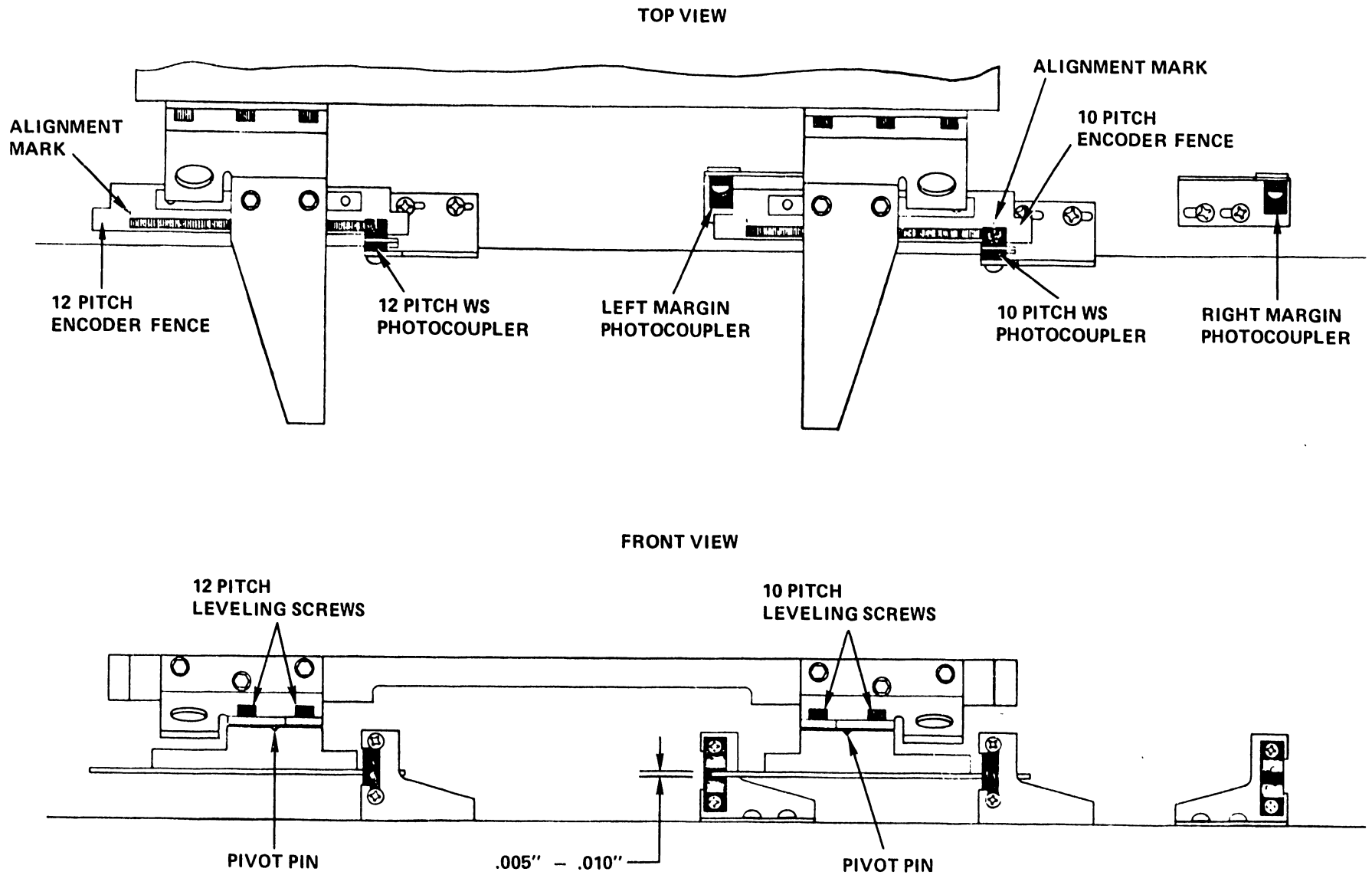
Figure 5-24. Encoder Fence Adjustment

NOTE:

The fence/photocoupler clearances are specified with
the print heads in the maximum penetration position
(heads all the way forward).

The encoder fences should be parallel to the photocoupler masks.
Adjust one encoder fence at a time. Observe the fence/photo-
coupler clearance while turning the Phillips head holding screws
on the bearing bracket. As one screw is tightened down, the
other must be loosened proportionately to prevent bowing of
the fence. When the gap is constant along the length of both
fences, perform the margin photocoupler adjustment.

NOTE:

The pivot pins are glued in place at the factory.
If they should break free, however, take care not
to lose them.

c. Margin Photocoupler Height - Move the carriage to each margin,
    in turn, and check the gap from the top of the 10 pitch encoder
    fence to the margin photocouplers. Move the photocouplers ver-
    tically to obtain the proper gap of .005" to .010". See Figure
    5-25.

2. Margin Photocoupler Timing

a. 10 Pitch Margin Timing - Move the carriage to the left margin
    and align print head #1 with the first character position of
    the striker plate. A notch has been ground into the striker
    plate at each end; the first character position is immediately
    to the right of this notch on the left end of the plate. See
    Figure 5-26. Loosen the bracket screws on the 10 pitch timing
    (WS) photocoupler and move the coupler laterally until its
    alignment slit is even with the alignment mark on right side
    of the 10 pitch fence. See Figures 5-24 and 5-27. Tighten
    the bracket screws.

FENCE/PHOTOCOUPLER
GAP .005″ — .010″

RIGHT MARGIN
PHOTOCOUPLER

PHOTO COUPLER
MOUNTING SCREWS

10 PITCH
WS PHOTOCOUPLER

7129 PCB
OPTICAL SCANNER

10 PITCH
ENCODER FENCE
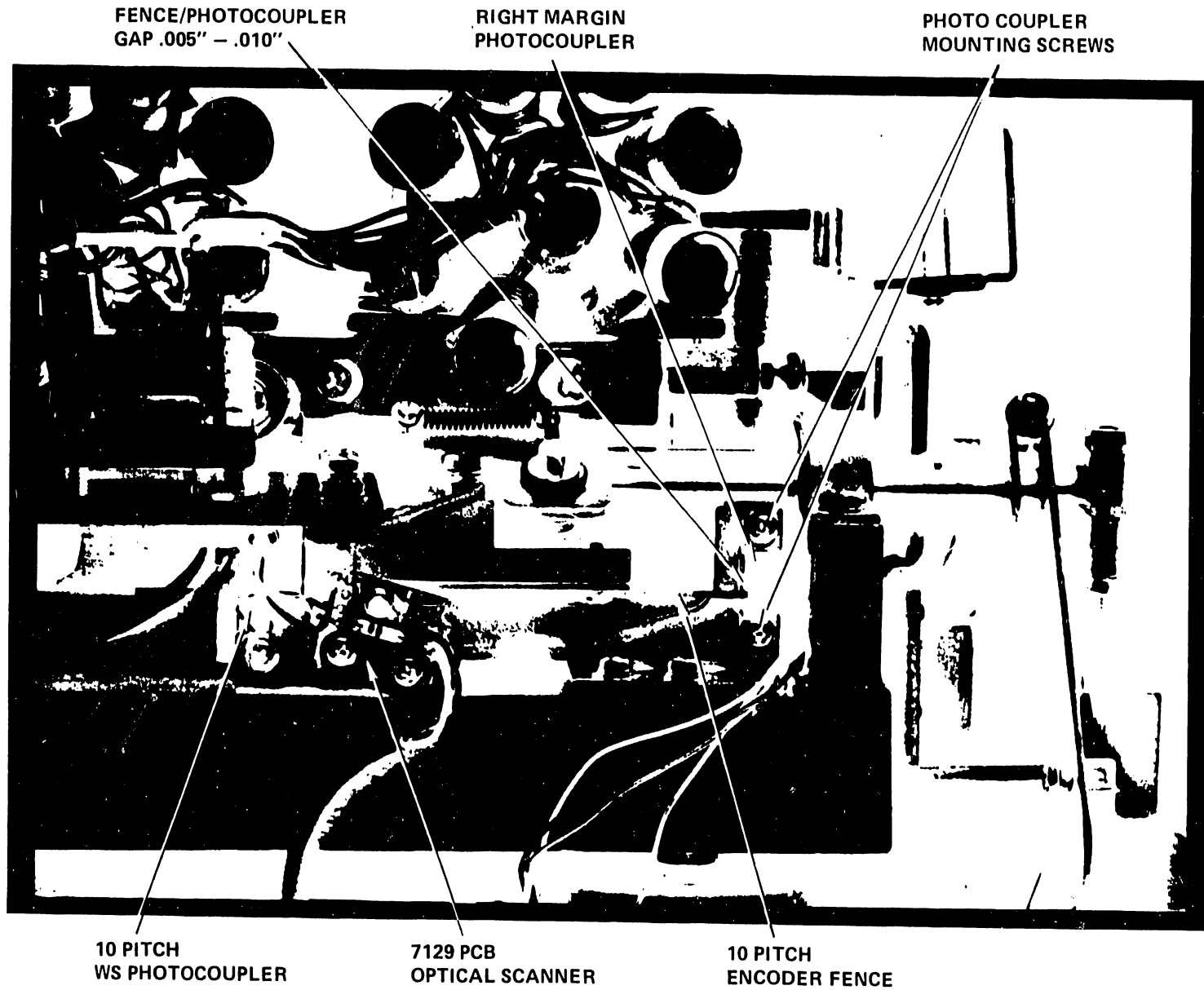
Figure 5-25. Margin Photocoupler Height Adjustment

In this position, the left edge of the 10 pitch fence should
be just entering the left margin photocoupler. If it is not,
loosen the bracket screws and move the left margin coupler
laterally to the correct position. Tighten the bracket screws.

Move the carriage toward the right margin until the alignment
slit of the 10 pitch timing photocoupler is even with the align-
ment mark on the left side of the 10 pitch fence. In this
position, the right edge of the 10 pitch fence should be just
entering the right margin photocoupler. If it is not, loosen
the bracket screws and move the right margin coupler to the
correct position. Tighten the bracket screws.

PRINT HEAD #1   STRIKER PLATE NOTCH

Figure 5-26. Print Head #1 in First Character Position

ALIGNMENT
SLIT & MARK

10 PITCH PHOTOCOUPLER
BRACKET SCREWS
(LATERAL ADJUSTMENT)

RIGHT MARGIN
PHOTOCOUPLER
BRACKET SCREWS

RIGHT MARGIN
PHOTOCOUPLER

LEFT MARGIN
PHOTOCOUPLER

ENCODER FENCE
ENTERING LEFT MARGIN
PHOTOCOUPLER

10 PITCH
ENCODER FENCE

10 PITCH
MARGIN PHOTOCOUPLER
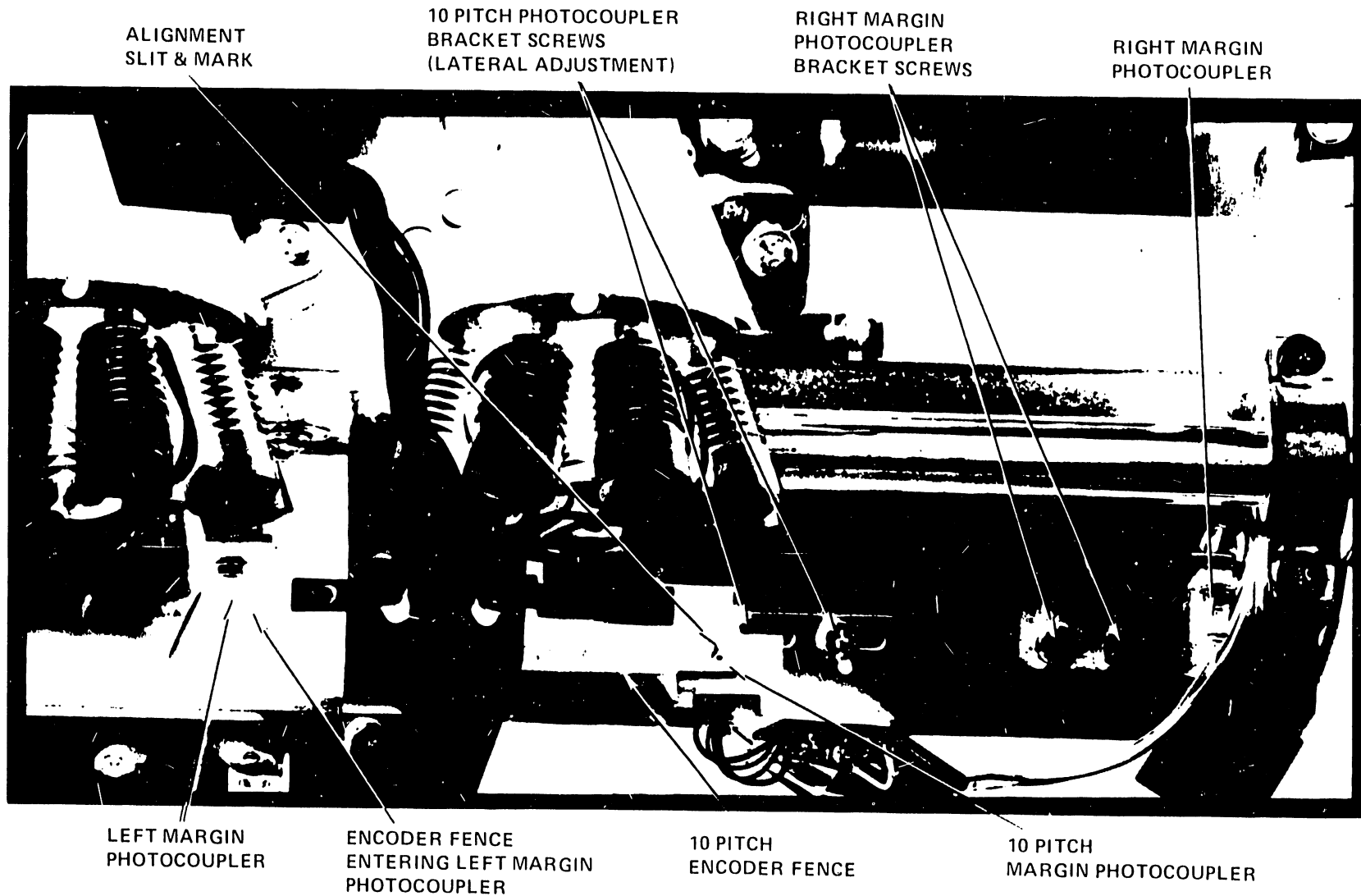
Figure 5-27. 10 Pitch Margin Timing

b.   12 Pitch Margin Timing

NOTE:

The 10 pitch timing adjustments and alignments must
be completed before the following adjustment is per-
formed.

Move the carriage toward the left margin until the alignment
slit of the 10 pitch timing (WS) photocoupler is even with the
alignment mark on the right side of the 10 pitch encoder fence.

The 12 pitch fence and photocoupler should now be lined up.
If they are not, loosen the bracket screws on the 12 pitch
timing (WS) photocoupler and move the coupler laterally until
the alignment slit of the coupler is even with the alignment
mark on the right side of the 12 pitch fence. Tighten the
bracket screws. See Figure 5-24.

3.   Photocoupler and Encoder Fence Removal

a.   Photocouplers

1)   Turn the power off, remove the print head shield and set the
head adjustment arm to maximum penetration (heads forward).

2)   Move the carriage assembly left or right to give free access
to the photocoupler mounting brackets.

3)   For each photocoupler, remove both photocoupler mounting screws;
dislodge and move the photocoupler back, taking care not to
scratch the encoder fence. See Figure 5-28.

4)   Desolder the timing photocoupler wires at the optical scanner
PCB.
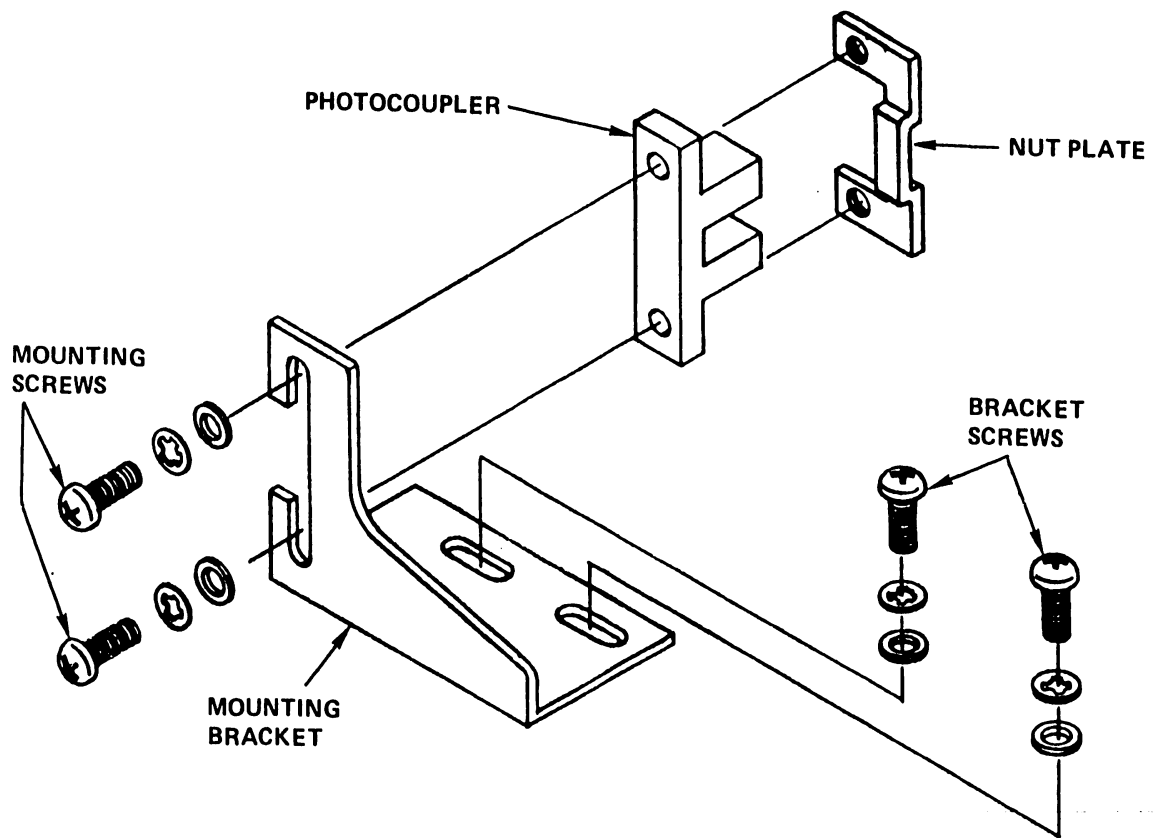
Figure 5-28. Photocoupler Assembly

5) Repeat the above procedure to remove the other photocouplers.

6) Reinstall the photocouplers by reversing the above procedure.

7) Perform the photocoupler height adjustment.

b. Encoder Fences (10 pitch and 12 pitch)

1) Dislodge the timing photocouplers as described in the section above.

2) Move the carriage assembly to the center of the carriage shaft.

3) Remove the two Phillips head screws securing the aluminum fence bracket to the outboard bearing bracket. See Figure 5-29.

PIVOT PIN
#651-1640

FENCE BRACKET
#478-0346

ENCODER FENCE
(10 PITCH — #461-0111)
(12 PITCH — #461-0112)

MOUNTING
SCREWS
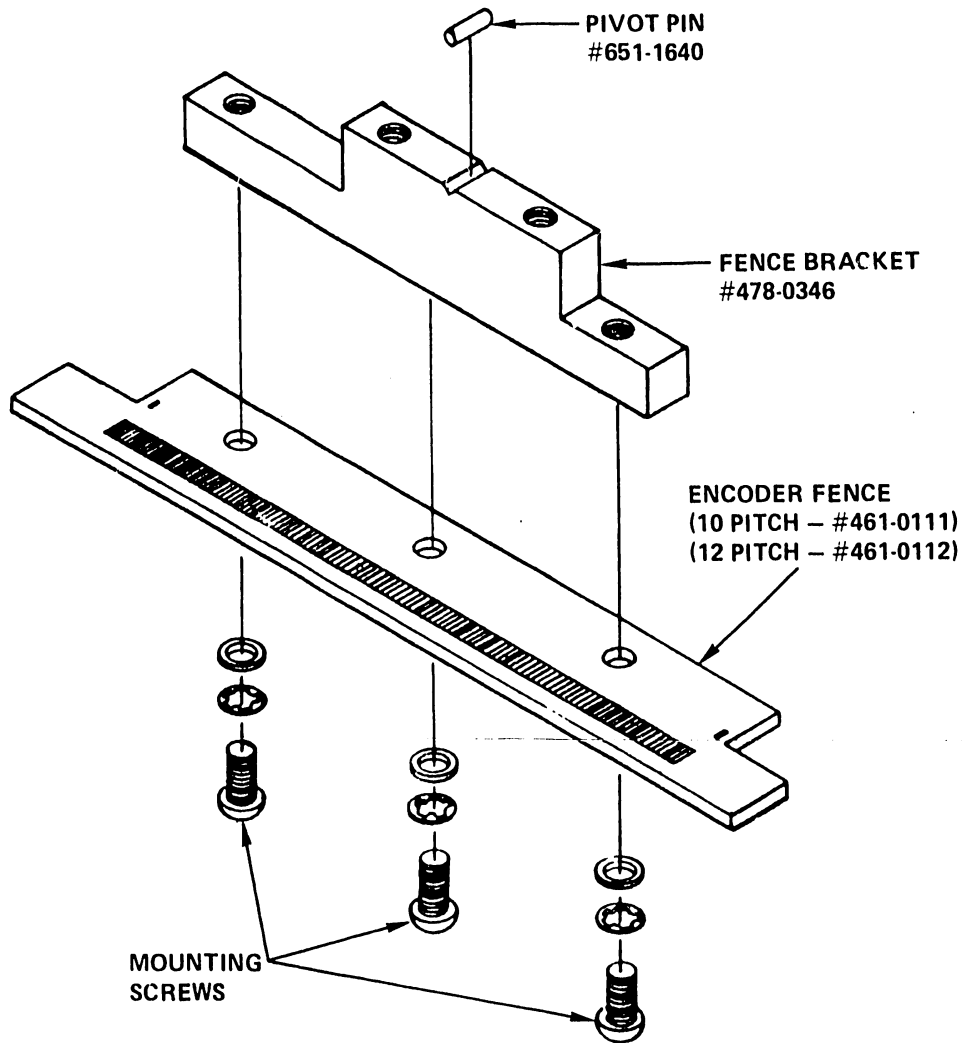
Figure 5-29. Encoder Fence Assembly

4)   Lift out the encoder fence and bracket. The encoder fence is
     fastened to the bracket by three screws; remove these to replace
     the fence.

5)   Reassemble by reversing this procedure. Do not lose the bracket
     pivot pin and do not scratch the encoder fence.

6)   Perform the photocoupler height adjustment and the encoder fence
     parallelism adjustment.

5.3.6 *PRINT HEAD ADJUSTMENT*

Adjustment Checks

To check for correct print head adjustment, first secure a sample printout several lines long containing a variety of characters. The Model 77 printer diagnostic, reproduced in section 6, can be used for this purpose. Examine the printout for the following:

Print Intensity - The intensity of the characters (lightness or darkness) must be uniform for the entire line of print. If it is not, one or more print heads may require a print intensity adjustment (see adjustment section following). Next, examine the individual character dots for uniform print intensity. Non-uniform or missing dots anywhere in a character line may indicate incorrectly adjusted or malfunctioning print solenoids. In this case, an off carriage print head adjustment is required (see adjustment section following).

Horizontal Spacing - Each of the four heads prints one quarter of the total character line. Examine the print sample at the transition points, where one print head stopped printing and the next one started. Separated or overlapping characters at these transition points indicate incorrect horizontal spacing adjustment. Perform the horizontal spacing adjustment in the section following.

Vertical Spacing - The entire line of print must be in a level, even row. If any quarter of the printed line is above or below the rest of the line, a Vertical Spacing Adjustment must be performed (see the section following).

Print Head Adjustments

Print Intensity

1.   Remove the ribbon as per section 3.3.

2. Check the carriage shaft alignment (see section 5.3.13) and adjust if needed.

3. Move the head adjustment arm to the maximum penetration position (heads all the way forward).

4. Measure the gap from the #2 print head bearing to the striker plate; it should be .006" (.15 mm). In turn, check the other three print heads for the same gap. See Figure 5-30.

PRINT HEADS TO STRIKER PLATE .006" (.15mm)
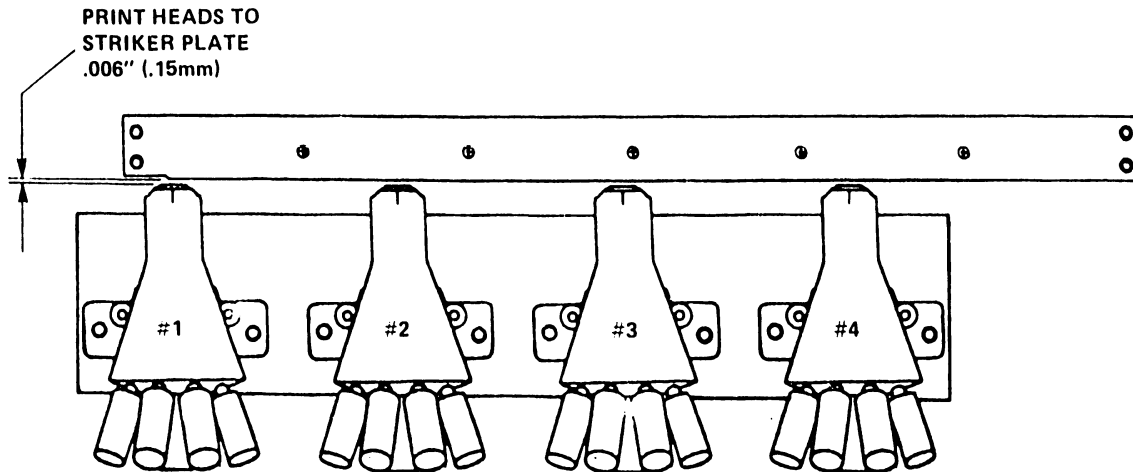
Figure 5-30. Print Intensity Adjustment

5. To adjust a print head for the proper gap, loosen the four Allen head screws on the head mounting bracket. Turn the eccentric (1/4" nut, front-left on bracket) clockwise or counterclockwise until the correct gap is obtained. Tighten the four Allen head screws. See Figure 5-31.

DOWEL (TO PREVENT LATERAL MOVEMENT)

PRINT INTENSITY ECCENTRIC NUT

HORIZONTAL SPACING ECCENTRIC NUT

MASTER PRINT HEAD #2

PRINT HEAD MOUNTING BRACKET

CONNECTOR MOUNT

PRINT HEAD MOUNTING BRACKET SCREWS
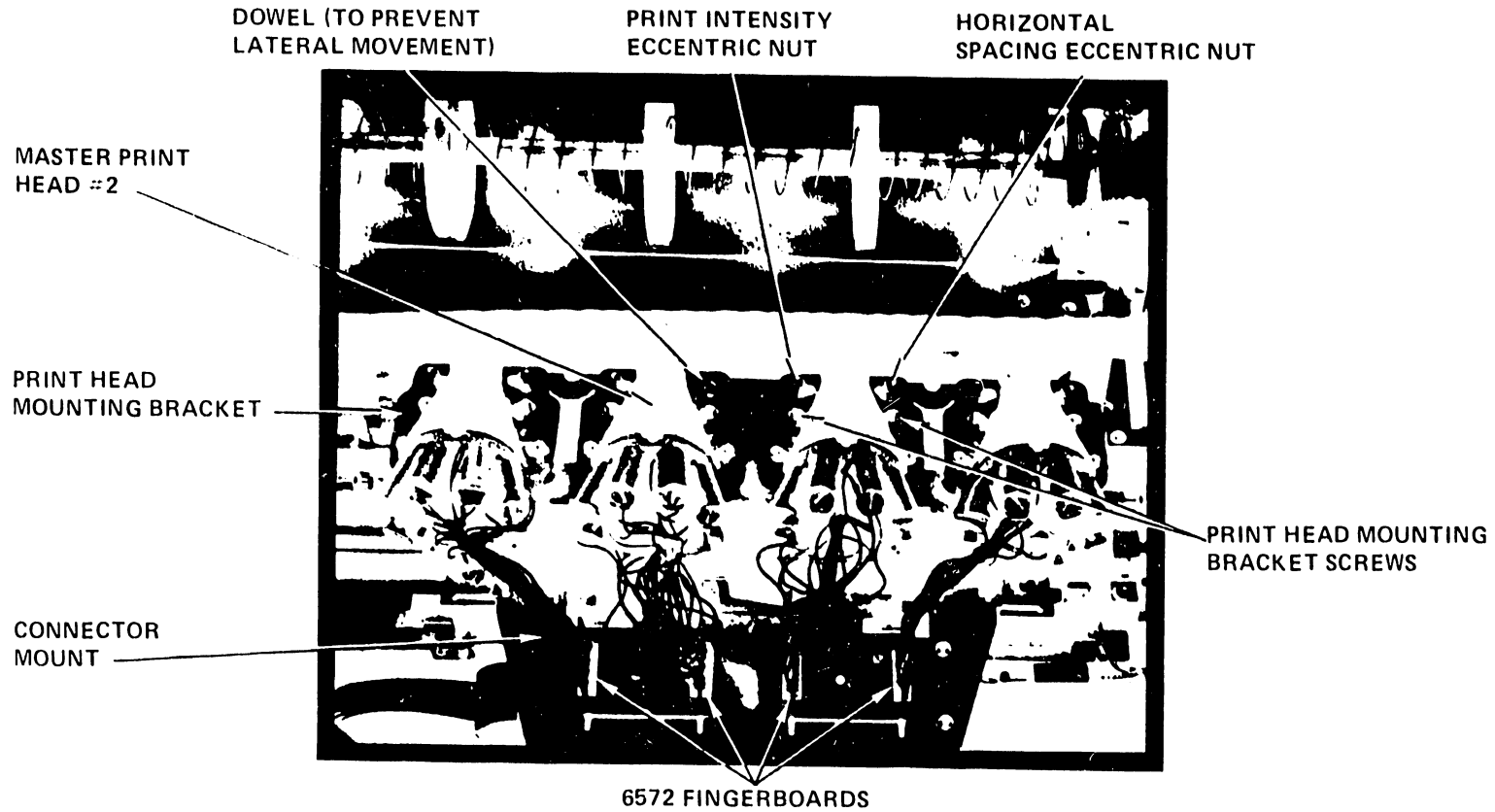
6572 FINGERBOARDS

Figure 5-31. Print Head Carriage

Off Carriage Print Head Adjustment

1. Unplug the 6572 fingerboard, remove the two print head retaining screws, and lift off the print head (do not lose the plastic shim).

2. Using a magnifier, examine the print head bearing. All eight solenoid wires should be flush with the bearing or extend a maximum of .002" (.05 mm) from it. If any solenoid wires are incorrectly adjusted, continue with this procedure. See Figure 5-32.

3. Remove the print head cover, held in place by two Phillips screws.

4. Unlock the solenoid by loosening its corresponding nylon tipped set screw. These screws are positioned radially about the rear of the print head casting.
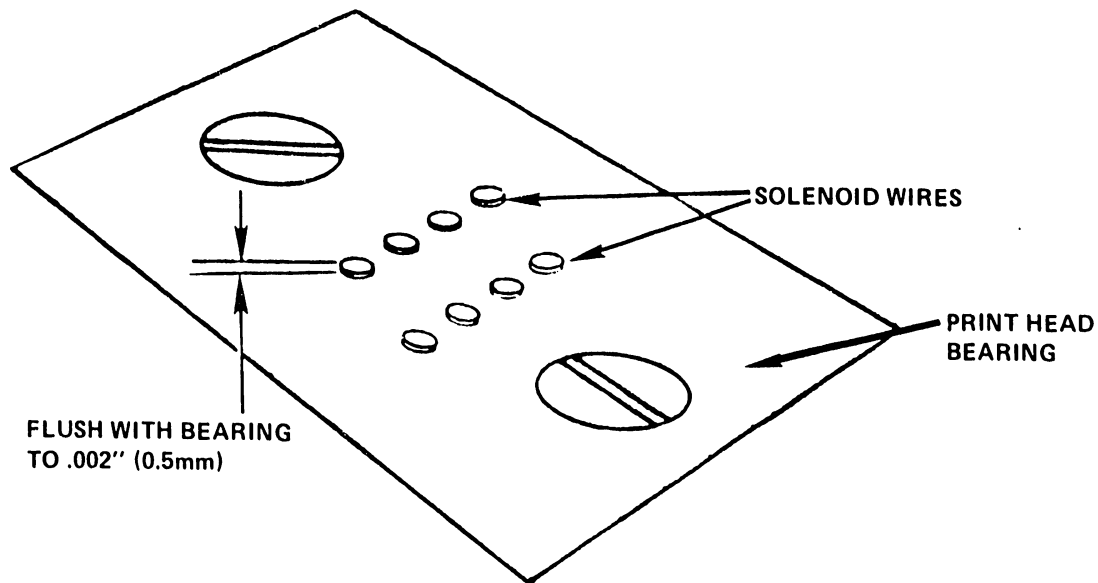
Figure 5-32. Solenoid Wire Adjustment

5. Rotate the solenoid in or out until the solenoid wire is flush with the bearing face.

6. Tighten the nylon tipped set screw and recheck the bearing.

7. Remount the print head and plastic shim on the print head mounting bracket, and plug in the fingerboard.

8. Reinstall the ribbon.

Horizontal Spacing - Print head #2, doweled to prevent lateral movement, is the Master reference print head for this adjustment. Print heads #1 and #3 must be aligned first, then print head #4. This adjustment will eliminate character separation or overlapping at the transition points, where one print head stops printing and the next one starts. The procedure is identical for each of the print heads.

1. Loosen the four Allen head holding screws on the head mounting bracket.

2. Turn the horizontal spacing eccentric (1/4" nut, front-right on bracket) clockwise or counterclockwise, thus moving the head left or right as needed. See Figure 5-31. Retighten the four Allen head screws.

3. Obtain a second print sample and compare it with the first. Check the print transition points for improvements. If further adjustment is necessary, repeat steps 1 and 2. Continue with this procedure of adjusting the print head, comparing print samples, and readjusting the print head until smooth, even character spacing is obtained.

4. Repeat this procedure for the remaining print heads.

Vertical Spacing - This adjustment is performed with respect to print head #2, the master print head. If print heads #1, #3, or #4 need vertical spacing adjustment, proceed as follows:

1. Unplug the 6572 fingerboard, remove the two print head retaining screws, and lift off the print head.

HEAD #1

HEAD #2 (MASTER)

HEAD #3

HEAD #4

VERTICAL SPACING
(SHIM AS NECESSARY FOR
VERTICAL ADJUSTMENT)

PRINT INTENSITY
(TURN ECCENTRIC NUT TO
MOVE HEAD FORWARD OR BACK)

HORIZONTAL SPACING
(TURN ECCENTRIC NUT TO
MOVE HEAD SIDE TO SIDE)
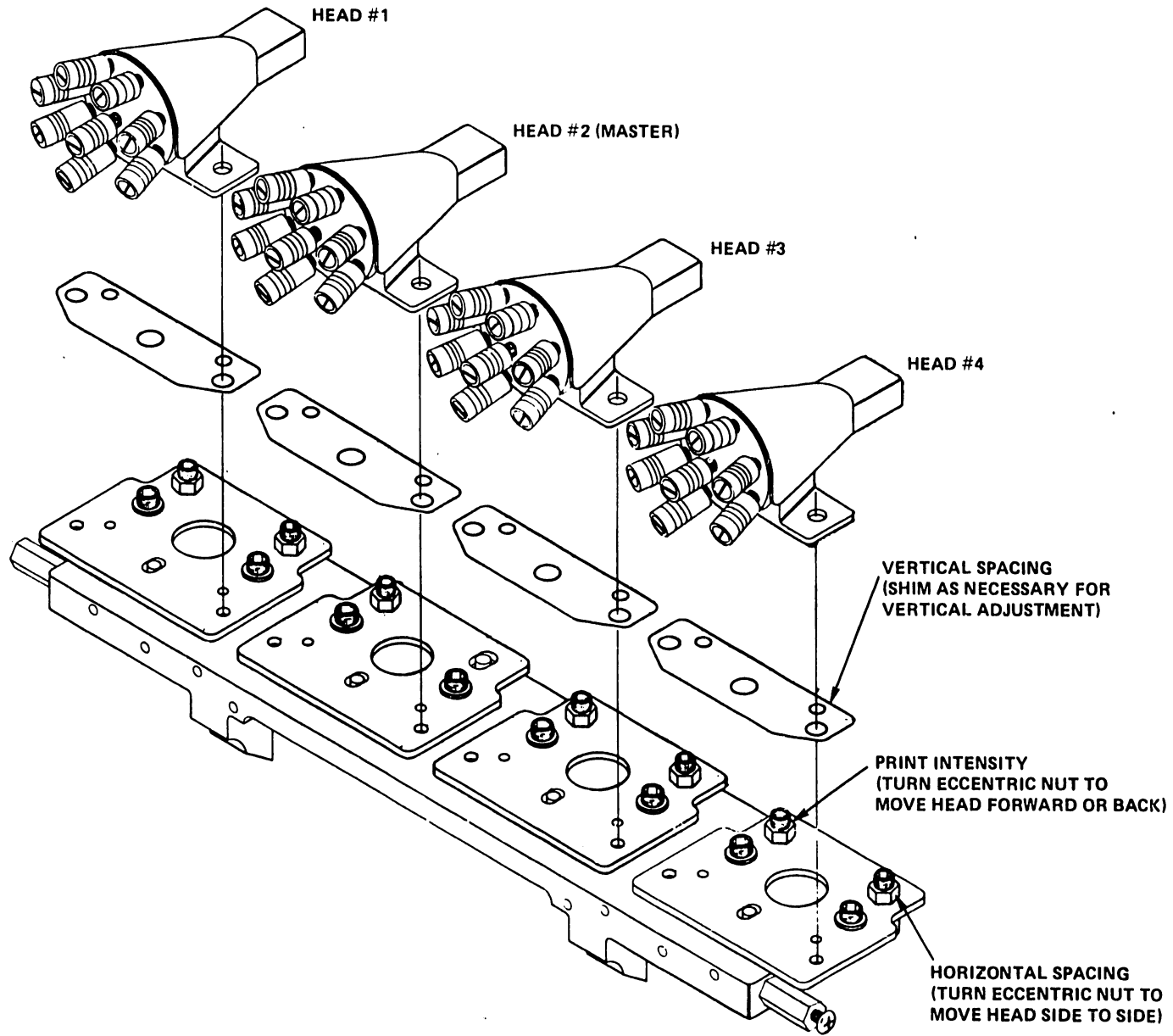
Figure 5-33. Print Head Adjustment Summary

2. Using the print sample as a guide, add or remove plastic shims to raise or lower the print head. Plastic shim stock is available in the following thicknesses:

.002" WLI #462-0287
.003" WLI #462-0286
.005" WLI #462-0285

3. After remounting the head, obtain a second print sample and compare it with the first. If the print head requires additional adjustments, repeat steps 1 and 2.

4. Perform the above adjustment on the remaining print heads, if needed, until a level print line is obtained. See Figure 5-33 for a summary of print head adjustments.

Solenoid Removal and Replacement

NOTE:

If more than one solenoid requires replacement, only one solenoid should be removed, replaced and adjusted at a time. See Figure 5-34 for solenoid identification.
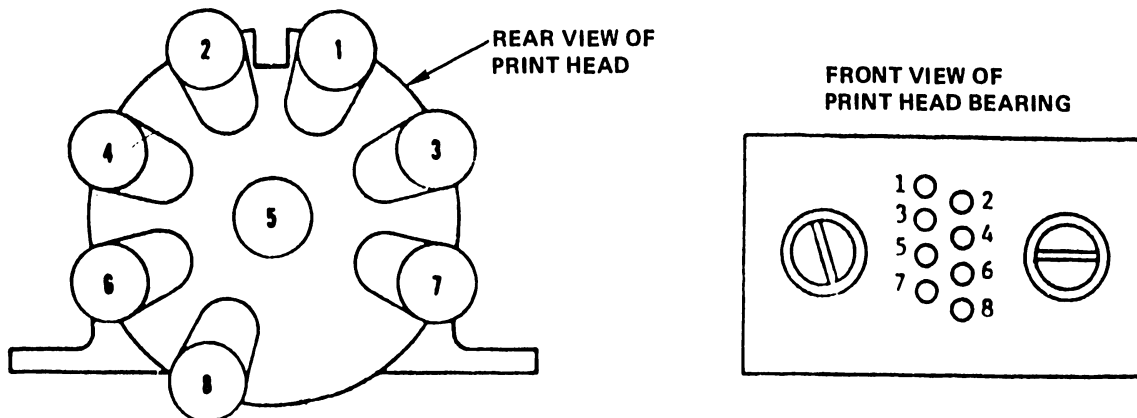
Figure 5-34. Identification of Solenoids

1. Remove print head from carriage assembly by first removing the two head retaining screws.

2. Unplug the 6572 fingerboard and lift out the print head.

3. Remove the print head cover. See Figure 5-35.

4. Unsolder solenoid wires from 6572 fingerboard.

5. Loosen the solenoid set screw; then unscrew the solenoid from the head casting. See Figure 5-36.
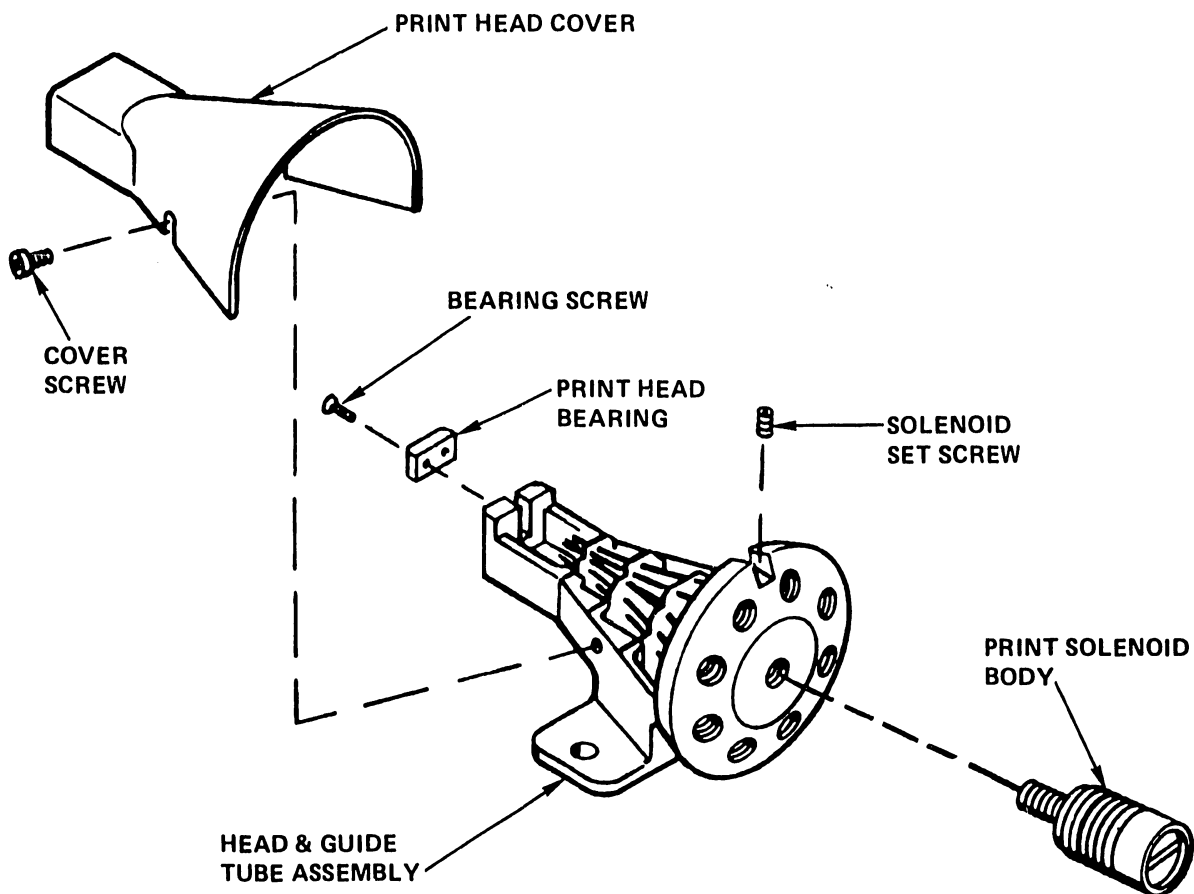
Figure 5-35. Print Head Assembly

6. Remove lubricant pad. Remove any broken wire material at the pad location.

7. Dip the new solenoid wire into the lubricant (obtained from the Home Office; no other lubricant can be substituted). Cautiously insert the new solenoid, taking care not to bend the new print wire. With a pair of tweezers guide the wire into its guide tube and then into its respective bearing hole. Relock the solenoid with nylon tip set screw. Separating the two rows of print wires with a feeler gauge eliminates the confusion created by eight wires and aids in guiding the new solenoid wire into the bearing.

8. Solder the solenoid wires to 6572 fingerboard.

9. Dip the lubricant pad into the lubricant and place it back into the print head. Tip the head forward to allow the lubricant to reach the tip of the print wires.

10. Replace the print head on the carriage assembly and operate the printer for several minutes to ensure that lubricant is distributed (lubricant has a wax base and does not flow readily).
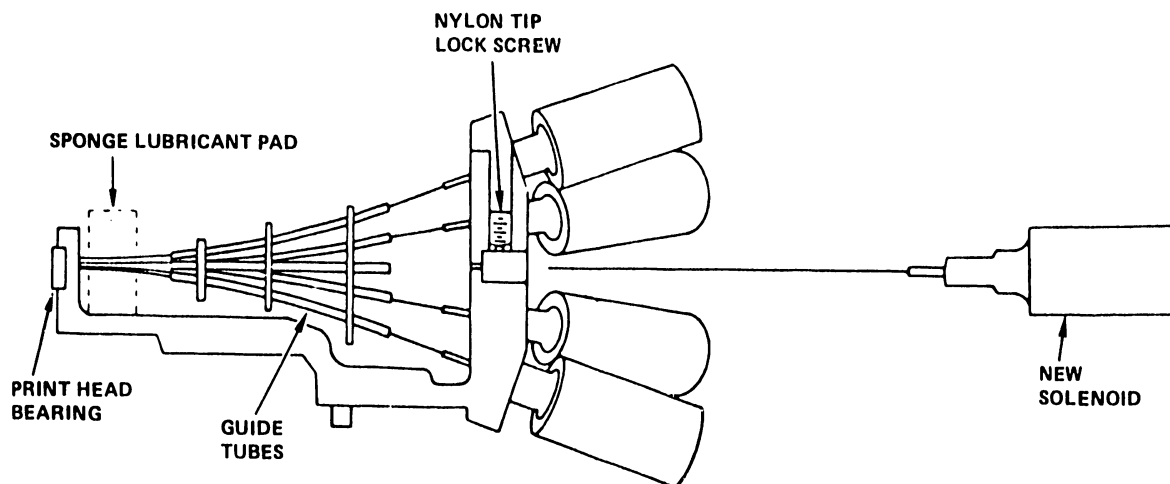
Figure 5-36. Removal and Replacement of Solenoids

11. Dab the entrance to each guide tube with a swab soaked in lubricant and operate the printer again.

12. Reinstall the print head cover.

5.3.7 *PAPER FEED SPROCKETS*

Adjustment Check

1. With both sprocket wheel covers closed, check the gaps between each cover and paper feed sprocket; the gaps should measure .025" to .030" (.64 mm to .76 mm).

2. The teeth of each sprocket should be located in the center of its cover slot as shown in Figure 5-37.
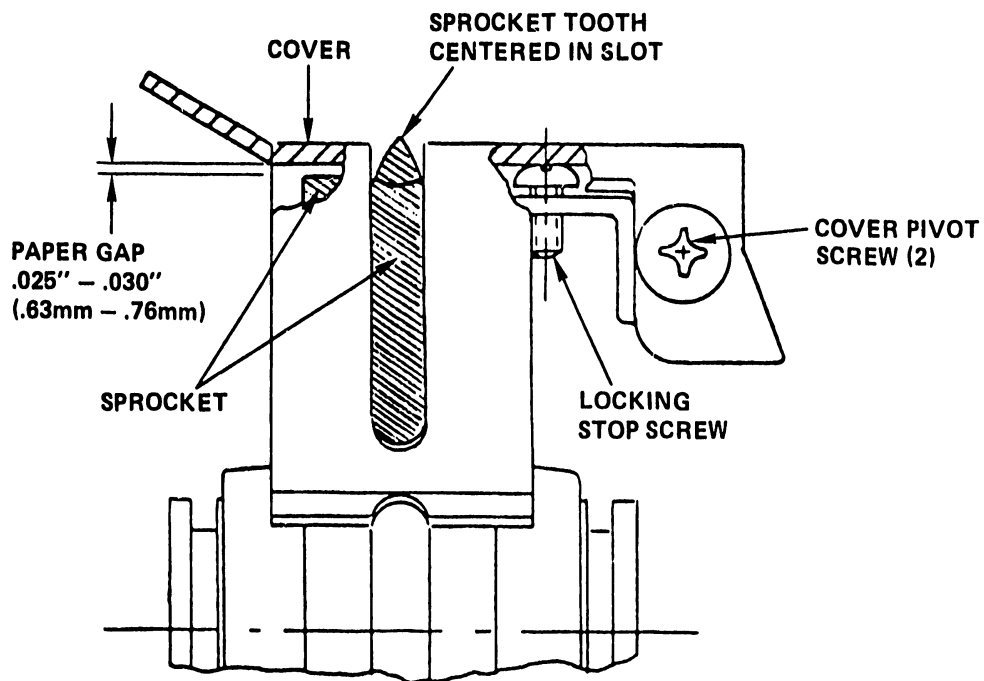
Figure 5-37. Paper Feed Sprocket Adjustments

Adjustment

1. Adjust the sprocket cover height with the locking stop screw. Move the screw up or down until a gap of .025" to .030" is obtained between the sprocket cover and the rubber rim of the sprocket.

2. Adjust the sprocket cover pivot screws (2) to center the teeth. This must be done to both paper guide assembly covers. The pivot screws act as eccentrics to center the cover.

Paper Feed Sprocket Removal

To remove and replace the paper feed sprockets, it is necessary to first remove the right side frame (plate). Refer to Figures 5-38 and 5-39.
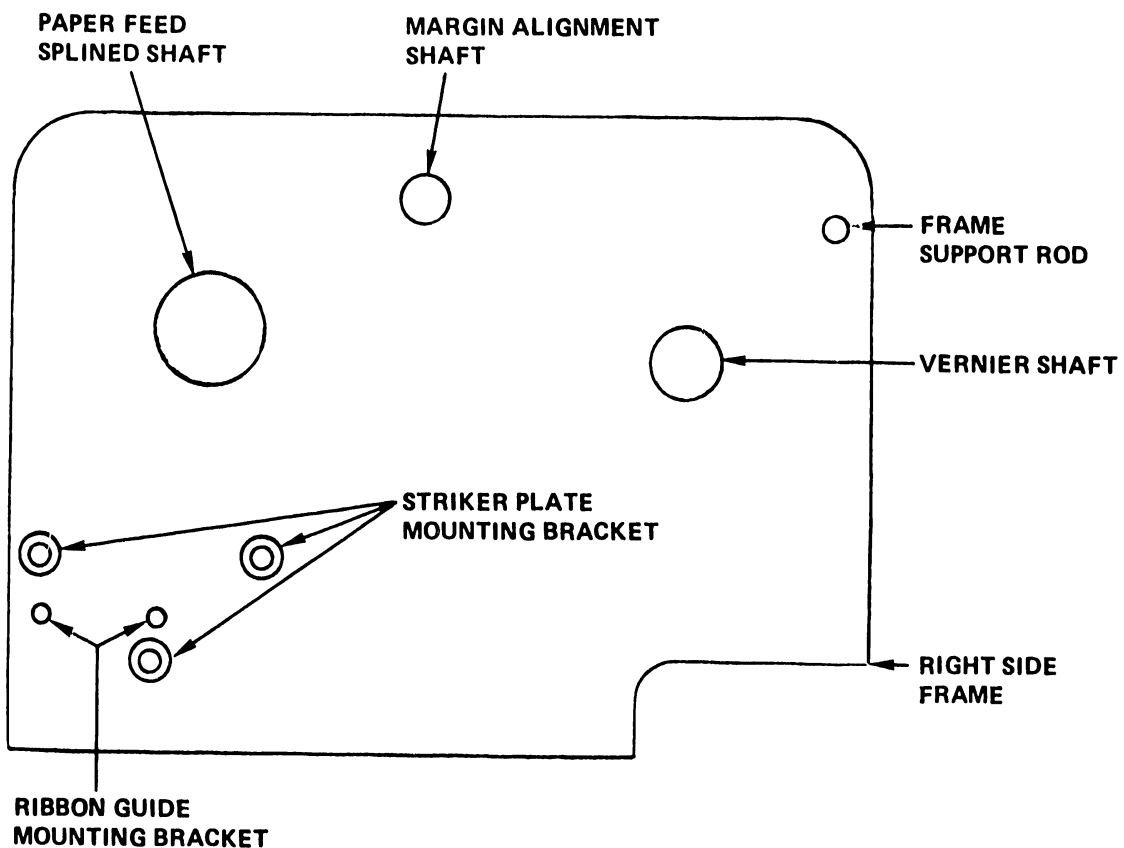
Figure 5-38. Paper Feed Sprocket Removal

RIGHT PAPER
FEED SPROCKET

SNAP RING

SPLINED
SHAFT

STRIKER PLATE
MOUNTING BRACKET
SCREWS

RIBBON GUIDE

RIBBON GUIDE
MOUNTING BRACKET
SCREWS

HORIZONTAL
VERNIER KNOB

RETAINING SCREW

RIGHT SIDE FRAME

FRAME SUPPORT ROD
HOLDING SCREW

VERTICAL
VERNIER KNOB
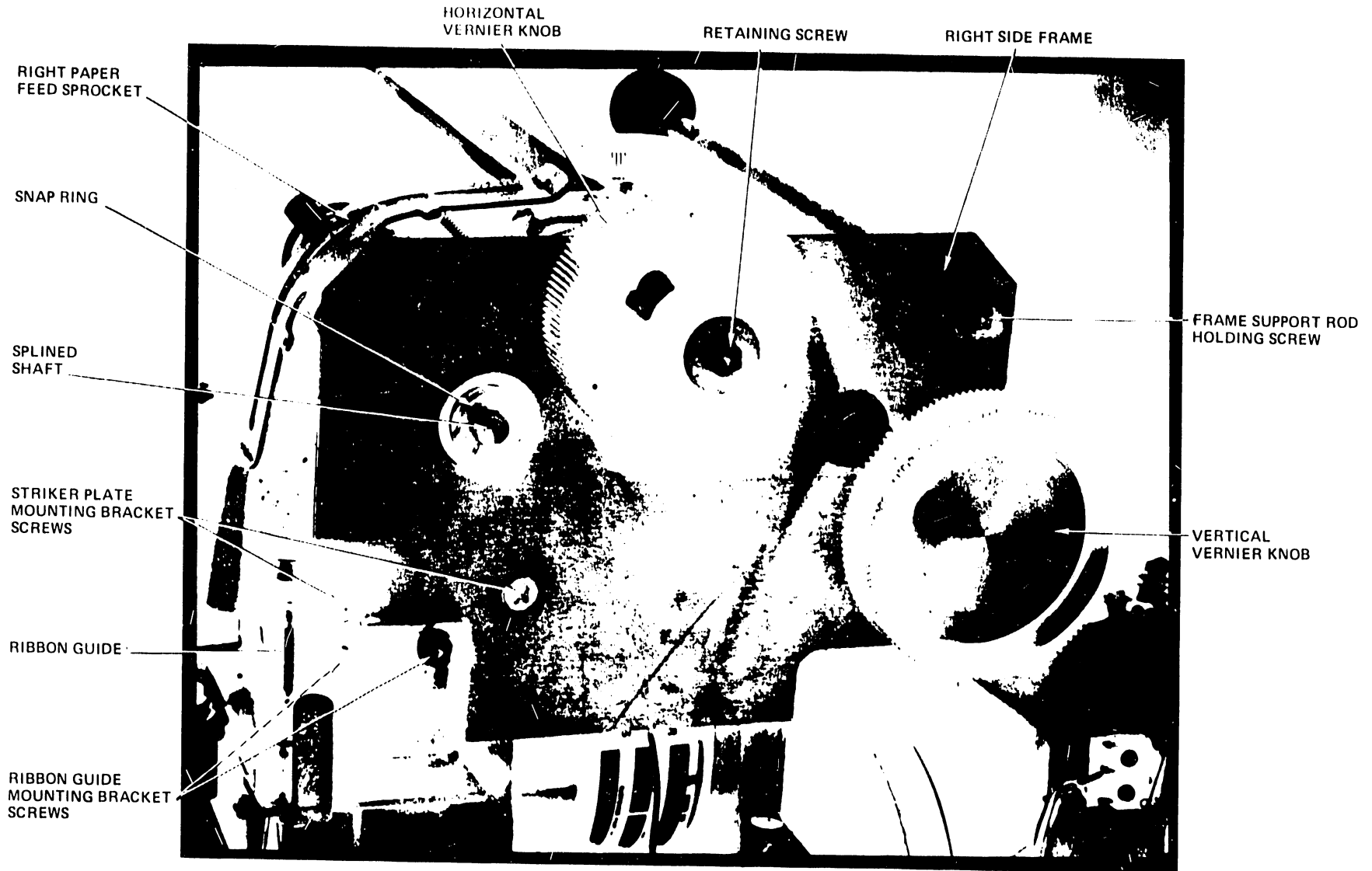
Figure 5-39. Right Side Frame Removal

1. Remove the single Phillips screw that holds the frame support rod.

2. Remove the retaining screw and washer from the horizontal vernier knob; then remove the knob by unscrewing it from the margin alignment shaft. Remove the plastic washer from the shaft; do not lose this washer.

3. Remove the vertical vernier knob, the hitch pin, the spring, and the plastic washer.

4. Remove the two Phillips screws from the ribbon guide mounting bracket and remove the bracket.

5. Remove the three Phillips mounting screws that hold the right side frame to the striker plate mounting bracket.

6. Remove the snap ring from the end of the splined shaft. Use snap ring pliers for this step.

7. Slide the right side frame (plate) to the right, off the splined shaft, the margin alignment shaft, the vernier knob shaft, and the frame support rod.

8. Unlock the paper margin knobs; then slide the pin feed sprockets off the splined shaft.

Reassembly

To reassemble the paper feed sprocket assembly, reverse the steps in the procedure above. During reassembly, take special caution with the following steps.

1. When replacing the sprocket assemblies, ensure that the teeth of the left and the right sprockets line up on the splined shaft. Each sprocket assembly has a molded rib on its inside hub which is a key for proper alignment.

2. When replacing the snap ring on the end of the splined shaft, seat it firmly against the side frame. Note that the splined shaft does not have a groove to hold the snap ring in place.

3. Before replacing the two vernier knobs, ensure that the two plastic washers are in place against the side frame.

4. At the completion of reassembly, perform the ribbon guide post adjustment as per section 5.3.2.

5.3.8 *VERNIER CLUTCH*

Adjustment Check

1. Push in the vertical vernier knob and turn it. The vernier clutch should now be disengaged: the print paper should advance, but the vertical format sprocket should not. Next, release the vernier knob and turn it; the vernier clutch should reengage and the vertical format sprocket should turn. If the vernier clutch does not operate in the manner described, it will require adjustment.

2. With a feeler gauge, check for a clearance of .002" to .005" (.005 cm to .013 cm) between the flange of the idler shaft pulley and the left side frame (plate) as shown in Figure 5-40. If the clearance is out of tolerance, proceed with the following adjustments.

Adjustment

1. Loosen the Allen set screw on the idler shaft pulley. To do this, turn the vernier knob until the set screw is unobstructed by the belt.

2. While pushing the vernier knob in all the way, slide the idler shaft pulley against the left side frame and retighten the Allen set screw. Release the vernier knob and recheck the clearance from the flange to the side frame (.002" to .005").

FLANGE TO SIDE FRAME CLEARANCE .002" — .005" (.015 cm — .031 cm)

ALLEN SET SCREW

SNAP RING (RELEASES VERNIER CLUTCH ASSEMBLY)

LEFT SIDE FRAME

COTTER PIN

VERTICAL FORMAT TAPE SPROCKET

BEARING HOUSING

IDLER PULLEY (TIMING GEAR)

IDLER SHAFT PULLEY WITH FLANGE

VERNIER SHAFT
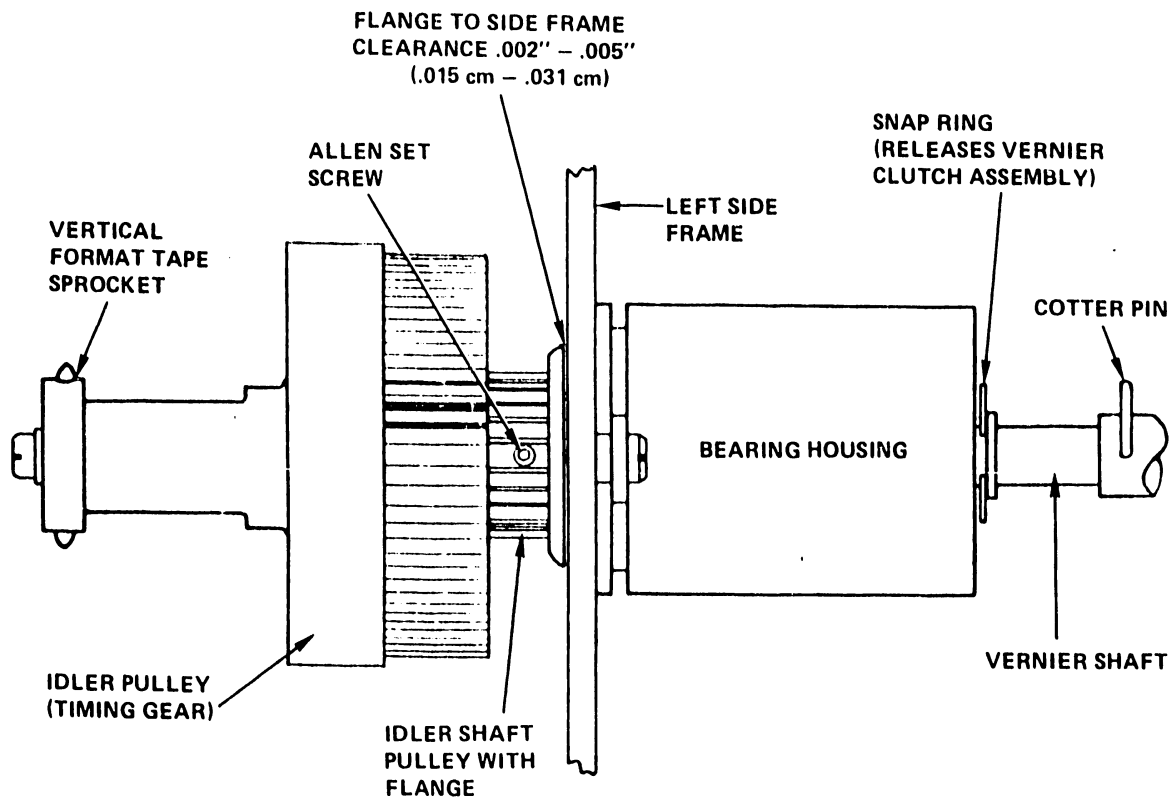
Figure 5-40. Vernier Clutch Adjustments

Removal and Replacement

1. Remove the vertical format tape.

2. Remove the metal cell mount cover from the rear of the vertical for-
    mat housing. The cover is held in place by 2 screws.

3. Remove the four VFU mounting plate screws.

4.   Slide the VFU assembly and bracket up and forward to clear the VFU sprocket.

5.   Remove the stepping motor timing belt and the paper sprocket drive belt.

6.   Remove the cotter pin from the vernier shaft.

7.   Remove the snap ring from the end of the bearing housing. The vernier clutch assembly will now pull out.

8.   Reverse the above procedure to reassemble. The belts can be positioned easily on the pulleys by first loosening the bearing housing retaining screws. Upon completion of reassembly, check the belt tensions (section 5.3.9) and perform the VFU adjustments (section 5.3.14).

5.3.9   *PAPER MOVEMENT BELTS*

1.   Using a spring gauge and scale, deflect the middle of the paper sprocket drive belt .18" (.45 cm). The scale should read 1 lb. See Figure 5-41.

2.   Deflect the middle of the stepper motor timing belt .1" (.25 cm). The scale should read 1 lb. See Figure 5-42.

Adjustments

1.   Paper Sprocket Drive Belt - Loosen the two screws holding the bearing housing to the side frame and move the bearing housing to tighten or slacken the belt. After this has been done, check the stepper motor belt tension.

2.   Stepper Motor Timing Belt - Loosen the screws holding the stepping motor bracket to the side frame. Move the motor to obtain the correct belt tension, and then tighten the holding screws.
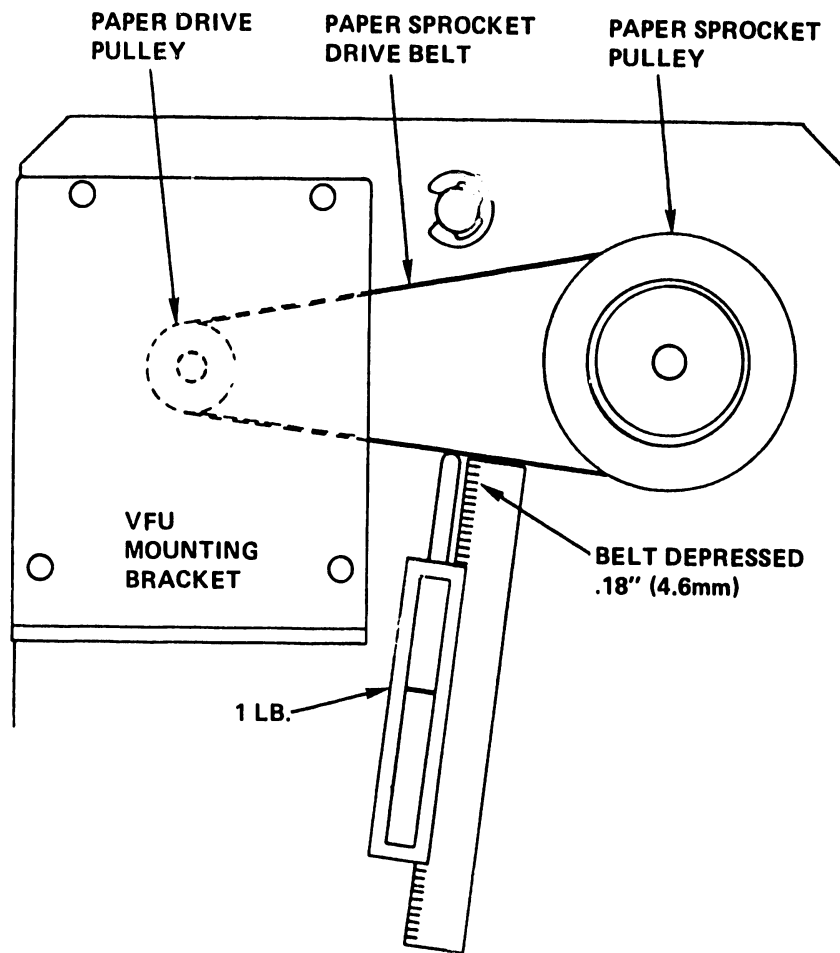
**Figure 5-41. Paper Sprocket Drive Belt
Tension Check**

Removal and Replacement - Stepping Motor Timing Belt and Paper Sprocket
Drive Belt

1.   Remove the vertical format tape.

2.   Remove the metal cell mount cover from the rear of the vertical
     format housing (2 screws).

3.   Remove the four VFU mounting plate screws.

4. Slide the VFU assembly and bracket up and forward to clear the VFU sprocket.

5. Loosen the two bearing housing retaining screws.

6. Remove or replace the belts.

7. Reassemble by reversing this procedure.

8. Upon completion of reassembly, check the belt tensions and perform the VFU adjustments (section 5.3.14).
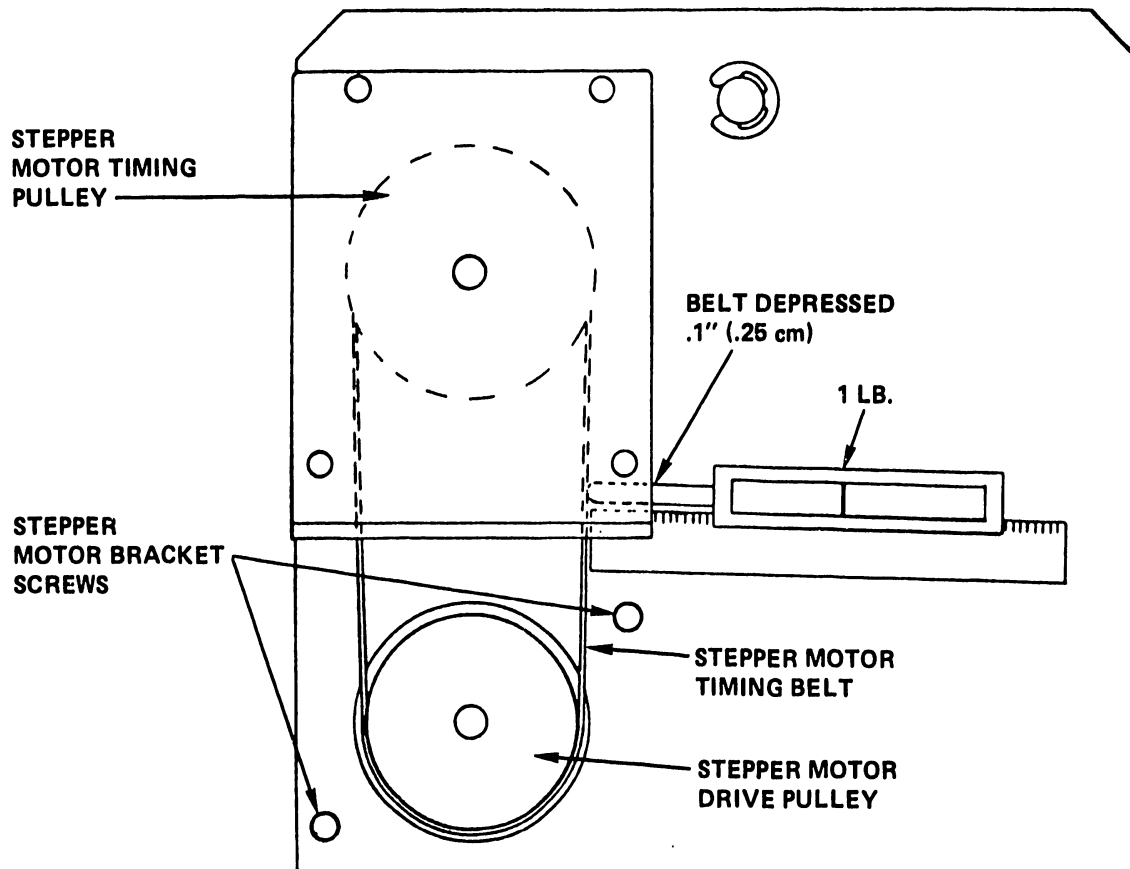
Figure 5-42. Stepper Motor Timing Belt Tension Check

DRIVE MOTOR BELT

SERVO MOTOR

CARRIAGE MOTOR PULLEY

TACHOMETER

LOWER REAR COVER

SERVO/TACHOMETER CABLE

CARRIAGE DRIVE SHAFT PULLEY

J6 CONNECTOR

Figure 5-43. Servo Motor and Tachometer

5.3.10 *TACHOMETER AND DRIVE MOTOR ADJUSTMENT*

Adjustment Check

1. Remove the lower rear cover, held in place by 2 Phillips screws
    (see Figure 5-43).

2. Tachometer Belt – Using a spring gauge and scale, measure the tach-
    ometer belt tension at the middle of the belt. A force of .55 lbs.
    (250 grams) should deflect the belt .05" (.12 cm).

BELT DEPRESSED
.05" (.12 cm)

.55 LBS.

TACHOMETER
PULLEY

SERVO MOTOR

TACHOMETER
BELT

TACHOMETER
BRACKET SCREWS

TACHOMETER
MOUNTING BRACKET
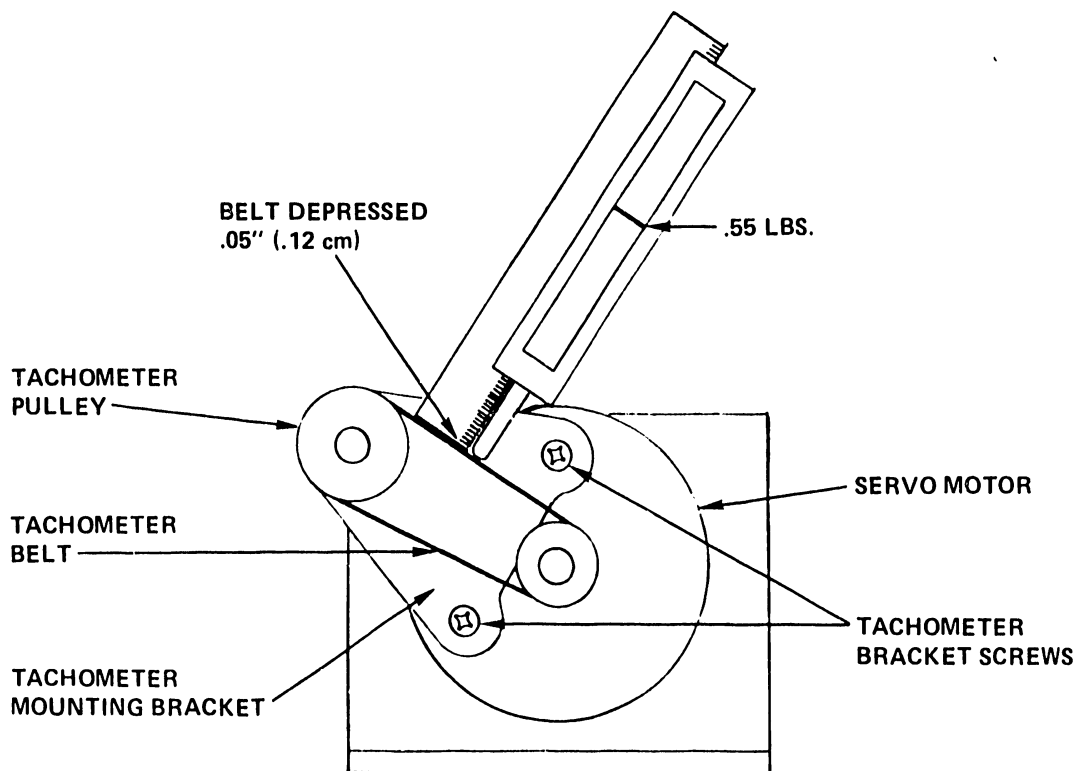
Figure 5-44. Tachometer Belt Adjustment

3. Drive Motor Belt – Using a spring gauge and scale, measure the drive
    motor belt tension at the middle of the belt. A force of 1 lb. should
    deflect the belt .10" (.25 cm).

Adjustment of Belt Tensions

1.   Tachometer Belt - Loosen the two Phillips screws holding the tach-
      ometer bracket to the servo motor, and move the tachometer to
      obtain the correct belt tension. Tighten the screws and recheck
      the tension. See Figure 5-44.

2.   Drive Motor Belt - Loosen the two Allen screws holding the tacho-
      meter/servo assembly and move the assembly to obtain the correct
      belt tension. Tighten the screws and recheck the belt tension.
      See Figure 5-45.

3.   Reinstall the lower rear cover.

BELT DEPRESSED
.10″ (.25 cm)

1 LB.

CARRIAGE DRIVE
SHAFT PULLEY

CARRIAGE MOTOR
PULLEY

SERVO MOTOR MOUNTING SCREWS
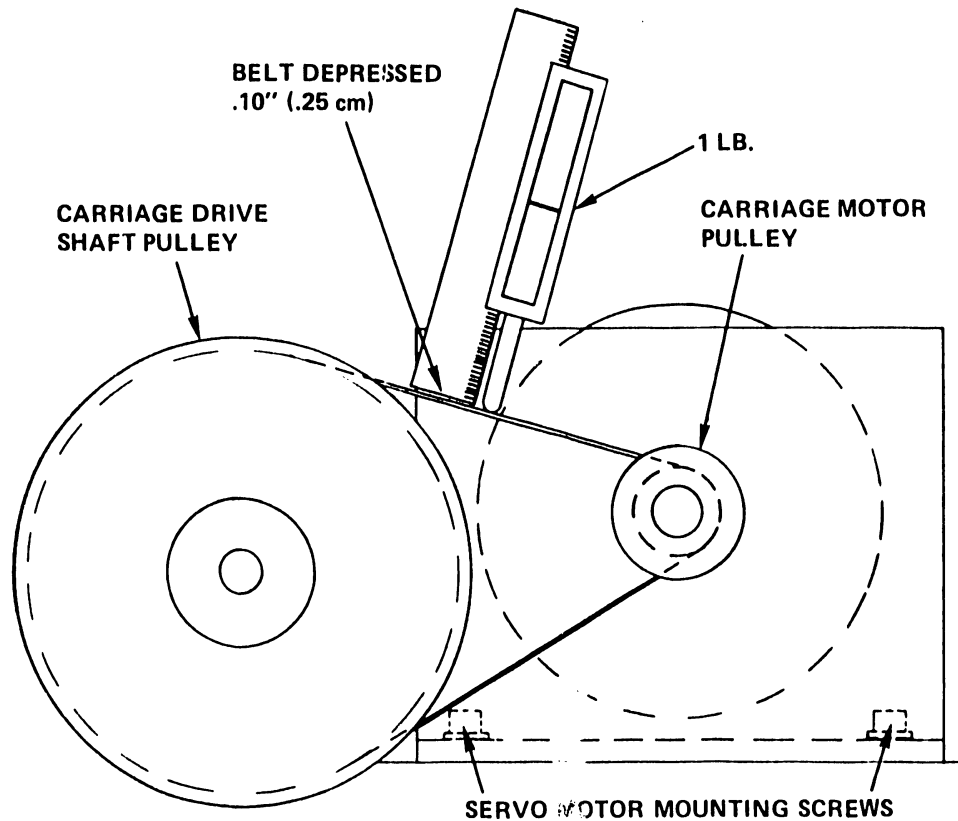
Figure 5-45. Drive Motor Belt Adjustment
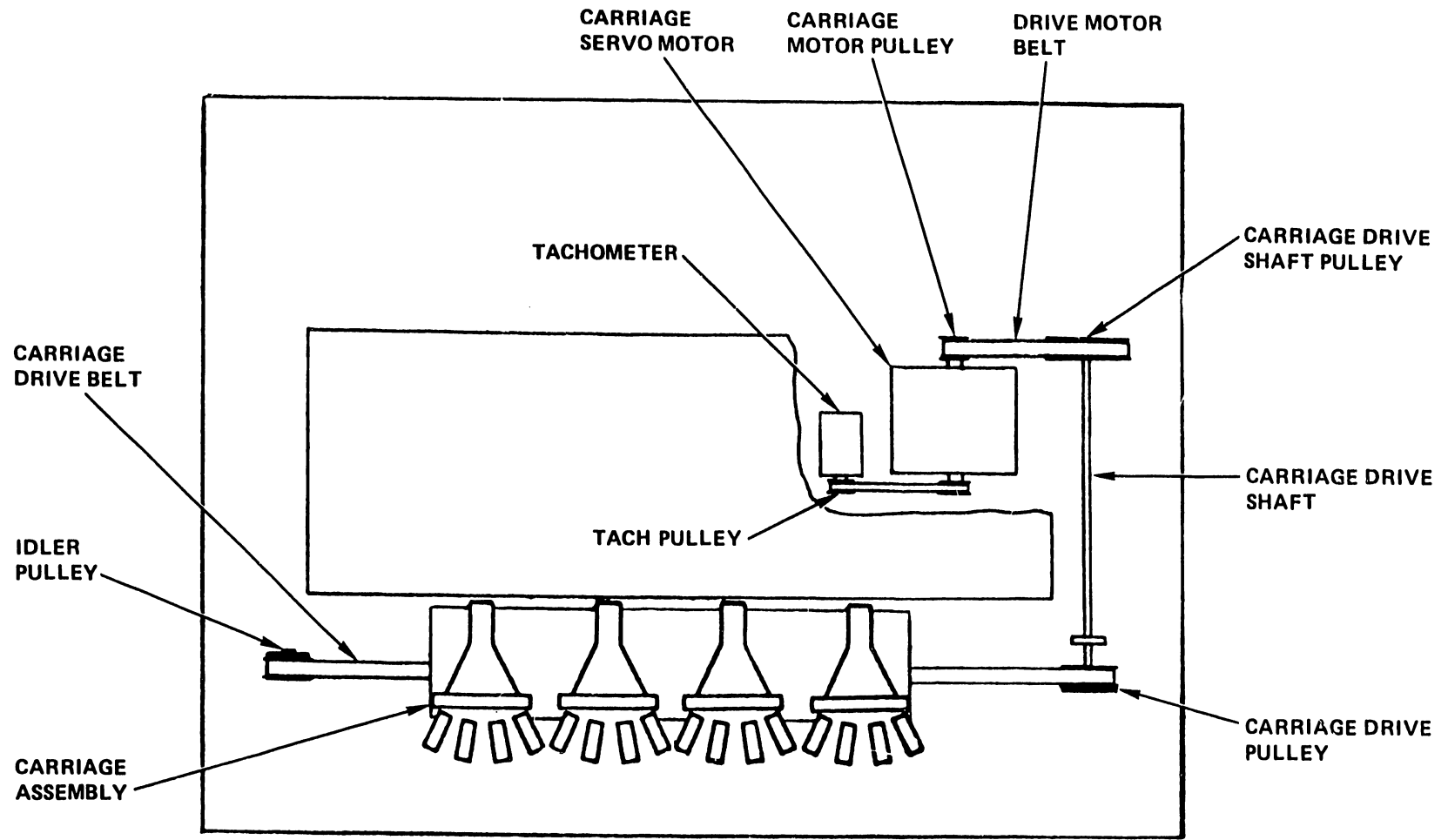
Figure 5-46. Identification of Carriage Drive Components

Removal and Replacement

1. Unplug the servo/tachometer cable (J6) at the 7133 interconnection
    board.

2. Remove the two Allen screws that secure the drive motor and tacho-
    meter to printer baseplate. Remove the drive motor belt and lift
    out the motor.

3. To reassemble the carriage drive motor and tachometer assembly,
    reverse this procedure.

4. Adjust the belt tensions.

5.3.11 *CARRIAGE DRIVE BELT*

Drive Belt Tension Check

1. Turn the main power switch off.

2. Remove the print head shield (4 screws, 2 each side).

3. Move the carriage assembly to the right margin.

4. Using a spring gauge and scale, deflect the drive belt at the left
    edge of print head mounting bracket #1. The gauge should read 1 lb.
    ± 2 oz. when the belt is deflected 3/16" (4.8 mm). If the belt
    tension is incorrect, perform the adjustment below. See Figure 5-47.

Carriage Drive Belt Tension Adjustment

1. Loosen the two mounting screws on the idler pulley bracket. See
    Figure 5-48. Slide the pulley bracket to tighten or slacken the
    drive belt until proper tension is achieved; then tighten both
    bracket mounting screws. Recheck the belt tension.

MEASURE BELT
TENSION AT THIS
POINT
.475" (4.8mm)
1LB. ON SCALE

CARRIAGE
ASSEMBLY AT
RIGHT MARGIN

ADJUST IDLER
PULLEY TO CORRECT
TENSION

CARRIAGE
DRIVE BELT
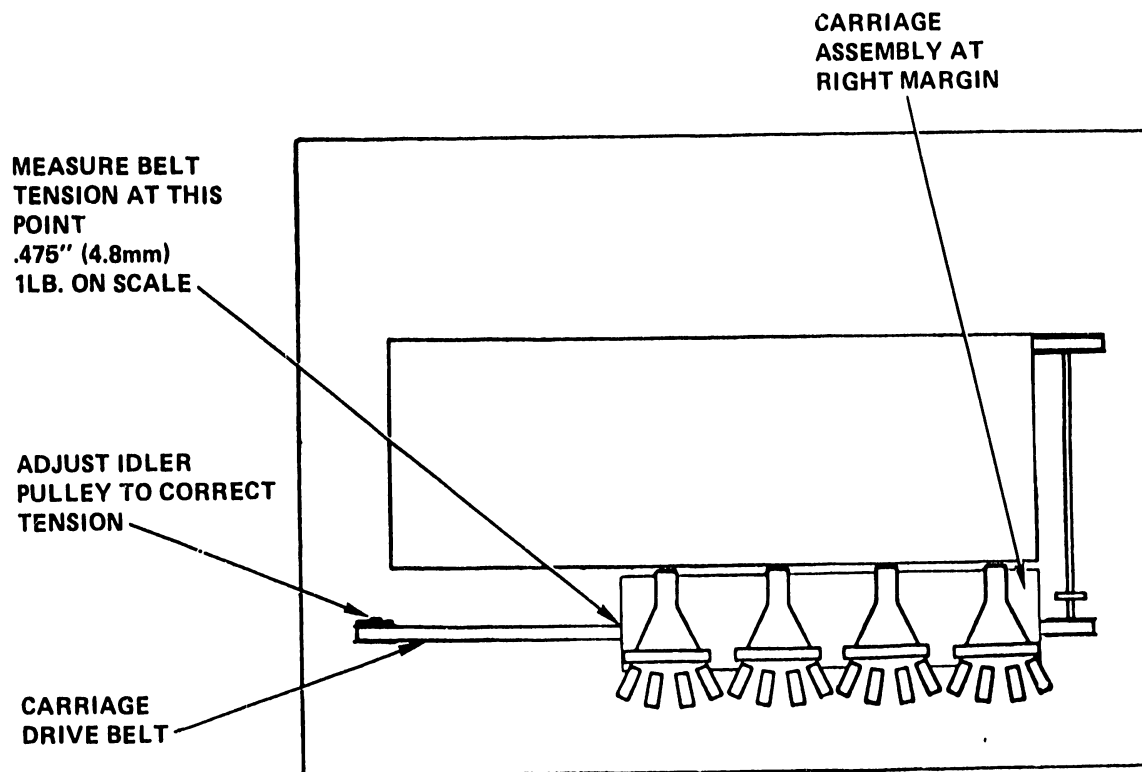
Figure 5-47. Carriage Drive Belt Adjustment

Carriage Drive Belt Removal and Replacement

1. Remove the carriage assembly as described in Section 5.3.12.

2. Invert the carriage assembly. Take care not to scratch or damage the encoder fences.

3. Remove the five holding screws on the drive belt clamp. Replace the carriage drive belt.

4. Reassemble the printer by reversing this procedure.

5. Perform the following adjustments:

    a) Carriage Drive Belt Tension.

    b) Encoder Fences and Photocouplers (section 5.3.5).

CARRIAGE DRIVE BELT

IDLER PULLEY
MOUNTING BRACKET

IDLER PULLEY

BRACKET MOUNTING
SCREWS

PRINTER BASE CASTING
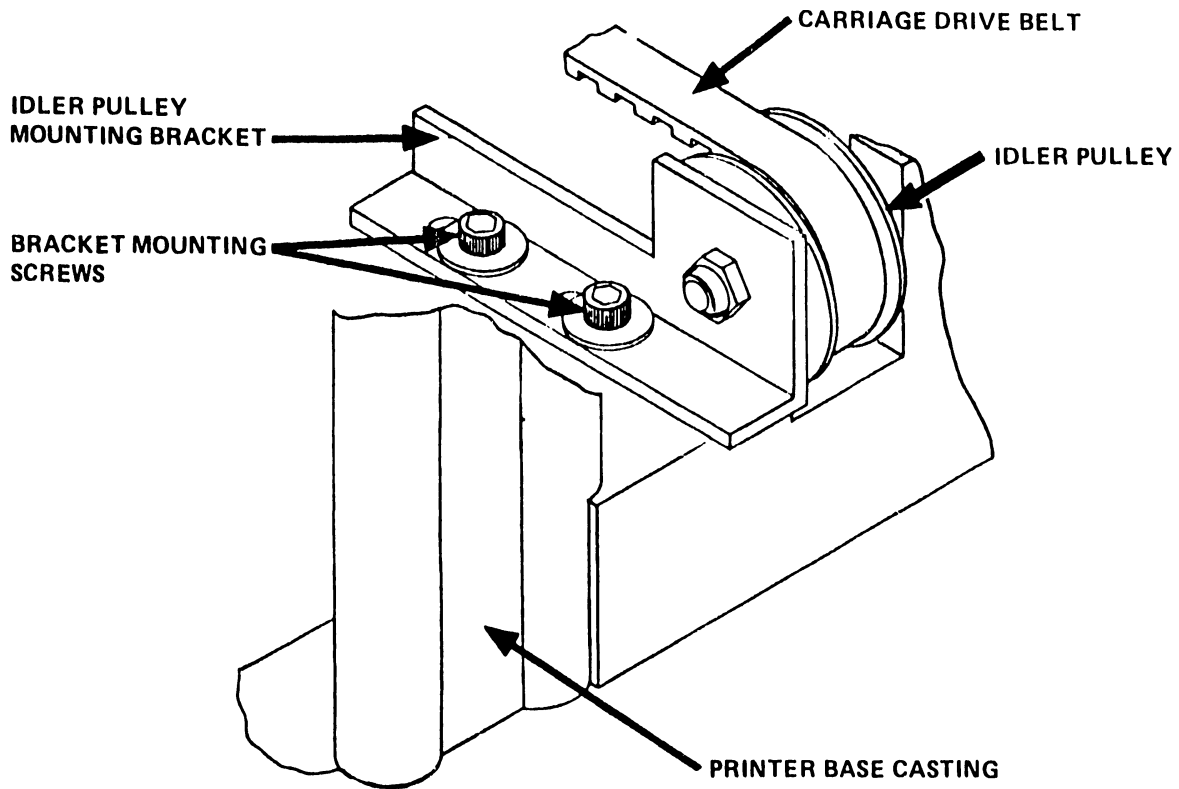
Figure 5-48. Idler Pulley

5.3.12 *CARRIAGE ASSEMBLY REMOVAL AND REPLACEMENT*

1. Turn off the main power switch.

2. Remove the print head shield (4 screws, 2 each side).

3. Move the head adjustment arm to the ribbon load position (heads back) and remove the ribbon.

4. Move the carriage assembly to the left margin to gain access to the 10 pitch photocoupler (right side). Remove the two photocoupler mounting screws; then carefully pull the photocoupler from the encoder fence, taking care not to scratch the fence.

5. Move the carriage assembly to the right margin to gain access to the 12 pitch photocoupler (left side). Remove the two 12 pitch photocoupler mounting screws and carefully pull the photocoupler back from the encoder fence, as in step 4.

BEARING BRACKET MOUNTING SCREWS

LEFT BEARING BRACKET

MAIN CARRIAGE CASTING

12 PITCH ENCODER FENCE

TO HEADS #1 AND #2

BEARING BRACKET MOUNTING SCREWS

CONNECTOR MOUNT

TO HEADS #3 AND #4

HEAD CABLES

RIGHT BEARING BRACKET

10 PITCH ENCODER FENCE
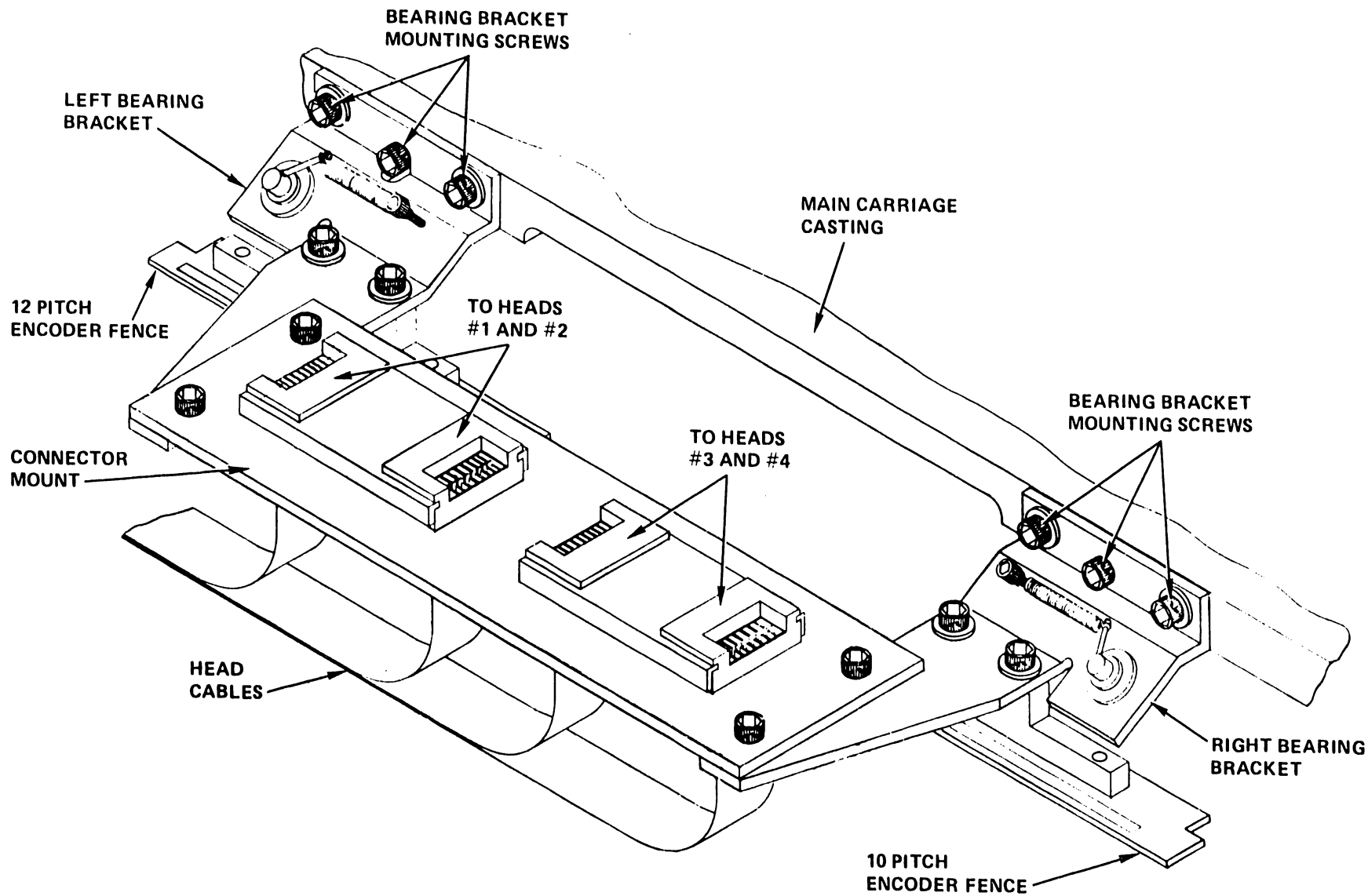
Figure 5-49. Carriage Assembly Removal

6. Disconnect the indicator cable from the head adjustment arm by removing the single retaining screw. This step applies to first version machines only.

7. Loosen the two Allen screws on the idler pulley bracket. Slide the bracket toward the carriage assembly to slacken the carriage drive belt. Remove the belt from the idler pulley (left side).

8. Move the carriage assembly to the left margin and dislodge the belt from the carriage drive pulley (right side).

9. Unplug the four head cable fingerboards.

10. Move the carriage assembly to the center of its track. Remove the six Phillips screws holding the outboard bearing brackets to the main carriage assembly (3 screws on each bracket). See Figure 5-49. Carefully lift out the bearing bracket/connector mount assembly; take special care not to damage the two encoder fences.

11. Remove the two carriage guide bar screws (Phillips), located below the main carriage assembly, in front of print heads #2 and #3. See Figure 5-50. These screws are accessible only when the carriage is in the center of its track.
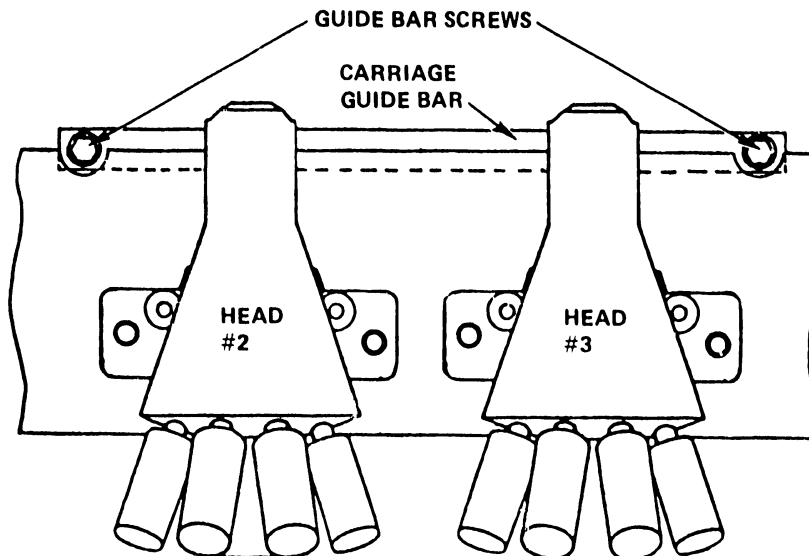
Figure 5-50. Carriage Guide Bar

12. Carefully lift out the carriage assembly.

13. To reassemble, reverse this procedure.

14. When the printer has been reassembled, check the following:

    a)   Encoder Fence and Photocoupler Adjustments (section 5.3.5).

    b)   Carriage Drive Belt Tension (section 5.3.11).
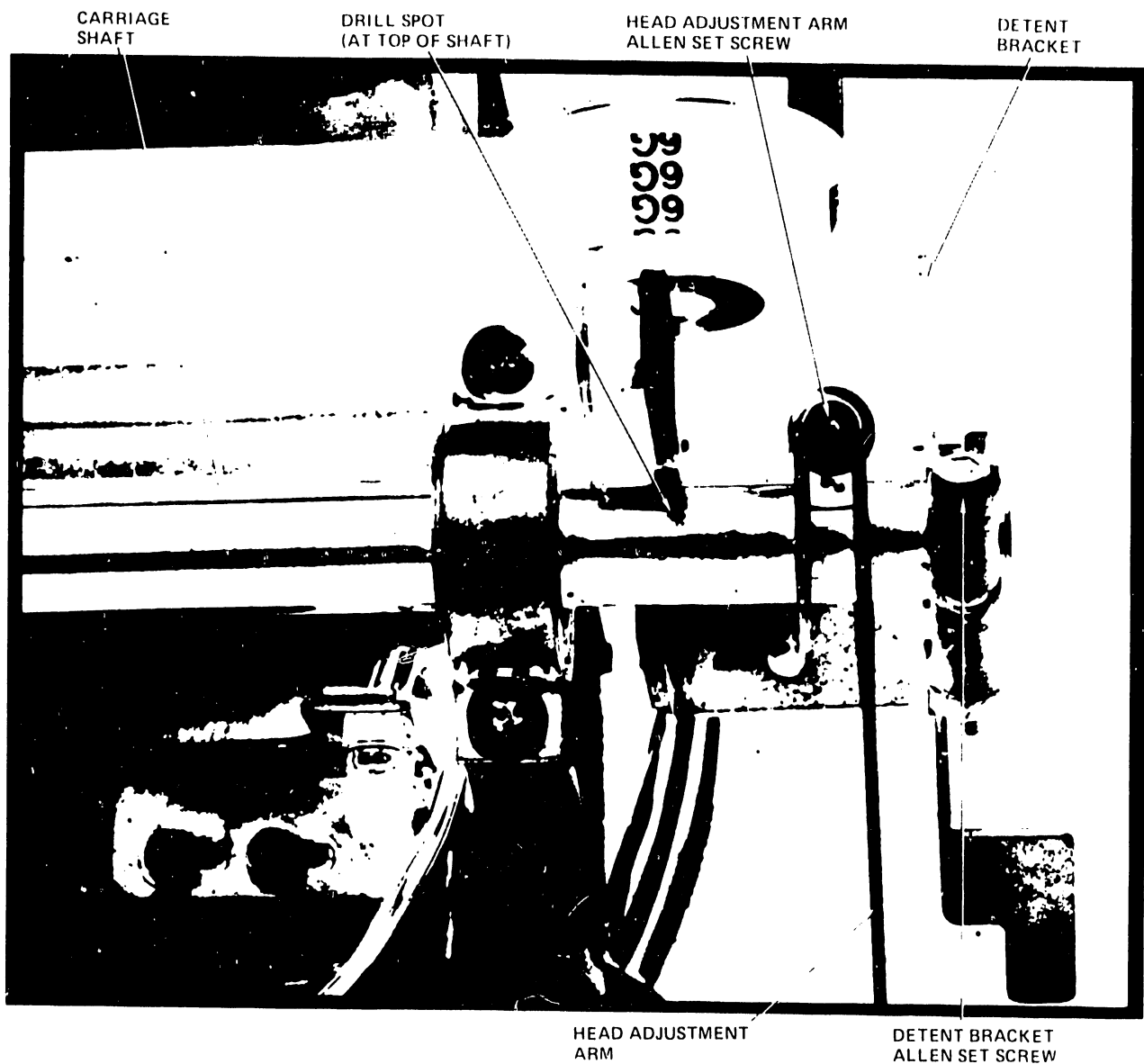
Figure 5-51. Carriage Shaft Alignment

5.3.13 *CARRIAGE SHAFT ALIGNMENT*

Alignment Check

1. Remove the print shield (4 screws, 2 each side).

2. Move the head adjustment arm to the center detent position.

3. Locate the drill spot on the carriage shaft (approximately 1 1/2"
    from the right end of the shaft). If the carriage shaft is aligned
    correctly, the drill spot should now be located precisely at the
    top of the shaft. If it is not, perform the carriage shaft align-
    ment. See Figure 5-51.
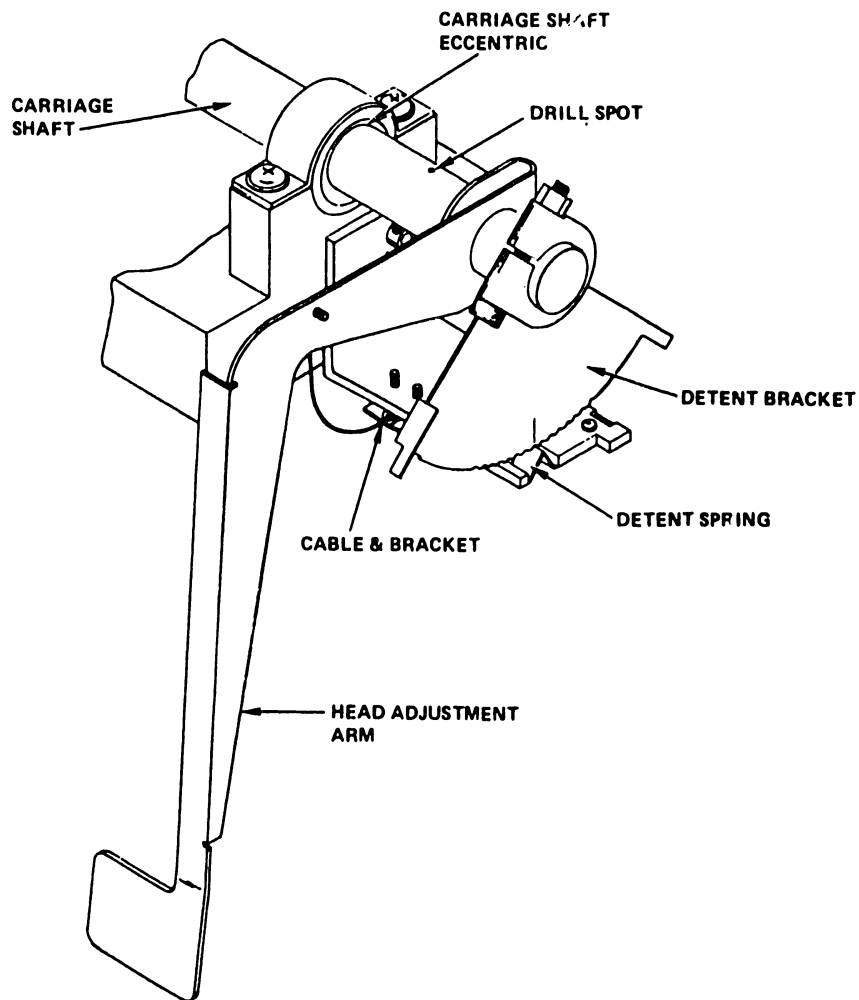
Figure 5-52. Head Adjustment Arm With Old Style Position Indicator

Carriage Shaft Alignment

1. Using the head adjustment arm, position the detent bracket at the center detent position.

2. Loosen the Allen head set screw on the detent bracket.

3. Move the head adjustment arm as necessary to position the drill spot exactly at the top of the carriage shaft; then tighten down the Allen set screw on the detent bracket. See Figures 5-51 and 5-52.

NOTE:
Each detent position for the head adjustment arm
represents a 3° rotation of the carriage shaft.
This 3° rotation moves the carriage assembly
approximately .002" toward or away from the
striker plate.

4. Head Position Indicator - Two versions of the head position indicator currently exist in the field. Both versions should be adjusted to give a scale reading of zero when the print heads are fully forward; the graduated scale is located on the face of the print head shield. The adjustment procedure for the two versions follow:

a) Old Style - This version, installed in the first production units, consists of a cable fastened at one end of the head adjustment arm (see Figure 5-52), and at the other end to a sliding indicator mounted in the print head shield. To adjust this version, position the print heads all the way forward; then carefully bend the cable until the sliding indicator reads zero. Tighten the cable support brackets.

b) Current Style - The current version consists of a fixed indicator arm attached to the carriage shaft. See Figure 5-53. To adjust, loosen the Allen set screw on the indicator arm, set the print heads forward, move the indicator to read zero, and then tighten the set screw.
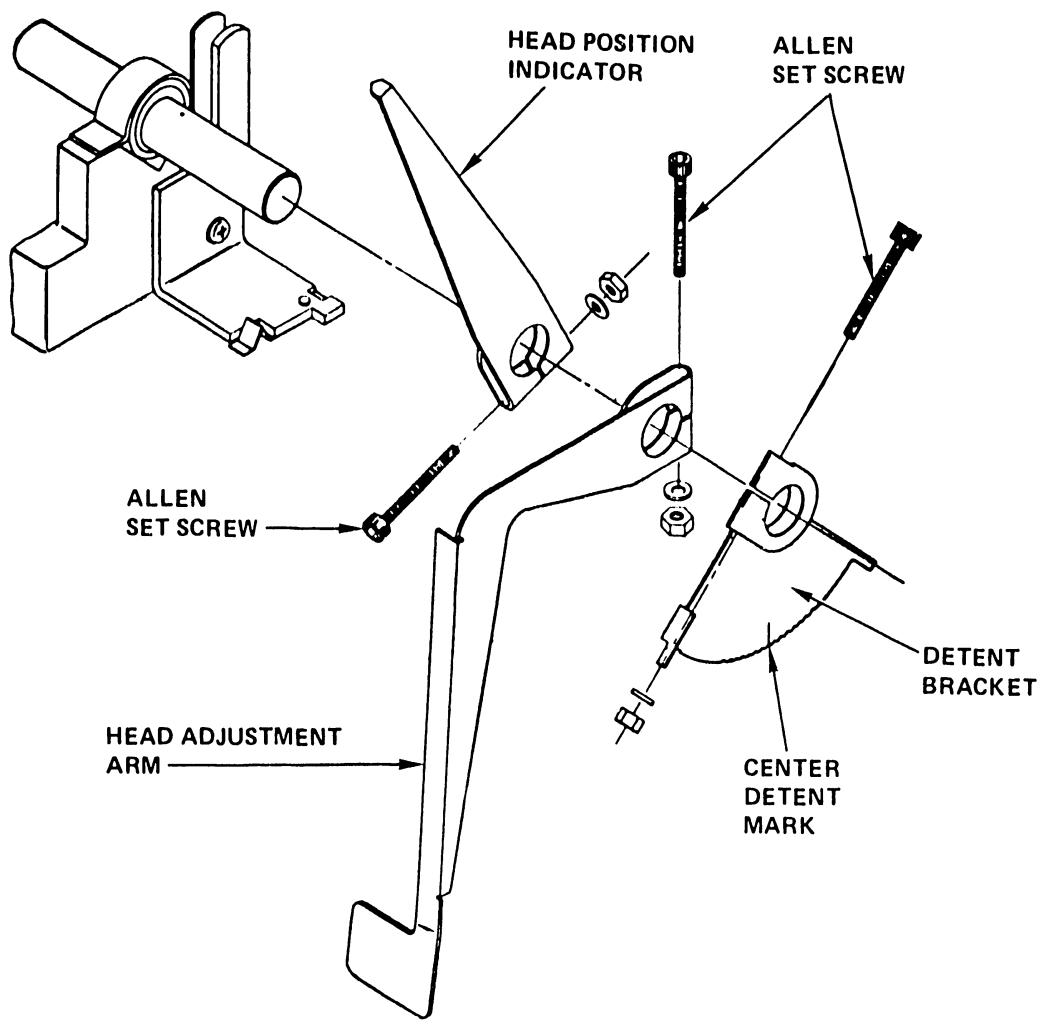
Figure 5-53. Head Adjustment Arm (New Style)

Carriage Shaft Removal and Replacement

1.   Remove the carriage assembly as described in Section 5.3.12.

2.   Remove the six Phillips screws that hold the three carriage clamps.
     The carriage shaft should now lift out.

3.   To reassemble, first attach the carriage shaft to the carriage
     casting.

4.   Reinstall the carriage as described in Section 5.3.12.

COVER STOP
ECCENTRIC

SPROCKET

SPROCKET
ALIGNMENT
SCREW

COVER
ASSEMBLY

LED
COVER
SCREWS

PHOTOTRANSISTOR
HOUSING
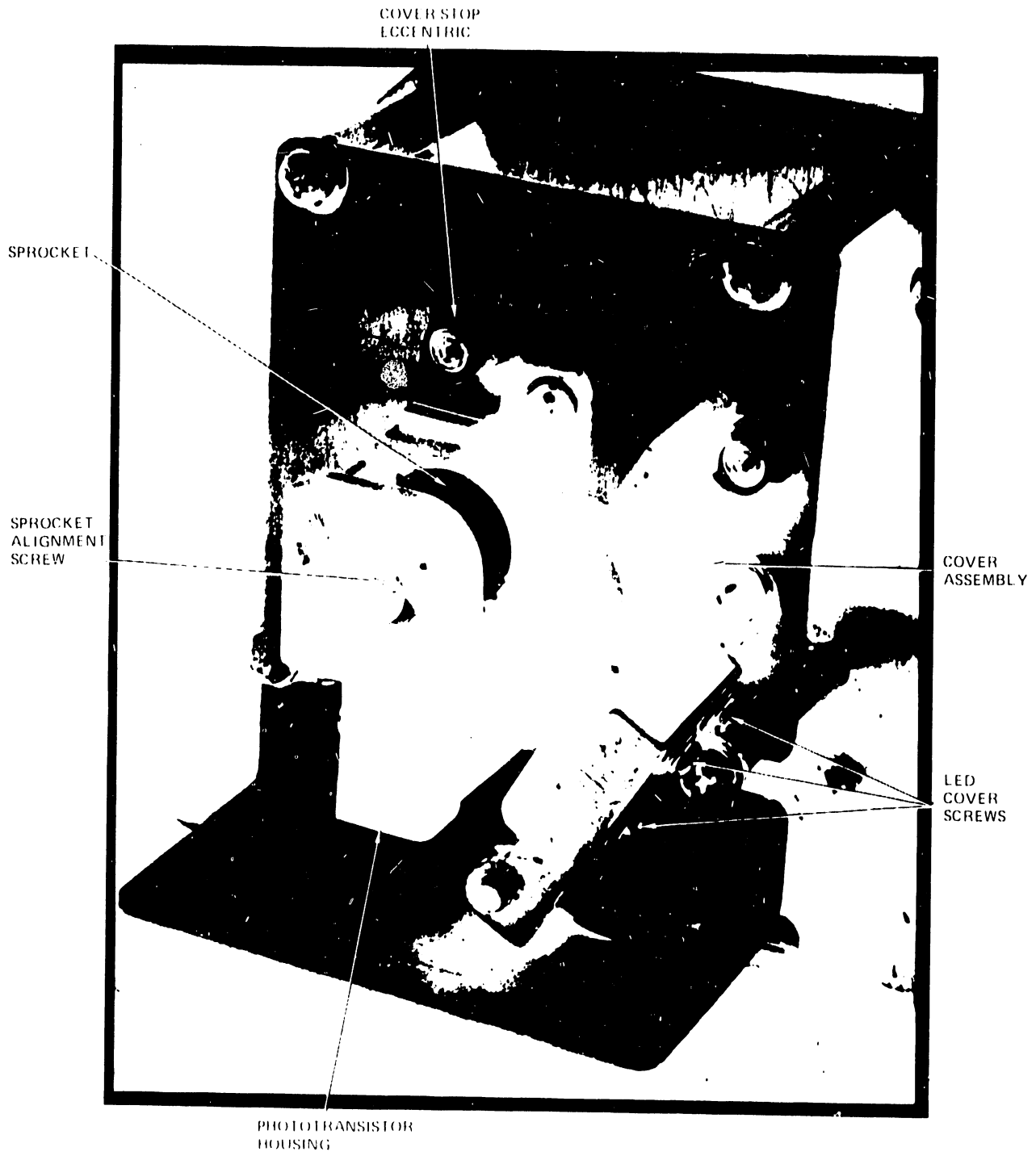
Figure 5-54. Vertical Format Tape Reader

5. Perform the following adjustments:

a) Carriage Drive Belt Tension.

b) Encoder Fences and Photocouplers.

c) Carriage Shaft Alignment.

5.3.14 *VERTICAL FORMAT UNIT (VFU)*

Adjustment Check

1. See that the sprocket rim and the curved surface of the phototransistor housing are even and parallel. See Figures 5-54 through 5-56.

2. Check for a uniform clearance, with the cover assembly closed, between the phototransistor housing and cover. The clearance should measure .010" to .015" (.25 mm to .38 mm). See Figure 5-55.
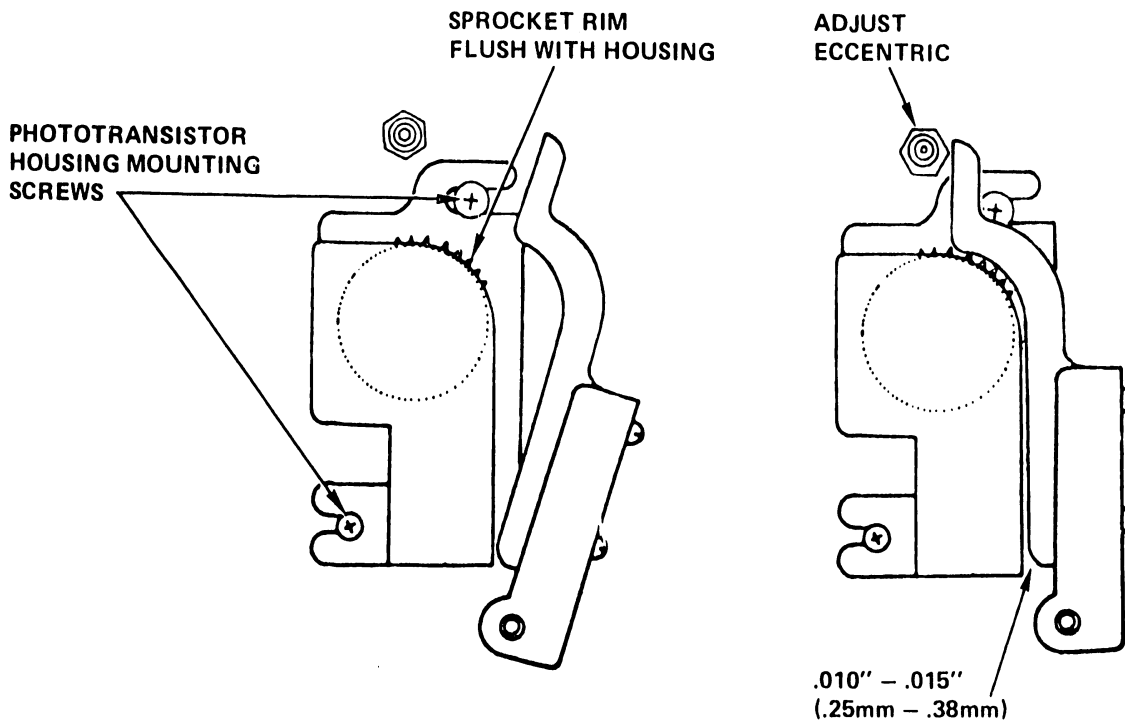
Figure 5-55. VFU Adjustments

SPROCKET
RIM FLUSH
WITH HOUSING

TAPE GUIDES

REAR VIEW   TOP VIEW

SPROCKET
ALIGNMENT
SCREW
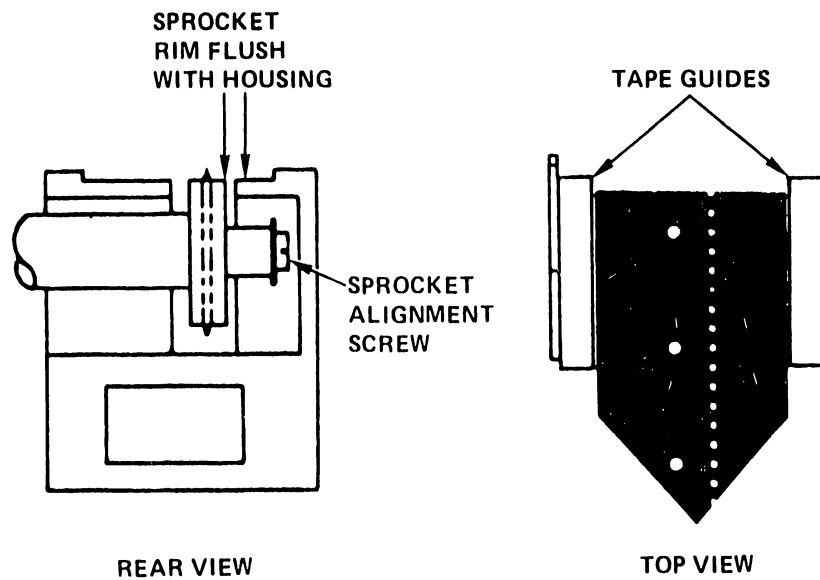
Figure 5-56. VFU Sprocket Adjustments

3. With the cover open and format tape in place, check that the tape
    is centered within the indented surface of the phototransistor
    housing. See Figure 5-56.

4. The output of all four phototransistors should be at least +4 volts.
    Connect scope to the following pins of the 7132 board to determine
    the amplitude (hold down the TOP OF FORM button):

        Channel 2 (SLD NPE) B_3
        Channel 5 (VTPE) A_3
        Channel 7 (FFPE) S_2
        Sprocket Detect (SKTPE) 5_3

Adjustment

1. With the cover assembly open, loosen the two mounting screws on the
    phototransistor housing. Position the housing so that its curved
    surface is flush with the rim of the VFU sprocket.

2. Adjust the cover stop eccentric (see Figure 5-55) to obtain a gap
    of .010" to .015" (.25 mm - .38 mm) between the cover and photo-
    transistor housing.

COVER STOP
ECCENTRIC

MOUNTING
PLATE

CELL MOUNT
COVER

PHOTOTRANSISTOR
PCB 210-7174

LED
HOUSING

PHOTOTRANSISTOR
HOUSING

TORSION
SPRING

LED BOARD
210-7175

LED COVER
ASSEMBLY
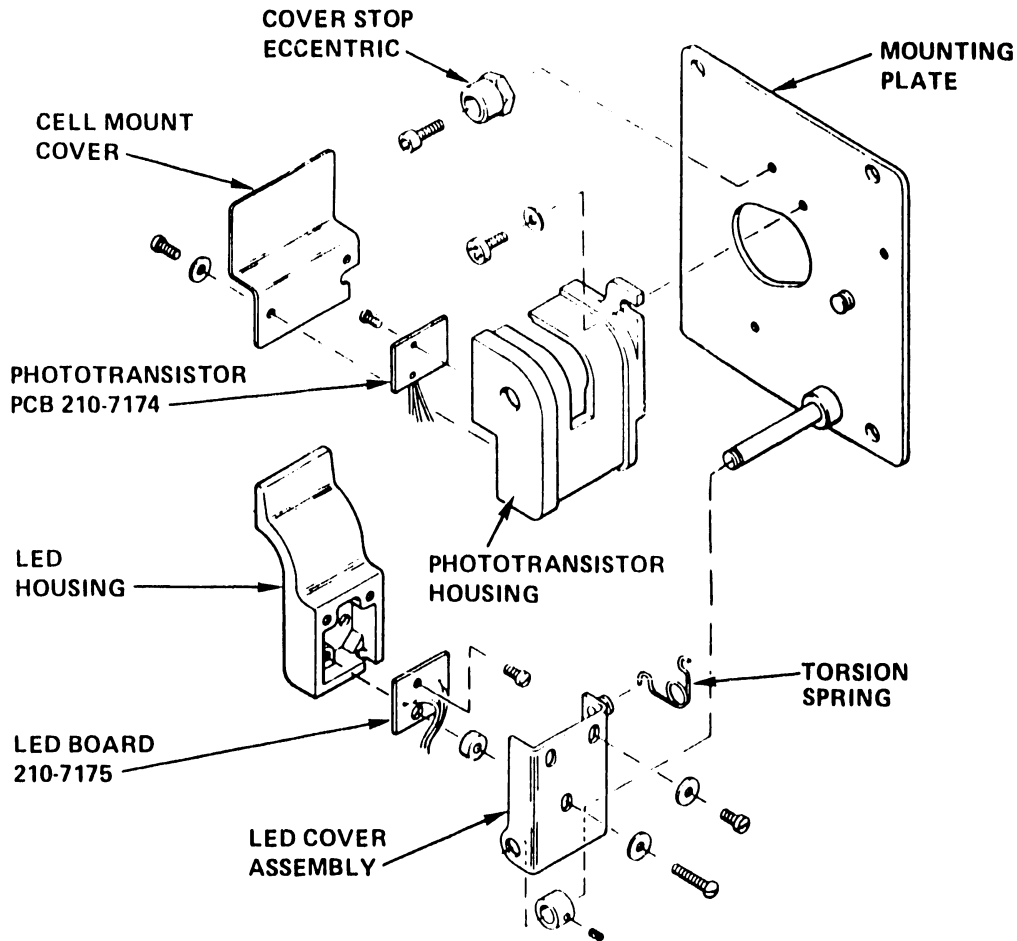
Figure 5-57. VFU Assembly

3. To center the VFU tape (lateral adjustment), turn the sprocket alignment/retaining screw. See Figures 5-54 and 5-56. A spring, located under this screw, keeps the screw at even tension as it is turned.

4. Cover Assembly Adjustment - Connect scope probes to pins S_2 and B_3 of the 7132 board. These pins monitor tape channels 2 and 7, which are closest to the edges of the tape.

a) With the format tape removed and with the cover assembly closed, loosen the three LED cover screws (see Figure 5-54) and move the cover up or down to obtain +5 volts on both channels, while still maintaining the clearance specified in step 2. Retighten the LED cover screws.

b) Reinstall the format tape and close the cover. Hold down the TOP OF FORM button. The signals on pins S_2 and B_3 should be a minimum of +4 volts. If not, fine adjust the sprocket alignment/retaining screw; this will move the punched tape laterally for aligning the LEDs with the sprocket holes.

SECTION
6
MAINT-
ENANCE

SECTION 6

MAINTENANCE

6.1 INTRODUCTION

This section of the manual is divided into three parts: preventive maintenance, troubleshooting, and diagnostics.

The preventive maintenance section contains a procedure that directs the customer engineer to examine the Model 77's most critical service areas. It should be performed during each scheduled PM call (semiannual). It consists of routines for checking the printer voltages, print timing adjustments, and print head lubrication, along with instructions for printer cleaning and visual inspection to detect wear. Early detection and replacement of worn printer parts will prevent more serious problems later on. These PM routines should also be performed during all un-scheduled service calls.

The troubleshooting table should aid the customer engineer in finding the cause of operational problems and effecting their solution. The trouble-shooting table begins with the most common and basic faults and progresses to the less frequent and more complex faults.

The diagnostic section contains a description of the Model 77 printer diagnostic to be run with series 2200 computers. The diagnostic program should aid the customer engineer in the checkout of the printer and con-tribute to maintaining good print quality. This diagnostic also has many special features which make it an important troubleshooting tool for isolating operational problems. The Model 77 diagnostic is available through the Home Office. Immediately following the diagnostic description is APPENDIX A, PRINTER DIAGNOSTIC PRINT SAMPLE to be used in conjunction with the printer diagnostic description.

6.2 MODEL 77 MATRIX PRINTER PREVENTIVE MAINTENANCE SCHEDULE

The following preventive maintenance should be performed semi-annually. This preventive maintenance schedule assumes a clean oper-

ating environment with a normal 50% printer operating time during standard five-day, forty-hour weeks. A dusty operating environment or any substantial increase in printer operating time will require that preventive maintenance be scheduled at closer intervals. In addition, these maintenance routines should be performed during each unscheduled service call.

1. Check for $+5 \pm .1V$ VRSW at connector pin 12_3 of the 7136 power regulator board. Adjust this voltage to the correct level by R-32. Check for +12 to +12.5 VRSW at connector pins A_1 and 1_1; adjust to the correct level by R-37. Check all the remaining voltages as described in section 5.2.1.

2. Check the forward and reverse servo speed adjustment as described in section 5.2.2. Adjust the speed, if necessary, to obtain a full cycle width of 900 μs.

3. Check the window signal duty cycle adjustment for both 10 and 12 pitch as described in section 5.2.2. Adjust, if necessary, to obtain a 50% duty cycle at 450 μs.

4. Visually examine the 10 pitch and 12 pitch encoder fences for dirt and scratches.

5. Check the striker plate for marring and dirt.

6. Check the left and right carriage bumpers and margin springs for excessive wear.

7. Check and set the tensions of the servo motor drive belts, the paper feed stepper motor belts, and the tachometer drive belt.

8. Remove the print head shield. Vacuum the cooling fans in the print head shield and the rear door. Check that the air intake filter (on bottom of printer cabinet) is not clogged. See that the fans are not obstructed.

9. Check the ribbon for wear and replace it if necessary.

10. Check and lubricate all four print heads. For each print head, proceed as follows:

Remove the print head cover. Remove the sponge from under the print head wires and soak it in print head lubricant. Press the sponge against the rear of the print head bearing; this will force some of the lubricant into the bearing holes. Using a swab made of lint free absorbent material, dab each entrance and exit hole of the guide tubes with lubricant. Replace the sponge and print head cover.

Immediately after lubrication, operate the printer for several minutes and ensure that every solenoid is used during the printing. The Model 77 printer diagnostic may be used for this purpose. This allows the lubricant to make contact with all surfaces of the guide tubes and bearings.

NOTE:
Lubricant can be ordered using Wang part #660-0180.

11. A periodic vacuum cleaning of the printer will remove the paper dust, a major cause of malfunctions in high speed printers. With the power cord disconnected, vacuum the printer as described below.

Move the heads to the ribbon load position (heads all the way back) and vacuum between the print head bearings and the striker plate. Vacuum the carriage assembly and exterior of the print heads; then, remove the individual print head covers and carefully clean away the paper dust that has accumulated around the guide tubes, print wires, and bearings.

Vacuum the area around the paper feed mechanism, the vertical format unit, and the vernier clutch. Clean the paper feed sprockets and the paper guides.

12. Check all the printed circuit boards for proper seating. See that the four ribbon cables to the solenoid driver boards are seated

firmly in their connectors. The electrical chassis must be vibration proof; all screws and clamps must be tight and secure. Check the tightness of all the chassis screws that hold the power regulator (7136) and the four solenoid driver boards (7035). Carefully vacuum the spaces between the solenoid driver boards.

13. Record the hours indicated on the elapsed time meter. These readings will later be used to determine more accurate preventive maintenance schedules.

14. Run the Model 77 printer diagnostic (section 6.4) and carefully inspect the print samples for quality. Make any adjustments for print quality that seem necessary. See section 5.3.6 for print quality adjustment procedures.

6.3 TROUBLESHOOTING

SYMPTOM		CAUSE		SOLUTION
1.	Main power on; no power lamp.	1A.	Main fuse blown.	1A.	Replace fuse.
		1B.	Power lamp out.	1B.	Replace lamp.
		1C.	No voltages at regulator.	1C.	Replace 7136 pcb.
		1D.	No voltages at chassis.	1D.	Check electrical chassis.
2.	Main power on; alarm tone sounds continuously; ALARM light on.	2A.	Servo circuit breaker off.	2A.	Reset breaker after checking cause.
		2B.	Servo circuit breaker malfunction.	2B.	Check breaker voltage and/or replace breaker.
3.	Solenoids fire during power prime.	3A.	Defective 7134/7035.	3A.	Replace 7134 or 7035 pcbs.
4.	Printer cabinet moves during printing.	4A.	Cabinet support feet not extended.	4A.	Extend circular support feet.
5.	Printer busy to 2200 System.	5A.	ECN 7358 not installed.	5A.	Perform ECN 7358.
6.	No +5V on motherboard.	6A.	Q_1 bad (transistor on electrical chassis).	6A.	Replace Q_1.
7.	Power prime and carriage does not move to left or right margin.	7A.	Defective 7132/7137.	7A.	Replace 7132 or 7137.
		7B.	Defective servo belt.	7B.	Adjust or replace belt.
		7C.	Paper or ribbon jam.	7C.	Check carriage for obstructions.
8.	Power ON; depress SELECT button and select lamp does not light.	8A.	Defective lamp.	8A.	Replace lamp.
		8B.	Defective switch.	8B.	Replace switch.
		8C.	Defective wiring.	8C.	Check wiring.
		8D.	Defective 7137.	8D.	Replace 7137.
9.	Ribbon is at end of spool, but does not change direction of movement.	9A.	No ribbon rivet.	9A.	Replace ribbon.
		9B.	Ribbon not threaded through reverse actuators.	9B.	Thread ribbon through actuator.
		9C.	Defective reverse microswitch.	9C.	Replace microswitch.
		9D.	Defective ribbon drive motor.	9D.	Check or replace motor.
		9E.	Defective 7132 pcb.	9E.	Replace 7132 pcb.

SYMPTOM	CAUSE	SOLUTION
10. Erratic forward or reverse motion of carriage (at both 10 and 12 pitch).	10A. Loose tachometer belt. 10B. Defective tachometer. 10C. Defective servo motor. 10D. Defective servo circuit.	10A. Adjust tachometer belt. 10B. Replace tachometer. 10C. Replace servo motor. 10D. Replace 7132 pcb.
11. Unequal forward and reverse carriage speed.	11A. Incorrectly adjusted servo speed. 11B. Defective 7132 pcb.	11A. Adjust as per Section 5.2.2. 11B. Replace 7132 pcb.
12. No carriage reverse after printing a line.	12A. Defective margin photocoupler. 12B. Defective margin coupler circuit. 12C. Incorrect margin adjustment.	12A. Replace margin photocoupler. 12B. Replace 7132 pcb. 12C. Adjust as per Section 5.2.2.
13. Intermittent loss of servo drive during printing.	13A. Poor electrical connection. 13B. Defective servo motor circuit.	13A. Check J6 connector on 7133 pcb. 13B. Replace 7132 pcb.
14. Main power ON, but no power to servo drive motor.	14A. No +5V to servo. 14B. Poor electrical connection. 14C. Defective servo motor circuit.	14A. Adjust +5V. 14B. Check J6 connector on 7133 pcb. 14C. Replace 7132 pcb.
15. Carriage movement, but no printing at 10 and 12 pitch.	15A. Defective window scanning circuits. 15B. Defective diring registers. 15C. No +40 volts.	15A. Replace 7132 pcb. 15B. Replace 7134 pcb. 15C. Replace solenoid driver fuse; replace 7136 pcb.
16. Printing at single pitch only (10 or 12).	16A. Incorrect timing/optics adjustments. 16B. Fence/photocoupler misadjusted. 16C. Damaged encoder fence. 16D. Defective timing photocoupler. 16E. Defective 7132 pcb. 16F. Defective 7134 pcb. 16G. Defective 7129 pcb.	16A. Adjust as per Section 5.2.2. 16B. Adjust as per Section 5.3.5. 16C. Inspect and replace fence. 16D. Replace photocoupler. 16E. Replace 7132 pcb. 16F. Replace 7134 pcb. 16G. Replace 7129 pcb.

SYMPTOM	CAUSE	SOLUTION
17. Loss of 8 LPI or 6 LPI vertical line spacing.	17A. Defective switch. 17B. Defective 7132 pcb. 17C. Defective 7131 pcb. 17D. Loose J1 connector.	17A. Check or replace switch. 17B. Replace 7132 pcb. 17C. Replace 7131 pcb. 17D. Check connector.
18. Poor character quality at margins.	18A. Incorrect adjustment of margin photocouplers. 18B. Incorrect margin spacing adjustment.	18A. Adjust as per Section 5.2.2. 18B. Adjust as per Section 5.2.2.
19. Gaps in printed line, overlapping characters, or print line uneven.	19A. Incorrectly adjusted print heads.	19A. Adjust as per Section 5.3.6.
20. No manual linefeed.	20A. Defective switch. 20B. Defective 7132 pcb.	20A. Replace switch. 20B. Replace 7132 pcb.
21. Continuous paper feed when Top of Form is executed.	21A. Defective 7132. 21B. Defective VFU.	21A. Replace 7132. 21B1 Adjust VFU. 21B2 Replace format tape. 21B3 Replace LED for channel 7. 21B4 Replace photocell for channel 7.
22. Poor print quality along whole print line at both 10 and 12 pitch.	22A. Print heads too close to striker plate. 22B. Incorrect print timing. 22C. Defective 7132 pcb. 22D. Defective 7134 pcb. 22E. +5V adjustment incorrect.	22A. Move head adjustment arm. 22B. Adjust as per Section 5.2.2. 22C. Replace 7132 pcb. 22D. Replace 7134 pcb. 22E. Adjust +5V on 7136 pcb.
23. Light print on one side of printed line.	23A. Striker plate misaligned. 23B. Ribbon height incorrectly adjusted.	23A. Adjust striker plate (Section 5.3.1). 23B. Adjust ribbon guides (Section 5.3.2).
24. Poor print quality at one location in printed line.	24A. Encoder fence scratched. 24B. Encoder fence misadjusted.	24A. Inspect/replace fence. 24B. Adjust fence (Section 5.3.5).

SYMPTOM	CAUSE	SOLUTION
25. Print wires catching ribbon during printing.	25A. Print heads too close to striker plate.	25A. Move head adjustment arm.
	25B. Worn ribbon.	25B. Replace ribbon.
	25C. Print solenoid malfunction.	25C1 Replace print solenoid.
		25C2 Lubricate solenoids.
		25C3 Replace 7035 pcb.
26. Paper streaked during print.	26A. Print heads too close to striker plate.	26A. Move head adjustment arm.
	26B. Paper guides misaligned.	26B. Adjust paper guides (Section 5.3.4).
	26C. Print solenoid malfunction.	26C. Replace print solenoid.
	26D. Ribbon height incorrectly adjusted.	26D. Adjust ribbon guides (Section 5.3.2).
27. Single print head will not print.	27A. Defective 7035 pcb.	27A. Replace 7035.
	27B. Loose solenoid driver ribbon cable connector.	27B. Check ribbon cables.
28. Missing dots in characters.	28A. Defective PROM-7131 pcb.	28A. Replace 7131 pcb.
	28B. Incorrectly adjusted print solenoid.	28B. Adjust solenoid Section 5.3.6.
	28C. Defective 7035 pcb.	28C. Replace 7035 pcb.
	28D. Broken print solenoid wire.	28D. Replace solenoid.
	28E. Solenoid driver ribbon cable loose.	28E. Check ribbon cable.
29. Erratic printing at one pitch selection.	29A. Incorrect timing adjustments.	29A. Adjust timing (Section 5.2.2).
	29B. Damaged encoder fence.	29B. Replace encoder fence.
	29C. Incorrectly adjusted encoder fence.	29C. Adjust encoder fence (Section 5.3.5).
30. LED lights on 7136 board.	30A. Blown solenoid driver fuse.	30A. Replace fuse.
	30B. Defective 7136 pcb.	30B. Replace 7136 pcb.
31. Poor print quality along whole print line at one pitch selection.	31A. Damaged encoder fence.	31A. Replace fence.
	31B. Encoder fence incorrectly adjusted.	31B. Adjust fence (Section 5.3.5).
	31C. Incorrect timing adjustments.	31C. Adjust print timing (Section 5.2.2).

6.4 DIAGNOSTICS

This section contains a description of the Model 77 printer diagnostic which is available through the Home Office. Immediately following the description is APPENDIX A, PRINTER DIAGNOSTIC PRINT SAMPLE.

If the Model 77 diagnostic has not yet been obtained, the diagnostic programs for the Model 72 printer can be used for a basic checkout of the Model 77. Note that the Model 72 diagnostics, having been designed to test a 132 column printer, will not check all the print columns of the Model 77 printer, which has 136 maximum print columns at 10 pitch (160 columns at 12 pitch).

To run the Model 77 diagnostic described in the next section, proceed as follows:

1. Load the diagnostic tape (or diskette) into memory. Note that the diagnostic requires 32K of CPU memory.

2. Key CLEAR EXECUTE, LOAD EXECUTE, AND RUN EXECUTE.

3. The CRT will display the first menu. To run tests 1 through 13 inclusive select SPECIAL FUNCTION KEY No. 14.

4. Use green and white striped paper for this diagnostic and initially set the printer switches to 6 lines/inch and 12 pitch. Follow all instructions displayed on the CRT.

6.4.1 *MODEL 77 DIAGNOSTIC DESCRIPTION*

TEST NO. 1 DATA BUFFER

This test checks all possible data bit combinations and the character status. It checks the line buffer and verifies that all characters are correct. It then verifies the actual data bits. For example, if a Hex code of (3F) is sent to the printer, the character printed must

be (?). The test tells what bits it is testing and what to expect as a printout in the next five print lines. Hex (3F) will print the question mark character (?). The bit testing is performed in both the normal and the expanded mode. See pages 1 and 2.

NOTE:

In this diagnostic description, occasional references
are made such as "See Page X". These references refer
to pages in the sample diagnostic printout which follows.

TEST NO. 2   HEAD SOLENOID FIRING

This test verifies the solenoid wire firing action and the response time by repeatedly activating and deactivating the print wires of each solenoid. See Page 3.

TEST NO. 3   HEAD ALIGNMENT AND CONSISTENCY TEST

This test checks the horizontal alignment of the print heads. The test verifies the spacing of the heads at the transition point, where one head stops printing and the next one begins. The transition points are indicated by arrows. This test can also be used to verify the vertical alignment of the print heads. See page 4 for a sample of the test.

TESTS NO. 4 AND NO. 5   SPIRAL PRINT SAMPLE

Tests 4 and 5 are identical except for character size. Test No. 4 is the normal character at 12 pitch, and Test No. 5 is an expanded version of Test No. 4. This test verifies the shifting effect of the entire character set across the print buffer of 160 characters, using 94 characters. See pages 5, 6, 7, and 8 for samples.

TEST NO. 6   SPECIAL PAPER MOTION

This section of the diagnostic is broken down into five smaller tests. The tests are designated as follows:

1.   Line Feed Test No. 1.

2. Line Feed Test No. 2.

3. Vertical Tab Test No. 3.

4. End of Document.

5. Carriage Return Test.

For these tests it is important to use lined (white and green striped) paper. Top of Form is tested at the beginning of each test, and End of Document (Paper Eject) is tested in every test that exceeds 60 print lines.

LINE FEED TEST NO. 1

This test actuates the line feed mechanism and verifies its proper operation. The program prints a reference asterisk and then sends out 3 line feed Hex codes (0A). The asterisks will be evenly spaced down the page. The operator should be able to check for errors, at a glance. See page 9 for a sample.

LINE FEED TEST NO. 2

This test is similar to Line Feed Test No. 1; it also checks the operation of the line feed mechanism. It sends a reference line of print, and then 23 line feed Hex codes (0A). If alternating white and green striped paper is used, with 22 stripes per page, the reference lines will be printed on the same color stripe all the way down the page. See page 10 for a sample. In this sample, the reference marks are printed slightly above the center lines of the white stripes. If the paper was initially aligned correctly, the reference marks would have been printed exactly in the center of the white stripes. Reference marks not uniformly spaced down the page will be an indication of a vertical paper feed malfunction.

VERTICAL TAB TEST

The number of vertical tabs any given printer can execute is determined by the vertical format tape. The standard vertical format tape issued with the printer allows 10 vertical tabs. But, since the tenth

vertical tab hole is directly opposite the End of Document hole, the tenth vertical tab cannot be executed. This test prints the test title, and then sends the Vertical Tab Hex code (0B). The statement "Vertical Tab No. ?" is then printed, where the question mark represents the cumulative number of Vertical Tab codes issued by the CPU.

NOTE:
All Vertical Tabs should be printed one line below the designated horizontal reference line for the page. See page 11 for print sample.

END OF DOCUMENT

The number of lines printed on any given page is determined by the vertical format tape installed in the VFU tape reader. The standard vertical format tape allows for 60 lines of printed data before the tape reader advances the paper to the top of the next page.

This test starts by printing on line No. 4. It prints "Line No. XX", where XX represents the actual line number. The test continues to advance the paper and print the line number until line No. 60 is reached. After line No. 60 has been printed, the printer executes a Top of Form command, under hardware control, and advances the print paper to the top of the next page. The test program then issues its own Top of Form command, a Hex code (0C). Each successful End of Document test should, therefore, contain a blank page. See pages 12 and 13 for examples.

CARRIAGE RETURN TESTS

Three types of carriage return tests are performed. All three tests have the print line length selected for 160 characters per line.

The first test prints 85 characters and then issues a Hex code (0D); five consecutive lines of data will be printed.

The second test issues 160 characters exactly. The printer hardware then issues the Hex code (0D).

NOTE:

At the present time, the printer hardware issues two
carriage return Hex codes (OD) for this test. The
160 character line is printed, the print paper is
advanced two lines, and then the next 160 character
line is printed. See page 14.

The third test, at 12 pitch, issues 196 characters. The line length
is selected for 160, the maximum for the printer. The extra characters
after column 160 are printed on the next line. The 0 in 160 at the end
of the first full line represents the 160th character printed.

TEST NO. 7   HEX CODE CHARACTER SET

This test prints the entire 96 character set, down the page and
also across the page. This test is designed to issue the Hex codes (20)
through (7F). After verifying that the proper characters are printed,
carefully check the characters for correctness in shape.

The last Hex Code, (7F), is a delete code and is not printed. A
character appearing in response to this code will indicate a printer
malfunction. See pages 15 and 16.

TEST NO. 8   EXPANDABLE HEX CODE CHARACTER SET

This part of the test program may be used for checking the shape
and consistency of EXPANDED MODE characters. The test prints out 95
characters of the 96 character set in the 12 pitch expanded mode. See
pages 17 and 18 for the sample printout.

TEST NO. 9   SPECIAL PATTERN

This test program randomly selects characters and prints them. See
that the print quality and consistency is maintained throughout. The
test printout should contain 59 lines of data, each containing a total
of 159 characters. See page 19.

TEST NO. 10   END OF DOCUMENT AT 8 LINES PER INCH

This test is similar to the End of Document Test in Test No. 6,
but in this case, the test program contains 80 lines of data. Set the
vertical line spacing switch to 8 LPI and the pitch control switch to
10 pitch before beginning the test. See pages 20 and 21 for the sample
printout.

TEST NO. 11   OPERATOR ACTION

Certain tests require the operator to verify some printer function
or perform some sort of action. The operator must follow the instruc-
tions on the CRT at these times; the test program waits a sufficient
amount of time for these operator actions to be completed before con-
tinuing with the next part of the test.

For the first part of this test, verify that the audio alarm is
functioning correctly. The alarm will sound for about one second.

For the second part of this test, SELECT and DESELECT the printer
while the program is running to verify that there is no loss of data.
The test program will continue printing until the CRT console receives
a Return (EXECUTE) from the operator.

The third section of the program tests the manual CLEAR switch on
the printer main control panel. Refer to pages 22 and 23 for the normal
test printout.

For the fourth section of this test, see that the pitch control
toggle switch is set to 10. This test is similar to Test No. 6; it
prints 196 characters while the printer is selected for 136 characters.
The 6 in 136 at the end of the full line of printed data represents
the 136th character column. The extra characters after column 136 are
printed on the next line. See page 24 for the sample printout.

TEST NO. 12   HEX CODE CHARACTER SET

   This test program exercises the 10 pitch PROMs. The test prints
95 characters of the 96 character set in 10 pitch. See pages 25 and
26 for the sample printout.

TEST NO. 13   EXPANDED HEX CODE CHARACTER SET

   This test also exercises the 10 pitch character generator PROMs.
Examine the characters for good formation and consistency. See pages
27 and 28 for the sample printout.

STAND ALONE PROGRAM ADDITIONS

   In addition to the test programs listed above, the following pro-
grams can be run by pressing the special function keys on the CRT con-
sole. When one of the following tests is selected, it will operate
in a repeat mode until it is halted. The following is a test program
listing of the special function keys.

SPECIAL FUNCTION KEY PROGRAMS

0	1st MENU	
1	TEST NO. 1	DATA BUFFER
2	TEST NO. 2	HEAD -- PIN FIRING
3	TEST NO. 3	HEAD ALIGNMENT AND PRINTABILIT
4	TEST NO. 4	NORMAL SPIRAL
5	TEST NO. 5	EXPANDED SPIRAL
6	TEST NO. 6	SPECIAL PAPER MOTION TESTS
7	TEST NO. 7	NORMAL HEX CODE CHARACTER SET
8	TEST NO. 8	EXPANDABLE HEX CODE CHARACTER SET
9	TEST NO. 9	SPECIAL PATTERN
10	TEST NO. 10	END OF DOCUMENT AT 8 LPI
11	TEST NO. 11	OPERATOR ACTION
12	TEST NO. 12	NORMAL HEX CODE CHARACTER SET AT 10 PITCH
13	TEST NO. 13	EXPANDABLE HEX CODE CHARACTER SET AT 10 PITCH

14	ALL TESTS 1 TO 13 INCLUSIVE
16	2ND MENU
17	HEAD ALIGNMENT
18	OUTPUT ONE INPUT CHARACTER
19	OUTPUT TWO INPUT CHARACTERS
20	ALTERNATING BIT PATTERN
21	OUTPUT ONE HEX CODE FOR TWO CHARACTER INPUT
22	LINE FEED TEST NO. 1
23	LINE FEED TEST NO. 2
24	VERTICAL TAB TEST
25	END OF DOCUMENT AT 6 LPI
26	CARRIAGE RETURN TEST
31	3RD MENU (For tests 22 through 26)

Tests 1 through 13 are described above; tests 16 through 21 are described in the section that follows.

SPECIAL FUNCTION KEY TEST NO. 17   HEAD ALIGNMENT

This test program continuously prints a selected head alignment character, either T or M. Set the printer to 12 pitch (160 characters/line).

The printout consists of 5 lines of the selected character, followed by one line containing arrows to indicate the print head transition points. After one line feed, the pattern is repeated.

In the sample printout on page 29, the character T has been selected.

SPECIAL FUNCTION KEY TEST NO. 18   OUTPUT ONE INPUT CHARACTER

This test program will accept any printable character via the CRT console and print it continuously. In the sample printout on page 30, the character M has been selected.

SPECIAL FUNCTION KEY TEST NO. 19   OUTPUT TWO INPUT CHARACTERS

This test program is similar to Test No. 18. This test, however, will accept two printable characters. In the sample printout on page 31, the characters R and Y have been selected.

SPECIAL FUNCTION KEY TEST NO. 20   ALTERNATING BITS (U*)

This test program continuously prints the characters (U*). This test is useful for troubleshooting hardware bit problems. See page 32 for the sample printout.

SPECIAL FUNCTION KEY TEST NO. 21   OUTPUT ONE HEX CODE

This test program will accept two characters via the CRT console and print them in the HEX code format. For example, an input of the two character Hex code (OC) will result in a printout of its equivalent, the Top of Form command.

For the sample printout on page 33, the CRT input was HEX (41); for the sample on page 34, the input was HEX (42).
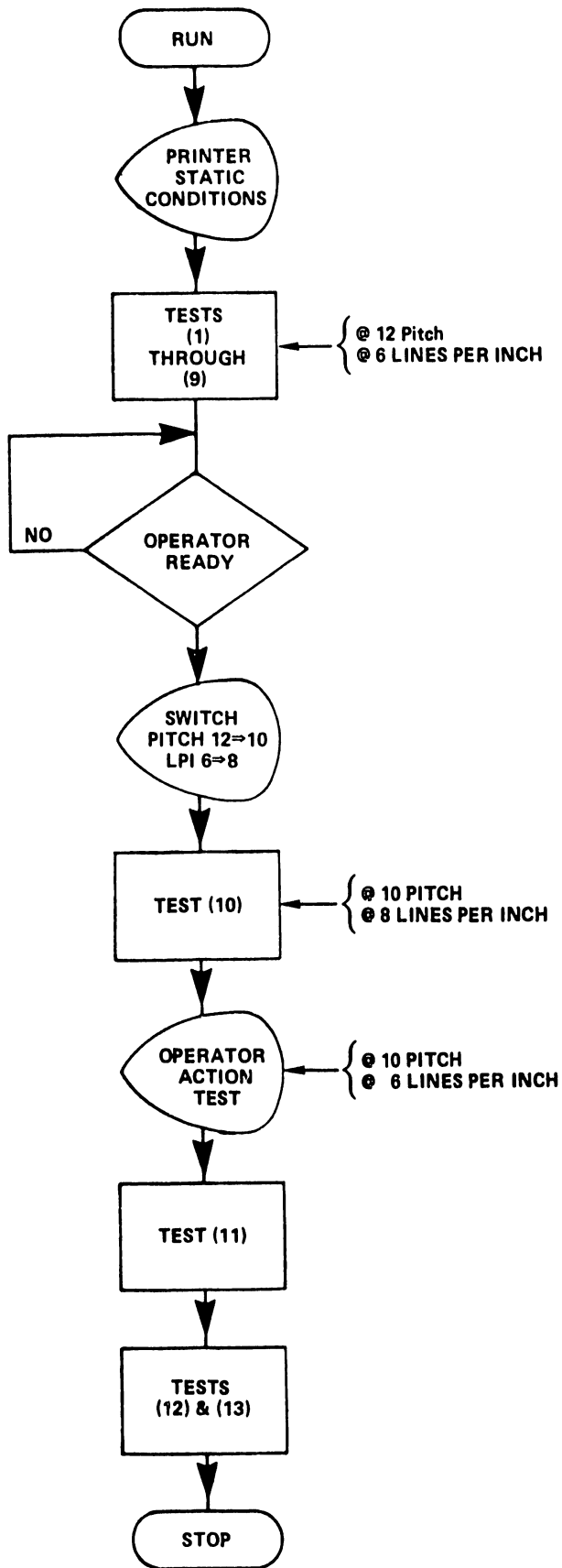
Figure 6-1. Model 77 (2261W) Printer Diagnostic Flow Diagram

APPENDIX
A
DIAG-
NOSTIC
PRINT
SAMPLE

APPENDIX A
MODEL 77 (2261W)
DIAGNOSTIC PRINT SAMPLE

DATA BITS 1 THROUGH 4 HEX(3F=?)

```
?????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
?????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
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?????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
```

DATA BITS 5 & 6 HEX(30=0)

```
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
```

DATA BITS 1,3,5 & 6 HEX(35=5)

```
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
```

DATA BITS 2,4,5 & 6 HEX(3A=:)

```
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
```

DATA BITS 5,6 & 7 HEX(70=p)

```
ppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
ppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
ppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
ppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
ppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
```

DATA BITS 2,4 & 6 HEX(2A=*)

```
*************************************************************************************************************************************************************
*************************************************************************************************************************************************************
*************************************************************************************************************************************************************
*************************************************************************************************************************************************************
*************************************************************************************************************************************************************
```

DATA BITS 1,3,5 & 7 HEX(55=U)

```
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
```

A-1

DATA BITS 1 THROUGH 6 HEX(3F=?)

```
???????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
???????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
???????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
???????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
???????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????????
```

DATA BITS 5 & 6 HEX(30=0)

```
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
```

DATA BITS 1,3,5 & 6 HEX(35=5)

```
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
5555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
```

DATA BITS 2,4,5 & 6 HEX(3A=:)

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
```

DATA BITS 5,6 & 7 HEX(70=p)

```
pppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
pppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
pppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
pppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
pppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
```

DATA BITS 2,4 & 6 HEX(2A=*)

```
****************************************************************************************************************************************************************
****************************************************************************************************************************************************************
****************************************************************************************************************************************************************
****************************************************************************************************************************************************************
****************************************************************************************************************************************************************
```

DATA BITS 1,3,5 & 7 HEX(55=U)

```
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
```

A-2

A
B
C
D
E
F

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5Sww JJMM++;;;;BBBNNN'''VVVXXXWWW
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*(T)-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABA
ABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABA
ABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABA

A
B
C
D
E
F

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑&*()-+';/./:?.abcdefghijklmnopqrstuvwxyz!@#$%↑&*()-+1234567890-=';/.:?.ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890-=!@#$%↑
TTTTT=====55555wwwwwJJJJmmmm;;;;;;;;;JJJJJJJJtt==5SwwJJMM++;;;;BBBNNN'''VVVXXXWWW
ABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABA
ABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABA
ABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABABA

A-3

TEST NO. 3 HEAD ALIGNMENT AND CONSISTENCY TEST   (12 PITCH SELECTED - 160 CHARACTERS PER/LINE)   PROGRAM ID: 2261W.PTR-03 (8/29/77)

```
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
```

```
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3  ·333333333
1111111111   HEAD ZONE 1   111111111                            3333333333   HEAD ZONE 3   333333333
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
                           2222222222   HEAD ZONE 2   222222222                4444444444   HEAD ZONE 4   44444444
```

```
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
1111111111   HEAD ZONE 1   11111111112222222222   HEAD ZONE 2   22222222223333333333   HEAD ZONE 3   33333333334444444444   HEAD ZONE 4   44444444
```

VERIFY HEAD ALIGNMENT AT THE CROSS OVER POINTS AND ACCEPTABLE PRINT CONSISTENCY FOR ALL FOUR HEADS

A-4

A-5

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab!
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab!"
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab!"#
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab!"#$
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab!"#$%
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab!"#$%&
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`abcdefghijklmnopqrstuvwxyz{£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[ß]↑←`ab!"#$%&'
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```

A-6

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ZI(ß]†+*abcdefghijklmnopqrstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
(ß]†+*abcdefghijklmnopqrstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
ß]†+*abcdefghijklmnopqrstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
]†+*abcdefghijklmnopqrstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(
†+*abcdefghijklmnopqrstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß
+*abcdefghijklmnopqrstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]
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qrstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmno
rstuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnop
stuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopq
tuvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqr
uvwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrs
vwxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrst
wxyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrstu
xyz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrstuv
yz$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrstuvw
z$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrstuvwx
$£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrstuvwxy
£ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrstuvwxyz
ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*ab!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ(ß]†+*abcdefghijklmnopqrstuvwxyz$
```

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnop
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnop
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopq
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqr
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrs
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrst
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstu
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuv
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvw
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwx
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxy
,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz
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0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'(
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,
<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,
=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-
>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-.
?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./01
BCDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./012
CDEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123
DEFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./01234
EFGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./012345
FGHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456
GHIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./01234567
HIJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./012345678
IJKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789
JKLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:
KLMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<
LMNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<
MNOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=
NOPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>
OPQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?
PQRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@A
QRSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@AB
RSTUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@AB
STUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@ABC
TUVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCD
UVWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDE
VWXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEF
WXYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGH
XYZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHI
YZ[\]↑←˚abcdefghijklmnopqrstuvwxyz$£¢!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJ
```

```
Z[β]↑←˚abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
[β]↑←˚abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKL
β]↑←˚abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLM
]↑←˚abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
↑←˚abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
←˚abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
˚abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQ
abcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
bcdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
cdefghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
defghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
efghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
fghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
ghijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX
hijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
ijklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
jklmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
klmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β
lmnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]
mnopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑
nopqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←
opqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚
pqrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚a
qrstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab
rstuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!
stuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"
tuvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#
uvwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$
vwxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%
wxyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&
xyz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&'
yz§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&'(
z§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&'()
§£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&'()
£¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&'()
¢ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&'()*
ç!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[β]↑←˚ab!"#$%&'()*+,
```

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LINE FEED TEST #1 - (HEX CODE 0A)

ACCEPTABLE RESULT IS 18 STARS VERTICALLY SPACED DOWN THIS PAGE.

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(TOP OF FORM TEST - HEX CODE 0D) MUST BE THE FIRST LINE OF PRINT AT THE TOP OF A NEW PAGE.

LINE FEED TEST #2 = (HEX CODE 0A)

#1 - REFERENCE LINE

#2 - REFERENCE LINE

#3 - REFERENCE LINE

ACCEPTABLE RESULT IS 3 REFERENCE LINES VERTICALLY SPACED DOWN THIS PAGE.

(TOP OF FORM TEST - HEX CODE 0C) MUST BE THE FIRST LINE OF PRINT AT THE TOP OF A NEW PAGE.

VERTICAL TAB TEST (HEX CODE-0B)

VERTICAL TAB NO. 1

VERTICAL TAB NO. 2

VERTICAL TAB NO. 3

VERTICAL TAB NO. 4

VERTICAL TAB NO. 5

VERTICAL TAB NO. 6

VERTICAL TAB NO. 7

VERTICAL TAB NO. 8

VERTICAL TAB NO. 9

ACCEPTABLE RESULTS ON THIS PAGE IS 9 EVENLY SPACED VERTICAL TABS SIX LINES APART.

MODEL 77 DIAGNOSTIC PRINT SAMPLE PAGE 11 OF 34

(TOP OF FORM TEST - HEX CODE 0C) MUST BE THE FIRST LINE OF PRINT AT THE TOP OF A NEW PAGE.

```
LINE NO. 4   END OF DOCUMENT TEST
LINE NO. 5
LINE NO. 6
LINE NO. 7
LINE NO. 8
LINE NO. 9
LINE NO. 10
LINE NO. 11
LINE NO. 12
LINE NO. 13
LINE NO. 14
LINE NO. 15
LINE NO. 16
LINE NO. 17
LINE NO. 18
LINE NO. 19
LINE NO. 20
LINE NO. 21
LINE NO. 22
LINE NO. 23
LINE NO. 24
LINE NO. 25
LINE NO. 26
LINE NO. 27
LINE NO. 28
LINE NO. 29
LINE NO. 30
LINE NO. 31
LINE NO. 32
LINE NO. 33
LINE NO. 34
LINE NO. 35
LINE NO. 36
LINE NO. 37
LINE NO. 38
LINE NO. 39
LINE NO. 40
LINE NO. 41
LINE NO. 42
LINE NO. 43
LINE NO. 44
LINE NO. 45
LINE NO. 46
LINE NO. 47
LINE NO. 48
LINE NO. 49
LINE NO. 50
LINE NO. 51
LINE NO. 52
LINE NO. 53
LINE NO. 54
LINE NO. 55
LINE NO. 56
LINE NO. 57
LINE NO. 58
LINE NO. 59
LINE NO. 60   LINE 60 MUST BE THE LAST LINE PRINTED ON THIS PAGE - THE NEXT PAGE **( MUST )** BE BLANK.
```

A-12

MODEL 77 DIAGNOSTIC PRINT SAMPLE PAGE 15 OF 24

(TOP OF FORM TEST - HEX CODE OC) MUST BE THE FIRST LINE OF PRINT AT THE TOP C ` A NEW PAGE.

CARRIAGE RETURN TEST - TESTING HEX CODE(OD), HARDWARE C/R AND LINE OVER RUN.

FIVE LINES OF 82 CHARACTERS ENDING THE LINE WITH A CARRIAGE RETURN - HEX CODE (OD).

123456789-123456789-1232456789 PROGRAM SENT HEX CODE(OD) AT THE END OF THIS LINE.
123456789-123456789-1232456789 PROGRAM SENT HEX CODE(OD) AT THE END OF THIS LINE.
123456789-123456789-1232456789 PROGRAM SENT HEX CODE(OD) AT THE END OF THIS LINE.
123456789-123456789-1232456789 PROGRAM SENT HEX CODE(OD) AT THE END OF THIS LINE.
123456789-123456789-1232456789 PROGRAM SENT HEX CODE(OD) AT THE END OF THIS LINE.

PRINT 5 LINES OF 160 CHARACTERS PER LINE, UTILIZING THE HARDWARE C/R.

123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-

123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-

123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-

123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-

123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456 1)-123456789-123456789-123456789-123456789-123456789-

PRINT 5 LINES TO DEMONSTRAT HARDWARE C/R (LINE OVER RUN), WITH 12 PITCH SELECTED (160 CHARACTERS PER/LINE.

123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136@12 PITCH CHARACTER 160
OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136@12 PITCH CHARACTER 160
OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136@12 PITCH CHARACTER 160
OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136@12 PITCH CHARACTER 160
OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136@12 PITCH CHARACTER 160
OVER 160 CHARACTERS FROM LINE ABOVE.

A-14

A-15

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!    HEX CODE 20    !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
.........................................................................    HEX CODE 21    ........................................................................
*************************************************************************    HEX CODE 22    *************************************************************************
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$    HEX CODE 23    *************************************************************************
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX    HEX CODE 24    $$$$$$$$$$$$$$$$.$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&    HEX CODE 25    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''    HEX CODE 26    &&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((    HEX CODE 27    '''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))    HEX CODE 28    ((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((
*************************************************************************    HEX CODE 29    ))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++    HEX CODE 2A    *************************************************************************
.........................................................................    HEX CODE 2B    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
-------------------------------------------------------------------------    HEX CODE 2C    .........................................................................
.........................................................................    HEX CODE 2D    -------------------------------------------------------------------------
/////////////////////////////////////////////////////////////////////////    HEX CODE 2E    .........................................................................
0000000000000000000000000000000000000000000000000000000000000000000000000    HEX CODE 2F    /////////////////////////////////////////////////////////////////////////
1111111111111111111111111111111111111111111111111111111111111111111111111    HEX CODE 30    0000000000000000000000000000000000000000000000000000000000000000000000000
2222222222222222222222222222222222222222222222222222222222222222222222222    HEX CODE 31    1111111111111111111111111111111111111111111111111111111111111111111111111
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5555555555555555555555555555555555555555555555555555555555555555555555555    HEX CODE 34    4444444444444444444444444444444444444444444444444444444444444444444444444
6666666666666666666666666666666666666666666666666666666666666666666666666    HEX CODE 35    5555555555555555555555555555555555555555555555555555555555555555555555555
7777777777777777777777777777777777777777777777777777777777777777777777777    HEX CODE 36    6666666666666666666666666666666666666666666666666666666666666666666666666
8888888888888888888888888888888888888888888888888888888888888888888888888    HEX CODE 37    7777777777777777777777777777777777777777777777777777777777777777777777777
9999999999999999999999999999999999999999999999999999999999999999999999999    HEX CODE 38    8888888888888888888888888888888888888888888888888888888888888888888888888
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::    HEX CODE 39    9999999999999999999999999999999999999999999999999999999999999999999999999
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;    HEX CODE 3A    :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<    HEX CODE 3B    ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
=========================================================================    HEX CODE 3C    <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>    HEX CODE 3D    =========================================================================
?????????????????????????????????????????????????????????????????????????    HEX CODE 3E    >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@    HEX CODE 3F    ?????????????????????????????????????????????????????????????????????????
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA    HEX CODE 40    @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB    HEX CODE 41    AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC    HEX CODE 42    BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD    HEX CODE 43    CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE    HEX CODE 44    DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF    HEX CODE 45    EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG    HEX CODE 46    FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH    HEX CODE 47    GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII    HEX CODE 48    HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ    HEX CODE 49    IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK    HFX CODE 4A    JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ
LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL    HEX CODE 4B    KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM    HEX CODE 4C    LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN    HEX CODE 4D    MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO    HEX CODE 4E    NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP    HEX CODE 4F    OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ    HEX CODE 50    PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR    HEX CODE 51    QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS    HEX CODE 52    RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT    HEX CODE 53    SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU    HEX CODE 54    TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV    HEX CODE 55    UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW    HEX CODE 56    VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX    HEX CODE 57    WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
                                                                             HEX CODE 58    XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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EOD TEST - END OF DOCUMENT TEST, THIS MUST BE THE FIRST LINE OF PRINT ON A NEW PAGE

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YYYYYY·YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY'·YYYYY    HEX CODE 59    YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ:ZZZZZZZZZZZZZZZZZZZZZZZZZZ    HEX CODE 5A    ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[: [[[[[[[[[[[[[[[[[[[[[[[T4[[[[[[[[[[[[[    HEX CODE 5B    [[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[
ßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßß    HEX CODE 5C    ßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßß
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↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑    HEX CODE 5E    ↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑
←←←←←←←←←←←←←←←←←←←←←←←←←←←←·←←←←←←←←←←←←←←←·←←←←←←←←←←←←←←←←←←←←←←←←←←←    HEX CODE 5F    ←←←←←←←←←←←←←·←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←
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aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa    HEX CODE 61    aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbubbbbbbbbbbbbbbbbbbbbbb    HEX CODE 62    bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb
cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc    HEX CODE 63    cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
dddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddd    HEX CODE 64    dddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee    HEX CODE 65    eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
fffffffffffffffffffffffffffffffffffffffff·fffffffffffffffffffffffff    HEX CODE 66    ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
99999999999999999999999999999999· 499999·99999999999999999999999999    HEX CODE 67    9999999999999999·99999999·9999999·9999999999999999999999999999999999
hhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhh    HEX CODE 68    hhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhh
iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii    HEX CODE 69    iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii
jjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj·jjjjjjjjjjjjjjjjjjjjjj    HEX CODE 6A    jjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
kkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkk· ·kkkk· ·kkkkkkkkkkk··kkkkkkkkkkkkkk    HEX CODE 6B    kkkkkkkkkkkkkkkkk··kkkkkkkkk··kkkkk·kkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkk
lllllllllllllllll ·lllllllllllll·!lllllllllllllllllllllllllllllllll    HEX CODE 6C    llllllllllll·l·llllllllllllllllllllllllllllllllllllllllllllllllllllll
∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎    HEX CODE 6D    ∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎∎
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn·nnnnnnnnnnnnnnnnnnnnnnn    HEX CODE 6E    nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
ooooooooooooooooooooooooooooooooooc·ooooooooooooooooooooooooooooooooo    HEX CODE 6F    oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP    HEX CODE 70    PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
qqqqq· 3qqqqqqq··· ·7qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq    HEX CODE 71    ·3qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq··3qqqqqqq··3qqq
rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrl· rrrrrrrrrrl··    HEX CODE 72    rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr
ssssssssssssssssssssssssssssssss· ssss· ·sssssss·ss·ssssssssssssss    HEX CODE 73    sssssssssssssss·sssssss··sssss··ssssssssssssssssssssssssssssssss
tttttttttttttttttt·tttttttttttt·ttltttttttttttttttttttttttttttttttt    HEX CODE 74    tttttttttttt·ttt·ttttttttttttttttttttttttttttttttttttttttttttttttttt
uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu    HEX CODE 75    ·uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu·uuuuuuuuuuuuuu
vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv·vvvvvvvvvvvvvvvv    HEX CODE 76    vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv·vvvvvvvvvv·vv·vvvvvvvvvvvvvvvvvvv
wwwwwwwwwwwwwwwwwwwwwwwwwwwwwww ·wwww· ·wwwwwwww·wwwwwwwwwwwww    HEX CODE 77    wwwwwwwwwwwwwww·wwwwwwww·www·w·wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww
xxxxxxxxxxxxxxxxxx· ·xxxxxxx· ·x·x· ·xxxxxxxxxxxxxxxxxxxxxxxxxx    HEX CODE 78    ·  xxxxxxxxx·  ·xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
yyyyyyyyyyyyyyyyyyyyyyyyyyy· yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy    HEX CODE 79    yyyyyyy· yyyyyyyyyyy· · yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZ· ZZZZZZZZZZZZ· ZZZZZZZZZZZZZZZZ    HEX CODE 7A    ZZZZZZZZZZZZZ·ZZZZZZZZZ·Z·ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§· §§§§§§§§§§§§§§§§§§    HEX CODE 7B    §§§§§§§§§§§§§§§§§§§·§§§§§§§§§§·§§§§§§§§·§§§§§§§§§§§§§§§§§§§§§§
££££££££££££££££££££££££££££££££££££££££££· ££££££££££·££££    HEX CODE 7C    ££££££££££££££££££££££££££££££·££££££££·££££££££££££££££££££££
¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢· ·¢¢¢¢¢    HEX CODE 7D    ¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢¢· ·¢¢¢¢¢¢¢¢¢· ·¢¢¢¢¢¢¢¢¢
§§§§§§§§· ·§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§ ·    HEX CODE 7E    §§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§·§§§§§§§§§§§§§§§§§§
```

96 CHARACTER SET-CODES 20 TO 7E (LAST CHARACTER IS HEX(E0), REPLACES HEX(7F)

```
*:*************************************************************· ·*********· ·**·**********************
*  !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQPQRSTUVWXYZ[ß]↑←°abcdefghijklmnopqrstuvwxyz§£¢§ *
*  !"#$%&'()*+, ./0123456789:;<=>?@ABCDEFGHIJKLMNOPQPQRSTUVWXYZ[ß]↑←°abcdefghijklmnopqrstuvwxyz§£¢§ *
*  !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQPQRSTUVWXYZ[ß]↑←°abcdefghijklmnopqrstuvwxyz§£¢§ *
*  !"#$%&'()*+,-./0123456789::  ·?@ABCDEFGH·JKLMNOPQPQRSTUVWXYZ[ß]↑←°abcdefghijklmnopqrstuvwxyz§£¢§ *
*  !"#$%&'()*+,-./0123456789:;<=>?@ABCDE· -·JKLMNOPQ··QRSTUVWXYZ[ß]↑←°abcdefghijklmnopqrstuvwxyz§£¢§ *
*****************************************·°·. ·*********·**********************************************
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MODEL 77 DIAGNOSTIC PRINT SAMPLE PAGE 16 OF 34

A-17

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HEX  CODE  20
HEX  CODE  21  !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
HEX  CODE  22  """"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
HEX  CODE  23  ################################################################################
HEX  CODE  24  $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
HEX  CODE  25  %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
HEX  CODE  26  &&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
HEX  CODE  27  ''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
HEX  CODE  28  ((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((
HEX  CODE  29  ))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))
HEX  CODE  2A  ********************************************************************************
HEX  CODE  2B  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
HEX  CODE  2C  ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
HEX  CODE  2D  --------------------------------------------------------------------------------
HEX  CODE  2E  ................................................................................
HEX  CODE  2F  ////////////////////////////////////////////////////////////////////////////////
HEX  CODE  30  00000000000000000000000000000000000000000000000000000000000000000000000000000000
HEX  CODE  31  11111111111111111111111111111111111111111111111111111111111111111111111111111111
HEX  CODE  32  22222222222222222222222222222222222222222222222222222222222222222222222222222222
HEX  CODE  33  33333333333333333333333333333333333333333333333333333333333333333333333333333333
HEX  CODE  34  44444444444444444444444444444444444444444444444444444444444444444444444444444444
HEX  CODE  35  55555555555555555555555555555555555555555555555555555555555555555555555555555555
HEX  CODE  36  66666666666666666666666666666666666666666666666666666666666666666666666666666666
HEX  CODE  37  77777777777777777777777777777777777777777777777777777777777777777777777777777777
HEX  CODE  38  88888888888888888888888888888888888888888888888888888888888888888888888888888888
HEX  CODE  39  99999999999999999999999999999999999999999999999999999999999999999999999999999999
HEX  CODE  3A  ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
HEX  CODE  3B  ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
HEX  CODE  3C  <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
HEX  CODE  3D  ================================================================================
HEX  CODE  3E  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
HEX  CODE  3F  ????????????????????????????????????????????????????????????????????????????????
HEX  CODE  40  @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
HEX  CODE  41  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
HEX  CODE  42  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
HEX  CODE  43  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
HEX  CODE  44  DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
HEX  CODE  45  EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
HEX  CODE  46  FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
HEX  CODE  47  GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
HEX  CODE  48  HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HEX  CODE  49  IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
HEX  CODE  4A  JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ
HEX  CODE  4B  KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK
HEX  CODE  4C  LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
HEX  CODE  4D  MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
HEX  CODE  4E  NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
HEX  CODE  4F  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
HEX  CODE  50  PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
HEX  CODE  51  QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
HEX  CODE  52  RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
HEX  CODE  53  SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
HEX  CODE  54  TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
HEX  CODE  55  UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
HEX  CODE  56  VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
HEX  CODE  57  WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
HEX  CODE  58  XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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EOD TEST - END OF DOCUMENT TEST, THIS MUST BE THE FIRST LINE OF PRINT ON A NEW PAGE

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HEX  CODE  59   YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
HEX  CODE  5A   ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
HEX  CODE  5B   [[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[[
HEX  CODE  5C   ßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßßß
HEX  CODE  5D   ]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]
HEX  CODE  5E   ↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑↑
HEX  CODE  5F   ←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←←↑↑↑↑↑
HEX  CODE  60   ooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo
HEX  CODE  61   aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
HEX  CODE  62   bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb
HEX  CODE  63   cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
HEX  CODE  64   dddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
HEX  CODE  65   eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
HEX  CODE  66   ffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffffff
HEX  CODE  67   gggggggggggggggggggggggggggggggggggggggggggggggggggggggggggggggggggggggggg
HEX  CODE  68   hhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhh
HEX  CODE  69   iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii
HEX  CODE  6A   jjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
HEX  CODE  6B   kkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkk
HEX  CODE  6C   llllllllllllllllllllllllllllllllllllllllllllllllllllllllllllllllllllllllll
HEX  CODE  6D   mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm
HEX  CODE  6E   nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
HEX  CODE  6F   oooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo
HEX  CODE  70   pppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppppp
HEX  CODE  71   qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq
HEX  CODE  72   rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr
HEX  CODE  73   ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
HEX  CODE  74   tttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttt
HEX  CODE  75   uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu
HEX  CODE  76   vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv
HEX  CODE  77   wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww
HEX  CODE  78   xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
HEX  CODE  79   yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy
HEX  CODE  7A   zzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzz
HEX  CODE  7B   §§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§§
HEX  CODE  7C   ££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££££
HEX  CODE  7D   èèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèè
HEX  CODE  7E   ςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςς
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TEST NO. 9 SPECIAL PATTERN TEST   (12 PITCH SELECTED - 160 CHARACTERS PER/LINE)   PROGRAM ID: 2261W.PTR-03 (8/29/77)

```
6   F  'E   h   f   I  b   t   ·  :   Y  W  I   C   $  U  D   ·  )   t  N  L  i   q   k   c  £  X  +  A  W  v  &   I
66666FFFFFEEEEEhhhhh[[[[[IIIIIbbbbbttttt;;;;;YYYYY#####[[[[[CCCCC$$$$$UUUUUDDDDD>>>>>tttttNNNNNLLLLL11111qqqqqkkkkkccccc£££££XXXXX+++++AAAAAWWWWWvvvvv&&&&&IIIII
66666FFFFFEEEEEhhhhh[[[[[IIIIIbbbbbttttt;;;;;YYYYY#####[[[[[CCCCC$$$$$UUUUUDDDDD>>>>>tttttNNNNNLLLLL11111qqqqqkkkkkccccc£££££XXXXX+++++AAAAAWWWWWvvvvv&&&&&IIIII
66666FFFFFEEEEEhhhhh[[[[[IIIIIbbbbbttttt;;;;;YYYYY#####[[[[[CCCCC$$$$$UUUUUDDDDD>>>>>tttttNNNNNLLLLL11111qqqqqkkkkkccccc£££££XXXXX+++++AAAAAWWWWWvvvvv&&&&&IIIII
66666FFFFFEEEEEhhhhh[[[[[IIIIIbbbbbttttt;;;;;YYYYY#####[[[[[CCCCC$$$$$UUUUUDDDDD>>>>>tttttNNNNNLLLLL11111qqqqqkkkkkccccc£££££XXXXX+++++AAAAAWWWWWvvvvv&&&&&IIIII
W   <   Q  W  v  &  Y   9  g   3   >   S   <   j  j'o   =   >   t  N  J  D  W  g  S  B  B  1  :  G  ·  +
wwwww<<<<<QQQQQWWWWWvvvvv&&&&&YYYYY99999ggggg33333>>>>>SSSSS<<<<<JJJJJJJJJJooooo=====&&&&&JJJJJ11111DDDDDDDDDDWWWWWggggg55555BBBBBßßßßß11111:::::GGGGG""""·+++
wwwww<<<<<QQQQQWWWWWvvvvv&&&&&YYYYY99999ggggg33333>>>>>SSSSS<<<<<JJJJJJJJJJooooo=====&&&&&JJJJJ11111DDDDDDDDDDWWWWWggggg55555BBBBBßßßßß11111:::::GGGGG""""·+++
wwwww<<<<<QQQQQWWWWWvvvvv&&&&&YYYYY99999ggggg33333>>>>>SSSSS<<<<<JJJJJJJJJJooooo=====&&&&&JJJJJ11111DDDDDDDDDDWWWWWggggg55555BBBBBßßßßß11111:::::GGGGG""""·+++
wwwww<<<<<QQQQQWWWWWvvvvv&&&&&YYYYY99999ggggg33333>>>>>SSSSS<<<<<JJJJJJJJJJooooo=====&&&&&JJJJJ11111DDDDDDDDDDWWWWWggggg55555BBBBBßßßßß11111:::::GGGGG""""·+++
4   3  'F   9   x   M  g   =   2  I  'N   =   C   *   y  s  +  Z   1  d  0  (   $   [  E  n  B  4   :  K  #
4444433333FFFFF99999xxxxxMMMMMggggg=====22222XXXXXNNNNN=====CCCCC*****yyyyysssss+++++ZZZZZ11111ddddd00000(((((($$$$$[[[[[EEEEEnnnnn8888844444;;;;;[[[[[KKKKK####
4444433333FFFFF99999xxxxxMMMMMggggg=====22222XXXXXNNNNN=====CCCCC*****yyyyysssss+++++ZZZZZ11111ddddd00000(((((($$$$$[[[[[EEEEEnnnnn8888844444;;;;;[[[[[KKKKK####
4444433333FFFFF99999xxxxxMMMMMggggg=====22222XXXXXNNNNN=====CCCCC*****yyyyysssss+++++ZZZZZ11111ddddd00000(((((($$$$$[[[[[EEEEEnnnnn8888844444;;;;;[[[[[KKKKK####
4444433333FFFFF99999xxxxxMMMMMggggg=====22222XXXXXNNNNN=====CCCCC*****yyyyysssss+++++ZZZZZ11111ddddd00000(((((($$$$$[[[[[EEEEEnnnnn8888844444;;;;;[[[[[KKKKK####
F   I   F   Y  8   8   l  P   H   f   Q   =   $  I  X  J  S   :  7  E   ·   +   W  G  2  +  P  I  Y  ·
FFFFF11111+++++FFFFFYYYYY88888#####11111PPPPPHHHHH+++++QQQQQ=====$$$$$[[[[[XXXXXJJJJJSSSSS:::::77777EEEEE¢¢¢¢¢"""""+++++wwwwwGGGGG22222+++++PPPPPIIIIIYYYYY"""·
FFFFF11111+++++FFFFFYYYYY88888#####11111PPPPPHHHHH+++++QQQQQ=====$$$$$[[[[[XXXXXJJJJJSSSSS:::::77777EEEEE¢¢¢¢¢"""""+++++wwwwwGGGGG22222+++++PPPPPIIIIIYYYYY"""·
FFFFF11111+++++FFFFFYYYYY88888#####11111PPPPPHHHHH+++++QQQQQ=====$$$$$[[[[[XXXXXJJJJJSSSSS:::::77777EEEEE¢¢¢¢¢"""""+++++wwwwwGGGGG22222+++++PPPPPIIIIIYYYYY"""·
FFFFF11111+++++FFFFFYYYYY88888#####11111PPPPPHHHHH+++++QQQQQ=====$$$$$[[[[[XXXXXJJJJJSSSSS:::::77777EEEEE¢¢¢¢¢"""""+++++wwwwwGGGGG22222+++++PPPPPIIIIIYYYYY"""·
K   @  '<   u   $   S  T   *   k  W  y   g   ;   O  N  U  H  q  p  +  5   :  X  H  p  ·  #  ·  0  4  H
KKKKK@@@@@<<<<<uuuuu$$$$$55555TTTTT*****kkkkkWWWWWyyyyyggggg;;;;;oooooNNNNNUUUUUHHHHHqqqqqJJJJJPPPPP+++++55555;;;;;XXXXXHHHHHppppp"""""#####.....0000044444HHHH
KKKKK@@@@@<<<<<uuuuu$$$$$55555TTTTT*****kkkkkWWWWWyyyyyggggg;;;;;oooooNNNNNUUUUUHHHHHqqqqqJJJJJPPPPP+++++55555;;;;;XXXXXHHHHHppppp"""""#####.....0000044444HHHH
KKKKK@@@@@<<<<<uuuuu$$$$$55555TTTTT*****kkkkkWWWWWyyyyyggggg;;;;;oooooNNNNNUUUUUHHHHHqqqqqJJJJJPPPPP+++++55555;;;;;XXXXXHHHHHppppp"""""#####.....0000044444HHHH
d   ß   r   s   a  @   /   G   +   S  M   9  6  6  d  0  ,  e  5  ß  1  E  d  7  9  7  M  X  N  D
dddddßßßßßrrrrrsssssaaaaa@@@@@/////GGGGG+++++SSSSSMMMMMggggg66666&&&&&ddddd00000,,,,,eeeee55555ßßßßß11111EEEEEdddddZZZZZXXXXXggggg77777MMMMMxxxxxXXXXXNNNNNDDDD
dddddßßßßßrrrrrsssssaaaaa@@@@@/////GGGGG+++++SSSSSMMMMMggggg66666&&&&&ddddd00000,,,,,eeeee55555ßßßßß11111EEEEEdddddZZZZZXXXXXggggg77777MMMMMxxxxxXXXXXNNNNNDDDD
dddddßßßßßrrrrrsssssaaaaa@@@@@/////GGGGG+++++SSSSSMMMMMggggg66666&&&&&ddddd00000,,,,,eeeee55555ßßßßß11111EEEEEdddddZZZZZXXXXXggggg77777MMMMMxxxxxXXXXXNNNNNDDDD
dddddßßßßßrrrrrsssssaaaaa@@@@@/////GGGGG+++++SSSSSMMMMMggggg66666&&&&&ddddd00000,,,,,eeeee55555ßßßßß11111EEEEEdddddZZZZZXXXXXggggg77777MMMMMxxxxxXXXXXNNNNNDDDD
E   k   a   E   *   Z   )   h   L  P  8  M  p  W  i  h  +  R  i  d  d  W  ·  8  f
EEEEEkkkkkaaaaaEEEEEoooooKKKKK*****ZZZZZvvvvv)))))hhhhhLLLLLPPPPP88888MMMMMpppppWWWWWyyyyy11111hhhhh+++++RRRRR11111dddddddddddddddddWWWWW=====""""99999ßßßßßffff
EEEEEkkkkkaaaaaEEEEEoooooKKKKK*****ZZZZZvvvvv)))))hhhhhLLLLLPPPPP88888MMMMMpppppWWWWWyyyyy11111hhhhh+++++RRRRR11111dddddddddddddddddWWWWW=====""""99999ßßßßßffff
EEEEEkkkkkaaaaaEEEEEoooooKKKKK*****ZZZZZvvvvv)))))hhhhhLLLLLPPPPP88888MMMMMpppppWWWWWyyyyy11111hhhhh+++++RRRRR11111dddddddddddddddddWWWWW=====""""99999ßßßßßffff
EEEEEkkkkkaaaaaEEEEEoooooKKKKK*****ZZZZZvvvvv)))))hhhhhLLLLLPPPPP88888MMMMMpppppWWWWWyyyyy11111hhhhh+++++RRRRR11111dddddddddddddddddWWWWW=====""""99999ßßßßßffff
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?????fffff"""""33333=====BBBBB+++++QQQQQhhhhhSSSSS@@@@@"""""hhhhhßßßßß11111>>>>>vvvvv-----'''''WWWWW11111EEEEEvvvvv0000022222TTTTT-----MMMMMiiiiiccccc$$$$$nnnn
?????fffff"""""33333=====BBBBB+++++QQQQQhhhhhSSSSS@@@@@"""""hhhhhßßßßß11111>>>>>vvvvv-----'''''WWWWW11111EEEEEvvvvv0000022222TTTTT-----MMMMMiiiiiccccc$$$$$nnnn
?????fffff"""""33333=====BBBBB+++++QQQQQhhhhhSSSSS@@@@@"""""hhhhhßßßßß11111>>>>>vvvvv-----'''''WWWWW11111EEEEEvvvvv0000022222TTTTT-----MMMMMiiiiiccccc$$$$$nnnn
)   2   W  A  q  l  <  B  D  9  C  X  k  b  p  9  q  &  F  J  >  Y  8  )  M  x  U  9  ■
)))))22222wwwwwAAAAAqqqqq11111<<<<<BBBBBDDDDD99999[[[[CCCCCXXXXXkkkkkbbbbbpppppeeeee99999qqqqq&&&&&@@@@@FFFFFJJJJJ>>>>>YYYYY88888)))))MMMMMxxxxxUUUUU99999■■■■
)))))22222wwwwwAAAAAqqqqq11111<<<<<BBBBBDDDDD99999[[[[CCCCCXXXXXkkkkkbbbbbpppppeeeee99999qqqqq&&&&&@@@@@FFFFFJJJJJ>>>>>YYYYY88888)))))MMMMMxxxxxUUUUU99999■■■■
)))))22222wwwwwAAAAAqqqqq11111<<<<<BBBBBDDDDD99999[[[[CCCCCXXXXXkkkkkbbbbbpppppeeeee99999qqqqq&&&&&@@@@@FFFFFJJJJJ>>>>>YYYYY88888)))))MMMMMxxxxxUUUUU99999■■■■
/   E  !s   d   b   g  B  B  n  f  X  U  ;  r  z  s  a  N  l  j  q  n  ·  s  V  q
/////EEEEE$$$$$dddddbbbbbgggggBBBBBBBBBBnnnnn"""""fffffXXXXXUUUUU;;;;;rrrrrzzzzzsssssaaaaaNNNNNAAAAA]]]]]■■■■■-----zzzzz$$$$$qqqqqnnnnn*****.....sssssVVVVVqqqq
/////EEEEE$$$$$dddddbbbbbgggggBBBBBBBBBBnnnnn"""""fffffXXXXXUUUUU;;;;;rrrrrzzzzzsssssaaaaaNNNNNAAAAA]]]]]■■■■■-----zzzzz$$$$$qqqqqnnnnn*****.....sssssVVVVVqqqq
/////EEEEE$$$$$dddddbbbbbgggggBBBBBBBBBBnnnnn"""""fffffXXXXXUUUUU;;;;;rrrrrzzzzzsssssaaaaaNNNNNAAAAA]]]]]■■■■■-----zzzzz$$$$$qqqqqnnnnn*****.....sssssVVVVVqqqq
/////EEEEE$$$$$dddddbbbbbgggggBBBBBBBBBBnnnnn"""""fffffXXXXXUUUUU;;;;;rrrrrzzzzzsssssaaaaaNNNNNAAAAA]]]]]■■■■■-----zzzzz$$$$$qqqqqnnnnn*****.....sssssVVVVVqqqq
```

LINE NO. 4 END OF DOCUMENT TEST
LINE NO. 5
LINE NO. 6
LINE NO. 7
LINE NO. 8
LINE NO. 9
LINE NO. 10
LINE NO. 11
LINE NO. 12
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LINE NO. 14
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LINE NO. 69
LINE NO. 70
LINE NO. 71
LINE NO. 72
LINE NO. 73
LINE NO. 74
LINE NO. 75
LINE NO. 76
LINE NO. 77
LINE NO. 78
LINE NO. 79
LINE NO. 80   LINE 80 MUST BE THE LAST LINE PRINTED ON THIS PAGE - THE NEXT PAGE **(MUST)** BE BLANK.

A-21

VERIFY THAT THE AUDIO ALARM IS SOUNDING

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 1

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 2

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 3

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 4

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 5

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 6

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 7

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 8

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 9

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 10

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 11

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 12

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 13

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 14

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 15

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 16

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 17

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 18

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 19

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 20

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 21

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 22

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 23

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 24

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 25

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 26

A-22

THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 27
THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 28
THE OPERATOR MUST DESELECT AND RESELECT THIS PRINTER AT LEAST ONCE PER LINE FOR ABOUT 5 LINES OF PRINT AT THIS TIME - LINE NO. 29

OPERATOR SELECT CLEAR TEST

PRINT 5 LINES TO DEMONSTRAT HARDWARE C/R (LINE OVER RUN), WITH 10 PITCH SELECTED (136 CHARACTERS PER/LINE.

123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136◄

@12 PITCH   CHARACTER 160OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136◄

@12 PITCH   CHARACTER 160OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136◄

@12 PITCH   CHARACTER 160OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136◄

@12 PITCH   CHARACTER 160OVER 160 CHARACTERS FROM LINE ABOVE.
123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-123456789-   CHARACTER 136◄

@12 PITCH   CHARACTER 160OVER 160 CHARACTERS FROM LINE ABOVE.

A-24

A-25

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.. .. ---  ---                                                        HEX CODE 20      .. .. ---  ---
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!   HEX CODE 21      !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""   HEX CODE 22      """"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
###########################################################        HEX CODE 23      ##############################################################
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$       HEX CODE 24      $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX       HEX CODE 25      XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&       HEX CODE 26      &&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
'''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''       HEX CODE 27      ''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''''
((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((       HEX CODE 28      ((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((((
))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))       HEX CODE 29      ))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))))
**************************************************************      HEX CODE 2A      ****************************************************************
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++      HEX CODE 2B      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,      HEX CODE 2C      ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
------------------------------------------------------------       HEX CODE 2D      ----------------------------------------------------------------
............................................................       HEX CODE 2E      ................................................................
////////////////////////////////////////////////////////////      HEX CODE 2F      ////////////////////////////////////////////////////////////////
0000000000000000000000000000000000000000000000000000000000000      HEX CODE 30      0000000000000000000000000000000000000000000000000000000000000000
1111111111111111111111111111111111111111111111111111111111111      HEX CODE 31      1111111111111111111111111111111111111111111111111111111111111111
2222222222222222222222222222222222222222222222222222222222222      HEX CODE 32      2222222222222222222222222222222222222222222222222222222222222222
33333333333333333333333333333333333333333333333333333333333333     HEX CODE 33      3333333333333333333333333333333333333333333333333333333333333333
44444444444444444444444444444444444444444444444444444444444444     HEX CODE 34      4444444444444444444444444444444444444444444444444444444444444444
55555555555555555555555555555555555555555555555555555555555555     HEX CODE 35      5555555555555555555555555555555555555555555555555555555555555555
66666666666666666666666666666666666666666666666666666666666666     HEX CODE 36      6666666666666666666666666666666666666666666666666666666666666666
77777777777777777777777777777777777777777777777777777777777777     HEX CODE 37      7777777777777777777777777777777777777777777777777777777777777777
88888888888888888888888888888888888888888888888888888888888888     HEX CODE 38      8888888888888888888888888888888888888888888888888888888888888888
99999999999999999999999999999999999999999999999999999999999999     HEX CODE 39      9999999999999999999999999999999999999999999999999999999999999999
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::    HEX CODE 3A      ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;    HEX CODE 3B      ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     HEX CODE 3C      <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
===========================================================        HEX CODE 3D      ================================================================
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>       HEX CODE 3E      >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
????????????????????????????????????????????????????????????      HEX CODE 3F      ????????????????????????????????????????????????????????????????
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@      HEX CODE 40      @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA      HEX CODE 41      AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB      HEX CODE 42      BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC      HEX CODE 43      CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD      HEX CODE 44      DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE      HEX CODE 45      EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF      HEX CODE 46      FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG      HEX CODE 47      GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH      HEX CODE 48      HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII      HEX CODE 49      IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ      HEX CODE 4A      JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ
KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK      HEX CODE 4B      KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK
LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL      HEX CODE 4C      LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM      HEX CODE 4D      MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN      HEX CODE 4E      NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO      HEX CODE 4F      OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP      HEX CODE 50      PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ      HEX CODE 51      QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR      HEX CODE 52      RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS      HEX CODE 53      SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT      HEX CODE 54      TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU      HEX CODE 55      UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV      HEX CODE 56      VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW      HEX CODE 57      WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX      HEX CODE 58      XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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EOD TEST - END OF DOCUMENT TEST, THIS MUST BE THE FIRST LINE OF PRINT ON A NEW PAGE

Column 1	HEX CODE	Column 3
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY	HEX CODE 59	YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	HEX CODE 5A	ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
[[	HEX CODE 5B	[[
ßß	HEX CODE 5C	ßß
))	HEX CODE 5D	))
↑↑	HEX CODE 5E	↑↑
←←	HEX CODE 5F	←←
oooooooooooooooooooooooooooooooooooooooooooooooooooooooo	HEX CODE 60	oooooooooooooooooooooooooooooooooooooooooooooooooooooooo
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	HEX CODE 61	aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb	HEX CODE 62	bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb
cccccccccccccccccccccccccccccccccccccccccccccccccccccccc	HEX CODE 63	ccccccccccccccccc cccccccccccccccccccccccccccccccccccc
dddddddddddddddddddddddddddddddddddddddddddddddddddddddd	HEX CODE 64	ddddddddddddddddd dddddddddddddddddddddddddddddddddddd
eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee	HEX CODE 65	eeeeeeeeeeeeeeeeeee_eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee
ffffffffffffffffffffffffffffffffffffffffffffffffffffffff	HEX CODE 66	ffffffffffffffffffffffffffffffffffffffffffffffffffffffff
gggggggggggggggggggggggggggggggggggggggggggggggggggggggg	HEX CODE 67	gggggggggggggggggggggggggggggggggggggggggggggggggggggggg
hhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhh	HEX CODE 68	hhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhhh
iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	HEX CODE 69	iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii
jjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj	HEX CODE 6A	jjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
kkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkk	HEX CODE 6B	kkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkkk
llllllllllllllllllllllllllllllllllllllllllllllllllllllll	HEX CODE 6C	llllllllllllllllllllllllllllllllllllllllllllllllllllllll
mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	HEX CODE 6D	mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn	HEX CODE 6E	nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
oooooooooooooooooooooooooooooooooooooooooooooooooooooooo	HEX CODE 6F	oooooooooooooooooooooooooooooooooooooooooooooooooooooooo
pppppppppppppppppppppppppppppppppppppppppppppppppppppppp	HEX CODE 70	pppppppppppppppppppppppppppppppppppppppppppppppppppppppp
qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq	HEX CODE 71	qqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqq
rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr	HEX CODE 72	rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr
ssssssssssssssssssssssssssssssssssssssssssssssssssssssss	HEX CODE 73	ssssssssssssssssssssssssssssssssssssssssssssssssssssssss
tttttttttttttttttttttttttttttttttttttttttttttttttttttttt	HEX CODE 74	tttttttttttttttttttttttttttttttttttttttttttttttttttttttt
uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu	HEX CODE 75	uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu
vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv	HEX CODE 76	vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv
wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww	HEX CODE 77	wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	HEX CODE 78	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy	HEX CODE 79	yyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyyy
zzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzz	HEX CODE 7A	zzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzz
§§	HEX CODE 7B	§§
££	HEX CODE 7C	££
bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb	HEX CODE 7D	bbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbbb
ςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςς	HEX CODE 7E	ςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςςς

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HEX  CODE  20   ------                                        ---                                 ...
HEX  CODE  21   ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
HEX  CODE  22   " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " " "
HEX  CODE  23   ##############################################################################################################
HEX  CODE  24   $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
HEX  CODE  25   %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%.
HEX  CODE  26   &&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&.
HEX  CODE  27   ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '
HEX  CODE  28   ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (
HEX  CODE  29   ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )
HEX  CODE  2A   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
HEX  CODE  2B   + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + +
HEX  CODE  2C   , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , , ,
HEX  CODE  2D   - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
HEX  CODE  2E   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
HEX  CODE  2F   / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / / /
HEX  CODE  30   000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000
HEX  CODE  31   111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111
HEX  CODE  32   222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222222
HEX  CODE  33   333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333333
HEX  CODE  34   444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444
HEX  CODE  35   555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555555
HEX  CODE  36   666666666666666666666666666666666666666666666666666666666666666666666666666666666666666666666666
HEX  CODE  37   777777777777777777777777777777777777777777777777777777777777777777777777777777777777777777777777
HEX  CODE  38   888888888888888888888888888888888888888888888888888888888888888888888888888888888888888888888888
HEX  CODE  39   999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999999
HEX  CODE  3A   : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : :
HEX  CODE  3B   ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
HEX  CODE  3C   < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < < <
HEX  CODE  3D   = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
HEX  CODE  3E   > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > > >
HEX  CODE  3F   ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ?
HEX  CODE  40   @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
HEX  CODE  41   AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
HEX  CODE  42   BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
HEX  CODE  43   CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
HEX  CODE  44   DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
HEX  CODE  45   EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
HEX  CODE  46   FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
HEX  CODE  47   GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
HEX  CODE  48   HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HEX  CODE  49   IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
HEX  CODE  4A   JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ
HEX  CODE  4B   KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK
HEX  CODE  4C   LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
HEX  CODE  4D   MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
HEX  CODE  4E   NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
HEX  CODE  4F   OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
HEX  CODE  50   PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
HEX  CODE  51   QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
HEX  CODE  52   RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
HEX  CODE  53   SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
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HEX  CODE  56   VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
HEX  CODE  57   WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
HEX  CODE  58   XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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HEX  CODE  5A  ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
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APPENDIX B
SIGNAL MNE-MONICS

APPENDIX B
SIGNAL MNEMONICS

SIGNAL	DEFINITION
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6 SW	6 lines per inch switch
8 SW	8 lines per inch switch
10	10 pitch
10 D+	10 pitch LED
10 PE	10 pitch photoemitter
10 SW	10 pitch switch
12	12 pitch
12 D+	12 pitch LED
12 PE	12 pitch photoemitter
12 SW	12 pitch switch
$A_0 - A_{15}$	µP address bus
$\overline{ACKLG}$	Acknowledge
$AD_1 - AD_8$	Address data buffer
ALARM	Alarm light
$\overline{BELP}$	Bell pulse
B/$\overline{R}$	Busy/Ready
$\overline{BUSY}$	Device Busy Status for I/O
$\overline{CE}_7$	Chip enable
CLR	Clear
$\overline{CLRM}$	Manual Clear
CNT	Count
$D_0 - D_7$	µP data bus
$DATA_1 - DATA_8$	Data from CPU
$\overline{DSTB}$	Data strobe from CPU

SIGNAL	DEFINITION
$DT_1 - DT_8$	Data from line buffer
EC	Expanded character
FFD+	Form feed LED (format control)
$\overline{FFM}$	Form feed manual
$\overline{FFPE}$	Form feed photoemitter (format control)
$\overline{FIRE\ E}$	Fire even (solenoids)
$\overline{FIRE\ 0}$	Fire odd (solenoids)
$\overline{FORM\ OVERRIDE}$	Form override switch
F/R	Forward/reverse (carriage servo)
FULL	Buffer full
$\overline{I/O\ R}$	I/O read
$\overline{I/O\ W}$	I/O write
$\overline{IP}$	Reset from CPU
$\overline{LFC}$	Line feed time count
$\overline{LFM}$	Manual line feed
LPE	Left margin photoemitter
LRBG	Left ribbon drive motor gate
LS	Left ribbon solenoid
LSD+	Left margin sensor LED
MBD	Motor drive base
MD 1	Motor drive 1
MD 2	Motor drive 2
$\overline{MEM\ W}$	Memory write
$\overline{METER}$	Hour meter
$\overline{MF}$	Malfunction
$\overline{MF}_1$	Malfunction
$\overline{MF}_2$	Malfunction

SIGNAL	DEFINITION
MF LITE	Malfunction light (alarm)
MLBG	Left ribbon motor drive
MRBG	Right ribbon motor drive
$\overline{\text{MOP}}$	Motor on pulse
$\overline{\text{MR}}$	Master reset
Pa, Pb, Pc, Pd	Stepper motor drive signals
PED+	Paper eject LED (format control)
PEPE	Paper eject photoemitter (format control)
PFB	Paper feed base drive
PO	Paper out
POS W	Paper out switch
$\overline{\text{PWR PRIME}}$	Power on reset
R/B	Ready/Busy
RB07	Set busy to 8080
RB SW L	Left ribbon switch
RB SW R	Right ribbon switch
$\overline{\text{RO}}_0 - \overline{\text{RO}}_3$	I/O read addresses
RPE	Right margin photoemitter
RRBG	Right ribbon motor drive gate
RS	Right ribbon solenoid
RSD+	Right margin sensor LED
$S_{11} - S_{48}$	Print solenoids
SKTD+	Sprocket detect LED (format control)
SKTPE	Sprocket detect photoemitter (format control)
$\overline{\text{SL}}$	Select
SL CMN	Select common
SL LITE	Select light

SIGNAL	DEFINITION
SL SW OFF	Select switch off
SL SW ON	Select switch on
SPE	Space enable
SPEAKER	Speaker
$\overline{\text{STPM}}$	Stop motor
$\overline{\text{SYNC}}$	Sync from µP
TACH+	Feedback tachometer positive
TACH-	Feedback tachometer negative
$\overline{\text{T CLEAR 1}}$	Clear
$\overline{\text{T CLEAR 2}}$	Clear
VTD+	Vertical tab LED (format control)
VTPE	Vertical tab photoemitter (format control)
$\overline{\text{WO}}_0 - \overline{\text{WO}}_F$	I/O write addresses
$\overline{\text{WR}}$	Write
$\overline{\text{WRW}}$	Memory write pulse
$\overline{\text{WS}}$	Window signal
$\overline{\text{WS}}\ \overline{\text{10}}$	Window signal 10 pitch
$\overline{\text{WS}}\ \overline{\text{12}}$	Window signal 12 pitch
$\overline{\text{WSP}}$	Window signal pulse

APPENDIX
C
SIGNAL
RUN
LIST

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
±0	M1-Z1$_1$, C$_1$, A$_1$, P$_2$	C$_1$, P$_3$	C$_1$, P$_3$	C$_1$, P$_3$	C$_1$, P$_3$	J$_1$, 8$_1$, P$_3$	(12,13, 14,15)$_1$	(12,13, 14,15)$_1$	(12,13, 14,15)$_1$	(12,13, 14,15)$_1$	21,23, 25	F		
*01			8$_1$	8$_1$										
*02			J$_1$	J$_1$										
*03			9$_1$	9$_1$										
*04			5$_1$	5$_1$										
*05			7$_1$	7$_1$										
*06			F$_1$	F$_1$										
*07			6$_1$	6$_1$										
*08			E$_1$	E$_1$										
-5V	21$_2$		F$_2$		F$_2$	14$_1$								
+5VR	13$_1$, 22$_2$	B$_1$, R$_3$	B$_1$, R$_3$	B$_1$, R$_3$	B$_1$, R$_3$	12$_3$,					15,17, 19	C		
+5VR1						13$_1$								5
+5VRB						P$_1$								1
6 SW					M$_1$						12			
8 SW					L$_1$						14			

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
+9V						N_3								4
10		K_1	E_2, K_1		K_1									
10 PE					10_1						28			
10 SW					1_2						36			
12			7_2		8_1									
12D+					H_1						24			
12 PE					9_1						26			
12 SW					P_1						32			
-12V	2_1, 4_2		S_1			15_1								
+12V	6_1, 5_2		A_1			S_1								
+12VRSW						A_1, 1_1	6_3, 7_3	6_3, 7_3	6_3, 7_3	6_3, 7_3				
-12VSW					14_1	4_1								
+12VSW					A_1	F_1								
-18V					S_1	7_1, H_1							3	3
+18V						D_1								6

C-2

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
+18VTR						F_3								2
24 VAC													9	
+40V						E_1	$(1,2,3,4)_1$	$(1,2,3,4)_1$	$(1,2,3,4)_1$	$(1,2,3,4)_1$				
a					10_2	5_3								
A_0		L_2	L_2	L_2								16		
A_1		10_2	10_2	10_2								S		
A_2		K_2	K_2	K_2								15		
A_3		9_2	9_2	9_2								17		
A4			J_2									V		
A5			8_2									T		
A6			N_2									18		
A7			12_2									W		
A8			M_2									19		
A9			11_2									X		
A10			13_1									U		
A11			N_1									Z		
A12			P_1									Y		
A13			12_1									21		
A14			M_1									22		

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
A15			11_1	11_1								20		
*ACKLG	22_1	P_1												
AD1		3_3	3_3											
AD2		C_3	C_3											
AD3		D_3	D_3											
AD4		4_3	4_3											
AD5		1_3	1_3											
AD6		A_3	A_3											
AD7		B_3	B_3											
AD8		2_3	2_3											
ALARM LITE					4_2								33	
b					6_2	6_3								
*BELP		7_1			10_3									
BUSY/RDY	3_1	13_1												
c					9_2	7_3								
CE7		3_2	D_1											
CLR		5_1	14_2	4_1										
*CLRM		N_1											3	
CNT		P_2	P_2											
COVER SW		12_1											1	

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
d					M_2	8_3								
D0		H_3	H_3									8		
D1		6_3	6_3									H		
D2		F_3	F_3									14		
D3		8_3	8_3									P		
D4		K_3	K_3									10		
D5		9_3	9_3									K		
D6		J_3	J_3									12		
D7		7_3	7_3									M		
D41		12_3	12_3											
DATA 1	18_1	14_2												
DATA 2	16_1	M_3												
DATA 3	17_1	L_3												
DATA 4	20_1	E_2												
DATA 5	15_1	15_3												
DATA 6	11_1	S_2												
DATA 7	19_1	6_2												
DATA 8	12_1	D_2												
*DSTB	21_1	4_2												
EC		11_2		11_2										

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
FFD+					R_2						4			
*FFM					11_1						30			
FFPE					S_2						2			
*FIRE E				J_2	K_2									
*FIRE O				M_2	L_2									
FORM OVRDE		11_1									5			
F/R		R_2		N_1	5_2									
FULL		5_2	5_2											
IOD+					F_1						18			
*I/OR		N_3	N_3											
*I/OW		11_3	11_3	11_3										
*IP	E_1	10_1												
*LFM					13_1						34			
LFR1													5	
LFR2													7	
LPE					4_3						49			
LRBG					N_3	R_3								
*LRC		F_1			3_2									
L/RSWOFF		9_1									9			
LS					S_3						35,37			

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
LSD+					M_3						43			
MD1						D_3							1	
MDB					N_2	10_3								
*MDPM					8_2									
*MEMW		L_1	L_1											
*METER					D_3									
*MF1					7_2						29			
*MF	8_1	13_2			D_2									
MLEG						$15_3,$ S_3							12	
MRBG						L_3							11	
Pa						1_3							2	
Pb						2_3							4	
Pc						3_3							6	
Pd						4_3							8	
PF 9						11_3								
PF 20						9_3								
PFB					11_3	H_3								
PO	9_1	E_2												
PO LITE		F_2									27			

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
POSW		M_1									7			
PSE			L_3	5_3										
PWR PRIME 1		8_1			11_2									
PWR PRIME		10_3	10_3											
*PWR PRIME		D_1		D_1	D_1									
*RO2		7_2			C_3									
R/B		E_3	E_3											
*RB07		15_2	15_2											
RBSWL					1_1						22			
RBSWR					E_1						20			
RPE					3_3						50			
RRBG					L_3	14_3								
RS					12_3						39,41			
RSD+					E_2						10			
S11				14_1			E_1					A		
S12				B_3			F_1					7		
S13				15_1			H_1					B		
S14				2_3			J_1					6		
S15				R_1			K_1					2		
S16				A_3			L_1					5		

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
S17				1_2			A_3					4		
S18				1_3			C_3					E		
S19				S_1			J_3					1		
S21				5_2				E_1						
S22				D_3				F_1						
S23				B_2				H_1						
S24				4_3				J_1						
S25				A_2				K_1						
S26				3_1				L_1						
S27				3_2				A_3						
S28				C_3				C_3						
S29				C_2				J_3						
S31				4_2					E_1					
S32				K_3					F_2					
S33				D_2					H_1					
S34				L_3					J_1					
S35				N_2					K_1					
S36				9_3					L_1					
S37				8_2					A_3					
S38				J_3					C_3					

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
S39				7_2					J_3					
S41				12_2						E_1				
S42				N_3						F_1				
S43				S_2						H_1				
S44				12_3						J_1				
S45				15_2						K_1				
S46				M_3						L_1				
S47				R_2						A_3				
S48				10_3						C_3				
S49				14_2						J_3				
SERVO $\pm$ 0							$(12,13,14,15)_1$	$(12,13,14,15)_1$	$(12,13,14,15)_1$	$(12,13,14,15)_1$			10	
SKTD+					E_3						47			
SKTPE					5_3						45			
SL	F_1	14_1												
*SL		J_2			J_2									
SLCMN					14_2						6			
SLDNPE					B_3						46			
SLDND+					2_3						48			
SL LITE					15_2						40			

SIGNAL	I/O	7137	7131	7134	7132	7136	7035-1	7035-2	7035-3	7035-4	C1	C2	M1	M2
SLSWOFF		H_1									11			
SLSWON		6_1									13			
SPEAKER					J_1						16			
SYNC			M_3											
*T07			S_2									L		
TECH+					P_2						8			
TECH-					12_2						38			
*TSP			H_2	E_2								9		
VTD+					1_3						44			
VTPE					A_3						42			
*WO9		C_2			C_2									
*WOA		2_2			2_2									
*WOB		B_2			B_2									
*WOD		A_2			A_2									
*WOE		R_1			R_1									
*WOF		J_1		F_3										
WR			15_3	15_3										
*WRW		5_3	5_3											
*WSP			13_2		13_2									

APPENDIX D

BILL OF MATER- IALS

ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
1	* # 210-7035- - -	7035 MODULE		4.0000	
2	000-0001- - -	LABOR SUB-SYSTEMS		.5000	###
2	000-0011- - -	LABOR QUALITY CONTROL		.1000	###
2	330-2022- - -	RES 220 OHM 1/4W 10% FIXED COMP	EC6891	8.0000	
2	330-3022- - -	RES 2.2K OHM 1/4W 10% FIXED COMP	EC7082	8.0000	
2	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP	EC6891	8.0000	
2	334-0027- - -	4 OHM 5W 3% RESISTOR	EC6891	8.0000	
2	* 350-0037- - -	20 PIN 90 DEG CONN AMP225-21021-105		1.0000	
2	375-1026- - -	TSTR 2N3467 1.0W 40V SH PNP S TO5	EC6891	8.0000	
2	375-1054- - -	TRANSISTOR 2N6488(PLASTIC)	EC6891	8.0000	
2	375-9001- - -	TRANSIPAD 8977887-1 LARGE	EC6891	8.0000	
2	375-9016- - -	MICA INSUL #DF103B FOR 375-1034/1035	EC6891	8.0000	
2	380-2131- - -	DIO ZEN 1N5373 68.0V 5 W S AIEE	EC6891	8.0000	
2	380-4000- - -	DIO 1N4004 400V 1A RECT S DO41	EC6891	8.0000	
2	462-0014- - -	SPCR .140 ID .250 OD .750 L RD B	EC6891	2.0000	
2	478-0359- - -	HEATSINK.MACH (77) C6822-176	EC6891	1.0000	
2	478-0360- - -	CHANNEL.TRANS HEATSINK(77)C6822-175	EC6891	1.0000	
2	N 510-7035- - -	7035 PRINTED CIRCUIT BOARD		1.0000	
2	650-3120- - -	6-32 X 3/8 PAN HD PHL MS SS SEMS	EC6891	3.0000	
2	650-3131- - -	6-32 X 3/8 NYLON COVERED FIL HD SLT	EC6891	8.0000	
2	650-3401- - -	SCR 6-32 1 1/4 PHIL PH MS SS	EC6891	2.0000	
2	652-3000- - -	NUT 6-32UNC HEX REG PAT SS	EC6891	2.0000	
2	653-3000- - -	WASH 6 .149ID .3750D .016 FL SS	EC7394	2.0000	
2	653-3001- - -	WASH 6 .150ID .288OD INT T ST	EC7082	2.0000	
2	653-3002- - -	WASH 6 .141ID .250OD .062 FL NYL	EC7082	4.0000	
1	* 210-7130- - -	IOP CONTROL PANEL		1.0000	
2	220-3027- - -	14PIN 4 HEAD PTR KBD CABLE C6482-14		1.0000	
3	. 350-0400- - -	14 PIN FLAT CABLE PLUG 3M 3406		2.0000	
3	* 420-0042- - -	14 COND FLAT CABLE 3M 3365/14		4.0000	
2	325-2305- - -	11SM1 MICRO SWITCH FOR CP-1		5.0000	
2	370-0018- - -	CM6833 AS15 CLEAR LAMP		4.0000	
2	370-1020- - -	1200 LAMPHOLDER B5776-895		4.0000	
2	.376-9008- - -	IC PAD 16 PIN TEKNA #4330	EC7111	1.0000	
2	510-7130- - -	7130 PRINTED CIRCUIT BOARD		1.0000	
2	* 605-0017- - -	TEFLON TUBING #28 TFT 200	EC7111	.6600	###
2	652-3002- - -	NUT 6-32UNC HEX REG PAT NYLON	EC7111	4.0000	
1	*: 210-7131-A - -	7131-A MODULE(PRELIM)		1.0000	
2	209-7131- - -	7131 W/UNLOADED SOCKETS		1.0000	
3	300-1100- - -	CAP 100 PF 10% 500 V CERAMIC DISC		1.0000	
3	300-1900- - -	CAP .05 UF +80-20% 12 V CERAMIC D	EC7082	17.0000	
3	300-1906- - -	CAP .001 UF 10% 500 V CERAMIC DISC		1.0000	
3	. 300-4021- - -	CAP 100.0 UF 15 V 10% TANT AXIAL	EC7082	3.0000	
3	300-4022- - -	CAP 15.0 UF 20 V 10% TANT AXIAL	EC6643	2.0000	
3	321-0018- - -	17.1 MHZ OSCILLATOR	PATREL	1.0000	
3	330-3018- - -	RES 1K OHM 1/4W 10% FIXED COMP	EC7082	2.0000	
3	330-3047- - -	RES 4.7K OHM 1/4W 10% FIXED COMP	EC7082	2.0000	
3	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP	EC7082	3.0000	
3	376-0002- - -	IC 7400N 4 2 IN POS NAND GATE	PATREL	1.0000	
3	376-0004- - -	IC 7420N 2 4 IN POS NAND GATE	PATREL	1.0000	

ASSEMBLY PART NUMBER   177 2261 W
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)

LEGEND
*=KIT TAG   #=STATUS ITEM   ###=FRACTIONAL QUANTITY   P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
3	376-0006- - -	IC 7474N 2 D EDGE TRIG FLIP-FLOP	PATREL	2.0000
3	376-0008- - -	IC 7442N 4 LINE-10 LINE DECODER	EC6643	2.0000
3	376-0010- - -	IC 7404N HEX INVERTER	PATREL	1.0000
3	376-0011- - -	IC 7493N 4 BIT BINARY COUNTER		2.0000
3	376-0081- - -	IC 7408 4 2 IN POS AND GATE	EC6643	2.0000
3	376-0082- - -	IC 74157 4 2 IN MX		2.0000
3	376-0093- - -	IC 7432 4 2 IN OR GATE		1.0000
3	376-0189- - -	IC 8T97 H SPEED HEX 3 STATE BUFFER	PATREL	4.0000
3	376-9003- - -	24 PIN IC SOCKET BURNDY	EC7082	10.0000
3	376-9006- - -	16 PIN IC SOCKET AUGAT 316-A6-5D-2R	PATREL	1.0000
3	376-9010- - -	22 PIN IC SOCKET BURNDY # DILBZ22PI	PATREL	2.0000
3	376-9011- - -	40 PIN IC SOCKET BURNDY # DILBZ40PI	EC7082	1.0000
3	376-9015- - -	28 PIN IC SOCKET (BURNDY)	PATREL	1.0000
3	378-2086-R3- -	2261W MICRO CODE CHIP #1		.0000
3	378-2087-R3- -	2261W MICRO CODE CHIP #2		.0000
3	510-7131- - -	7131 PRINTED CIRCUIT BOARD		1.0000
2	377-0269- - -	8080A MICROPROCESSOR	PATREL	1.0000
2	# 377-0308- - -	2101-1 RAM I.C.		2.0000
2	# 377-0317- - -	2708 INTEL PROM	EC7165	6.0000
2	# 377-0337- - -	8224 I.C.	PATREL	1.0000
2	# 377-0338- - -	8228 I.C.	PATREL	1.0000
2	378-2061- - -	2261 10-PITCH WANG 4-HEAD	EC7165	.0000
2	378-2062- - -	2261 10-PITCH WANG 4-HEAD	EC7165	.0000
2	378-2063- - -	2261 12-PITCH WANG 4-HEAD	EC7165	.0000
2	378-2064- - -	2261 12-PITCH WANG 4-HEAD	EC7165	.0000
2	378-2086- - -	2261W MICRO CODE CHIP #1	EC7165	.0000
2	378-2087- - -	2261W MICRO CODE CHIP #2	EC7165	.0000
1	* 210-7132- - -	7132 MODULE		1.0000
2	300-1082- - -	CAP 82 PF 10% 500 V CERAMIC DISC	EC7082	1.0000
2	300-1100- - -	CAP 100 PF 10% 500 V CERAMIC DISC		5.0000
2	300-1150- - -	CAP 150 PF 10% 500 V CERAMIC DISC	EC6683	2.0000
2	300-1330- - -	CAP 330 PF 10% 500 V CERAMIC DISC	EC6683	2.0000
2	300-1470- - -	CAP 470 PF 10% 500 V CERAMIC DISC		1.0000
2	300-1900- - -	CAP .05 UF +80-20% 12 V CERAMIC D		11.0000
2	300-1903- - -	CAP .01 UF +80-20% 25 V CERAMIC D		3.0000
2	300-1904- - -	CAP .02 UF +80-20% 25 V CERAMIC D	EC7082	16.0000
2	300-1910- - -	CAP .0047 UF 20% 500 V CERAMIC DISC	EC6683	4.0000
2	300-2215- - -	CAP .15 UF 10% 100 V MYLAR		1.0000
2	300-3011- - -	CAP 100 UF 16V -10+75% ELECT AXIAL		2.0000
2	300-4008- - -	CAP .33 UF 35 V 10% TANT AXIAL	EC7082	1.0000
2	300-4010- - -	CAP .56 UF 35 V 10% TANT AXIAL		2.0000
2	300-4012- - -	.82 UF TANT CAPACITOR W/OFF-76	EC6683	1.0000
2	300-4022- - -	CAP 15.0 UF 20 V 10% TANT AXIAL		3.0000
2	320-0047- - -	12V REED RELAY 46D01A0012		2.0000
2	330-1010- - -	RES 10 OHM 1/4W 10% FIXED COMP	EC7173	10.0000
2	330-2010- - -	RES 100 OHM 1/4W 10% FIXED COMP	EC7082	5.0000
2	330-2015- - -	RES 150 OHM 1/4W 10% FIXED COMP	EC7499	1.0000
2	330-2018- - -	RES 180 OHM 1/4W 10% FIXED COMP		2.0000
2	330-2022- - -	RES 220 OHM 1/4W 10% FIXED COMP		2.0000
2	330-2033- - -	RES 330 OHM 1/4W 10% FIXED COMP		1.0000

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ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG   #=STATUS ITEM   ###=FRACTIONAL QUANTITY   P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
2	330-2039- - -	RES 390 OHM 1/4W 10% FIXED COMP		2.0000
2	330-2047- - -	RES 470 OHM 1/4W 10% FIXED COMP	EC6970	3.0000
2	330-2068- - -	RES 680 OHM 1/4W 10% FIXED COMP		2.0000
2	330-3010- - -	RES 1K OHM 1/4W 10% FIXED COMP		1.0000
2	330-3022- - -	RES 2.2K OHM 1/4W 10% FIXED COMP	EC7499	6.0000
2	330-3047- - -	RES 4.7K OHM 1/4W 10% FIXED COMP	EC7499	12.0000
2	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP	EC7082	14.0000
2	330-4012- - -	RES 12K OHM 1/4W 10% FIXED COMP	EC6683	2.0000
2	330-4022- - -	RES 22K OHM 1/4W 10% FIXED FILM	EC7499	5.0000
2	330-4023- - -	RES 22K OHM 1/4W 5% FIXED COMP		2.0000
2	330-4027- - -	RES 27K OHM 1/4W 10% FIXED COMP	EC7499	8.0000
2	330-4033- - -	RES 33K OHM 1/4W 10% FIXED COMP		1.0000
2	330-4039- - -	RES 39K OHM 1/4W 10% FIXED COMP	EC7082	1.0000
2	330-4047- - -	RES 47K OHM 1/4W 10% FIXED COMP	EC7082	12.0000
2	330-4056- - -	RES 56K OHM 1/4W 10% FIXED COMP		1.0000
2	330-5010- - -	RES 100K OHM 1/4W 10% FIXED COMP	EC7082	2.0000
2	330-5015- - -	RES 150K OHM 1/4W 10% FIXED COMP	EC7499	2.0000
2	330-5027- - -	RES 270K OHM 1/4W 10% FIXED COMP	EC7499	1.0000
2	330-5033- - -	RES 330K OHM 1/4W 10% FIXED COMP		1.0000
2	330-5040- - -	RES 390K OHM 1/4W 5% FIXED COMP		1.0000
2	330-5048- - -	RES 470K OHM 1/4W 5% FIXED COMP		1.0000
2	330-6015- - -	RES 1.5M OHM 1/4W 10% FIXED COMP	EC7082	3.0000
2	330-6016- - -	RES 1.5M OHM 1/4W 5% FIXED COMP	EC7082	1.0000
2	332-1015- - -	RES 15 OHM 1W 10% FIXED COMP		2.0000
2	336-1008- - -	RES 100 OHM VAR TRIM TOP ADJ RD		2.0000
2	336-1018- - -	RES 1M OHM VAR TRIM SIDE ADJ SQ	EC7173	2.0000
2	336-1020- - -	RES 5K OHM VAR TRIM SIDE ADJ SQ		2.0000
2	375-0017- - -	TSTR 2N3014 360MW 40V SH NPN S 52	EC6683	5.0000
2	375-1006- - -	NIXIE DRIVER SIL TRANSISTOR	EC7082	4.0000
2	375-1026- - -	TSTR 2N3467 1.0W 40V SH PNP S T05		4.0000
2	375-1027- - -	TSTR 2N3725 0.8W 80V SH NPN S		1.0000
2	375-9001- - -	TRANSIPAD 8977887-1 LARGE	EC6683	5.0000
2	375-9004- - -	TRANSIPAD TO-18 (SMALL)	EC7082	9.0000
2	376-0002- - -	IC 7400N 4 2 IN POS NAND GATE		3.0000
2	376-0005- - -	IC 7473N 2 J-K MA-SLAVE FLIP-FLOP	EC7082	1.0000
2	376-0008- - -	IC 7442N 4 LINE-10 LINE DECODER		1.0000
2	376-0010- - -	IC 7404N HEX INVERTER		2.0000
2	376-0025- - -	IC 993559X HEX INV DERECT IN-BASE		2.0000
2	376-0028- - -	IC 7403N 4 2 IN POS NAND GATE		1.0000
2	376-0055- - -	IC 7406 HEX INV BUF DRIVERS HV OUT		2.0000
2	376-0056- - -	IC 7407 HEX BUF DRIVER HV OUTPUT		1.0000
2	376-0074- - -	IC 741C OPERATIONAL AMP		4.0000
2	376-0081- - -	IC 7408 4 2 IN POS AND GATE		2.0000
2	376-0104- - -	IC 9602 2 RETRIG RESET MONOSTBL MVB	EC6683	2.0000
2	376-0126- - -	IC 555 TIMER		1.0000
2	376-0139- - -	IC 7414 HEX SCHMITT TRIGGER		1.0000
2	376-0176- - -	IC 74367 HEX BUFFER		2.0000
2	376-0188- - -	IC 74279 4 S-R LATCH		2.0000
2	376-0194- - -	IC 7411 3 3 IN POS AND GATE	EC7082	1.0000
2	* 380-1001-4B- -	D035 SIL DIODE 30V, 100MA AT 1V .4B	EC7082	11.0000
2	510-7132- - -	7132 PRINTED CIRCUIT BOARD		1.0000

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ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   #=KIT TAG   #=STATUS ITEM   ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
1	✦ 210-7134- - -	7134 MODULE		1.0000
2	300-1100- - -	CAP 100 PF 10% 500 V CERAMIC DISC		4.0000
2	300-1900- - -	CAP .05 UF +80-20% 12 V CERAMIC D		11.0000
2	300-1906- - -	CAP .001 UF 10% 500 V CERAMIC DISC		3.0000
2	300-3011- - -	CAP 100 UF 16V -10+75% ELECT AXIAL		2.0000
2	300-4002- - -	CAP .1 UF 35 V 10% TANT AXIAL		1.0000
2	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP	EC7082	2.0000
2	330-4012- - -	RES 12K OHM 1/4W 10% FIXED COMP	EC7082	1.0000
2	336-1020- - -	RES 5K OHM VAR TRIM SIDE ADJ SQ	EC7082	1.0000
2	376-0002- - -	IC 7400N 4 2 IN POS NAND GATE	EC6644	3.0000
2	376-0008- - -	IC 7442N 4 LINE-10 LINE DECODER	EC7082 .	2.0000
2	376-0010- - -	IC 7404N HEX INVERTER		5.0000
2	376-0011- - -	IC 7493N 4 BIT BINARY COUNTER		1.0000
2	376-0048- - -	IC 74153 2 4-1 LINE DATA SEL MX	EC7082	1.0000
2	376-0065- - -	IC 7496 5 BIT SHIFT REGISTER		8.0000
2	376-0067- - -	IC 7426 4 2 IN HV INTERFACE NAND GT		9.0000
2	376-0093- - -	IC 7432 4 2 IN OR GATE		1.0000
2	376-0098- - -	IC 74174 HEX D TYPE FLIP FLOP		-4.0000
2	376-0104- - -	IC 9602 2 RETRIG RESET MONOSTBL MVB		1.0000
2	376-0119- - -	IC 74175 4 D TYPE EDGE TRIG F/F	EC7082	3.0000
2	376-0194- - -	IC 7411 3 3 IN POS AND GATE		1.0000
2	510-7134- - -	7134 PRINTED CIRCUIT BOARD		1.0000
1	✦ 210-7136- - -	7136 PS REG & DC MOTOR DR & P.F.		1.0000
2	300-1901- - -	CAP .1 UF 20% 12 V CERAMIC DISC		2.0000
2	300-1904- - -	CAP .02 UF +80-20% 25 V CERAMIC D		1.0000
2	300-3011- - -	CAP 100 UF 16V -10+75% ELECT AXIAL	EC6731	2.0000
2	330-1033- - -	RES 33 OHM 1/4W 10% FIXED COMP		2.0000
2	330-1047- - -	RES 47 OHM 1/4W 10% FIXED COMP	EC6892	1.0000
2	330-2010- - -	RES 100 OHM 1/4W 10% FIXED COMP		1.0000
2	330-2015- - -	RES 150 OHM 1/4W 10% FIXED COMP	EC7394	2.0000
2	330-2018- - -	RES 180 OHM 1/4W 10% FIXED COMP	EC6892	1.0000
2	330-2022- - -	RES 220 OHM 1/4W 10% FIXED COMP	EC6731	6.0000
2	330-2033- - -	RES 330 OHM 1/4W 10% FIXED COMP		2.0000
2	330-2047- - -	RES 470 OHM 1/4W 10% FIXED COMP		8.0000
2	330-2068- - -	RES 680 OHM 1/4W 10% FIXED COMP	EC7036	2.0000
2	330-3010- - -	RES 1K OHM 1/4W 10% FIXED COMP		4.0000
2	330-3012- - -	RES 1.2K OHM 1/4W 10% FIXED COMP	EC6731	1.0000
2	330-3018- - -	RES 1.8K OHM 1/4W 10% FIXED COMP	EC6892	1.0000
2	330-3022- - -	RES 2.2K OHM 1/4W 10% FIXED COMP	EC6892	7.0000
2	330-3027- - -	RES 2.7K OHM 1/4W 10% FIXED COMP		6.0000
2	330-3033- - -	RES 3.3K OHM 1/4W 10% FIXED COMP	EC7181	2.0000
2	330-3047- - -	RES 4.7K OHM 1/4W 10% FIXED COMP		3.0000
2	330-3056- - -	RES 5.6K OHM 1/4W 10% FIXED COMP	EC7181	3.0000
2	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP	EC7036	1.0000
2	330-4012- - -	RES 12K OHM 1/4W 10% FIXED COMP		1.0000
2	330-4015- - -	RES 15K OHM 1/4W 10% FIXED COMP		1.0000
2	331-1012- - -	RES 12 OHM 1/2W 10% FIXED COMP		4.0000
2	331-2027- - -	RES 270 OHM 1/2W 10% FIXED COMP		1.0000
2	331-2034- - -	RES 330 OHM 1/2W 5% FIXED COMP		1.0000
2	331-2047- - -	RES 470 OHM 1/2W 10% FIXED COMP		2.0000
2	331-2068- - -	680 OHM 1/2W 10% RESISTOR W/OFF-76	EC7036	1.0000

ASSEMBLY PART NUMBER   177 2261 W
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)

LEGEND
*=KIT TAG   #=STATUS ITEM   ###=FRACTIONAL QUANTITY   P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
2		332-2018- - -	RES 180 OHM 1W 10% FIXED COMP		2.0000
2		332-2047- - -	RES 470 OHM 1W 10% FIXED COMP		1.0000
2		334-0035- - -	RES .075 OHM 2W 3% WW	EC7181	1.0000
2		336-1014- - -	RES 1K OHM VAR TRIM SIDE ADJ SQ	EC7394	2.0000
2		370-0026- - -	LAMP,RED (LED) MV5024	EC6892	1.0000
2		375-0017- - -	TSTR 2N3014 360MW 40V SH NPN S 52	EC6731	3.0000
2		375-1026- - -	TSTR 2N3467 1.0W 40V SH PNP S T05	EC6731	8.0000
2		375-1027- - -	TSTR 2N3725 0.8W 80V SH NPN S	EC6731	5.0000
2		375-1034- - -	2N6111 PNP PLASTIC POWER TRANSISTOR		2.0000
2		375-1051- - -	TRANSISTOR 2N6292 (PLASTIC)		1.0000
2		375-1052- - -	TRANSISTOR 2N6387 (PLASTIC)		3.0000
2		375-1053- - -	TRANSISTOR RCA8203A (PLASTIC)		3.0000
2		375-1054- - -	TRANSISTOR 2N6488(PLASTIC)		4.0000
2		375-3002- - -	2N6070B TRIAC		2.0000
2		375-9001- - -	TRANSIPAD 8977887-1 LARGE	EC6731	13.0000
2		375-9004- - -	TRANSIPAD TO-18 (SMALL)	EC6731	3.0000
2		375-9016- - -	MICA INSUL#DF1038 FOR 375-1034/1035	EC6892	15.0000
2		376-0066- - -	IC 723 VOLTAGE REGULATOR		2.0000
2	*	380-1001-4B- -	D035 SIL DIODE 30V. 100MA AT 1V .4B		7.0000
2		380-2042- - -	DIO ZEN 1N749 A 4.3V 400MW S D0-7	EC6731	2.0000
2		380-2051- - -	DIO ZEN 1N751 A 5.1V 400MW S D0-7		1.0000
2		380-2082-1 - -	DIO ZEN 1N4738 8.2V 1 W S D041	EC6731	1.0000
2		380-2120- - -	DIO ZEN 1N759 A 12.0V 400MW S D0-7		2.0000
2		380-3002- - -	DIO 1N4719 50V 3A RECT S C60	EC7394	3.0000
2		380-3003- - -	DIO 1N3253 200V .75A RECT S D041		5.0000
2		462-0014- - -	SPCR .140 ID .250 OD .750 L RD B	EC6892	2.0000
2		478-0359- - -	HEATSINK,MACH (77) C6822-176	EC6892	1.0000
2		478-0360- - -	CHANNEL,TRANS HEATSINK(77)C6822-175	EC6892	1.0000
2		510-7136- - -	7136 PRINTED CIRCUIT BOARD		1.0000
2		650-2102- - -	SCR 4-40 5/16 PAN SLOT MS NYL	EC7394	2.0000
2		650-3120- - -	6-32 X 3/8 PAN HD PHL MS SS SEMS	EC6892	3.0000
2		650-3131- - -	6-32 X 3/8 NYLON COVERED FIL HD SLT	EC7394	13.0000
2		650-3401- - -	SCR 6-32 1 1/4 PHIL PH MS SS	EC6892	2.0000
2		652-3000- - -	NUT 6-32UNC HEX REG PAT SS	EC7394	2.0000
2		653-3000- - -	WASH 6 .149ID .3750D .016 FL SS	EC7394	2.0000
2		653-3002- - -	WASH 6 .141ID .250OD .062 FL NYL	EC7394	4.0000
2		653-7001- - -	WASH..19 IDX.27 OX.05THK FL YEF	EC7394	2.0000
1	*	210-7137- - -	7137 MODULE (MODEL 77)		1.0000
2		300-1100- - -	CAP 100 PF 10% 500 V CERAMIC DISC	EC7481	2.0000
2		300-1330- - -	CAP 330 PF 10% 500 V CERAMIC DISC		3.0000
2		300-1900- - -	CAP .05 UF +80-20% 12 V CERAMIC D		11.0000
2		300-1904- - -	CAP .02 UF +80-20% 25 V CERAMIC D	EC7082	8.0000
2		300-1906- - -	CAP .001 UF 10% 500 V CERAMIC DISC	EC7159	5.0000
2		300-1910- - -	CAP .0047 UF 20% 500 V CERAMIC DISC		1.0000
2		300-1912- - -	CAP .02 UF 20% 500 V CERAMIC DISC	EC7481	1.0000
2		300-4000- - -	CAP 1.0 UF 35 V 10% TANT AXIAL		1.0000
2		300-4014- - -	CAP 2.2 UF 20 V 10% TANT AXIAL		1.0000
2		300-4018- - -	CAP 18.0 UF 15 V 10% TANT AXIAL		1.0000
2		300-4022- - -	CAP 15.0 UF 20 V 10% TANT AXIAL		2.0000
2	*	330-1010- - -	RES 10 OHM 1/4W 10% FIXED COMP	EC6645	7.0000
2	*	330-2018- - -	RES 180 OHM 1/4W 10% FIXED COMP	EC7481	2.0000

ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG   #=STATUS ITEM   ###=FRACTIONAL QUANTITY   P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
2		330-2047- - -	RES 470 OHM 1/4W 10% FIXED COMP	EC7481	2.0000	
2	*	330-3010- - -	RES 1K OHM 1/4W 10% FIXED COMP	EC7481	9.0000	
2	*	330-3047- - -	RES 4.7K OHM 1/4W 10% FIXED COMP	EC6645	5.0000	
2	*	330-4010- - -	RES 10K OHM 1/4W 10% FIXED COMP	EC7481	17.0000	
2	*	330-4056- - -	RES 56K OHM 1/4W 10% FIXED COMP		1.0000	
2	*	330-6015- - -	RES 1.5M OHM 1/4W 10% FIXED COMP		1.0000	
2		375-0017- - -	TSTR 2N3014 360MW 40V SH NPN S 52		1.0000	
2		375-9004- - -	TRANSIPAD TO-18 (SMALL)	EC7082	1.0000	
2		376-0002- - -	IC 7400N 4 2 IN POS NAND GATE	EC7358	3.0000	
2		376-0003- - -	IC 7410N 3 3 IN POS NAND GATE		2.0000	
2		376-0004- - -	IC 7420N 2 4 IN POS NAND GATE		1.0000	
2		376-0007- - -	IC 7476N 2 JK MA-SLV F/F PRST CLEAR		1.0000	
2		376-0008- - -	IC 7442N 4 LINE-10 LINE DECODER		4.0000	
2		376-0010- - -	IC 7404N HEX INVERTER	EC6645	5.0000	
2		376-0025- - -	IC 993559X HEX INV DERECT IN-BASE		1.0000	
2		376-0046- - -	IC 993259 4 4 IN NAND BUFFER EXPAND		1.0000	
2		376-0055- - -	IC 7406 HEX INV BUF DRIVERS HV OUT		1.0000	
2		376-0081- - -	IC 7408 4 2 IN POS AND GATE		1.0000	
2		376-0082- - -	IC 74157 4 2 IN MX		2.0000	
2		376-0093- - -	IC 7432 4 2 IN OR GATE		2.0000	
2		376-0104- - -	IC 9602 2 RETRIG RESET MONOSTBL MVB	EC6645	4.0000	
2		376-0125- - -	IC 7427 3 3 IN NOR GATE		1.0000	
2		376-0176- - -	IC 74367 HEX BUFFER		3.0000	
2		376-0188- - -	IC 74279 4 S-R LATCH	EC7082	2.0000	
2		376-0276- - -	IC 74S133 13 INPUT POSITIVE NAND	EC6927	1.0000	
2	*	380-1001-4B- -	D035 SIL DIODE 30V. 100MA AT 1V .4B	EC7159	6.0000	
2		510-7137- - -	7137 PRINTED CIRCUIT BOARD		1.0000	
1		220-0171- - -	I/O CABLE.QUAD HD D6482-192	EC7368	1.0000	
2		350-2082- - -	CONN 18-36 CABLE TO PANEL PLUG		1.0000	
2		350-4228- - -	36 POS.SR COVER AMP#552073-1		1.0000	
2		350-4234- - -	4-40X3/8 CAPT SCR FOR SCR MT CONNS.		2.0000	
2	*	420-0054- - -	36 COND 26 GA SHIELDED CABLE		11.0000	
2		458-0361- - -	GROUND STRAP C6815-28		1.0000	
2	A	510-6703- - -	6703 PRINTED CIRCUIT BOARD		1.0000	
2	*	605-1004- - -	CABLE TYE. PAN-TY PLT1M-M		1.0000	
2		654-1006- - -	#6 GROUND LUG		1.0000	
1		220-1150- - -	CIRCUIT BKR CABLE ASSY(77)B6482-216	EC7368	1.0000	
2	*	600-0000- - -	WIRE 18 GA BLACK UL		5.5000	###
2	*	600-2003- - -	WIRE 24 GA ORANGE UL		2.2500	###
2	*	600-2009- - -	WIRE 24 GA WHITE UL		2.2500	###
2	*	605-1004- - -	CABLE TYE. PAN-TY PLT1M-M		6.0000	
2	*	654-0048-R - -	FASTON TERMINAL RED AMP 42599-4		2.0000	
2	*	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4		2.0000	
2	*	654-1165-R - -	SOCKET 30-22 GA(REEL)AMP 3500078-4		2.0000	
2		654-1195- - -	4 POS SOCKET HOUSING AMP 1-480424-0		1.0000	
1		220-1151- - -	FAN CABLE ASSY(77) B6482-217	EC7368	1.0000	
2	*	600-0000- - -	WIRE 18 GA BLACK UL		13.0000	
2	*	605-0015- - -	#3 CLEAR TUBING		6.3300	###
2		654-1148- - -	SOCKET HOUSING 1-480318-0		2.0000	

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ASSEMBLY PART NUMBER 177 2261 W
ASSEMBLY DESCRIPTION 2261W 240LPM MATRIX PRINTER (77)   LEGEND
                                                           *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
2	*	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4		4.0000	
1		220-1152- - -	PWR SWITCH CABLE ASSY(77) B6482-218	EC7368	1.0000	
2	*	600-0000- - -	WIRE 18 GA BLACK UL		4.5800	###
2		600-0090- - -	WIRE 18 GA WH/BLK		4.5800	###
2	*	605-0015- - -	#3 CLEAR TUBING		4.3300	###
2	*	605-0132- - -	TUBING,3/8 ID HEATSHRINK		.2500	###
2	*	654-0048-R - -	FASTON TERMINAL RED AMP 42599-4		3.0000	
2		654-1107- - -	PIN HOUSING 1-480350-0		1.0000	
2	*	654-1164-R - -	PIN TERM 20-14 GA(REEL)AMP 61118-4		1.0000	
1		220-1153- - -	FAN CORD ASSY (77) B6482-219	EC7368	2.0000	
2		420-1005- - -	POWER CORD ROTRON FAN 16415	EC7502	2.0000	
2		600-0000- - -	WIRE 18 GA BLACK UL	EC7502	3.6600	###
2	*	605-0021- - -	TUBING,HEATSHRINK 1/80IA IRRAD POLY		.1600	###
2	*	605-0101- - -	TUBING 1/4 BLACK	EC7502	3.5800	###
2		654-1148- - -	SOCKET HOUSING 1-480318-0		1.0000	
2	*	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4		2.0000	
1		220-1156- - -	WIRE & LUG ASSY TYPE P069 B6482-12	EC7368	2.0000	
2		000-0004- - -	SUB-SYSTEMS		.0300	###
2		000-0011- - -	LABOR QUALITY CONTROL		.0100	###
2	*	420-0074- - -	TINNED COPPER FLAT BRAID 1/2" WIDE		.5000	###
2	*	654-0117-R - -	1/4" RING LUG YELLOW BA 10-14M		2.0000	
1		220-3028- - -	FLEXIBLE CABLE ASSY(2261W)C6482-129		4.0000	
2		000-0001- - -	LABOR SUB-SYSTEMS		.2500	###
2		000-0011- - -	LABOR QUALITY CONTROL		.0500	###
2		420-0063- - -	10 CONDUCTOR FLAT FLEX CABLE		12.0000	
2	C	510-6759- - -	6759 PRINTED CIRCUIT BOARD		1.0000	
2		654-0093- - -	10 POS DUAL FFC CARD EDGE HOUSING		1.0000	
2		654-0095- - -	CARD EGE CONTACT FFC AMP 86742-4		20.0000	
2		654-0097- - -	FFC SOLDER TAB AMP 86706-6		20.0000	
1	*	270-0420- - -	CHASSIS ASSY (77) 6822-70		1.0000	
2	*	210-7030- - -	7030 MODULE MDL 77 (PRELIM)		1.0000	
3		350-0011- - -	225-21521-110 PC CONN SOLDER TYPE		22.0000	
3		350-0021- - -	225-22221-110 SOL TYPE		3.0000	
3		360-0006- - -	FUSE CLIP P.C. LITTLE FUSE 102068		2.0000	
3		360-1080-SB- -	FUSE 8 AMP 250V SB CERAMIC	EC7383	1.0000	
3		510-7030- - -	7030 PRINTED CIRCUIT BOARD		1.0000	
3		654-1172- - -	12 POS PIN HEADER ASSY AMP 350213-1		1.0000	
3		654-1186- - -	6 POS PIN HEADER AMP 1-380999-0		1.0000	
3		654-1198- - -	2 POS PIN HEADER ASSY AMP 350209-1		3.0000	
3		654-1199- - -	50POS PIN HEADER ASSY 3M# 3496-2002		1.0000	
2		220-1154- - -	WIRE & LUG ASSY TYPE P067 B6482-12	EC7368	1.0000	
3	*	600-7000- - -	16 GA BLACK STRANDED WIRE		.3300	###
3		654-1108- - -	SOCKET HOUSING 1-480349-0		1.0000	
3	*	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4		1.0000	
2		300-3044- - -	40000 UF 12/ ELECTROLYTIC CAPACITOR		1.0000	

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ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
2	300-3069- - -	27000 UF 30V ELECTROLYTIC CAP		1.0000
2	300-3070- - -	53000 UF 25V ELECTROLYTIC CAP		2.0000
2	300-3072- - -	19K UF CAPACITOR W/OFF-76		2.0000
2	300-9006- - -	CAP CLAMP 2 1/2 INCH 3 LUG		4.0000
2	300-9022- - -	CAP CLAMP 2 1/16 INCH 3 LUG		2.0000
2	326-2112- - -	SLIDE SW.115/230 VAC		1.0000
2	* 330-2033- - -	RES 330 OHM 1/4W 10% FIXED COMP		1.0000
2	332-2056- - -	RES 560 OHM 1W 10% FIXED COMP		3.0000
2	332-3010- - -	RES 1K OHM 1W 10% FIXED COMP		2.0000
2	* 334-0034- - -	RES 10 OHM 25W 3% WW FIXED	EC7034	2.0000
2	334-0036- - -	RES 5 OHM 25W 3% WW	EC7158	2.0000
2	360-0000- - -	FUSE HOLDER 90 DEGREE CONTACT		1.0000
2	360-9000- - -	RUBBER WSHR FOR 360-0000 / 360-0001		1.0000
2	360-9002- - -	HEX NUT FOR 360-0000 / 360-0001		1.0000
2	360-9003- - -	LOCK WSHR LF#905023(FOR 360-0000/1)		1.0000
2	375-1046- - -	TRANSISTOR 2N6282 (TO-3)		1.0000
2	375-9014- - -	INSULATOR XTOR MOUNT WECKESSER TM-1		1.0000
2	375-9020- - -	MICA WSHR (LARGE) FOR POWER XISTORS		1.0000
2	380-3000- - -	DIO 1N1200A 100V 12A RECT S DO4		10.0000
2	380-5001- - -	250 VOLT VARISTOR V250LA20		1.0000
2	380-9003- - -	HARDWARE ACCESSORY KIT FOR 380-3000		10.0000
2	410-0121- - -	HMC 5587 XFMR 50/60H (77) C5068-121		1.0000
2	410-2005- - -	LINE FILTER 5 AMP CORCOM 5K1		1.0000
2	420-1006- - -	POWER CORD 15' BELDEN 17425	EC7368	1.0000
2	451-1113- - -	CHASSIS,ELECTRONICS (77) E6822-815		1.0000
2	451-4374- - -	BRKT(4TO)CARD CLAMP B6634-137	EC6946	1.0000
2	452-4030- - -	GUIDE,CARD (-70)B6634-138	EC7368	2.0000
2	462-0299- - -	SPACER,CARD CLAMP (77) B6822-189	EC6946	1.0000
2	A 510-6749- - -	6749 PRINTED CIRCUIT BOARD		1.0000
2	650-2120- - -	4-40 X 3/8 PAN HD PHL MS SS SEMS		8.0000
2	650-2240- - -	4-40 X 3/4 PAN HD PHL MS SS SEMS		30.0000
2	650-3120- - -	6-32 X 3/8 PAN HD PHL MS SS SEMS		18.0000
2	650-3200- - -	SCR 6-32 5/8 PHIL PH MS SS		8.0000
2	650-6120- - -	SCR 10-32 3/8 PHIL PH MS SS	EC6946	1.0000
2	651-0401- - -	RIVET,POP 1/8 X 3/16 AD42ABS		2.0000
2	652-0032- - -	6-32 LOCK-NUT KEPS 511-061800-00		6.0000
2	652-2005- - -	4-40 LOCK-NUT KEPS SS		30.0000
2	652-3004- - -	NUT 6-32UNC HEX SMALL PAT SS		6.0000
2	653-0003- - -	WASHER, NO.4 NYLON 1/8 ID X 3/8 OD		30.0000
2	653-2000- - -	NO. 4 FLAT WASHER		30.0000
2	653-3001- - -	WASH 6 .150ID .288OD INT T ST		3.0000
2	653-3003- - -	WASH 6 .141ID .253OD SPLIT SS		2.0000
2	653-6002- - -	#10 FLAT WSHR (7/32X1/2X1/16ZINC PL	EC6946	1.0000
2	654-0513- - -	BUS BAR,CAPACITOR (77) B6822-186	EC7368	1.0000
2	654-0514- - -	BUS BAR,CAPACITOR (77) B6822-187	EC7368	1.0000
2	654-0515- - -	BUS BAR,CAPACITOR (77) B6822-188	EC7368	1.0000
2	654-1006- - -	#6 GROUND LUG		2.0000
2	654-1010- - -	#10 GROUND LUG	EC7368	23.0000
2	654-1107- - -	PIN HOUSING 1-480350-0	EC7368	1.0000
2	654-1108- - -	SOCKET HOUSING 1-480349-0	EC7368	1.0000
2	654-1188- - -	6 POS SOC HOUSING AMP 1-480270-0	EC7368	1.0000
2	654-1214- - -	GROMMET, HEYCO 6P3-4 ... (70.80.F	EC7368	1.0000

ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG   #=STATUS ITEM   ###=FRACTIONAL QUANTITY   P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
2		654-1274- - -	CABLE CLAMP ADH.BACK DKLSP 021-0375	EC7368	4.0000	
2		654-1290- - -	SNAP BUSH SB-1.000-12(1"HOLEX3/4ID)	EC7368	2.0000	
		.20-1152- ...				
1		270-3088- - -	MAIN HARNESS (77) D6482-197	EC7368	1.0000	
2		350-0404- - -	50 PIN FLAT CABLE SOCKET CONNECTOR		1.0000	
2		350-0406-B - -	50 PIN FLAT CABLE CONNECTOR BOTTOM		1.0000	
2		350-0406-C - -	50 PIN FLAT CABLE CONNECTOR COVER		1.0000	
2		376-9008-R - -	IC PAD 16 PIN TEKNA #4330		1.0000	
2		376-9012- - -	14 PIN IC SOCKET CAMBION		1.0000	
2	*	420-0088-R - -	50 COND FLAT CABLE 3M 3365/50		3.6600	###
2		510-7133- - -	7133 PRINTED CIRCUIT BOARD		1.0000	
2	*	600-0000- - -	WIRE 18 GA BLACK UL		4.2000	###
2	*	600-0001- - -	WIRE 18 GA BROWN UL		3.3700	###
2	*	600-0002- - -	WIRE 18 GA RED UL		4.3700	###
2	*	600-0003- - -	WIRE 18 GA ORANGE UL		3.3300	###
2	*	600-0004- - -	WIRE 18 GA YELLOW UL		3.3300	###
2	*	600-0005- - -	WIRE 18 GA GREEN UL		3.2900	###
2	*	600-0006- - -	WIRE 18 GA BLUE UL		3.2900	###
2	*	600-0007- - -	WIRE 18 GA VIOLET UL		3.2500	###
2	*	600-0008- - -	WIRE 18 GA GRAY UL		3.2500	###
2	*	600-0009- - -	WIRE 18 GA WHITE UL		3.2000	###
2	*	600-0091- - -	WIRE 18 GA WH/BRN		3.1600	###
2	*	600-0092- - -	18 GA WIRE WH/RED		3.1600	###
2		605-1004- - -	CABLE TYE. PAN-TY PLT1M-M	EC7502	9.0000	
2	*	654-0048-R - -	FASTON TERMINAL RED AMP 42599-4		2.0000	
2		654-0108- - -	20 POS.100 HEADER 2 ROW 1-87227-0		1.0000	
2		654-0113- - -	12 POS .100 HEADER 2 ROW AMP87456-8		1.0000	
2	*	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4		12.0000	
2		654-1171- - -	12 POS SOCKET HOUSING AMP 1-4802870	EC7361	1.0000	
2		654-1186- - -	6 POS PIN HEADER AMP 1-380999-0		3.0000	
2		654-1194- - -	4 POS P.C.HEADER ASSY AMP 350211-1		2.0000	
2		654-1198- - -	2 POS PIN HEADER ASSY AMP 350209-1		1.0000	
1		271-1135- - -	2261W KEYBOARD ASSY	EC7368	1.0000	
2	*	310-7130- - -	TOP CONTROL PANEL		1.0000	
3		220-3027- - -	14PIN 4 HEAD PTR KBD CABLE C6482-14		1.0000	
4		350-0400- - -	14 PIN FLAT CABLE PLUG 3M 3406		2.0000	
4	*	420-0042- - -	14 COND FLAT CABLE 3M 3365/14		4.0000	
3		328-2305- - -	11SM1 MICRO SWITCH FOR CP-1		5.0000	
3		370-0015- - -	CM6833 AS15 CLEAR LAMP		4.0000	
3		370-1020- - -	1200 LAMPHOLDER B5776-895		4.0000	
3		376-9008- - -	IC PAD 16 PIN TEKNA #4330	EC7111	1.0000	
3		510-7130- - -	7130 PRINTED CIRCUIT BOARD		1.0000	
3	*	605-0017- - -	TEFLON TUBING #28 TFT 200	EC7111	.6600	###
3		652-3002- - -	NUT 6-32UNC HEX REG PAT NYLON	EC7111	4.0000	
2		452-1056- - -	BEARING PLATE (77) B6822-875		1.0000	
2		462-0183- - -	SPCR 6-32UNC .250 OD .750 L HX B		6.0000	
2		550-0002- - -	LG WHT KEY STEM W/OFF-76		4.0000	
2		550-0002-M - -	LG WHT KEY STEM (77) B6822-881		3.0000	
2		550-0007-5 - -	LG GRN KEY CAP		7.0000	

ASSEMBLY PART NUMBER 177 2261 W   LEGEND
ASSEMBLY DESCRIPTION 2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
2		580-0013- - -	KEY RETAINER B5900-32		7.0000	
2		680-3100- - -	SCR 6-32 5/16 PHIL PH MS SS		12.0000	
2		683-3001- - -	WASH 6 .150ID .288OD INT T ST		12.0000	
2		684-1209- - -	GROMMET 1/4ID FOR 3/8HOLE 1/8PNL		1.0000	
1		279-0104- - -	FAN.SUB ASSY C6422-310	EC7368	1.0000	
2		000-0001- - -	LABOR SUB-SYSTEMS		.0800	###
2		000-0011- - -	LABOR QUALITY CONTROL		.0200	###
2		400-1007- - -	FAN.HOWARD 3-90-8177		1.0000	
2	*	605-0012- - -	TUBING #4 CLEAR		.8400	###
2		654-1147- - -	PIN HOUSING 1-480319-0		1.0000	
2	*	654-1164-R - -	PIN TERM 20-14 GA(REEL)AMP 61118-4		2.0000	
1	*	279-4100- - -	CABINET ASSY (2261W)		1.0000	
2		220-1155- - -	WIRE & LUG ASSY TYPE P068 B6482-12	EC7368	3.0000	
3		000-0004- - -	SUB-SYSTEMS		.0400	###
3		000-0011- - -	LABOR QUALITY CONTROL		.0100	###
3	*	420-0074- - -	TINNED COPPER FLAT BRAID 1/2" WIDE		.5000	###
3	*	654-0017-R - -	FASTON TERMINAL.YELLOW(REEL)		1.0000	
3		654-0117-R - -	1/4" RING LUG YELLOW BA 10-14M		1.0000	
2		220-1156- - -	WIRE & LUG ASSY TYPE P069 B6482-12	EC7368	2.0000	
3		000-0004- - -	SUB-SYSTEMS		.0300	###
3		000-0011- - -	LABOR QUALITY CONTROL		.0100	###
3	*	420-0074- - -	TINNED COPPER FLAT BRAID 1/2" WIDE		.5000	###
3	*	654-0117-R - -	1/4" RING LUG YELLOW BA 10-14M		2.0000	
2		400-1001- - -	FAN WHISPER M745	EC7368	2.0000	
2		446-0030- - -	WINDOW.COVER CONTROLS(SS) C6822-858		1.0000	
2		446-0031- - -	WINDOW.COVER.SIGHT C6822-855		1.0000	
2		446-0032- - -	WINDOW.FRONT DOOR D6822-859		1.0000	
2		449-0101- - -	FAN GUARD 4"(BLACK)D5300-1085	EC7368	2.0000	
2		449-0180- - -	COVER TOP (QUAD HD 2261W) E6822-812		1.0000	
2		451-1230- - -	PAN.TOP (MECHANISM)(77) E6822-817		1.0000	
2		451-1231- - -	PAN.BOTTOM (77) D6822-824		1.0000	
2		451-2926- - -	FRAME.COVER WELDMENT (77) D6822-832		1.0000	
2		451-3864- - -	PANEL.MODESTY (77) D6822-816		1.0000	
2		451-3866- - -	PANEL.SIDE(LH) (77) E6822-831		1.0000	
2		451-3867- - -	PANEL.SIDE(RH) (77) E6822-831		1.0000	
2		451-4541- - -	BRKT.ANGLE REAR (77) C6822-838		4.0000	
2		451-4542- - -	BRKT.ANGLE FRONT (77) C6822-837		4.0000	
2		451-4543- - -	BRKT.CHASSIS (77) B6822-820		1.0000	
2		451-4544- - -	BRKT.CHASSIS SUPPORT(77) C6822-822		1.0000	
2		451-4545- - -	BRKT.MAGNET B6822-840		1.0000	
2		451-4546- - -	BRKT.PROP BAR C6822-843	EC7368	1.0000	
2		451-4547- - -	BRKT.CHASSIS SLIDE C6822-823		1.0000	
2		451-4548- - -	BRKT.PAPER GUIDE (77) C6822-184		2.0000	
2		451-4549- - -	BRKT.COVER PIVOT RH WELDM C6822-847	EC7368	1.0000	
2		451-4550- - -	BRKT.COVER PIVOT LH WELDM C6822-847	EC7368	1.0000	
2		452-2169- - -	PLATE.STOP (REAR DOOR) B6822-856		2.0000	
2		452-4063- - -	GUIDE.COVER B6822-844		1.0000	
2		452-4055- - -	GUIDE.PAPER (LOWER) C6822-182	EC7368	1.0000	

ASSEMBLY PART NUMBER   177 2261 W
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   LEGEND
                                                                 *=KIT TAG   #=STATUS ITEM   ###=FRACTIONAL QUANTITY   P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
2		458-0428- - -	DOOR,FRONT (77) D6822-849		1.0000	
2		458-0429- - -	BAR,PROP C6822-846	EC7368	1.0000	
2		458-0431- - -	CATCH,REAR DOOR (77) B6822-857		1.0000	
2		458-0432- - -	DOOR,REAR (77) E6822-826		1.0000	
2		458-0439- - -	FILTER,AIR (ALUM MESH)77 C6822-841		1.0000	
2		461-0058- - -	702 NUT PLATE OHIO TP1716 ZINC PL	EC7058	5.0000	
2		461-3342- - -	ROD,CHASSIS PIVOT B6822-821 (77)	EC7368	1.0000	
2		461-3343- - -	ROD,PIVOT-PAPER CHUTE B6822-848		1.0000	
2		462-0125- - -	100 SPACER XFMR B6068-52 W/OFF-76	EC7368	1.0000	
2		465-0824- - -	HINGE,REAR DOOR LH (77) B6822-834		2.0000	
2		465-0826- - -	HINGE,FRONT DOOR LH (77) B6822-833		2.0000	
2		478-0364- - -	HOLDER,ROD(PAPER CHUTE)77 B6822-827		1.0000	
2		478-0365- - -	PIVOT,CHASSIS (77)	EC7368	1.0000	
2		478-0367- - -	PIN,PROP BAR B6822-845	EC7368	1.0000	
2		650-4120- - -	8-32 X 3/8 PAN HD PHL MS SS SEMS	EC7368	2.0000	
2		650-6086- - -	SCR,SET 10-32 X 1/4 ALLEN	EC7368	1.0000	
2		650-6122- - -	10-32X3/8 FLANGE WHIZ-LOCK MS ZINC	EC7368	22.0000	
2		650-6201- - -	10-32X5/8 FLANGE WHIZ-LOCK MS ZINC	EC7368	1.0000	
2		650-9013- - -	1/4-20X 1/2 FLANGE WHIZ-LOCK MS ZNC	EC7368	25.0000	
2		652-0018- - -	INACTIVE,1/4X20 HEX NUT ZINC	EC7368	24.0000	
2		652-6002- - -	10-32 LOCK NUT KEPS #511-101800-50	EC7368	16.0000	
2		653-6006- - -	WASH 1/4 .265ID .500OD .032 FL SS	EC7368	32.0000	
2		655-0015- - -	CASTER 3"DIA WHEEL(BASSICK 3689-1)		4.0000	
2		655-0016- - -	GLIDES, LEVELING 1/2-13 2.00DIA PAD		4.0000	
2		655-0017- - -	MAGNETIC CATCH (SOUTH 02-10-201-10		1.0000	
2		655-0018- - -	PLUG,BUTTON (BLACK) SS48166 P5001	EC7368	1.0000	
2		660-0568- - -	FOAM,FRONT DOOR (77) C6822-866		1.0000	
2		660-0569- - -	FOAM,TOP SIDES (77) B6822-867		2.0000	
2		660-0570- - -	FOAM,TOP REAR (77) B6822-868		2.0000	
2		660-0571- - -	FOAM,REAR DOOR LEFT (77) C6822-869		1.0000	
2		660-0572- - -	FOAM,REAR DOOR RIGHT (77) B6822-870		1.0000	
2		660-0573- - -	FOAM,REAR DOOR TOP (77) B6822-871		1.0000	
2		660-0574- - -	FOAM,REAR DOOR BOTTOM(77) B6822-872		1.0000	
2		660-0575- - -	FOAM,SIDE PANEL FRONT(77) B6822-873		2.0000	
2		660-0576- - -	FOAM,SIDE PANEL REAR (77) B6822-874		2.0000	
1	*	279-5077-11- -	2261W MECHANICAL ASSY 6822-11		1.0000	
2		279-5077-12- -	HEAD ASSY (77) 6822-12		4.0000	
3	*	279-5070-14- -	PRINT SOLENOID ASSY C6635-14	EC7483	8.0000	
4		000-0011- - -	LABOR QUALITY CONTROL		.0300	###
4		000-0021- - -	LABOR PERIPHERAL SYSTEMS		.1500	###
4		320-0048- - -	MP-70 COIL B6615-38		1.0000	
4		458-0285- - -	HDL70 GUIDE TUBE B6615-20		1.0000	
4		458-0296- - -	MP-70 SOLENOID END CAP B6615-22		1.0000	
4	*	462-0231- - -	MP-70 SPRING SPACER.014 TH B6615-19		.1000	###
4	*	462-0232- - -	MP-70 SPRING SPACER.016 TH B6615-19		.1500	###
4	*	462-0233- - -	MP-70 SPRING SPACER.018 TH B6615-19		.2500	###
4		462-0234- - -	MP-70 SPRING SPACER.020 TH B6615-19		.2500	###
4	*	462-0235- - -	MP-70 SPRING SPACER.022 TH B6615-19		.1500	###
4	*	462-0236- - -	MP-70 SPRING SPACER.024 TH B6615-19		.1000	###
4		465-1608- - -	MP-70 #52 PLUNGER SPRING B6615-105	EC7429	1.0000	
4		478-0263- - -	HDL70 SPRING RETAINER B6615-18		1.0000	

ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   ♦=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
4		478-0265- - -	BODY & CORE -70 SOLENOID C6615-24		1.0000	
4		478-0271- - -	MP-70 SOLENOID WIRE B6615-16	EC4973	1.0000	
4		478-0272- - -	MP-70 SOLENOID PLUNGER B6615-15	EC4973	1.0000	
4	♦	660-0205- - -	SOLDER PREFORM(RING)E.F.#45	EC5357	1.0000	
3	♦	279-5077-13- -	HEAD & GUIDE TUBE ASSY 6822-13		1.0000	
4	A	450-0101- - -	HEAD,DIE CAST(72)D6615-197		1.0000	
4		452-4021- ♦ -	MDL71/72 TUBE PARTITION 3 C6615-37		1.0000	
4		452-4046- - -	TUBE GUIDE, PARTITION #1		1.0000	
4		452-4047- - -	TUBE GUIDE, PARTITION #2		1.0000	
4		458-0286- - -	MDL70 STRAIGHT GUIDE TUBE B6615-47		1.0000	
4		458-0287- - -	MDL70 CURVED GUIDE TUBE B6615-46		8.0000	
4		461-3224- - -	PIN,LOCATING(-72)B6615-232		1.0000	
4		465-0256- - -	BEARING,PRINTHEAD(77)C6822-114		1.0000	
4		650-0064- - -	00-90X3/16 FLAT HD SLOT SS SCREW		2.0000	
4		651-1605- - -	DOWELL PIN 1/8 X 3/8 SS		1.0000	
4	♦	660-0181- - -	CONACURE 02 HARDENER		.0100	###
4	♦	660-0183- - -	CONAPOXY,FR1210		.0100	###
3		449-0150- - -	COVER,PRINT HEAD(70/60)D6615-261		1.0000	
3	B	510-6572- - -	6572 PRINTED CIRCUIT BOARD		1.0000	
3	♦	605-1004- - -	CABLE TYE, PAN-TY PLTIM-M		2.0000	
3		650-2098- - -	SCR 4-40 X 1/4 PAN HD PHL LONGLOK		2.0000	
3		650-2167- - -	4-40 X 1/2 ALLEN HD SET SCREW		1.0000	
3		650-4086- - -	8-32 X 15/64 NYLON TIP SET SCREW		9.0000	
3		660-0560- - -	FELT WICK,PRINT HEAD B6636-266	EC7368	1.0000	
2		279-5077-17- -	DRIVE MOTOR & TACH ASSY 6822-17		1.0000	
3		270-3084- - -	CARRIAGE MOTOR HARNESS(77)B6482-196	EC7450	1.0000	
4	♦	600-0000- - -	WIRE 18 GA BLACK UL		1.4200	###
4	♦	600-0002- - -	WIRE 18 GA RED UL		1.1600	###
4	♦	600-3000- - -	WIRE 26 GA BLACK		1.0000	
4	♦	600-3003- - -	WIRE 26 GA ORANGE		1.0000	
4	♦	605-0010- - -	TUBING PVC #8 CLEAR		.1600	###
4	♦	605-1004- - -	CABLE TYE, PAN-TY PLTIM-M		3.0000	
4		654-1006- - -	#6 GROUND LUG		2.0000	
4	♦	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61917-4		2.0000	
4	♦	654-1165-R - -	SOCKET 30-22 GA(REEL)AMP 3500078-4		2.0000	
4		654-1195- - -	4 POS SOCKET HOUSING AMP 1-480424-0		1.0000	
3		279-5077-18- -	CARR DRIVE MTR & PULLEY ASSY6822-18		1.0000	
4	C	400-0034- - -	MOTOR,CARRIER(81)B6631-102		1.0000	
4		478-0261- - -	MDL70 CARRIAGE DR PULLEY B6615-112		1.0000	
4		478-0348- - -	PULLEY,TACH DRIVE(30T 40DP).500BORE		1.0000	
4		651-1508- - -	PR ROLL PIN 3/32 X 5/8		1.0000	
3		A 400-0028- - -	12V D.C.MOTOR NAPC 9904-120-12601		1.0000	
3		451-4501- - -	BRKT,MOTOR QUAD HEAD C6822-113 (77)		1.0000	
3		451-4503- - -	MOUNT,TACHOMETER (77) C6822-133		1.0000	
3		478-0288- - -	PULLEY,-70 TACHOMETER B6615-190		1.0000	
3		656-0232- - -	BELT,TACH DR(98T 40DP) 1/8 WIDE		1.0000	

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ASSEMBLY PART NUMBER 177 2261 W   LEGEND
ASSEMBLY DESCRIPTION 2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
2	279-5077-19- -	CARRIAGE ASSY 6822-19		1.0000	
3	279-5077-20- -	CARR CASTING ASSY 6822-20		1.0000	
4	450-0110- - -	CARRIAGE CASTING.(77) D6822-101		1.0000	
4	651-1603- - -	PIN,DOWEL 1/4 X 3/8 SS	EC7368	1.0000	
4	651-1639- - -	DOWEL PIN,3/16 X 3/8 LONG		4.0000	
3	279-5077-21- -	BRKT ASSY,OUTBD BEARING LH 6822-21		1.0000	
4	451-4508- * -	BRKT,OUTBOARD BEAR(LH)(B6822-102		1.0000	
4	465-1041- - -	MDL70 BEARING MOUNT HUB B6615-70		1.0000	
3	279-5077-22- -	BRKT ASSY,OUTBD BEARING RH 6822-22		1.0000	
4	451-4509- - -	BRKT,OUTBOARD BEAR(RH)(B6822-102)		1.0000	
4	465-1041- - -	MDL70 BEARING MOUNT HUB B6615-70		1.0000	
3	451-4531- - -	BRKT,HEAD MTG (77) C6822-104		4.0000	
3	452-0079- - -	PLATE,BACKING B6822-141		1.0000	
3	452-2576- - -	CLAMP,BELT (77) B6822-140		1.0000	
3	458-0294- - -	ECCENTRIC BEARING MOUNT B6615-69		2.0000	
3	461-3172- - -	MDL70 CARRIAGE BRG STUD B6615-72		4.0000	
3	461-3178- - -	CARRIAGE ECCEN.SPRING PIN B6615-146		2.0000	
3	461-3330- - -	ECCENTRIC,HORIZ HD ALIGN B6822-131		7.0000	
3	462-0290- - -	STANDOFF B6822-150		2.0000	
3	462-0294- - -	SPACER,CAM(LARGE)(77) B6822-178		1.0000	
3	462-0295- - -	SPACER,CAM(SMALL)(77) B6822-177		1.0000	
3	465-0012- - -	BALL BEARING,SR4IPP	EC7368	6.0000	
3	465-0260- - -	BEARING,CAMFOLLOWER		1.0000	
3	465-0261- - -	BEARING,CAMFOLLOWER ECCENTRIC		1.0000	
3	468-1672- - -	SPRING,EXTENSION .19X1.00X.031DIA	EC7368	2.0000	
3	478-0351- - -	MOUNT,CONNECTOR B6822-149		1.0000	
3	650-6168- - -	10-32X1/2 HEX INDENT HD STL ZINC PL		2.0000	
3	651-1727- - -	RETAINING RING,CRESC TRUARC 5103-25		4.0000	
3	656-0220- - -	TIMING BELT 420L050 FLEXIBLE CONSTR		1.0000	
2	279-5077-23- -	RIBBON FEED ASSY L.H.6822-23		1.0000	
3	278-3086- - -	R&L RIBBON MTR HARNESS(77)C6482-198	EC7450	1.0000	
4	600-0000- - -	WIRE 18 GA BLACK UL		1.2500	###
4	600-0090- - -	WIRE 18 GA WH/BLK		1.1700	###
4	600-3080- - -	WIRE 26 GA BLACK		1.4600	###
4	600-3090- - -	WIRE 26 GA WH/BLK W/OFF-76		1.4600	###
4	605-0000- - -	TUBING #10 CLEAR		1.3300	###
4	605-0185- - -	TUBING 1 BLACK W/OFF-76	EC7502	.2900	###
4	605-5004- - -	CABLE TYE, PAN-TY PLTIN-M	EC7502	1.0000	
4	654-0848-R - -	FASTON TERMINAL RED AMP 42599-4		2.0000	
4	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4		2.0000	
4	654-1165-R - -	SOCKET 30-22 GA(REEL)AMP 3500078-4		4.0000	
4	654-1188- - -	6 POS SOC HOUSING AMP 1-480270-0		1.0000	
3	279-5077-27- -	BRKT ASSY,LH RIBBON FEED 6822-27		1.0000	
4	451-4528- - -	BRKT,RIBBON FEED LH (77)B6822-164		1.0000	
4	461-3194- - -	-70 RIBBON TRIP ARM PIVOT B6615-88		1.0000	
4	462-0168- - -	STDF 4-40 .312LG CL TRU TRD SS		1.0000	
4	651-1642- - -	GROOVE PIN,3/32 X 3/8 TYPE 6 DRYLOK		1.0000	

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ASSEMBLY PART NUMBER   177 2261 W
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)

LEGEND
*=KIT TAG @=STATUS ITEM @##=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
3		320-1013- - -	TUBULAR SOLENOID & PLUNGER		1.0000	
3		325-2309- - -	SWITCH, BURGESS V4T7Y1		1.0000	
3		400-0041- - -	MOTOR,RIBBON FEED(CW)(77)C6822-118		1.0000	
3		451-4316- - -	MP-70 SOLENOID BRKT(R.H.)C6615-149		1.0000	
3		452-4049- - -	GUIDE,RIBBON B6822-137		1.0000	
3		458-0300- - -	MP-70 RIBBON REV.ACT.ARM B6615-86		1.0000	
3		458-0301- - -	MP-70 CLUTCH ENGAGEMENT ARM 6615-87		1.0000	
3		458-0411- - -	ARM,RIBBON TENSION(LH)(B6822-144)		1.0000	
3		461-3192- - -	-70 SOL.ACTUATOR ARM STUD B6615-109		1.0000	
3		461-3331- - -	BRAKE,RIBBON TENSION ARM B6822-136		1.0000	
3		465-0917- - -	SPRING TYPE 2 #5 B5776-288		2.0000	
3		465-1067- - -	HUB,TENSION ARM B6822-146		1.0000	
3		465-1670- - -	SPRG.EXT 3/16X1 3/8X.022DIA MUSIC W	EC7268	1.0000	
3		615-0334- - -	1200 MICRO-SWI INSULATOR B5776-733		1.0000	
3		651-1504- - -	PR ROLL PIN 1/16 X 3/8		1.0000	
3		651-1712- - -	5133-18 SNAP RING		1.0000	
3		651-1719- - -	SNAP RING TRUARC 5133-25		1.0000	
2		279-5077-24- -	RIBBON FEED ASSY R.H.6822-24		1.0000	
3		270-3086- - -	REL RIBBON MTR HARNESS(77)C6482-198	EC7450	1.0000	
4	*	600-0000- - -	WIRE 18 GA BLACK UL		1.2500	###
4	*	600-0090- - -	WIRE 18 GA WH/BLK		1.1700	###
4	*	600-3080- - -	WIRE 26 GA BLACK		1.4600	###
4	*	600-3090- - -	WIRE 26 GA WH/BLK	W/OFF-76	1.4600	###
4	*	605-0000- - -	TUBING #10 CLEAR		1.3300	###
4		605-0108- - -	TUBING 1 BLACK	W/OFF-76 EC7502	.2900	###
4		605-3004- - -	CABLE TYE, PAN-TY PLTIN-M	EC7502	1.0000	
4	*	654-0048-R - -	FASTON TERMINAL RED AMP 42599-4		2.0000	
4	*	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4		2.0000	
4	*	654-1165-R - -	SOCKET 30-22 GA(REEL)AMP 3500078-4		4.0000	
4		654-1185- - -	6 POS SOC HOUSING AMP 1-480270-0		1.0000	
3		279-5077-28- -	BRKT ASSY,RH RIBBON FEED 6822-28		1.0000	
4		451-4529- - -	BRKT,RIBBON FEED RH (77)B6822-165		1.0000	
4		461-3194- - -	-70 RIBBON TRIP ARM PIVOT B6615-88		1.0000	
4		462-0166- - -	STDF 4-40 .312LG CL TRU TRD SS		1.0000	
4		651-1642-1 - -	GROOVE PIN,3/32 X 3/8 TYPE G DRYLOK		1.0000	
3		320-1013- - -	TUBULAR SOLENOID & PLUNGER		1.0000	
3		325-2309- - -	SWITCH, BURGESS V4T7Y8		1.0000	
3		400-0042- - -	MOTOR,RIBBON FEED(CCW)(77)C6822-118		1.0000	
3		451-4316- - -	MP-70 SOLENOID BRKT(R5H.)C6615-149		1.0000	
3		452-4049- - -	GUIDE,RIBBON B6822-137		1.0000	
3		458-0300- - -	MP-70 RIBBON REV.ACT.ARM B6615-86		1.0000	
3		458-0301- - -	MP-70 CLUTCH ENGAGEMENT ARM 6615-87		1.0000	
3		458-0412- - -	ARM,RIBBON TENSION(RH) 6822-144		1.0000	
3		461-3192- - -	-70 SOL.ACTUATOR ARM STUD B6615-109		1.0000	
3		461-3331- - -	BRAKE,RIBBON TENSION ARM B6822-136		1.0000	
3		465-0917- - -	SPRING TYPE 2 #5 B5776-288		2.0000	
3		465-1067- - -	HUB,TENSION ARM B6822-146		1.0000	
3		465-1670- - -	SPRG.EXT 3/16X1 3/8X.022DIA MUSIC W	EC7268	1.0000	

ASSEMBLY PART NUMBER 177 2261 W
ASSEMBLY DESCRIPTION 2261W 240LPM MATRIX PRINTER (77)   LEGEND   *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
3		615-0334- - -	1200 MICRO-SWI INSULATOR B5776-733		1.0000	
3		651-1504- - -	PR ROLL PIN 1/16 X 3/8		1.0000	
3		651-1712- - -	5133-18 SNAP RING		1.0000	
3		651-1719- - -	SNAP RING TRUARC 5133-25		1.0000	
2		279-5077-29- -	FORMAT CONTROL ASSY(2261W)6822-29		1.0000	
3	*	210-7174- - -	7174 MODULE (MDL 77)		1.0000	
4		375-2104- - -	TIL78 PHOTO TRANSISTOR		4.0000	
4		510-7174- - -	7174 PRINTED CIRCUIT BOARD		1.0000	
3	*	210-7175- - -	7175 MODULE (MDL 77)		1.0000	
4		380-0104- - -	TIL32 LED (LIGHT EMITTING DIODE)		4.0000	
4		510-7175- - -	7175 PRINTED CIRCUIT BOARD		1.0000	
3		270-3082- - -	FORMAT CNTRL HARNESS (77) C6482-194 EC7368		1.0000	
4	*	600-3000- - -	WIRE 26 GA BLACK		1.7500	###
4	*	600-3001- - -	WIRE 26 GA BROWN		1.6600	###
4	*	600-3002- - -	WIRE 26 GA RED		1.6600	###
4	*	600-3003- - -	WIRE 26 GA ORANGE		1.7500	###
4	*	600-3004- - -	WIRE 26 GA YELLOW		1.6600	###
4	*	600-3005- - -	WIRE 26 GA GREEN		1.7500	###
4	*	600-3006- - -	WIRE 26 GA BLUE		1.6600	###
4	*	600-3007- - -	WIRE 26 GA VIOLET		1.7500	###
4	*	600-3008- - -	WIRE 26 GA GRAY		1.6600	###
4	*	600-3009- - -	WIRE 26 GA WHITE		1.7500	###
4	*	605-0014- - -	TUBING #5 CLEAR		1.3300	###
4		654-0102-R - -	30-26 GA CRIMP SNAP CONT AMP85967-6		10.0000	
4		654-0103- - -	.025 KEYING PLUG AMP 8707-2		1.0000	
4		654-0114- - -	12 POS .100 HOUSING 2 ROW 87227-6		1.0000	
3	*	279-5070-31- -	COVER ASSY.L.E.D.B6635-31		1.0000	
4		000-0020- - -	LABOR PREP AREA		.0100	###
4		452-2141- - -	MP-70 L.E.D.HOUSING COVER B6615-137		1.0000	
4		461-3181- - -	MP-70 SPRING PIN (F.C.) B6615-139		1.0000	
3		279-5077-30- -	MTG PLATE ASSY.FORMAT CONT 6822-30		1.0000	
4		452-0081- - -	PLATE.FORMAT CONTROL MTG C6A22-122		1.0000	
4		461-3181- - -	MP-70 SPRING PIN (F.C.) B6615-139		1.0000	
4		461-3182- - -	MP-70 PIVOT PIN (L.E.D.) B6615-133		1.0000	
3		452-2140- - -	MP-70 CELL MOUNT COVER B6615-134		1.0000	
3		458-0295- - -	MP-70 FORMAT CONTROL STOP B6615-138		2.0000	
3		461-3186- - -	PHOTOTRANSISTOR HOUSING C6615-115		1.0000	
3		461-3191- - -	MP-70 L.E.D.HOUSING C6615-116		1.0000	
3		462-0229- - -	MP-70 L.E.D.COVER SPACER B6615-136		1.0000	
3		465-0409- - -	MDL 24 COLLAR.SET SCREW B5996-100		1.0000	
3		465-0938- - -	SPRING.TORSION B5776-249		1.0000	
3		650-2043- - -	4-40X1/8 KNURL CUP PT BK OX SET SCR		1.0000	
3		650-3085- - -	6-32 X 1/4 PAN HD PHL MS BK OX		2.0000	
3		650-3134- - -	SCR 6-32 3/8 SOC CAP HD MS SS		2.0000	
3		651-0014- - -	SCR.#2X1/4 SELF THREAD PAN HD T-25		2.0000	
3		651-0015- - -	SCR.#4X1/4 SELF THR SL FIL HD T-25		5.0000	

ASSEMBLY PART NUMBER   177 2261 W   LEGEND
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)   ⊕=KIT TAG ∅=STATUS ITEM ∅∅∅=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
3		651-0016- - -	SCR,#4X1/2 SELF THR SL HND HD T-25		1.0000	
3		653-2000- - -	NO. 4 FLAT WASHER		5.0000	
3		653-3000- - -	WASH 6 .149ID .3750D .016 FL SS		2.0000	
2	⊕	279-5077-34- -	P.F FORMAT & FRAME ASSY(61W)6822-34		1.0000	
3	⊕	279-5070-38- -	COVER L.H.PAPER GUIDE ASSY C6635-38		1.0000	
4		000-0011- - -	LABOR QUALITY CONTROL		.0300	∅∅∅
4		000-0021- - -	LABOR PERIPHERAL SYSTEMS		.1500	∅∅∅
4		279-5070-40- -	SIDE PLATE ASSY LH B6635-40	EC4717	1.0000	
5		000-0020- - -	LABOR PREP AREA		.0100	∅∅∅
5		452-0045- - -	SIDE PLATE,LEFT P.F.(62)D6636-235	EC5389	1.0000	
5		461-3198- - -	MP-70 SPRING PIN B6615-167		1.0000	
4		451-2104- - -	MP-70 PAPER GUIDE COVER C6615-81		1.0000	
4		458-0304- - -	MP-70 PAPER LIFT ARM(L.H.)B6615-166		1.0000	
4		461-3199- - -	MP-70 SPROCKET COVR PIVOT B6615-160		2.0000	
4		465-0730- - -	BUSHING,SPROCKET(62)C6636-229	EC5390	1.0000	
4		465-1614- - -	SPRING,LEE 016A-0		1.0000	
4		650-2062- - -	SCR 4-40 3/16 PHIL FIL H MS SS	EC5306	2.0000	
4		650-2098- - -	SCR 4-40 X 1/4 PAN HD PHL LONGLOK		1.0000	
4		650-2241- - -	4-40X3/4 FL HD PHL MS BK OX		2.0000	
4		650-3124- - -	6-32 X 3/8 TRUSS HD PHL MS SS	EC5306	2.0000	
4		653-2002- - -	WASH 4 .123ID .2650D INT T ST		2.0000	
3	⊕	279-5070-39- -	COVER R.H.PAPER GUIDE ASSY C6635-39		1.0000	
4		000-0011- - -	LABOR QUALITY CONTROL		.0300	∅∅∅
4		000-0021- - -	LABOR PERIPHERAL SYSTEMS		.1500	∅∅∅
4		279-5070-41- -	SIDE PLATE ASSY RH B6635-41	EC4717	1.0000	
5		000-0020- - -	LABOR PREP AREA		.0100	∅∅∅
5		452-0046- - -	SIDE PLATE,RIGHT P.F.(62)D6636-235	EC5389	1.0000	
5		461-3198- - -	MP-70 SPRING PIN B6615-167		1.0000	
4		451-2104- - -	MP-70 PAPER GUIDE COVER C6615-81		1.0000	
4		458-0305- - -	MP-70 PAPER LIFT ARM(R.H.)B6615-166		1.0000	
4		461-3199- - -	MP-70 SPROCKET COVR PIVOT B6615-160		2.0000	
4		465-0730- - -	BUSHING,SPROCKET(62)C6636-229	EC5390	1.0000	
4		465-1614- - -	SPRING,LEE 016A-0		1.0000	
4		650-2062- - -	SCR 4-40 3/16 PHIL FIL H MS SS	EC5306	2.0000	
4		650-2098- - -	SCR 4-40 X 1/4 PAN HD PHL LONGLOK		1.0000	
4		650-2241- - -	4-40X3/4 FL HD PHL MS BK OX		2.0000	
4		650-3124- - -	6-32 X 3/8 TRUSS HD PHL MS SS	EC5306	2.0000	
4		653-2002- - -	WASH 4 .123ID .2650D INT T ST		2.0000	
3	⊕	279-5070-66- -	SPROCKET & BAND ASSY(LH)B6635-66		1.0000	
4		478-0332- - -	SPROCKET,LH PAPER FEED(21W)B6615276		1.0000	
4		656-0010- - -	SPROCKET BAND(-21W)B6615-241		2.0000	
4	⊕	660-0106- - -	CEMENT LOCTITE 1S06		.0100	∅∅∅
3	⊕	279-5070-67- -	SPROCKET & BAND ASSY(RH)B6635-67		1.0000	
4		478-0333- - -	SPROCKET,RH PAPER FEED(21W)B6615276		1.0000	
4		656-0010- - -	SPROCKET BAND(-21W)B6615-241		2.0000	
4	⊕	660-0106- - -	CEMENT LOCTITE 1S06		.0100	∅∅∅

ASSEMBLY PART NUMBER 177 2261 W   LEGEND
ASSEMBLY DESCRIPTION 2261W 240LPM MATRIX PRINTER (77)   **=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
3	279-5077-32- -	VERNIER CLUTCH ASSY(2261W) 6822-32		1.0000
4	461-1030- - -	RING,VERNIER(MP-70)B6615-164		1.0000
4	461-3183- - -	MP-70 IDLER SHAFT B6615-117		1.0000
4	461-3184- - -	-70 VERNIER CLUTCH SHAFT B6615-124		1.0000
4	465-0414- - -	MP-70 IDLER SHAFT COLLAR B6615-121		1.0000
4	465-1046- - -	MP-70 VERNIER HUB PAPER DR.6615-131	EC7429	1.0000
4	465-1066- - -	HUB,IDLER PULLEY C6822-145		1.0000
4	478-0268- - -	MP-70 IDLER SHAFT PULLEY B6615-123		1.0000
4	478-0349- - -	PULLEY,IDLER(72T 40DP)B6822-162		1.0000
4	650-4040- - -	SCR.8-32 X 1/8 SOC SET CUP POINT		1.0000
4	651-1600- - -	DOWEL PIN 3/32 X 3/4 SS		1.0000
4	651-1640- - -	DOWELL PIN .062 X.25 (SS)		1.0000
4	651-1713- - -	5103-18 SNAP RING		1.0000
4	651-1729- - -	SNAP RING,TRUARC#5103-37		1.0000
3	279-5077-36- -	SIDE PLATE ASSY RH(2261W) 6822-36		1.0000
4	452-0083- - -	PLATE, RIGHT SIDE C6822-117		1.0000
4	465-0721- - -	BUSHING,FSB-375		1.0000
3	326-2403-M1- -	SWITCH(62)PAPER OUT B6636-225		1.0000
3	449-0109- - -	MOLDED KNOB"D" C5300-1093		1.0000
3	C 451-2133- - -	COVER,LOWER REAR (72)C6615-199		1.0000
3	451-4303- - -	MDL70 SIDEFRAME ANGLE B6615-34		2.0000
3	451-4510- - -	BRKT.RIBBON GUIDE (LH) C6822-110		1.0000
3	451-4511- - -	BRKT.RIBBON GUIDE (RH) C6822-109		1.0000
3	452-0082- - -	PLATE, LEFT SIDE C6822-116	EC7368	1.0000
3	452-2648- - -	MP-70 BRG HOUSING CLAMP B6615-125		2.0000
3	452-4049- - -	GUIDE,RIBBON B6822-137		2.0000
3	461-0103- - -	NUT PLATE,PAPER SW(62)B6636-222	EC7368	1.0000
3	461-0113- - -	PLATE,STRIKER C6822-161		1.0000
3	461-1029- - -	DISC(MP-70)PAPER SUPPORT B6615-158		3.0000
3	461-1032- - -	DISC.-70 KNOB DRESS B5300-1094		1.0000
3	461-2015-M - -	MP-70 TAPE SPROCKET(MOD)B6615-122		1.0000
3	461-3170- - -	MDL70 MARGIN ALIGN SHAFT B6615-48		1.0000
3	461-3175- - -	MP-70 SPLINE SHAFT B6615-89		1.0000
3	461-3185- - -	MP-70 BEARING HOUSING B6615-126		1.0000
3	461-3197- - -	MP-70 TIE ROD B6615-163		1.0000
3	461-3338- - -	SHAFT,VERNIER EXT KNOB B6822-157		1.0000
3	462-0228- - -	-70 FORMAT CONTROL SPACER B6615-135		4.0000
3	465-0011- - -	BALL BEARING SR61PPD		2.0000
3	465-0235- - -	BEARING,KUBAR SFR6HH	EC7368	2.0000
3	465-0264- - -	BEARING,ROLLER (NYLON)	EC7368	1.0000
3	465-1606- - -	MP-70 SPROCKET ADJ.SPRING B6615-130		1.0000
3	465-1617- - -	SPRING,LEE LC-038G-8		2.0000
3	465-1620- - -	KNOB SPRING(-72)LECTRA #2700		1.0000
3	465-1628- - -	SPRING,DISC SEPARATOR(72)B6615-80		4.0000
3	478-0286- - -	PULLEY,SPROCKET SHAFT DR B6615-187		1.0000
3	656-0228- - -	TIMING BELT 40DP 153T 1/4W		1.0000
2	* 279-5077-43- -	BASE CASTING ASSY(2261W) 6822-43		1.0000
3	279-5077-16- -	CARRIAGE SHAFT ASSY (77) 6822-16		1.0000

ASSEMBLY PART NUMBER 177 2261 W   LEGEND
ASSEMBLY DESCRIPTION 2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
4	461-3336- - -	SHAFT,CARRIAGE B6822-151		1.0000
4	461-3337- - -	ECCENTRIC,CARRIAGE SHAFT B6822-163		3.0000
3	279-5077-45- -	DRIVE SHAFT & BEARING ASSY 6822-45		1.0000
4	461-3167- - -	MDL70 DRIVE SHAFT B6615-31		1.0000
4	461-3173- - -	MDL70 BEARING HOUSING B6615-96		2.0000
4	465-0011- - -	BALL BEARING SR61PPD		2.0000
4	465-0416- - -	COLLAR,SHAFT 3/8 ID 7C2-12412		1.0000
4	478-0278- - -	PULLEY(MP-70)CARR.DRIVE B6615-176		1.0000
4	478-0344- - -	PULLEY,TIMING (1/5P-58TOOTH)		1.0000
4	650-3124- - -	6-32 X 3/8 TRUSS HD PHL MS SS		4.0000
4	650-6061- - -	10-32 X 3/16 KNURL CUP PT. NYLOX		1.0000
4	651-1535- - -	ROLL PIN 1/8 X 1/8 BLACK		1.0000
4	653-0035- - -	WASHER,WAVE SPRING ASC W0484-009		1.0000
3	450-0109- - -	BASE CASTING,QUAD HD (77)E6822-100		1.0000
3	451-4301- - -	MDL70 IDLER PULLEY BRACKET B6615-33	EC7368	1.0000
3	452-2578- - -	CLAMP,CARRIAGE SHAFT(77)B6822-132		3.0000
3	452-2583- - -	CLAMP,PAPER TENSION(77)B6822-127		1.0000
3	452-4050- - -	GUIDE,CARRIAGE QUAD HEAD B6822-107		1.0000
3	458-0413- - -	STOP,CARRIAGE B6822-125		2.0000
3	458-0419- - -	SUPPORT,SPRING (77) B6822-174		1.0000
3	458-0420- - -	ARM,ADJUSTMENT(HEAD)(77)D6822-121		1.0000
3	461-3171- - -	MDL70 IDLER PULLEY STUD B6615-32	EC7368	1.0000
3	465-0238- - -	MP-70 ROLLER BEARING TORR#JH-812	EC7368	1.0000
3	465-0737- - -	BUSHING,CARRIAGE SHAFT(77)B6822-169		3.0000
3	465-1661- - -	SPRING,CARRIAGE B6822-126		2.0000
3	465-1662- - -	SPRING,HEAD ADJ ARM B6822-119		1.0000
3	478-0262- - -	MDL70 IDLER PULLEY B6615-120	EC7368	1.0000
3	651-1740- - -	RETAINING·RING TRUARC 5100-50	EC7368	1.0000
3	652-0054- - -	5/16-18 STOP NUT ZINITE 058	EC7368	1.0000
2	279-5077-64- -	PAPER FEED MTR ASSY 6822-64		1.0000
3	400-0040- - -	STEPPING MOTOR(77)		1.0000
3	478-0347- - -	PULLEY,PAPER FEED(75T 40DP).37580RE		1.0000
3	605-1004- - -	CABLE TYE, PAN-TY PLTIM-M	EC7368	3.0000
3	651-1533- - -	ROLL PIN 3/32 X 3/4	EC7368	1.0000
3	654-1163-R - -	SOCKET 20-14 GA(REEL)AMP 61117-4	EC7368	6.0000
3	654-1185- - -	6 POS SOC HOUSING AMP 1-480270-0	EC7368	1.0000
2	279-5077-66- -	DOUBLE SPOOL RIBBON ASSY(77)6822-66		1.0000
3	449-0178- - -	SPOOL,MOLDED RIBBON		2.0000
3	699-9995- - -	ASSEMBLY COST-VENDOR		6.2300 ###
2	451-4502- - -	SENSOR MOUNT,FENCE (77) C6822-152		2.0000
2	451-4512- - -	BRKT,ADJUSTMENT ARM SPR C6822-120		1.0000
2	451-4530- - -	BRKT,SPRING(INNER PAP GUI)B6822-172		1.0000
2	452-2577- - -	CLAMP,CONNECTOR (77) B6822-142		2.0000
2	452-2584- - -	CLAMP,HEAD CABLE (77) B6822-166		2.0000
2	452-2592- - -	CLAMP,FINGER BOARD(77) B6822-197	EC7414	2.0000
2	452-3541- - -	GUARD,RIBBON (77) B6822-168		1.0000
2	452-4051- - -	PAPER GUIDE,INNER (77) B6822-112		1.0000

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ASSEMBLY PART NUMBER 177 2261 W   LEGEND
ASSEMBLY DESCRIPTION 2261W 240LPM MATRIX PRINTER (77)   *=KIT TAG #=STATUS ITEM ###=FRACTIONAL QUANTITY P=PHANTOM

POSITION IN STRUCTURE		COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY	
2		452-4052- - -	PAPER GUIDE,OUTER (77) B6822-111		1.0000	
2		458-0409- - -	SENSOR MOUNT,MARGIN (LH)C6822-153		1.0000	
2		458-0410- - -	SENSOR MOUNT,MARGIN (RH)C6822-153		1.0000	
2		461-0109- - -	NUT PLATE,MARGIN SENSOR B6822-154		2.0000	
2		461-0110- - -	NUT PLATE,FENCE SENSOR B6822-155		2.0000	
2		461-0111- - -	FENCE-10PITCH,ENCODER B6822-105		1.0000	
2		461-0112- - -	FENCE-12PITCH,ENCODER B6822-103		1.0000	
2	*	462-0285- - -	SHIM,HEAD MOUNTING (BLUE)B6822-108		1.0000	
2	*	462-0286- - -	SHIM,HEAD MOUNTING (GREEN)B6822-108		1.0000	
2	*	462-0287- - -	SHIM,HEAD MOUNTING (RED)B6822-108		1.0000	
2		465-1663- - -	SPRING,PAPER TENSION (77)B6822-129		1.0000	
2		478-0346- - -	MOUNT,FENCE C6822-128		1.0000	
2		605-1004- - -	CABLE TYE, PAN-TY PLTIN-M	EC6586	2.0000	
2		605-1006- - -	CABLE TYE PAN-TY PLT25-C	EC6586	1.0000	
2		650-6561- - -	SCR 10-32 1 3/4 SOC CAP HD M'SBLST	EC7414	2.0000	
2		651-1640- - -	DOWELL PIN .062 X.25 (SS)	EC7368	2.0000	
2		655-0165- - -	CAP,THUMB SCREW SIBER #83-98-902	EC7414	2.0000	
2		656-0231- - -	BELT,CARR DR MTR(150XL037) 3/8 WIDE		1.0000	
2		656-0233- - -	BELT,PAPER FEED MTR(153T 40DP)1/4W		1.0000	
1		279-5077-67- -	OPT SENSOR & HARN ASSY(77)6822-67	EC7368	1.0000	
2	*	210-7129- - -	7129 MODULE (PRELIM MDL 77)		2.0000	
3		330-4022- - -	RES 22K OHM 1/4W 10% FIXED FILM	EC6899	1.0000	
3		375-0017- - -	TSTR 2N3014 360MW 40V SH NPN S 52		1.0000	
3		510-7129- - -	7129 PRINTED CIRCUIT BOARD		1.0000	
2		270-3083- - -	OPTICAL SENSOR HARNESS(77)D6482-195		1.0000	
3		420-0072- - -	4 COND 28GA SHIELDED CABLE PVC		7.0800	###
3	*	600-3000- - -	WIRE 26 GA BLACK		3.8300	###
3	*	600-3003- - -	WIRE 26 GA ORANGE		2.7500	###
3	*	600-3004- - -	WIRE 26 GA YELLOW		2.7500	###
3	*	600-3006- - -	WIRE 26 GA BLUE		3.0800	###
3	*	600-3007- - -	WIRE 26 GA VIOLET		3.6600	###
3	*	600-3093- - -	WIRE 26 GA WH/ORN		2.7500	###
3	*	600-3094- - -	WIRE 26 GA WH/YEL		2.7500	###
3	*	600-3096- - -	WIRE 26 GA WH/BLU		3.0800	###
3	*	600-3097- - -	WIRE 26 GA WH/VIO		3.6600	###
3	*	654-0102-R - -	30-26 GA CRIMP SNAP CONT AMP85967-6		17.0000	
3		654-0103- - -	.025 KEYING PLUG AMP 8707-2		1.0000	
3		654-0109- - -	20 POS.100 HOUSING 2 ROW 1-87456-6		1.0000	
2	*	279-5077-31- -	PHOTO CELL & MASK ASSY 6822-31	EC7441	2.0000	
3		375-2105- - -	PHOTOCELL OPB242 B6615-174		1.0000	
3		615-0382- - -	APERTURE,PHOTOTRANS(21W)B6611-52		2.0000	
2		325-0006- - -	115D SPDT TOGGLE SWITCH		2.0000	
2		375-2107- - -	OPB1249-1 SLOTTED OPTICAL SWITCH		2.0000	
2		451-4502- - -	SENSOR MOUNT,FENCE (77) C6822-152		2.0000	
2		458-0409- - -	SENSOR MOUNT,MARGIN (LH)C6822-153		1.0000	
2		458-0410- - -	SENSOR MOUNT,MARGIN (RH)C6822-153		1.0000	
2		461-0109- - -	NUT PLATE,MARGIN SENSOR B6822-154	EC7441	2.0000	
2		461-0110- - -	NUT PLATE,FENCE SENSOR B6822-155		2.0000	

ASSEMBLY PART NUMBER   177 2261 W
ASSEMBLY DESCRIPTION   2261W 240LPM MATRIX PRINTER (77)

LEGEND
*=KIT TAG   P=STATUS ITEM   PPP=FRACTIONAL QUANTITY   P=PHANTOM

POSITION IN STRUCTURE	COMPONENT PART NUMBER	DESCRIPTION	E C N	QUANTITY PER ASSY
2	462-0203- - -	1222 ENCODER SPACER B6497-115		4.0000
2	650-2100- - -	SCR 4-40 5/16 PHIL PH HS SS		1.0000
2	653-0003- - -	WASHER, NO.4 NYLON 1/8 ID X 3/8 OD		4.0000
2	653-2001- - -	NO. 4 FLAT WSHR 1/8ID 1/4OD		8.0000
2	653-2002- - -	WASH 4 .123ID .265OD INT T ST		8.0000
1	449-0087- - -	FAN GUARD 3" D5300-1068 W/O-77	EC7368	1.0000
1	451-1233- - -	ENCLOSURE,PAPER GUIDE(77) E6822-865		1.0000
X	451-4546- - -	BRKT,PROP BAR C6822-843		1.0000
1	451-4549- - -	BRKT,COVER PIVOT RH WELDM C6822-847		1.0000
1	451-4550- - -	BRKT,COVER PIVOT LH WELDM C6822-847		1.0000
1	451-4573- - -	BRKT,BRG PLATE SUPP (77) D6822-877		1.0000
1	452-1056- - -	BEARING PLATE (77) B6822-875		1.0000
1	452-2163- - -	PLATE,CABLE (77) B6822-863	EC7368	1.0000
1	452-2566- - -	CLAMP,RIBBON CABLE(77) B6822-818		4.0000
1	452-3543- - -	SHIELD,HEAD (77) E6822-864		1.0000
1	452-4054- - -	GUIDE,PAPER (UPPER) C6822-183		1.0000
1	458-0429- - -	BAR,PROP C6822-846		1.0000
1	458-0448- - -	ARM,HEAD ADJUSTMENT (77) C6822-185		1.0000
1	461-3342- - -	ROD,CHASSIS PIVOT B6822-821 (77)		1.0000
1	461-3344- - -	ROD,PAPER GUIDE SUPPORT B6822-853		1.0000
1	462-0299- - -	SPACER,CARD CLAMP (77) B6822-189		1.0000
1	478-0365- - -	PIVOT,CHASSIS (77)		1.0000
1	478-0367- - -	PIN,PROP BAR B6822-845		1.0000
1	615-1336- - -	LABEL,10/12 PITCH SCALE(77)C6611-71		1.0000
1	615-1337- - -	LABEL,FORM POSIT SCALE C6611-70		1.0000
1	615-1341- - -	LABEL,HEAD POSIT SCALE(77)C6611-78	EC7368	1.0000
1	654-1246- - -	PLAST1-GROMMET 1TW#212-170602240101	EC7368	6.0000

END OF COBOL CHASE

END OF REPORT MB0080-A VERSION 00

LOWEST REACHED WAS 05 LEVELS

APPENDIX E
ELEC-
TRICAL
SCHE-
MATICS

THE SCHEMATICS, WHEN AVAILABLE, ARE ON THE LAST FICHE IN THIS SET.

APPENDIX F
PAPER SPECIFI-CATIONS

APPENDIX F
PAPER SPECIFICATIONS

1. Material must be margin-perforated fanfold paper or card stock; perforations are used for guiding by pinfeed units.

2. Maximum form length is not to exceed 11 in. (27.9 cm).

3. Paper Stock:

   a) For single part forms use 15 to 20 lb bond (20 lb preferred).

   b) For multipart forms use:
       2 ply: 15/15 lb bond, 7 lb carbon
       3 ply: 15/12/15 lb bond, 7 lb carbon
       4 ply: 12/12/12/15 lb bond, 7 lb carbon
       5 ply: 12/12/12/12/15 lb bond, 5 lb carbon
       (Up to four copies in addition to the original can be used.)

   c) Form width must be:
       5.0 in. (12.7 cm) minimum
       14.9 in. (37.8 cm) maximum

4. Fastening of multipart forms:

   a) Improved multipart paper handling can be achieved with glued margin paper.

   b) Multipart forms must otherwise be fastened with crimps every two inches (5.1 cm) along both edges of the forms.

   c) Crimps must not come closer to the fanfold than 0.50 in. (1.27 cm).

   d) Each crimp must have four prongs, two entering both the forms and carbons and two entering the forms only.

5. Forms thickness:

   a) Maximum in the print area: 0.018 in. (0.046 cm) (allowing four 12 lb, one 15 lb and four 7 lb carbon parts).

b) Measured at crimps in the pinfeed margin: 0.030 in. (0.076 cm).

6. Sprocket holes:

   a) Must run along both margins 0.25 ± .03 in. (0.635 ± 0.076 cm)
       from paper edge to the hole center lines.

   b) Distance between hole centers along the margins must be 0.5 ±
       0.005 in. (1.27 ± 0.013 cm) non-accumulative in any five in.
       (12.7 cm) length.

   c) Hole diameters must be 0.156 + 0.005 in. (0.396 + 0.013 cm);
       the two top and bottom drive holes on each sheet (four per
       sheet) can be up to 0.200 in. (0.508 cm) in diameter to per-
       mit post or ring binding of output.

   d) Distance between hole centers across the sheet must be uniform
       throughout, 0.015 in. (0.038 cm) to a maximum of 14-1/2 in.
       (36.83 cm).

7. When using forms with wide and narrow copies in the same set, the
    top copy should always be widest.

8. For preprinted forms:

       Pin-hole center to left side of 1st printed character not less
       than 3/8 ± 1/16 in. (1.0 ± 0.2 cm).

       Pin-hole center to right side of last printed character not
       less than 3/8 ± 1/16 in. (1.0 ± 0.2 cm).

APPENDIX G CHARAC- TER CODE SET

APPENDIX   G

CHARACTER CODE SET

This appendix contains the PROM character code set for the Model
77 Printer at both 10 pitch and 12 pitch. The first listing is at 10
pitch; the second listing is at 12 pitch.

2261W PRINTER PROM

HEX = 00	HEX = 01	HEX = 02	HEX = 03
12345678901234	12345678901234	12345678901234	12345678901234

HEX = 04	HEX = 05	HEX = 06	HEX = 07
12345678901234	12345678901234	12345678901234	12345678901234

HEX = 08	HEX = 09	HEX = 0A	HEX = 0B
12345678901234	12345678901234	12345678901234	12345678901234

HEX = 0C	HEX = 0D	HEX = 0E	HEX = 0F
12345678901234	12345678901234	12345678901234	12345678901234

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2261W PRINTER PROM

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HEX = 10              HEX = 11              HEX = 12              HEX = 13
12345678901234        12345678901234        12345678901234        12345678901234
1 ..O.O.O.O.O...  1    ..O.O.O.O.O...  1    ..O.O.O.O.O...  1    ..O.O.O.O.O...
2 .O.........O..  2    .O........O..   2    .O.......O..    2    .O.......O..
3 ....O.O.O.....  3    ...O.O.O....    3    ...O.O......    3    ...O.O.O....
4 ..........O...  4    ...O.O.O....    4    .....O......    4    ....O.....O.
5 ..O.O.O.O.....  5    ...O.O.O....    5    ....O.......    5    ...O......O.
6 .O..........O. 6    .O..........    6    ...O........    6    ...O.....O..
7 ...O.O.O.O.O.. 7    ....O.O.O...    7    ...O.O.O.O..    7    ....O.O.O...
8 ..............  8    ............   8    ............    8    ............
9 ..............  9    ............   9    ............    9    ............

HEX = 14              HEX = 15              HEX = 16              HEX = 17
12345678901234        12345678901234        12345678901234        12345678901234
1 ..O.O.O.O.O..:  1    ..O.......O..  1    ..O........O... 1    ..O.....O.....
2 .O.........O.. 2    ............   2    ..O........O... 2    ...........
3 ..O......O.... 3    ....O.O.O.O..  3    ..O.O.O.O.O..: 3    ...O.O......
4 ...O........O. 4    .....O.O.O.O. 4    .O.........O.. 4    ....O.......
5 ...O.......O.. 5    ...O.O.O.O... 5    .O.O.O.O.O.O.. 5    ....O.......
6 ..O......O... 6    .O.........O. 6    .O..........  6    ....O.......
7 ....O.O.O.O... 7    ...O.O.O.O.O. 7    .O.O.O.O.O.O.. 7    ..O.O.O.O...
8 ..............  8    ............  8    ............   8    ............
9 ..............  9    ............  9    ............   9    ............

HEX = 18              HEX = 19              HEX = 1A              HEX = 1B
12345678901234        12345678901234        12345678901234        12345678901234
1 ...O......O...  1    \.O........O... 1    .........O....  1    ..........O...
2 ............   2    ..............  2    ............O. 2    ...........O..
3 ..O.O.O.O....  3    ..O.......O...  3    ....O.O.O....  3    ...O.O.O.O...
4 .O........O..  4    .O.......O....  4    .......O.....  4    .O........O..
5 .O.......O...  5    .O.......O....  5    ..O.O.O.O...  5    ..O.O.O.O.O..
6 .O.......O...  6    .O........O..  6    .O.......O.. 6    .O..........
7 ..O.O.O.O...  7    ...O.O.O.O.O.. 7    ...O.O.O.O.O.. 7    ...O.O.O.O...
8 ..............  8    ..............  8    ..............  8    ............
9 ..............  9    ..............  9    ..............  9    ............

HEX = 1C              HEX = 1D              HEX = 1E              HEX = 1F
12345678901234        12345678901234        12345678901234        12345678901234
1 ............O...  1    .O.........O...  1    ..O.......O...  1    ..O.......O...
2 ...........O.. 2    ....O.O....   2    ..........     2    ............
3 ..O.....O.... 3    ....O.O.....  3    .O.O.O.O.O.O..  3    .O..........
4 ..O.....O.... 4    ....O.......O. 4    .O.........O. 4    .O..........
5 ..O.....O.... 5    ..O.O.O.O.O...  5    .O.........O. 5    .O..........
6 ..O.....O.... 6    .O.........O. 6    .O.........O. 6    ..O.......O.
7 ...O.O.O.O... 7    .O.........O. 7    .O.O.O.O.O.O.. 7    ...O.O.O.O...
8 ..............  8    ..............  8    ..............  8    ............
9 ..............  9    ..............  9    ..............  9    ............
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2261W PRINTER PROM

PAGE = 3

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HEX = 20                 HEX = 21                 HEX = 22                 HEX = 23
  12345678901234           12345678901234           12345678901234           12345678901234
1 ..............  1      1 ......O.......  1      1 ....O...O.....  1      1 ...O...O......  1
2 ..............  2      2 ......O.......  2      2 ....O...O.....  2      2 ...O...O......  2
3 ..............  3      3 ......O.......  3      3 ....O...O.....  3      3 .O.O.O.O.O.O..  3
4 ..............  4      4 ......O.......  4      4 ..............  4      4 ...O...O......  4
5 ..............  5      5 ......O.......  5      5 ..............  5      5 .O.O.O.O.O.O..  5
6 ..............  6      6 ..............  6      6 ..............  6      6 ...O...O......  6
7 ..............  7      7 ......O.......  7      7 ..............  7      7 ...O...O......  7
8 ..............  8      8 ..............  8      8 ..............  8      8 ..............  8
9 ..............  9      9 ..............  9      9 ..............  9      9 ..............  9

HEX = 24                 HEX = 25                 HEX = 26                 HEX = 27
  12345678901234           12345678901234           12345678901234           12345678901234
1 ........O.....  1      1 .O.O...O......  1      1 ....O.O.......  1      1 ......O.......  1
2 ..O.O.O.O.O...  2      2 .O.O..O.......  2      2 ...O.O.O......  2      2 ......O.......  2
3 .O...O........  3      3 ..O.O..O......  3      3 ....O.O.......  3      3 ..............  3
4 ..O.O.O.O.O...  4      4 ......O.......  4      4 ...O...O.O....  4      4 .....O........  4
5 ....O.O...O.O.  5      5 .....O.O.O....  5      5 .O.......O.O..  5      5 ..............  5
6 ..O.O.O.O.O...  6      6 ...O..O..O.O..  6      6 .O.....O.O....  6      6 ..............  6
7 ......O.......  7      7 ...O....O.O...  7      7 ...O.O.O...O..  7      7 ..............  7
8 ..............  8      8 ..............  8      8 ..............  8      8 ..............  8
9 ..............  9      9 ..............  9      9 ..............  9      9 ..............  9

HEX = 28                 HEX = 29                 HEX = 2A                 HEX = 2B
  12345678901234           12345678901234           12345678901234           12345678901234
1 ......O.......  1      1 .....O........  1      1 ....O...O.....  1      1 ..............  1
2 .....O........  2      2 ......O.......  2      2 .O.O...O.O....  2      2 ......O.......  2
3 ....O.........  3      3 .......O......  3      3 ...O.O........  3      3 ......O.......  3
4 ....O.........  4      4 .......O......  4      4 ....O...O.....  4      4 ..O.O.O.O.O...  4
5 ....O.........  5      5 .......O......  5      5 ...O...O......  5      5 ......O.......  5
6 .....O........  6      6 ......O.......  6      6 ..............  6      6 ......O.......  6
7 ......O.......  7      7 .....O........  7      7 ..............  7      7 ..............  7
8 ..............  8      8 ..............  8      8 ..............  8      8 ..............  8
9 ..............  9      9 ..............  9      9 ..............  9      9 ..............  9

HEX = 2C                 HEX = 2D                 HEX = 2E                 HEX = 2F
  12345678901234           12345678901234           12345678901234           12345678901234
1 ..............  1      1 ..............  1      1 ..............  1      1 .........O....  1
2 ..............  2      2 ..............  2      2 ..............  2      2 ........O.....  2
3 ..............  3      3 ..............  3      3 ..............  3      3 .......O......  3
4 ..............  4      4 ..O.O.O.O.O...  4      4 ..............  4      4 ......O.......  4
5 ..............  5      5 ..............  5      5 ..............  5      5 .....O........  5
6 ......O.O.....  6      6 ..............  6      6 .....O.O......  6      6 ....O.........  6
7 .......O......  7      7 ..............  7      7 .....O.O......  7      7 ...O..........  7
8 .......O......  8      8 ..............  8      8 ..............  8      8 ..............  8
9 ..............  9      9 ..............  9      9 ..............  9      9 ..............  9
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2261W PRINTER PROM

PAGE = 4

HEX = 30   HEX = 31   HEX = 32   HEX = 33

HEX = 34   HEX = 35   HEX = 36   HEX = 37

HEX = 38   HEX = 39   HEX = 3A   HEX = 3B

HEX = 3C   HEX = 3D   HEX = 3E   HEX = 3F

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2261W PRINTER PROM

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HEX = 40              HEX = 41              HEX = 42              HEX = 43
  12345678901234        12345678901234        12345678901234        12345678901234
1 ...O.O.O.O...  1    ....O.O......  1    .O.O.O.O.O...  1    ...O.O.O.O...
2 ..O.....O...  2    .....O...O....  2    ..O.......O..  2    ...O......O..
3 .O...O.O...O.  3    ...O.....O...  3    ..O.......O..  3    ..O.........
4 .O...O.O...O.  4    .O.........O..  4    ..O.O.O.O.O..  4    ..O.........
5 .O...O.O.O.O.  5    .O.O.O.O.O.O.  5    ..O.......O..  5    ..O.........
6 ..O........  6    .O.........O..  6    ..O.......O..  6    ..O.......O..
7 ..O.O.O.O.O.  7    .O.........O..  7    .O.O.O.O.O...  7    ...O.O.O.O...
8 ............  8    ............  8    ............  8    ............
9 ............  9    ............  9    ............  9    ............

HEX = 44              HEX = 45              HEX = 46              HEX = 47
  12345678901234        12345678901234        12345678901234        12345678901234
1 .O.O.O.O....  1    .O.O.O.O.O..  1    .O.O.O.O.O..  1    ..O.O.O.O...
2 ..O.......O..  2    .O.........  2    ..O.........  2    .O.........
3 ..O.......O.  3    .O.........  3    ..O.........  3    .O.........
4 ..O.......O.  4    ..O.O.O.O...  4    ..O.O.O.O...  4    .O.......O.O.
5 ..O.......O.  5    .O.........  5    ..O.........  5    .O.......O.O.
6 .O.O.O.O....  6    .O.........  6    ..O.........  6    ..O.......O..
7 .O.O.O.O....  7    .O.O.O.O.O..  7    ..O.........  7    ...O.O.O.O...
8 ............  8    ............  8    ............  8    ............
9 ............  9    ............  9    ............  9    ............

HEX = 48              HEX = 49              HEX = 4A              HEX = 4B
  12345678901234        12345678901234        12345678901234        12345678901234
1 .O.......O.O..  1    ..O.O.O.O...  1    .......O.O.O..  1    .O.......O...
2 .O.......O.O.  2    .....O......  2    ........O...  2    .O......O....
3 .O.......O.O.  3    .....O......  3    ........O...  3    .O....O.....
4 .O.O.O.O.O..  4    .....O......  4    ........O...  4    .O.O.O.....
5 .O.......O.O.  5    .....O......  5    .......O....  5    .O....O.....
6 .O.......O.O.  6    ...O.....  6    .O.......O...  6    .O......O....
7 .O.......O..  7    ..O.O.O.O...  7    .O.O.O.O.....  7    .O.......O...
8 ............  8    ............  8    ............  8    ............
9 ............  9    ............  9    ............  9    ............

HEX = 4C              HEX = 4D              HEX = 4E              HEX = 4F
  12345678901234        12345678901234        12345678901234        12345678901234
1 .O.........  1    .O.......O...  1    .O.......O...  1    ..O.O.O.O.O..
2 .O.........  2    .O.O.....O.O.  2    ..O......O...  2    .O.........O.
3 .O.........  3    .O..O...O..O.  3    .O..O.....O..  3    .O.........O.
4 .O.........  4    .O...O.O...O.  4    .O....O...O..  4    .O.........O.
5 .O.........  5    .O.........O.  5    .O......O.O..  5    .O.........O.
6 .O.O.O.O.O..  6    .O.........O.  6    .O.......O...  6    .O.........O.
7 .O.O.O.O.O..  7    .O.........O.  7    .O.......O...  7    ..O.O.O.O.O..
8 ............  8    ............  8    ............  8    ............
9 ............  9    ............  9    ............  9    ............
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2261W PRINTER PROM

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HEX = 50                HEX = 51                HEX = 52                HEX = 53
  12345678901234          12345678901234          12345678901234          12345678901234
1 ..O.O.O.O.O...      1 ..O.O.O.O...     1 ..O.O.O.O.O..     1 ..O.O.O.O.O...
2 ..O.........O..     2 ..O.......O...    2 ..O.........O.     2 .O...........O..
3 ..O.........O.  3   3 .O.........O.  3  3 .O.........O.  3  3 .O..............
4 ..O.O.O.O.O...  4   4 .O.....O...O.  4  4 ..O.O.O.O.O..  4  4 ..O.O.O.O.O.O..
5 ..O.............5   5 .O.....O...O.  5  5 ..O....O.....  5  5 ...........O...
6 ..O.............6   6 .O.......O.O.  6  6 ..O.........O.  6  6 .O.........O....
7 ..O.............7   7 ..O.O.O.O.O..  7  7 ..O.........O.  7  7 ..O.O.O.O.O.O..
8 ................8   8 ............  8   8 ............  8   8 ............
9 ................9   9 ............  9   9 ............  9   9 ............

HEX = 54                HEX = 55                HEX = 56                HEX = 57
  12345678901234          12345678901234          12345678901234          12345678901234
1 .O.O.O.O.O.O..      1 .O.........O..     1 .O.........O..     1 .O.........O..
2 ......O......  2    2 .O.........O.  2  2 ..O.......O.  2   2 .O.........O.  2
3 ......O......  3    3 .O.........O.  3  3 ..O.......O.  3   3 .O.......O...O. 3
4 ......O......  4    4 .O.........O.  4  4 ...O.....O...  4  4 .O.....O...O.  4
5 ......O......  5    5 .O.........O.  5  5 ....O...O....  5  5 .O...O.....O.  5
6 ......O......  6    6 .O.......O...  6  6 .....O.O.....  6  6 .O.O.......O.  6
7 ......O......  7    7 ...O.O.O.O...  7  7 ......O......  7  7 ..O.O...O.O.. 7
8 ............  8     8 ............  8   8 ............  8   8 ............ 8
9 ............  9     9 ............  9   9 ............  9   9 ............ 9

HEX = 58                HEX = 59                HEX = 5A                HEX = 5B
  12345678901234          12345678901234          12345678901234          12345678901234
1 .O.........O..      1 .O.........O..     1 .O.O.O.O.O.O..     1 .......O.O....
2 ..O.......O..  2    2 ..O.......O.  2   2 ...........O.  2   2 ......O......  2
3 ....O...O....  3    3 ...O.....O...  3  3 ........O....  3   3 ......O......  3
4 .....O.O.....  4    4 ....O...O....  4  4 .......O.....  4   4 ......O......  4
5 ......O......  5    5 ......O......  5  5 .....O.......  5   5 ......O......  5
6 ....O...O....  6    6 ......O......  6  6 ..O..........  6   6 ......O......  6
7 .O.........O..7     7 ......O......  7  7 .O.O.O.O.O.O..7    7 ......O.O....  7
8 ............  8     8 ............  8   8 ............  8    8 ............  8
9 ............  9     9 ............  9   9 ............  9    9 ............  9

HEX = 5C                HEX = 5D                HEX = 5E                HEX = 5F
  12345678901234          12345678901234          12345678901234          12345678901234
1 .....O.O.O...       1 ....O.O.......     1 ......O......      1 ...........
2 ...O.....O...  2    2 .....O......  2    2 .....O.O.....  2   2 .......O.....  2
3 ...O.....O.  3      3 .....O......  3    3 ....O...O....  3   3 ...........  3
4 ..O.O.O.O....  4    4 .....O......  4    4 ..O..O..O....  4   4 ..O..O.O.O.O..  4
5 ...O.....O...  5    5 .....O......  5    5 ....O........  5   5 .....O......  5
6 ...O.....O...  6    6 .....O......  6    6 .....O.......  6   6 ..........  6
7 ...O.O.O.O...  7    7 ....O.O.....  7    7 .....O.......  7   7 ............  7
8 ..O.........  8     8 ............  8    8 ............  8    8 ............  8
9 ............  9     9 ............  9    9 ............  9    9 ............  9
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2261W PRINTER PROM

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         HEX = 60              HEX = 61              HEX = 62              HEX = 63
         12345678901234        12345678901234        12345678901234        12345678901234
      1  ....0.0.0....   1    ..............   1    ..0...........   1    ..............
      2  ...0.....0....  2    ..............   2    ..............   2    ..............
      3  ...0.....0....  3    ....0.0.0.0...   3    ..0.0.0.0.0...   3    ...0.0.0.0.0..
      4  ....0.0.0.....  4    ..........0...   4    ..0.......0...   4    ...0..........
      5  ..............  5    ...0.0.0.0.0..   5    ..0.......0...   5    ...0..........
      6  ..............  6    ...0.......0..   6    ..0.......0...   6    ...0..........
      7  ..............  7    ...0.0.0.0.0..   7    ..0.0.0.0.0...   7    ...0.0.0.0.0..
      8  ..............  8    ..............   8    ..............   8    ..............
      9  ..............  9    ..............   9    ..............   9    ..............

         HEX = 64              HEX = 65              HEX = 66              HEX = 67
         12345678901234        12345678901234        12345678901234        12345678901234
      1  ...........0..   1    ..............   1    .....0.0.0...   1    ..............
      2  ...........0..  2    ..............   2    ....0.....0..   2    ..............
      3  ...0.0.0.0.0..  3    ..0.0.0.0.0...  3    ..............   3    ...0.0.0.0...
      4  ..0.......0...  4    .0.......0...   4    ..0.0.0.0....   4    ..0.......0..
      5  ..0.......0...  5    .0.0.0.0.0...   5    ....0........   5    ..0.......0..
      6  ..0.......0...  6    .0...........  6    ....0........   6    ..0.0.0.0....
      7  ...0.0.0.0.0..  7    ..0.0.0.0.0..  7    ....0........   7    ..........0..
      8  ..............  8    ..............  8    ..............  8    ..0.0.0.0....
      9  ..............  9    ..............  9    ..............  9    ..............

         HEX = 68              HEX = 69              HEX = 6A              HEX = 6B
         12345678901234        12345678901234        12345678901234        12345678901234
      1  ..0...........   1    .......0......  1    ..........0...   1    ..0...........
      2  ..0...........  2    ..............  2    ..............  2    ..0...........
      3  ..0.0.0.0....  3    .....0.0......  3    .........0.0..  3    ..0.......0..
      4  ..0.......0...  4    ......0.......  4    ........0....  4    ..0.......0..
      5  ..0.......0...  5    ......0.......  5    ........0....  5    ...0.0.0.....
      6  ..0.......0...  6    ......0.......  6    ........0....  6    ..0.......0..
      7  ..0.......0...  7    ...0.0.0.0...  7    ..0.......0..  7    ..0.......0..
      8  ..............  8    ..............  8    ...0.0.0.0...  8    ..............
      9  ..............  9    ..............  9    ..............  9    ..............

         HEX = 6C              HEX = 6D              HEX = 6E              HEX = 6F
         12345678901234        12345678901234        12345678901234        12345678901234
      1  ....0.0.......   1    ..............  1    ..............  1    ..............
      2  ......0.......  2    ..............  2    ..............  2    ..............
      3  ......0.......  3    ..0.0.0.0.0...  3    ..0.0.0.0.0...  3    ...0.0.0.0...
      4  ......0.......  4    ..0...0...0..  4    ..0.......0..  4    ..0.......0..
      5  ......0.......  5    ..0...0...0..  5    ..0.......0..  5    ..0.......0..
      6  ......0.......  6    ..0...0...0..  6    ..0.......0..  6    ..0.......0..
      7  ..0.0.0.0.0...  7    ..0...0...0..  7    ..0.......0..  7    ...0.0.0.0...
      8  ..............  8    ..............  8    ..............  8    ..............
      9  ..............  9    ..............  9    ..............  9    ..............
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2261W PRINTER PROM

PAGE = 8

HEX = 70
HEX = 71
HEX = 72
HEX = 73

HEX = 74
HEX = 75
HEX = 76
HEX = 77

HEX = 78
HEX = 79
HEX = 7A
HEX = 7B

HEX = 7C
HEX = 7D
HEX = 7E
HEX = 7F

2261W PRINTER PROM

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    HEX = 00              HEX = 01              HEX = 02              HEX = 03
    12345678901234        12345678901234        12345678901234        12345678901234
1   .............. 1      .............. 1      .............. 1      ..............
2   .............. 2      .............. 2      .............. 2      ..............
3   .............. 3      .............. 3      .............. 3      ..............
4   .............. 4      .............. 4      .............. 4      ..............
5   .............. 5      .............. 5      .............. 5      ..............
6   .............. 6      .............. 6      .............. 6      ..............
7   .............. 7      .............. 7      .............. 7      ..............
8   .............. 8      .............. 8      .............. 8      ..............
9   .............. 9      .............. 9      .............. 9      ..............

    HEX = 04              HEX = 05              HEX = 06              HEX = 07
    12345678901234        12345678901234        12345678901234        12345678901234
1   .............. 1      .............. 1      .............. 1      ..............
2   .............. 2      .............. 2      .............. 2      ..............
3   .............. 3      .............. 3      .............. 3      ..............
4   .............. 4      .............. 4      .............. 4      ..............
5   .............. 5      .............. 5      .............. 5      ..............
6   .............. 6      .............. 6      .............. 6      ..............
7   .............. 7      .............. 7      .............. 7      ..............
8   .............. 8      .............. 8      .............. 8      ..............
9   .............. 9      .............. 9      .............. 9      ..............

    HEX = 08              HEX = 09              HEX = 0A              HEX = 0B
    12345678901234        12345678901234        12345678901234        12345678901234
1   .............. 1      .............. 1      .............. 1      ..............
2   .............. 2      .............. 2      .............. 2      ..............
3   .............. 3      .............. 3      .............. 3      ..............
4   .............. 4      .............. 4      .............. 4      ..............
5   .............. 5      .............. 5      .............. 5      ..............
6   .............. 6      .............. 6      .............. 6      ..............
7   .............. 7      .............. 7      .............. 7      ..............
8   .............. 8      .............. 8      .............. 8      ..............
9   .............. 9      .............. 9      .............. 9      ..............

    HEX = 0C              HEX = 0D              HEX = 0E              HEX = 0F
    12345678901234        12345678901234        12345678901234        12345678901234
1   .............. 1      .............. 1      .............. 1      ..............
2   .............. 2      .............. 2      .............. 2      ..............
3   .............. 3      .............. 3      .............. 3      ..............
4   .............. 4      .............. 4      .............. 4      ..............
5   .............. 5      .............. 5      .............. 5      ..............
6   .............. 6      .............. 6      .............. 6      ..............
7   .............. 7      .............. 7      .............. 7      ..............
8   .............. 8      .............. 8      .............. 8      ..............
9   .............. 9      .............. 9      .............. 9      ..............
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2261W PRINTER PROM

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      HEX = 10              HEX = 11              HEX = 12              HEX = 13
      12345678901234        12345678901234        12345678901234        12345678901234
1     ..0.0.0.0.....  1     ..0.0.0.0.....  1     ..0.0.0.0.....  1     ..0.0.0.0.....
2     .0.......0....  2     .0.......0....  2     .0.......0....  2     .0.......0....
3     ...0.0.0......  3     ...0.0.0......  3     ...0.0........  3     ...0.0.0......
4     .......0....  4     ..0.....0.....  4     .....0.......  4     ..0.....0....
5     ..0.0.0.0.....  5     ..0.0.0.0.....  5     .....0.......  5     ..0.....0....
6     .0......0.....  6     ..0..........  6     .....0.......  6     .0......0....
7     ..0.0.0.0.....  7     ...0.0.0......  7     ..0.0.0.0.....  7     ...0.0.0......
8     ..............  8     ..............  8     ..............  8     ..............
9     ..............  9     ..............  9     ..............  9     ..............


      HEX = 14              HEX = 15              HEX = 16              HEX = 17
      12345678901234        12345678901234        12345678901234        12345678901234
1     .0.0.0.0......  1     ..0....0......  1     ..0.....0.....  1     ..0....0......
2     0.......0.....  2     ..............  2     ..............  2     ..............
3     ..0...0.......  3     ...0.0.0......  3     ...0.0.0......  3     ...0.0........
4     ..0...0.......  4     .......0.....  4     ..0.....0.....  4     .....0.......
5     ..0...0.......  5     ..0.0.0.0.....  5     ..0.0.0.0.....  5     .....0.......
6     ..0...0.......  6     .0......0.....  6     ..0..........  6     .....0.......
7     ...0.0.0......  7     ..0.0.0.0.....  7     ...0.0.0......  7     ..0.0.0.0.....
8     ..............  8     ..............  8     ..............  8     ..............
9     ..............  9     ..............  9     ..............  9     ..............


      HEX = 18              HEX = 19              HEX = 1A              HEX = 1B
      12345678901234        12345678901234        12345678901234        12345678901234
1     ..0.....0.....  1     ..0....0......  1     ......0......  1     .....0.......
2     ..............  2     ..............  2     .........0....  2     .........0.....
3     ...0.0.0......  3     .0.....0......  3     ...0.0.0......  3     ..0.0.0.......
4     ..0.....0.....  4     .0.....0......  4     .........0....  4     .0.....0.....
5     ..0.....0.....  5     .0.....0......  5     ..0.0.0.0.....  5     .0.0.0.0......
6     ..0.....0.....  6     .0.....0......  6     .0......0....  6     .0...........
7     ...0.0.0......  7     ..0.0.0.0.....  7     ..0.0.0.0.....  7     ..0.0.0.......
8     ..............  8     ..............  8     ..............  8     ..............
9     ..............  9     ..............  9     ..............  9     ..............


      HEX = 1C              HEX = 1D              HEX = 1E              HEX = 1F
      12345678901234        12345678901234        12345678901234        12345678901234
1     ......0.......  1     ..0......0....  1     ..0.....0.....  1     ..0.....0.....
2     ........0.....  2     .....0.......  2     ..............  2     ..............
3     .0.....0......  3     ....0.0.......  3     .0.0.0.0.0....  3     .0.......0....
4     .0.....0......  4     ...0...0......  4     .0.......0....  4     .0......0....
5     .0.....0......  5     ..0.0.0.0.....  5     .0.......0....  5     .0......0....
6     .0.....0......  6     .0......0....  6     .0.......0....  6     .0......0....
7     ..0.0.0.0.....  7     .0.......0....  7     .0.0.0.0.0....  7     ..0.0.0.0.....
8     ..............  8     ..............  8     ..............  8     ..............
9     ..............  9     ..............  9     ..............  9     ..............
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2261W PRINTER PROM

```
  HEX = 20            HEX = 21            HEX = 22            HEX = 23
  12345678901234      12345678901234      12345678901234      12345678901234
1 .............. 1    .....0........ 1    ...0..0....... 1    ..0...0......
2 .............. 2    .....0........ 2    ...0..0....... 2    ..0...0......
3 .............. 3    .....0........ 3    ...0..0....... 3    .0.0.0.0....
4 .............. 4    .....0........ 4    ............. 4     ..0...0......
5 .............. 5    ............. 5     ............. 5     .0.0.0.0....
6 .............. 6    ............. 6     ............. 6     ..0...0......
7 .............. 7    .....0........ 7    ............. 7     ..0...0......
8 .............. 8    ............. 8     ............. 8     ............
9 .............. 9    ............. 9     ............. 9     ............


  HEX = 24            HEX = 25            HEX = 26            HEX = 27
  12345678901234      12345678901234      12345678901234      12345678901234
1 ......0........ 1   ..0.0...0..... 1    ..0.0......... 1    ......0.......
2 ..0.0.0.0..... 2    ..0.0..0...... 2    .0...0........ 2    .....0........
3 .0...0........ 3    .....0........ 3    ..0.0......... 3    ....0.........
4 ..0.0.0.0..... 4    .....0........ 4    ..0..0...0.... 4    .............
5 .....0...0.... 5    ....0......... 5    .0....0.0..... 5    .............
6 ..0.0.0.0..... 6    ...0..0.0..... 6    .0.....0..... 6     .............
7 .....0........ 7    ..0...0.0..... 7    ..0.0.0..0.... 7    .............
8 ............. 8     ............. 8     ............. 8     .............
9 ............. 9     ............. 9     ............. 9     .............


  HEX = 28            HEX = 29            HEX = 2A            HEX = 2B
  12345678901234      12345678901234      12345678901234      12345678901234
1 ......0....... 1    ....0......... 1    ...0...0...... 1    ............
2 .....0........ 2    ....0......... 2    ....0.0....... 2    .....0........
3 ....0......... 3    .....0........ 3    .0.0...0.0.... 3    ....0.........
4 ....0......... 4    ......0....... 4    ....0.0....... 4    ..0.0.0.0.....
5 ....0......... 5    ......0....... 5    ...0...0...... 5    .....0........
6 .....0........ 6    .....0........ 6    ............. 6     .....0........
7 ......0....... 7    ....0......... 7    ............. 7     ............
8 ............. 8     ............. 8     ............. 8     ............
9 ............. 9     ............. 9     ............. 9     ............


  HEX = 2C            HEX = 2D            HEX = 2E            HEX = 2F
  12345678901234      12345678901234      12345678901234      12345678901234
1 .............. 1    ............. 1     ............. 1     ........0.....
2 .............. 2    ............. 2     ............. 2     .......0......
3 .............. 3    ............. 3     ............. 3     ......0.......
4 .............. 4    ..0.0.0.0..... 4    ............. 4     .....0........
5 .............. 5    ............. 5     ............. 5     ....0.........
6 ....0.0....... 6    ............. 6     ....0.0....... 6    ...0..........
7 ......0....... 7    ............. 7     ....0.0....... 7    ..0...........
8 .....0........ 8    ............. 8     ............. 8     .............
9 ............. 9     ............. 9     ............. 9     .............
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2261W PRINTER PROM

```
   HEX = 30              HEX = 31              HEX = 32              HEX = 33
   12345678901234        12345678901234        12345678901234        12345678901234
1  ....0.0........  1     .....0........  1     ..0.0.0.0.....  1     ..0.0.0.0.....
2  ...0...0......  2      ...0.0........  2     .0......0....   2     .0......0....
3  ..0.....0.....  3      .....0........  3     ........0....   3     ........0....
4  ..0.....0.....  4      .....0........  4     ..0.0.0.0.....  4     ....0.0.0.....
5  ..0.....0.....  5      .....0........  5     .0...........   5     ........0....
6  ...0...0......  6      .....0........  6     .0...........   6     .0......0....
7  ....0.0.......  7      ..0.0.0.0.....  7     .0.0.0.0.0....  7     ..0.0.0.0.....
8  ..............  8      ..............  8     ..............  8     ..............
9  ..............  9      ..............  9     ..............  9     ..............


   HEX = 34              HEX = 35              HEX = 36              HEX = 37
   12345678901234        12345678901234        12345678901234        12345678901234
1  .....0.0......  1     .0.0.0.0......  1     ...0.0.0......  1     .0.0.0.0.0....
2  ....0..0......  2     .0...........  2      ..0..........  2     .......0.....
3  ...0...0......  3     .0...........  3      .0...........  3     ......0......
4  ..0....0......  4     .0.0.0.0......  4     .0.0.0.0......  4     ......0......
5  .0.0.0.0.0....  5     ........0.....  5     .0......0.....  5     ....0........
6  .......0......  6     ........0.....  6     ..0....0......  6     ....0........
7  .......0......  7     .0.0.0.0......  7     ...0.0.0......  7     .....0.......
8  ..............  8     ..............  8     ..............  8     ..............
9  ..............  9     ..............  9     ..............  9     ..............


   HEX = 38              HEX = 39              HEX = 3A              HEX = 3B
   12345678901234        12345678901234        12345678901234        12345678901234
1  ..0.0.0.0.....  1     ..0.0.0.......  1     ..............  1     ..............
2  .0......0....   2     .0....0......  2      ....0.0.......  2     ....0.0.......
3  ..0.....0.....  3     .0.....0......  3     ....0.0.......  3     ....0.0.......
4  ...0.0.0......  4     ..0.0.0.0.....  4     ..............  4     ..............
5  ..0.....0.....  5     .......0......  5     ..............  5     ..............
6  .0......0....   6     .......0......  6     ....0.0.......  6     ....0.0.......
7  ..0.0.0.0.....  7     ..0.0.0.......  7     ....0.0.......  7     .....0.......
8  ..............  8     ..............  8     ..............  8     .....0.......
9  ..............  9     ..............  9     ..............  9     ..............


   HEX = 3C              HEX = 3D              HEX = 3E              HEX = 3F
   12345678901234        12345678901234        12345678901234        12345678901234
1  ........0.....  1     ..............  1     ..0...........  1     ...0.0.0......
2  ......0.......  2     ..............  2     ....0.........  2     ..0.....0.....
3  ....0.........  3     ..0.0.0.0.....  3     ......0.......  3     ........0.....
4  ..0...........  4     ..............  4     ........0.....  4     .....0.0......
5  ....0.........  5     ..0.0.0.0.....  5     ......0.......  5     .....0........
6  ......0.......  6     ..............  6     ....0.........  6     ..............
7  ........0.....  7     ..............  7     ..0...........  7     .....0........
8  ..............  8     ..............  8     ..............  8     ..............
9  ..............  9     ..............  9     ..............  9     ..............
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2261W PRINTER PROM

```
   HEX = 40              HEX = 41              HEX = 42              HEX = 43
   12345678901234        12345678901234        12345678901234        12345678901234
1  ...0.0.0.0....  1   .....0........  1   .0.0.0.0......  1   ..0.0.0......
2  ..0.......0....  2   ...0.0.......  2   ..0......0....  2   ..0......0....
3  .0...0.0.0....  3   ...0...0......  3   ..0......0....  3   .0...........
4  .0..0....0....  4   ..0.....0.....  4   ..0.0.0.0.....  4   .0...........
5  .0...0.0.0....  5   .0.0.0.0.0....  5   ..0......0....  5   .0...........
6  ..0...........  6   .0.......0....  6   ..0......0....  6   ..0......0....
7  ...0.0.0.0....  7   .0.......0....  7   .0.0.0.0......  7   ...0.0.0......
8  .............  8   .............  8   .............  8   .............
9  .............  9   .............  9   .............  9   .............


   HEX = 44              HEX = 45              HEX = 46              HEX = 47
   12345678901234        12345678901234        12345678901234        12345678901234
1  .0.0.0.0......  1   .0.0.0.0.0....  1   .0.0.0.0.0....  1   ...0.0.0......
2  ..0.....0....  2   ..0...........  2   ..0...........  2   ..0.....0....
3  ..0......0....  3   ..0...........  3   ..0...........  3   .0...........
4  ..0......0....  4   ..0.0.0.0.....  4   ..0.0.0.0.....  4   .0...........
5  ..0......0....  5   ..0...........  5   ..0...........  5   .0.....0.0....
6  ..0.....0....  6   ..0...........  6   ..0...........  6   ..0.....0.....
7  .0.0.0.0......  7   .0.0.0.0.0....  7   ..0...........  7   ...0.0.0......
8  .............  8   .............  8   .............  8   .............
9  .............  9   .............  9   .............  9   .............


   HEX = 4b              HEX = 49              HEX = 4A              HEX = 4B
   12345678901234        12345678901234        12345678901234        12345678901234
1  .0.......0....  1   ...0.0.0......  1   .....0.0.0....  1   .0......0.....
2  .0.......0....  2   .....0........  2   .......0......  2   .0.....0......
3  .0.......0....  3   .....0........  3   .......0......  3   .0....0......
4  .0.0.0.0.0....  4   .....0........  4   .......0......  4   .0.0.0........
5  .0.......0....  5   .....0........  5   .......0......  5   .0....0......
6  .0.......0....  6   .....0........  6   .0.....0......  6   .0....0......
7  .0.......0....  7   ..0.0.0.0.....  7   ..0.0.0.......  7   .0......0....
8  .............  8   .............  8   .............  8   .............
9  .............  9   .............  9   .............  9   .............


   HEX = 4C              HEX = 4D              HEX = 4E              HEX = 4F
   12345678901234        12345678901234        12345678901234        12345678901234
1  .0............  1   .0.......0....  1   .0.......0....  1   ..0.0.0.0.....
2  .0............  2   .0.0...0.0....  2   .0.0.....0....  2   .0.......0....
3  .0............  3   .0..0.0..0....  3   .0..0....0....  3   .0.......0....
4  .0............  4   .0...0...0....  4   .0...0...0....  4   .0.......0....
5  .0............  5   .0.......0....  5   .0....0..0....  5   .0.......0....
6  .0............  6   .0.......0....  6   .0.....0.0....  6   .0.......0....
7  .0.0.0.0.0....  7   .0.......0....  7   .0.......0....  7   ..0.0.0.0.....
8  .............  8   .............  8   .............  8   .............
9  .............  9   .............  9   .............  9   .............
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2261W PRINTER PROM

```
     HEX = 50              HEX = 51              HEX = 52              HEX = 53
     12345678901234        12345678901234        12345678901234        12345678901234
1    .0.0.0.0......  1     ...0.0.0......  1     .0.0.0.0......  1     ..0.0.0.0.....
2    .0......0.....  2     ..0.....0.....  2     .0......0.....  2     .0......0....
3    .0......0.....  3     .0......0....  3      .0......0.....  3     .0............
4    .0.0.0.0......  4     .0......0....  4      .0.0.0.0......  4     ..0.0.0.0.....
5    .0............  5     .0...0.0....  5       .0....0.......  5     .........0....
6    .0............  6     ..0.....0.....  6     .0......0.....  6     .0......0.....
7    .0............  7     ...0.0.0..0...  7     .0......0.....  7     ..0.0.0.0.....
8    ..............  8     ..............  8     ..............  8     ..............
9    ..............  9     ..............  9     ..............  9     ..............

     HEX = 54              HEX = 55              HEX = 56              HEX = 57
     12345678901234        12345678901234        12345678901234        12345678901234
1    .0.0.0.0.0....  1     .0......0....  1      .0......0....  1      .0......0....
2    .....0........  2     .0......0....  2      .0......0....  2      .0......0....
3    .....0........  3     .0......0....  3      .0......0....  3      .0...0...0....
4    .....0........  4     .0......0....  4      ..0.....0....  4      .0...0...0....
5    .....0........  5     .0......0....  5      ...0...0....  5      .0..0.0..0....
6    .....0........  6     .0......0....  6      ....0.0.......  6     .0.0...0.0....
7    .....0........  7     ..0.0.0.0.....  7     .....0........  7     ..0.....0....
8    ..............  8     ..............  8     ..............  8     ..............
9    ..............  9     ..............  9     ..............  9     ..............

     HEX = 58              HEX = 59              HEX = 5A              HEX = 5B
     12345678901234        12345678901234        12345678901234        12345678901234
1    .0......0....  1      .0......0....  1      ..0.0.0.0.....  1     ....0.0.......
2    ..0....0.....  2     ..0....0.....  2      ......0.......  2     ....0.........
3    ...0...0......  3    ...0...0......  3      .....0........  3     ....0.........
4    .....0........  4     ....0.0.......  4     .....0........  4     ....0.........
5    ...0...0......  5     .....0........  5     ....0.........  5     ....0.........
6    ..0....0.....  6     .....0........  6     ...0..........  6     ....0.........
7    .0......0....  7     .....0........  7     ..0.0.0.0.....  7     ....0.0.......
8    ..............  8     ..............  8     ..............  8     ..............
9    ..............  9     ..............  9     ..............  9     ..............

     HEX = 5C              HEX = 5D              HEX = 5E              HEX = 5F
     12345678901234        12345678901234        12345678901234        12345678901234
1    .....0.0......  1     ...0.0........  1     .....0........  1     ..............
2    ...0...0.....  2     ......0.......  2      ....0.0.......  2     .....0........
3    ..0....0.....  3     ......0.......  3      ...0.0.0......  3     ...0..........
4    ...0.0.0......  4    ......0.......  4      ..0..0..0.....  4     .0..0.0.0.....
5    ..0....0......  5    ......0.......  5      .....0........  5     ..0...........
6    ..0....0.....  6     ......0.......  6      .....0........  6     .....0........
7    ...0.0.0......  7    ....0.0.......  7      .....0........  7     ..............
8    ..0...........  8    ..............  8     ..............  8     ..............
9    ..............  9     ..............  9     ..............  9     ..............
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2261W PRINTER PROM

```
     HEX = 60              HEX = 61              HEX = 62              HEX = 63
     12345678901234        12345678901234        12345678901234        12345678901234
1    ....0.0.......  1     ..............  1     .0............  1     ..............
2    ...0...0......  2     ..............  2     .0............  2     ..............
3    ....0.0.......  3     ...0.0.0......  3     .0.0.0.0......  3     ..0.0.0.0.....
4    ..............  4     .........0.....  4     .0......0.....  4     .0............
5    ..............  5     ..0.0.0.0.....  5     .0......0.....  5     .0............
6    ..............  6     .0......0.....  6     .0......0.....  6     .0............
7    ..............  7     ..0.0.0.0.....  7     .0.0.0.0......  7     ..0.0.0.0.....
8    ..............  8     ..............  8     ..............  8     ..............
9    ..............  9     ..............  9     ..............  9     ..............

     HEX = 64              HEX = 65              HEX = 66              HEX = 67
     12345678901234        12345678901234        12345678901234        12345678901234
1    .......0......  1     ..............  1     .....0.0......  1     ..............
2    .......0......  2     ..............  2     ...0...0......  2     ..............
3    ..0.0.0.0.....  3     ...0.0.0......  3     ....0.........  3     ..0.0.0.0.....
4    .0......0.....  4     ..0.....0.....  4     ..0.0.0.......  4     .0......0.....
5    .0......0.....  5     ..0.0.0.0.....  5     ....0.........  5     .0......0.....
6    .0......0.....  6     ..0...........  6     ....0.........  6     ..0.0.0.0.....
7    ..0.0.0.0.....  7     ...0.0.0......  7     ....0.........  7     .......0.....
8    ..............  8     ..............  8     ..............  8     .0.0.0.0......
9    ..............  9     ..............  9     ..............  9     ..............

     HEX = 68              HEX = 69              HEX = 6A              HEX = 6B
     12345678901234        12345678901234        12345678901234        12345678901234
1    .0............  1     .....0........  1     ........0.....  1     ..0...........
2    .0............  2     ..............  2     ..............  2     ..0...........
3    .0.0.0.0......  3     ...0.0........  3     ......0.0.....  3     ..0.....0.....
4    .0......0.....  4     .....0........  4     ........0.....  4     ..0....0......
5    .0......0.....  5     .....0........  5     ........0.....  5     ..0.0.0.......
6    .0......0.....  6     .....0........  6     ........0.....  6     ..0....0......
7    .0......0.....  7     ..0.0.0.0.....  7     ..0.....0.....  7     ..0.....0.....
8    ..............  8     ..............  8     ...0.0.0......  8     ..............
9    ..............  9     ..............  9     ..............  9     ..............

     HEX = 6C              HEX = 6D              HEX = 6E              HEX = 6F
     12345678901234        12345678901234        12345678901234        12345678901234
1    ...0.0........  1     ..............  1     ..............  1     ..............
2    .....0........  2     ..............  2     ..............  2     ..............
3    .....0........  3     0.0.0.0.0.....  3     .0.0.0.0......  3     ..0.0.0.0.....
4    .....0........  4     .0...0...0....  4     ..0.....0.....  4     .0.......0....
5    .....0........  5     .0...0...0....  5     ..0.....0.....  5     .0.......0....
6    .....0........  6     .0...0...0....  6     ..0.....0.....  6     .0.......0....
7    ..0.0.0.0.....  7     .0...0...0....  7     ..0.....0.....  7     ..0.0.0.0.....
8    ..............  8     ..............  8     ..............  8     ..............
9    ..............  9     ..............  9     ..............  9     ..............
```

```
       HEX = 70              HEX = 71              HEX = 72              HEX = 73
       12345678901234        12345678901234        12345678901234        12345678901234
    1  .............. 1      .............. 1      .............. 1      ..............
    2  .............. 2      .............. 2      .............. 2      ..............
    3  .0.0.0.0...... 3      .0.0.0.0...... 3      .0.0.0.0...... 3      ...0.0.0......
    4  .0......0..... 4      0......0..... 4       ..0.....0..... 4      ..0...........
    5  .0......0..... 5      0......0..... 5       ..0........... 5      ...0.0.0......
    6  .0.0.0.0...... 6      .0.0.0.0...... 6      ..0........... 6      .........0....
    7  .0............ 7      .......0..... 7       ..0........... 7      ...0.0.0......
    8  .0............ 8      .......0.0.... 8      .............. 8      ..............
    9  .............. 9      .............. 9      .............. 9      ..............

       HEX = 74              HEX = 75              HEX = 76              HEX = 77
       12345678901234        12345678901234        12345678901234        12345678901234
    1  ....0......... 1      .............. 1      .............. 1      ..............
    2  ....0......... 2      .............. 2      .............. 2      ..............
    3  .0.0.0.0...... 3      .0.....0...... 3      ..0.....0..... 3      .0.......0....
    4  ....0......... 4      .0.....0...... 4      ..0.....0..... 4      .0...0...0....
    5  ....0......... 5      .0.....0...... 5      ...0...0...... 5      .0..0.0..0....
    6  ...0...0...... 6      .0.....0...... 6      ....0.0....... 6      .0.0...0.0....
    7  .....0.0...... 7      ..0.0.0.0..... 7      .....0........ 7      ..0.....0....
    8  .............. 8      .............. 8      .............. 8      ..............
    9  .............. 9      .............. 9      .............. 9      ..............

       HEX = 78              HEX = 79              HEX = 7A              HEX = 7B
       12345678901234        12345678901234        12345678901234        12345678901234
    1  .............. 1      .............. 1      .............. 1      ....0.0.......
    2  .............. 2      .............. 2      .............. 2      ...0..........
    3  .0.......0.... 3      .0......0..... 3      .0.0.0.0.0.... 3      ....0.0.......
    4  ...0...0...... 4      .0.....0..... 4       .......0...... 4      ...0...0......
    5  .....0........ 5      .0......0..... 5      .....0........ 5      ....0.0.......
    6  ...0...0...... 6      ..0.0.0.0..... 6      ...0.......... 6      .......0......
    7  .0.......0.... 7      .......0..... 7       .0.0.0.0.0.... 7      ....0.0.......
    8  .............. 8      ...0.0.0...... 8      .............. 8      ..............
    9  .............. 9      .............. 9      .............. 9      ..............

       HEX = 7C              HEX = 7D              HEX = 7E              HEX = 7F
       12345678901234        12345678901234        12345678901234        12345678901234
    1  .....0.0...... 1      ....0......... 1      .............. 1      ..............
    2  ....0...0..... 2      ..0........... 2      .............. 2      ..............
    3  ....0......... 3      ...0.0.0...... 3      ...0.0.0...... 3      ..............
    4  ..0.0.0....... 4      ..0.....0.... 4       ..0........... 4      ..............
    5  ....0......... 5      ..0.0.0.0..... 5      ..0........... 5      ..............
    6  ...0.......... 6      ..0........... 6      ...0.0.0...... 6      ..............
    7  ..0.0.0.0..... 7      ...0.0.0...... 7      ......0....... 7      ..............
    8  .............. 8      .............. 8      ....0.0....... 8      ..............
    9  .............. 9      .............. 9      .............. 9      ..............
```

APPENDIX
H
ILLUSTRATED
PARTS LIST

MODEL 77 QUAD HEAD
MATRIX PRINTER

APPENDIX H
ILLUSTRATED PARTS LIST

TABLE OF CONTENTS

FIGURE 1   HEAD ASSEMBLY

HEAD ASSEMBLY (FIGURE 1)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1-8	279-5077-12	HEAD ASSEMBLY	4
1	650-2098	4-40 SCREW	2
2	449-0150	PRINT HEAD COVER	1
3	650-4086	8-32 SET SCREW	8
4	279-5070-14	PRINT SOLENOID ASSY.	8
5	650-0064	SCREW	2
6	465-0256	PRINT HEAD BEARING	1
7	660-0560	FELT WICK	1
8	279-5077-13	HEAD & GUIDE TUBE ASSY.	1
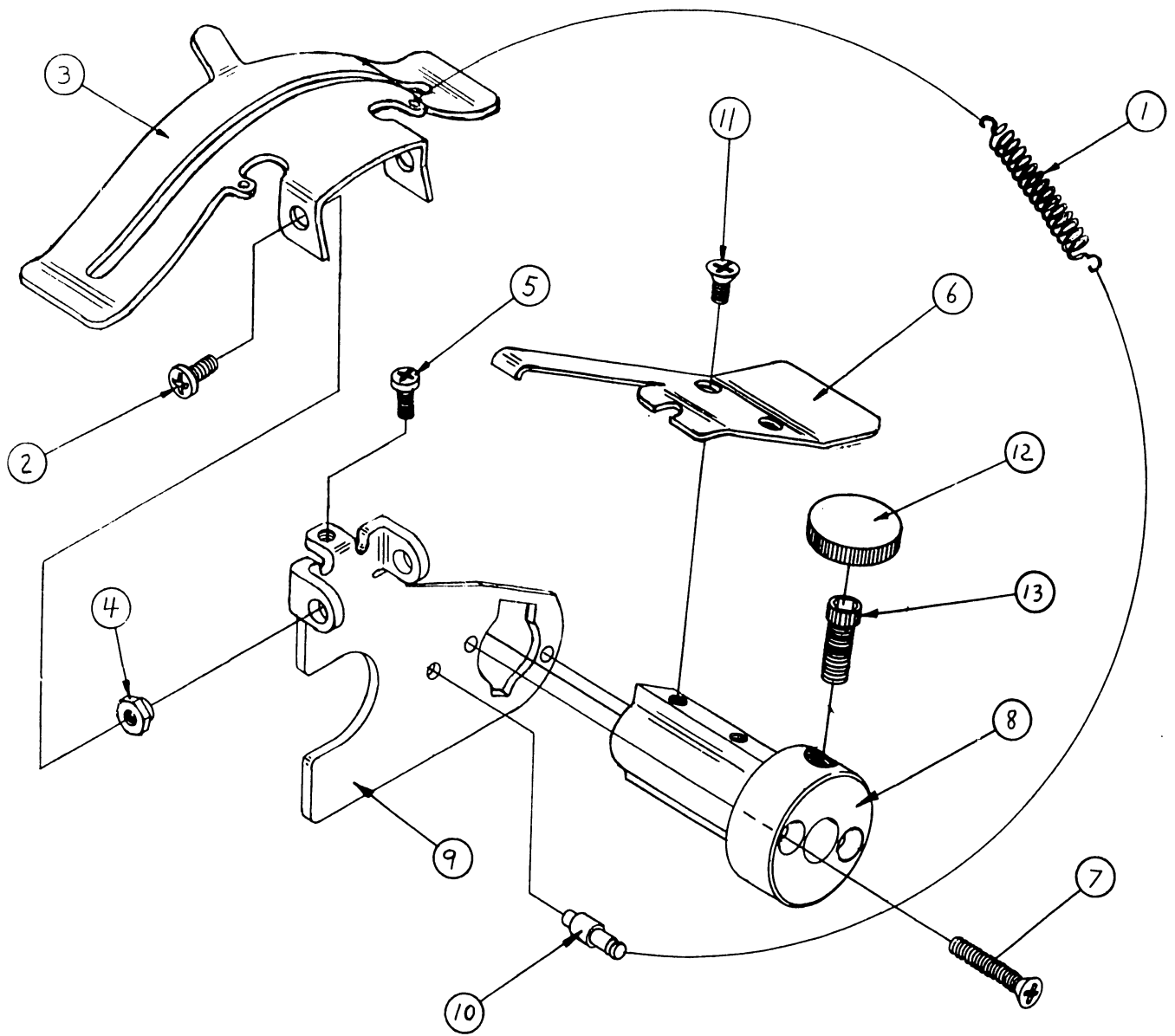
FIGURE 2   PAPER GUIDE COVER

PAPER GUIDE COVER (FIGURE 2)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1-11	279-5070-38	L.H. PAPER GUIDE COVER ASSY.	1
	279-5070-39	R.H. PAPER GUIDE COVER ASSY.	1
1	465-1614	SPRING	1
2	650-3124	6-32 SCREW	2
3	451-2104	PAPER GUIDE COVER	1
4	461-3199	SPROCKET COVER PIVOT	2
5	650-2098	4-40 SCREW	1
6	458-0304	L.H. PAPER LIFT ARM	1
	458-0305	R.H. PAPER LIFT ARM	1
7	650-2241	4-40 SCREW	2
8	465-0730	SPROCKET BUSHING	1
9-10	279-5070-40	L.H. PAPER FEED SIDE PLATE ASSY.	1
	279-5070-41	R.H. PAPER FEED SIDE PLATE ASSY.	1
11	650-2062	4-40 SCREW	2
12-13	279-5070-76	LOCKING KNOB ASSY.	1
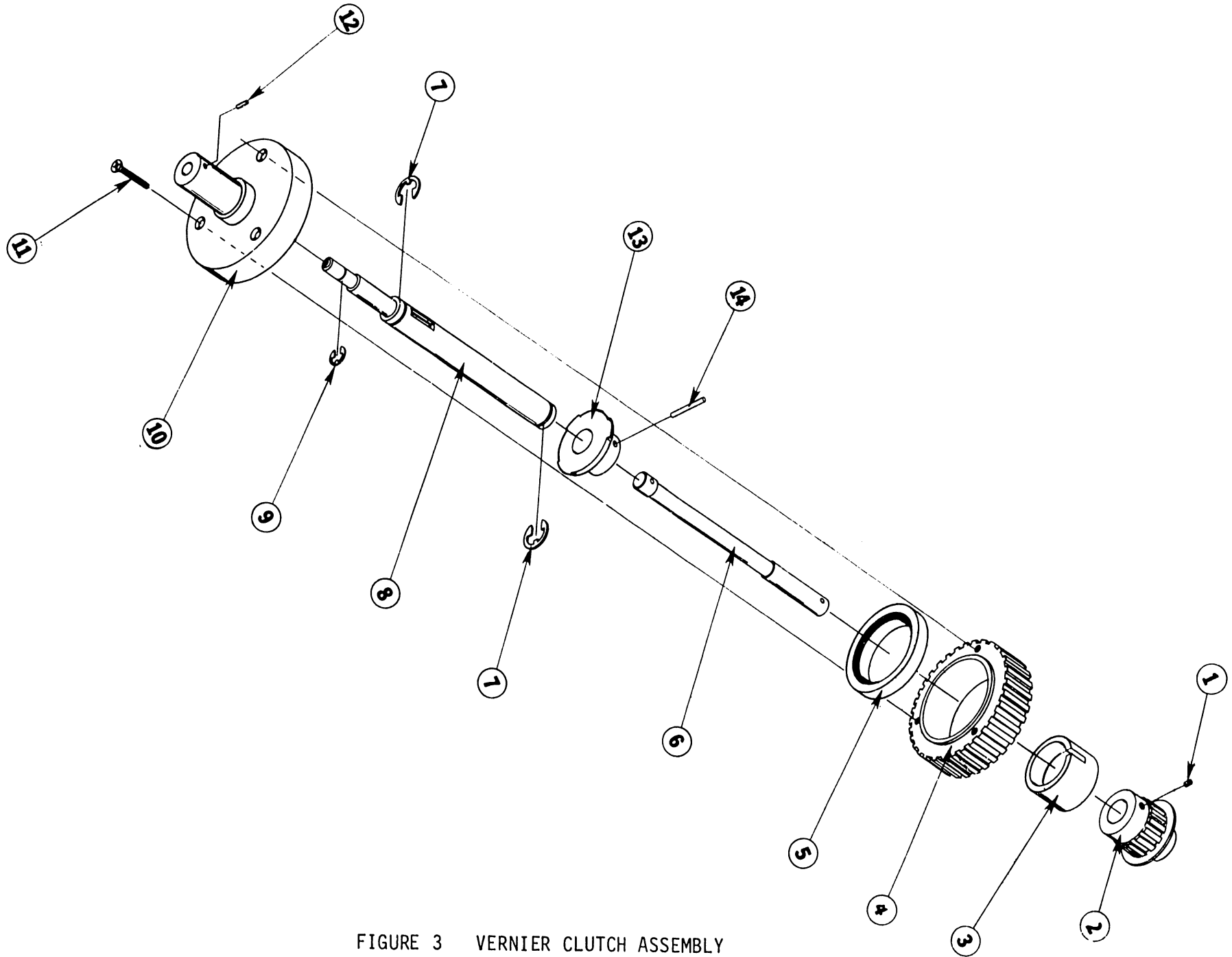
FIGURE 3   VERNIER CLUTCH ASSEMBLY

VERNIER CLUTCH ASSEMBLY (FIGURE 3)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1-14	279-5077-32	VERNIER CLUTCH ASSY.	1
1	650-4040	8-32 SET SCREW	1
2	478-0268	IDLER SHAFT PULLEY	1
3	465-0414	IDLER SHAFT COLLAR	1
4	478-0349	IDLER PULLEY	1
5	461-1030	VERNIER RING	1
6	461-3184	VERNIER CLUTCH SHAFT	1
7	651-1729	TRUARC SNAP RING	2
8	461-3183	IDLER SHAFT	1
9	651-1713	TRUARC SNAP RING	1
10	465-1066	IDLER PULLEY HUB	1
11	650-2241	4-40 SCREW	3
12	651-1640	DOWEL PIN	1
13	465-1046	PAPER DRIVE VERNIER HUB	1
14	651-1600	DOWEL PIN	1
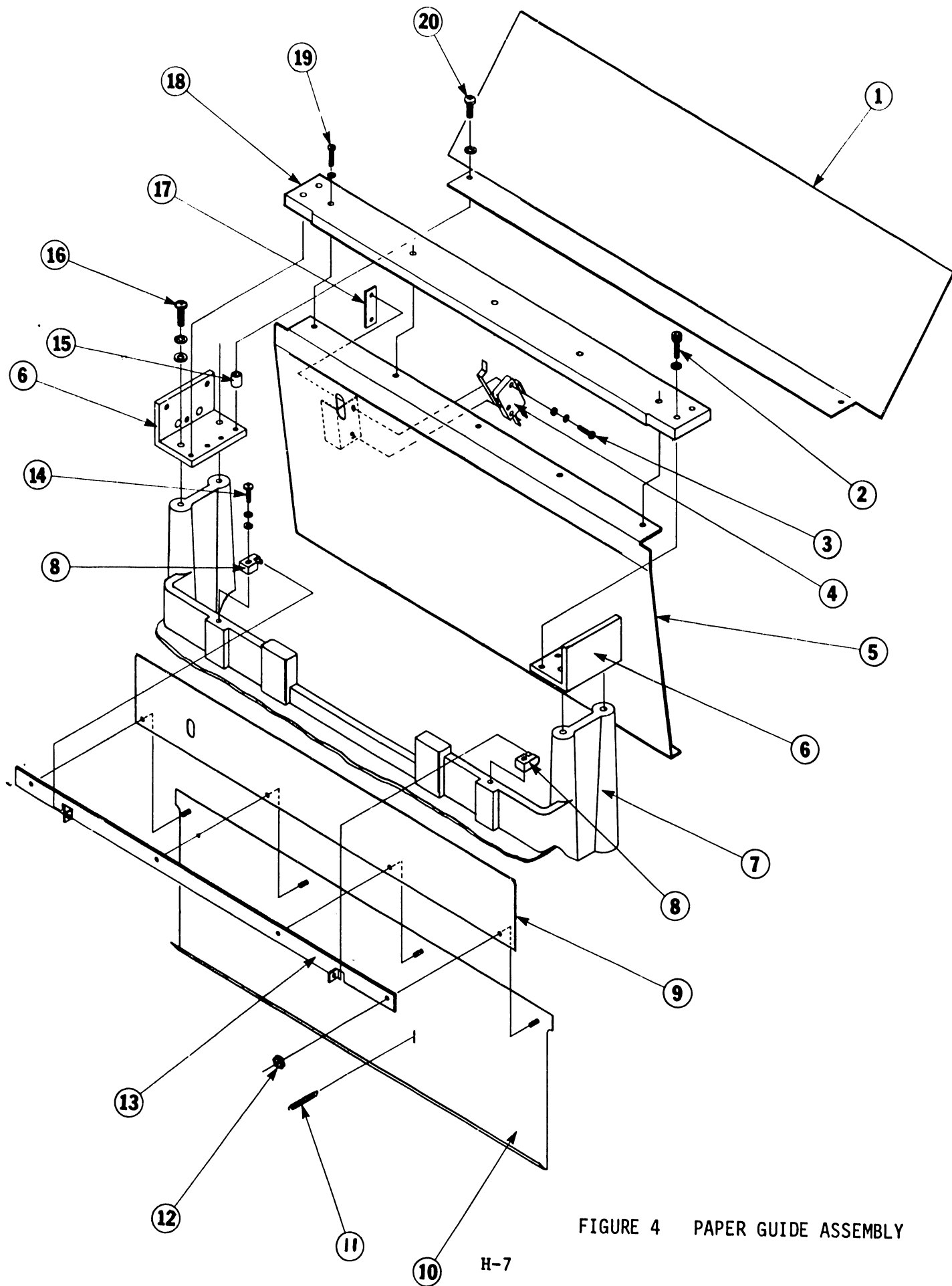
FIGURE 4   PAPER GUIDE ASSEMBLY

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PAPER GUIDE ASSEMBLY (FIGURE 4)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	451-2133	LOWER REAR COVER	1
2	650-6246	10-32 SOCKET SCREW	4
	653-6000	#10 FLAT WASHER	4
3	650-2200	4-40 SCREW	2
	653-2002	#4 LOCK WASHER	2
	653-2000	#4 FLAT WASHER	2
4	325-2403-M1	PAPER OUT SWITCH	1
5	452-4052	OUTER PAPER GUIDE	1
6	451-4303	SIDEFRAME ANGLE	2
7	450-0109	BASE CASTING	1
8	461-3249	PAPER GUIDE PIVOT	2
9	465-1663	PAPER TENSION SPRING	1
10	452-4051	INNER PAPER GUIDE	1
11	465-0925	PAPER GUIDE SPRING	1
12	652-2003	#4 NUT	4
13	452-2583	PAPER TENSION CLAMP	1
14	650-3200	6-32 SCREW	2
	653-3001	#6 LOCK WASHER	2
	653-3000	#6 FLAT WASHER	2
15	462-0125	SPACER	2
16	650-6243	10-32 SCREW	4
	653-6001	#10 LOCK WASHER	4
	653-6000	#10 FLAT WASHER	4
17	461-0103	NUT PLATE	1

PAPER GUIDE ASSEMBLY (Continued)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
18	461-0113	STRIKER PLATE	1
19	650-2201	4-40 SCREW	5
	653-2002	#4 LOCK WASHER	5
20	650-6241	10-32 SCREW	2
	653-6001	#10 LOCK WASHER	2
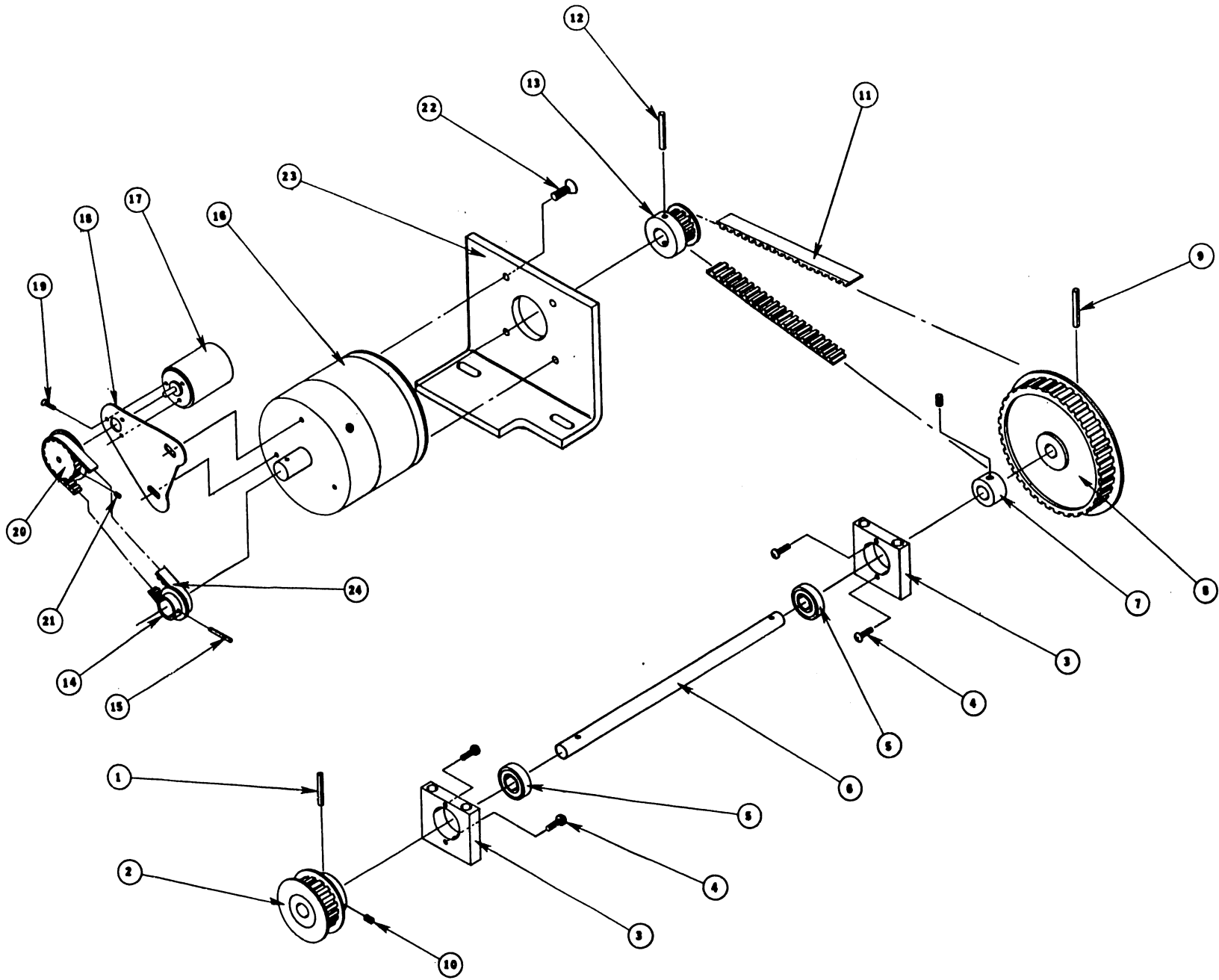
FIGURE 5   CARRIAGE DRIVE ASSEMBLY

CARRIAGE DRIVE ASSEMBLY (FIGURE 5)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1-10	279-5077-45	DRIVE SHAFT & BEARING ASSY.	1
1	651-1535	ROLL PIN	1
2	478-0278	CARRIAGE DRIVE PULLEY	1
3-5	279-5070-71	BEARING AND HOUSING ASSY.	2
3	461-3173	BEARING HOUSING	1
4	650-3124	6-32 SCREW	2
5	465-0011	BALL BEARING	1
6	461-3167	DRIVE SHAFT	1
7	465-0416	SHAFT COLLAR	1
8	478-0344	TIMING PULLEY	1
9	651-1522	ROLL PIN	1
10	650-6087	10-32 SET SCREW	1
11-23	279-5077-17	DRIVE MOTOR & TACH ASSY.	1
11	656-0213	CARRIAGE DRIVE MOTOR BELT	1
12-16	279-5077-18	CARRIAGE DRIVE MOTOR & PULLEY ASSY.	1
12	651-1515	ROLL PIN	1
13	478-0261	CARRIAGE DRIVE PULLEY	1
14	478-0348	TACH DRIVE PULLEY	1
15	651-1508	ROLL PIN	1
16	400-0034	CARRIER MOTOR	1
17	400-0028	TACH MOTOR	1
18	451-4503	TACH MOUNT	1
19	650-9505	SCREW	3
20	478-0288	TACH PULLEY	1
21	650-2043	#4 SET SCREW	1

CARRIAGE DRIVE ASSEMBLY (Continued)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
22	650-4121	8-32 SCREW	4
23	451-4501	MOTOR BRACKET	1
24	656-0232	TACH DRIVE BELT	1
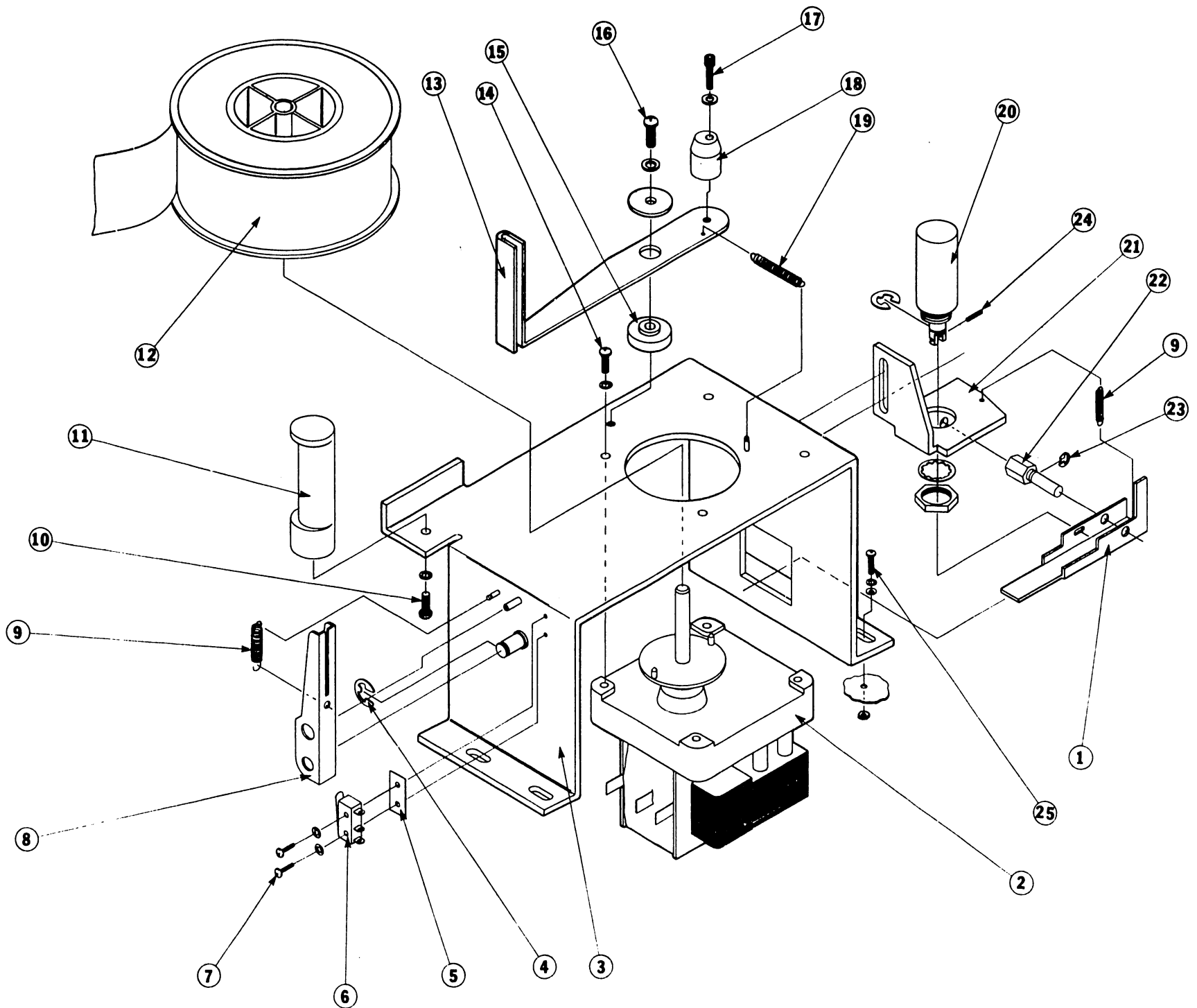
FIGURE 6   RIBBON FEED ASSEMBLY

RIBBON FEED ASSEMBLY (FIGURE 6)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1-25	279-5077-23	L.H. RIBBON FEED ASSY.	1
	279-5077-24	R.H. RIBBON FEED ASSY.	1
1	458-0301	CLUTCH ENGAGEMENT ARM	1
2	400-0041	L.H. RIBBON FEED MOTOR (CW)	1
	400-0042	R.H. RIBBON FEED MOTOR (CCW)	1
3	279-5077-27	L.H. RIBBON FEED BRKT. ASSY.	1
	279-5077-28	R.H. RIBBON FEED BRKT. ASSY.	1
4	651-1719	TRUARC SNAP RING	1
5	615-0334	SWITCH INSULATOR	1
6	325-2309	BURGESS SWITCH	1
7	650-0140	2-56 x 7/16 SCREW	2
	653-0990	#2 LOCK WASHER	2
8	458-0300	RIBBON REVERSE ACTUATING ARM	1
9	465-0917	SPRING	2
10	650-6243	10-32 x 3/4 SCREW	1
	653-6001	#10 LOCK WASHER	1
11	452-4049	RIBBON GUIDE	1
12	279-5077-66	DOUBLE SPOOL RIBBON ASSY.	1
13	458-0411	L.H. RIBBON TENSION ARM	1
	458-0412	R.H. RIBBON TENSION ARM	1
14	650-6243	10-32 x 3/4 SCREW	4
	653-6001	#10 LOCK WASHER	4
15	465-1067	TENSION ARM HUB	1
16	650-4160	8-32 x 1/2 SCREW	1
	653-4001	#8 LOCK WASHER	1

RIBBON FEED ASSEMBLY (Continued)

| ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
	653-6018	3/4 O.D. FLAT WASHER	1
17	650-3242	6-32 SOCKET SCREW	1
	653-3003	#6 SPLIT WASHER	1
18	461-3331	TENSION ARM BRAKE	1
19	465-1670	EXTENSION SPRING	1
20	320-1013	TUBULAR SOLENOID & PLUNGER	1
21	451-4316	SOLENOID BRACKET	1
22	461-3192	SOLENOID ACTUATOR ARM STUD	1
23	651-1712	SNAP RING	1
24	651-1504	ROLL PIN	1
25	650-4160	8-32 SCREW	4
	653-4004	#8 LOCK WASHER	4
	653-4005	#8 FLAT WASHER	4
	652-0029	LOCK NUT	4
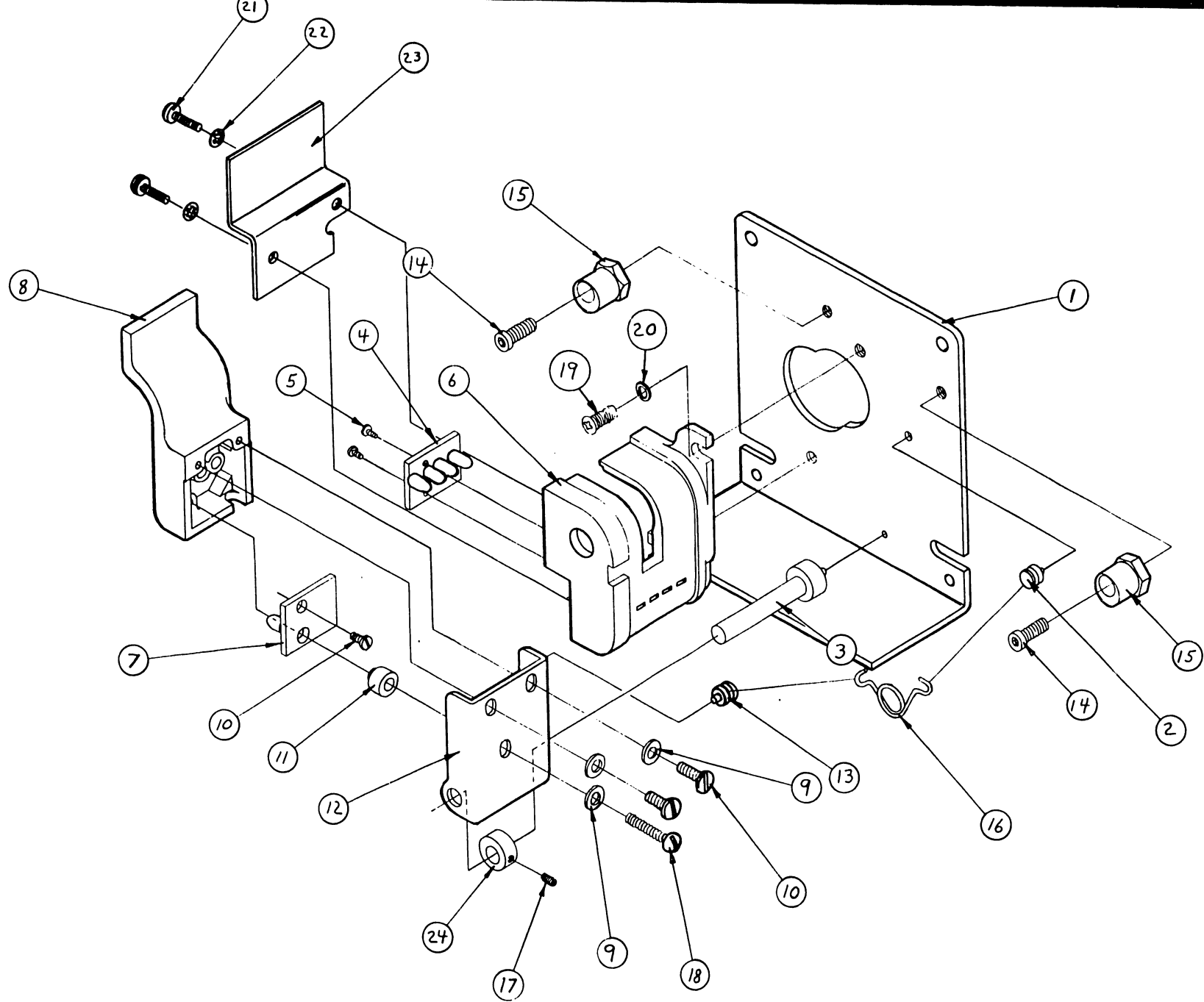
FIGURE 7 FORMAT CONTROL ASSEMBLY

FORMAT CONTROL ASSEMBLY (FIGURE 7)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1-24	279-5077-29	FORMAT CONTROL ASSY.	1
1-3	279-5077-30	FORMAT CONTROL MTG. PLATE ASSY.	1
4	210-7174	MODULE	1
5	651-0014	#2 SCREW	2
6	461-3186	PHOTOTRANSISTOR HOUSING	1
7	210-7175	MODULE	1
8	461-3191	LED HOUSING	1
9	653-2000	#4 FLAT WASHER	3
10	651-0004	4-40 SCREW	2
11	462-0229	LED COVER SPACER	1
12-13	279-5070-31	LED HOUSING COVER ASSY.	1
14	650-3134	6-32 SOCKET SCREW	2
15	458-0295	FORMAT CONTROL STOP	2
16	465-0938	TORSION SPRING	1
17	650-2043	SET SCREW	1
18	651-0016	#4 SCREW	1
19	650-3100	6-32 SCREW	1
20	653-3000	#6 FLAT WASHER	1
21	651-0015	#4 SELF TAP SCREW	2
22	653-2002	#4 LOCK WASHER	2
23	452-2140	CELL MOUNT COVER	1
24	465-0409	COLLAR	1
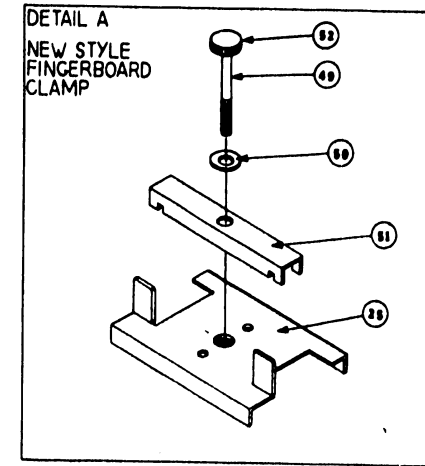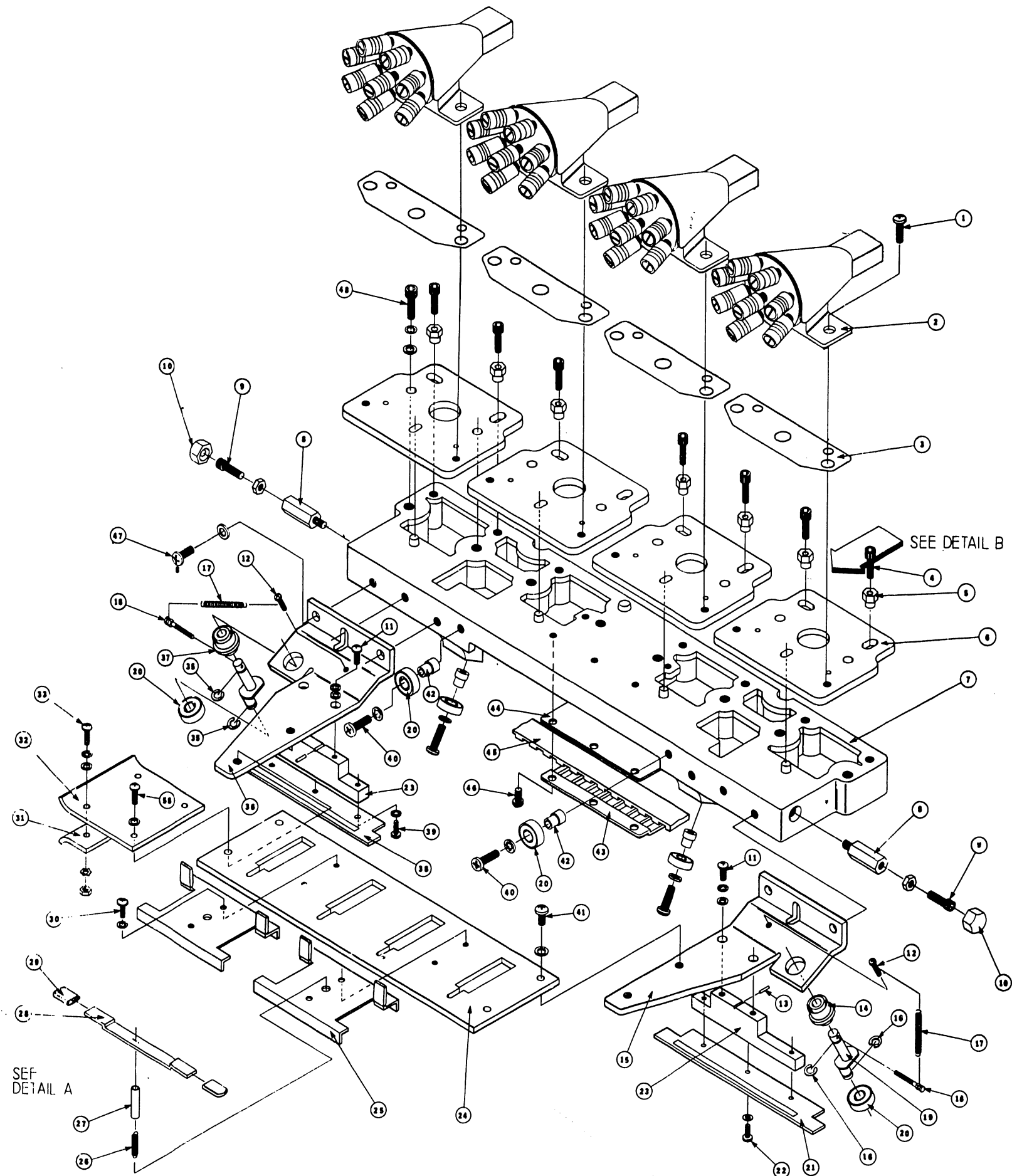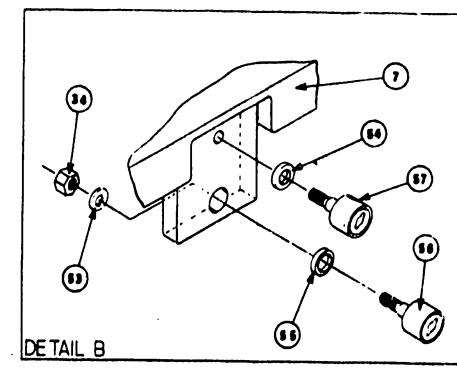
FIGURE 8   CARRIAGE ASSEMBLY

CARRIAGE ASSEMBLY (FIGURE 8)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
	279-5077-19	CARRIAGE ASSY.	1
1	650-6120	10-32 SCREW	8
2	279-5077-12	HEAD ASSY.	4
3	462-0285/6/7	SHIM (.005/.003/.002 Thk.)	As Req'd
4	650-4203	8-32 SOCKET SCREW	7
5	461-3330	HORIZ. HEAD ALIGN. ECCENTRIC	7
6	451-4531	HEAD MOUNTING BRACKET	4
7	279-5077-20	CARRIAGE CASTING ASSY.	1
8	462-0290	STANDOFF	2
9	650-6168	10-32 SOCKET SCREW	2
	652-6000	#10 NUT	2
10	655-0248	CARRIAGE RETURN BUMPER	2
11	650-4160	8-32 SCREW	4
	653-4000	#8 FLAT WASHER	4
12	650-2098	4-40 SCREW	2
13	651-1640	PIVOT PIN	2
14-15	279-5077-22	R.H. OUTBOARD BEARING BRKT. ASSY.	1
16	651-1727	RETAINING RING	2
17	465-1672	SPRING	2
18	461-3178	SPRING PIN	2
19	458-0294	ECCENTRIC BEARING MOUNT	2
20	465-0012	BEARING	6
21	461-0111	10 PITCH TIMING FENCE	1
22	650-3120	6-32 SCREW	3
23	478-0346	FENCE MOUNT	2

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
24	478-0351	CONNECTOR MOUNT	1
25	452-2577	CONNECTOR CLAMP	2
26-29	OBSOLETE	REPLACED BY DETAIL A	-
30	650-3200	6-32 SCREW	4
	653-3001	#6 LOCK WASHER	4
31	452-2584	HEAD CABLE CLAMP	1
32	452-2586	RIBBON CABLE CLAMP	1
33	650-4160	8-32 SCREW	2
	653-4000	#8 FLAT WASHER	2
	652-0029	8-32 LOCK NUT	2
34	652-6000	10-32 NUT	1
35	651-1727	RETAINING RING	2
36-37	279-5077-21	L.H. OUTBOARD BEARING BRKT. ASSY.	1
38	461-0112	12 PITCH TIMING FENCE	1
39	650-3120	6-32 SCREW	3
40	650-4200	8-32 SCREW	4
	653-4001	#8 LOCK WASHER	4
41	650-4120	8-32 SCREW	2
	653-4000	#8 FLAT WASHER	2
42	461-3172	CARRIAGE BEARING STUD	4
43	452-2576	BELT CLAMP	1
44	452-0079	BACKING PLATE	1
45	656-0220	CARRIAGE BELT	1
46	650-3120	6-32 SCREW	6
47	650-4120	8-32 SCREW	6

CARRIAGE ASSEMBLY (Continued)

| ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
	653-4000	#8 FLAT WASHER	6
48	650-6163	10-32 SOCKET SCREW	8
	653-6001	#10 LOCK WASHER	8
	653-6000	#10 FLAT WASHER	8
49-52	279-5077-1	P.C. HOLD DOWN ASSY.	2
53	653-6001	#10 LOCK WASHER	1
54	462-0295	SMALL CAM SPACER	1
55	462-0294	LARGE CAM SPACER	1
56	465-0261	ECCENTRIC CAMFOLLOWER BEARING	1
57	465-0260	CAMFOLLOWER BEARING	1
58	650-4160	8-32 SCREW	2
	653-4000	#8 FLAT WASHER	2
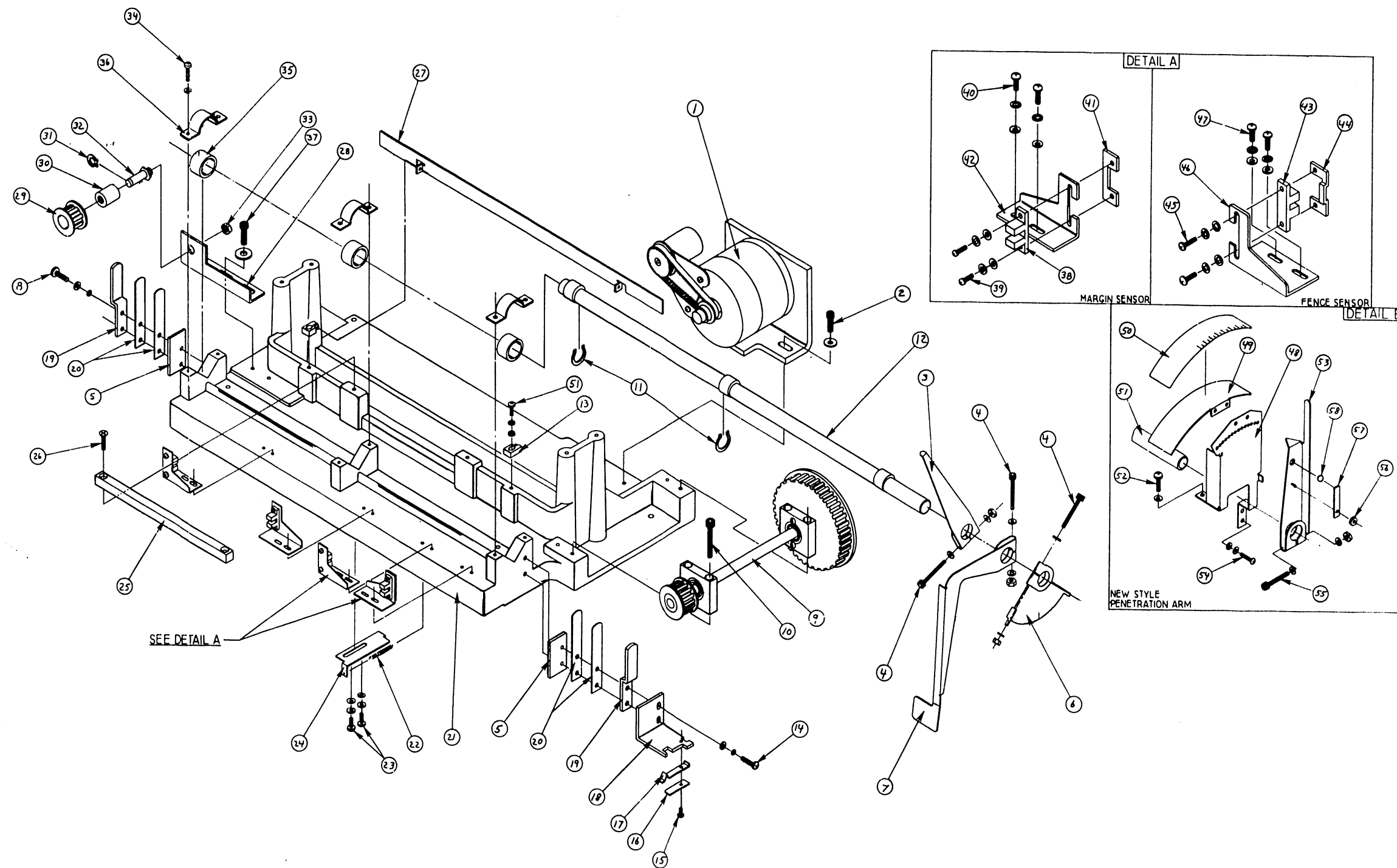
FIGURE 9   BASE CASTING ASSEMBLY

BASE CASTING ASSEMBLY (FIGURE 9)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	279-5077-17	DRIVE MOTOR & TACH ASSY.	1
2	650-9037	1/4 - 28 SOCKET SCREW	2
	653-6006	WASHER	2
3	458-0503	ARM INDICATOR	1
4	650-4400	8-32 SOCKET SCREW	3
	653-4000	#8 FLAT WASHER	6
	652-0047	8-32 NUT	3
5	452-1056	BEARING PLATE	2
6	458-0420	ADJUSTMENT ARM	1
7	458-0448	HEAD ADJUSTMENT ARM	1
8	650-6321	10-32 SCREW	2
	653-6001	#10 LOCK WASHER	2
	653-6000	#10 FLAT WASHER	2
9	279-5077-45	DRIVE SHAFT & BEARING ASSY.	1
10	650-6561	10-32 SOCKET SCREW	4
11-12	279-5077-66	CARRIAGE SHAFT ASSY.	1
13	461-3249	PAPER GUIDE PIVOT	2
14	650-6321	10-32 SCREW	2
	653-6001	#10 LOCK WASHER	2
	653-6000	#10 FLAT WASHER	2
15	650-3080	6-32 SCREW	1
16	458-0419	SPRING SUPPORT	1
17	465-1662	HEAD ADJUSTMENT ARM SPRING	1
18	451-4512	SPRING BRACKET	1
19	458-0413	CARRIAGE STOP	2

BASE CASTING ASSEMBLY (Continued)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
20	465-1661	CARRIAGE SPRING	4
21	450-0109	BASE CASTING	1
22	465-0925	PAPER GUIDE SPRING	1
23	650-4160	8-32 SCREW	2
	653-4001	#8 LOCK WASHER	2
	653-4000	#8 FLAT WASHER	2
24	451-4530	PAPER GUIDE SPRING BRACKET	1
25	452-4050	CARRIAGE GUIDE	1
26	650-6320	10-32 SCREW	2
27	452-2583	PAPER TENSION CLAMP	1
28-33	275-5070-70	IDLER PULLEY ASSY.	1
28	451-4301	IDLER PULLEY BRACKET	1
29	478-0262	IDLER PULLEY	1
30	465-0238	ROLLER BEARING	1
31	651-1740	RETAINING RING	1
32	461-3171	IDLER PULLEY STUD	1
33	652-0054	5/16-18 NUT	1
34	650-6202	10-32 SCREW	6
	653-6001	#10 LOCK WASHER	6
35	465-0737	CARRIAGE SHAFT BUSHING	3
36	452-2578	CARRIAGE SHAFT CLAMP	3
37	650-9044	1/4 - 28 SOCKET SCREW	2
	653-6006	1/4 FLAT WASHER	2
38	279-5077-31	MARGIN PHOTOCELL ASSY.	2
39	650-2100	4-40 SCREW	2

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
	653-2002	#4 LOCK WASHER	2
	653-2000	#4 FLAT WASHER	2
40	650-3160	6-32 SCREW	2
	653-3001	#6 LOCK WASHER	2
	653-3000	#6 FLAT WASHER	2
41	461-0109	MARGIN SENSOR NUT PLATE	2
42	458-0409	L.H. MARGIN SENSOR MOUNT	1
	458-0410	R.H. MARGIN SENSOR MOUNT	1
43	279-5077-31	FENCE PHOTOCELL ASSY.	2
44	461-0110	FENCE SENSOR NUT PLATE	2
45	650-2100	4-40 SCREW	2
	653-2002	#4 LOCK WASHER	2
	653-2000	#4 FLAT WASHER	2
46	451-4502	FENCE SENSOR MOUNT	2
47	650-3160	6-32 SCREW	2
	653-3001	#6 LOCK WASHER	2
	653-3000	#6 FLAT WASHER	2
48	451-4624	DETENT BRACKET	1
49	451-4623	SCALE BRACKET	1
50	615-1345	LABEL	1
51	650-3200	6-32 SCREW	2
	653-3001	#6 LOCK WASHER	2
	653-3000	#6 FLAT WASHER	2
52	650-6202	10-32 SCREW	1
	653-6001	#10 LOCK WASHER	1

BASE CASTING ASSEMBLY (Continued)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
53	458-0403	ARM INDICATOR	1
54	650-6321	10-32 SCREW	2
	653-6001	#10 LOCK WASHER	2
	653-6000	#10 FLAT WASHER	2
55	650-4400	8-32 SOCKET SCREW	1
	653-4000	#8 FLAT WASHER	2
	652-0047	8-32 NUT	1
56	652-0063	NUT	1
57	465-1675	SPRING	1
58	465-0014	STEEL BALL	1
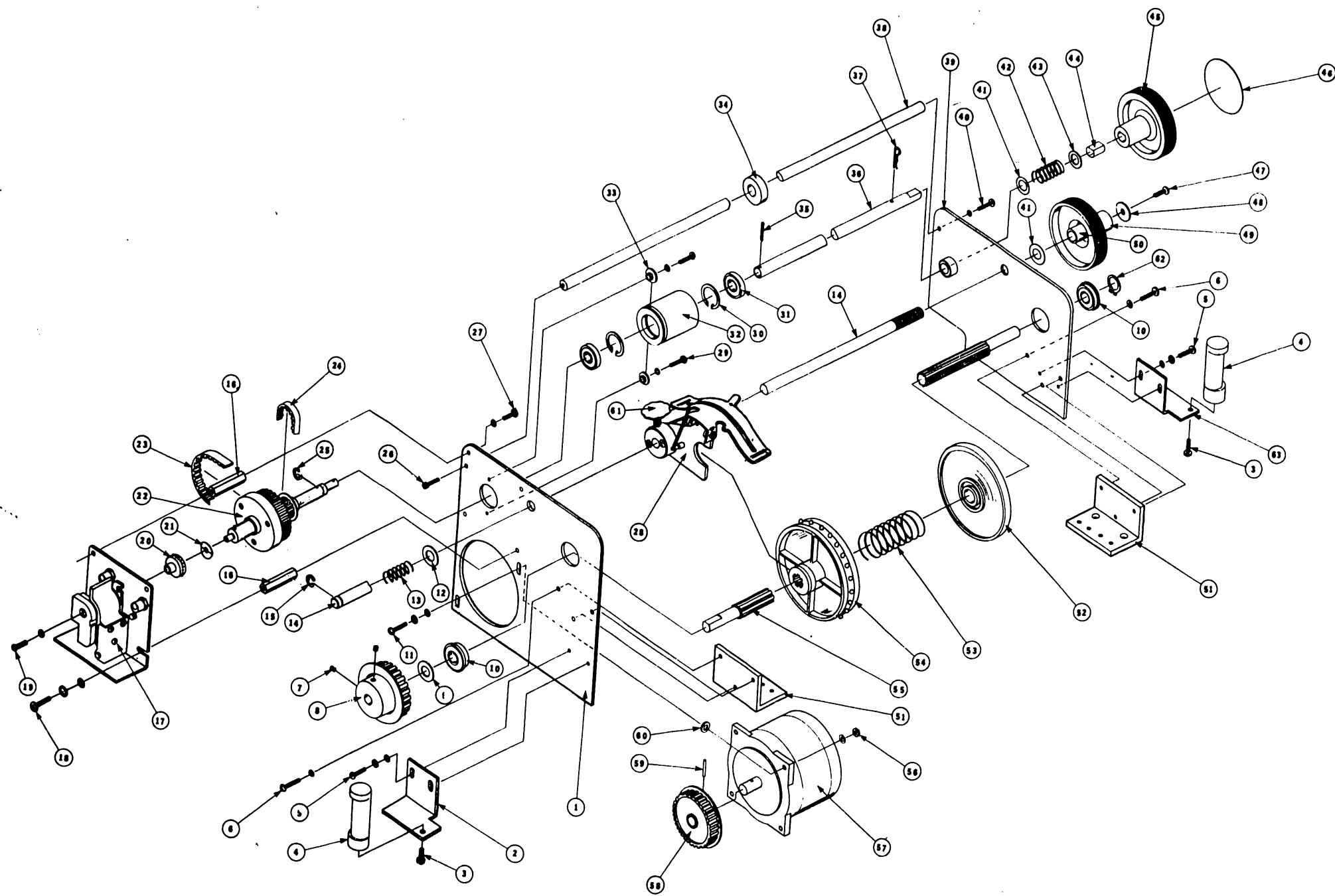
FIGURE 10 MECHANICAL ASSEMBLY

MECHANICAL ASSEMBLY (FIGURE 10)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	452-0082	L.H. SIDE PLATE	1
2	451-4510	L.H. RIBBON GUIDE BRACKET	1
3	650-6240	10-32 SCREW	2
4	452-4049	RIBBON GUIDE	2
5	650-4120	8-32 SCREW	4
	653-4001	#8 LOCK WASHER	4
	653-4000	#8 FLAT WASHER	4
6	650-6120	10-32 SCREW	6
	653-6001	#10 LOCK WASHER	6
7	650-6087	SET SCREW	2
8	478-0286	SPROCKET SHAFT DRIVE PULLEY	1
9	653-6010	WASHER	1
10	465-0235	BEARING	2
11	650-6240	10-32 SCREW	2
	653-6001	#10 LOCK WASHER	2
	653-6000	#10 FLAT WASHER	2
12	653-0031	NYLON WASHER	1
13	465-1617	SPRING	1
14	461-3170	MARGIN ALIGNMENT SHAFT	1
15	651-1704	SNAP RING	1
16	462-0228	FORMAT CONTROL SPACER	4
17	279-5077-29	FORMAT CONTROL ASSY.	1
18	650-4120	8-32 SCREW	4
	653-4001	#8 LOCK WASHER	4
	653-4000	#8 FLAT WASHER	4

MECHANICAL ASSEMBLY (Continued)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
19	650-2088	4-40 SCREW	1
	653-3000	#6 FLAT WASHER	1
20	461-2015-M	TAPE SPROCKET	1
21	465-1606	SPROCKET ADJUSTING SPRING	1
22	279-5077-32	VERNIER CLUTCH ASSY.	1
23	656-0228	TIMING BELT	1
24	656-0233	PAPER FEED MOTOR BELT	1
25	651-1729	SNAP RING	1
26	650-4242	8-32 SOCKET SCREW	1
27	650-4120	8-32 SCREW	4
	653-4001	#8 LOCK WASHER	4
28	279-5070-38	L.H. PAPER GUIDE COVER ASSY.	1
	279-5070-39	R.H. PAPER GUIDE COVER ASSY.	1
29	650-4120	8-32 SCREW	2
	653-4001	#8 LOCK WASHER	2
30-32	279-5070-73	BEARING AND HOUSING ASSY.	1
33	452-2548	BEARING HOUSING CLAMP	2
34	465-0264	NYLON ROLLER BEARING	1
35	651-0200	COTTEN PIN	1
36	461-3335	VERNIER EXTENSION KNOB SHAFT	1
37	651-1531	HITCH PIN	1
38	461-3197	TIE ROD	1
39	279-5077-36	R.H. SIDE PLATE ASSY.	1
40	650-4243	8-32 SCREW	1
	653-4001	#8 LOCK WASHER	1

MECHANICAL ASSEMBLY (Continued)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
41	653-0031	NYLON WASHER	2
42	465-1617	SPRING	1
43	653-6010	WASHER	1
44-46	279-5077-88	"D" KNOB ASSY.	1
44	465-1620	KNOB SPRING	1
45	449-0109	MOLDED KNOB "D"	1
46	461-1032	KNOB DRESS DISC	1
47	650-4160	8-32 SCREW	1
48	653-6018	WASHER	1
49-50	279-5070-75	"C" KNOB ASSY.	1
51	451-4303	SIDEFRAME ANGLE	2
52	461-1029	PAPER SUPPORT DISC	3
53	465-1628	DISC SEPARATOR SPRING	4
54	279-5070-66	L.H. SPROCKET AND BAND ASSY.	1
	279-5070-67	R.H. SPROCKET AND BAND ASSY.	1
55	461-3175	SPLINE SHAFT	1
56	652-6000	10-32 NUT	2
	653-6001	#10 LOCK WASHER	2
57-59	279-5077-64	PAPER FEED MOTOR ASSY.	1
60	653-6018	SPACER	2
61	279-5070-76	LOCKING KNOB ASSY.	2
62	651-1724	RETAINING RING	1
63	451-4511	R.H. RIBBON GUIDE	1
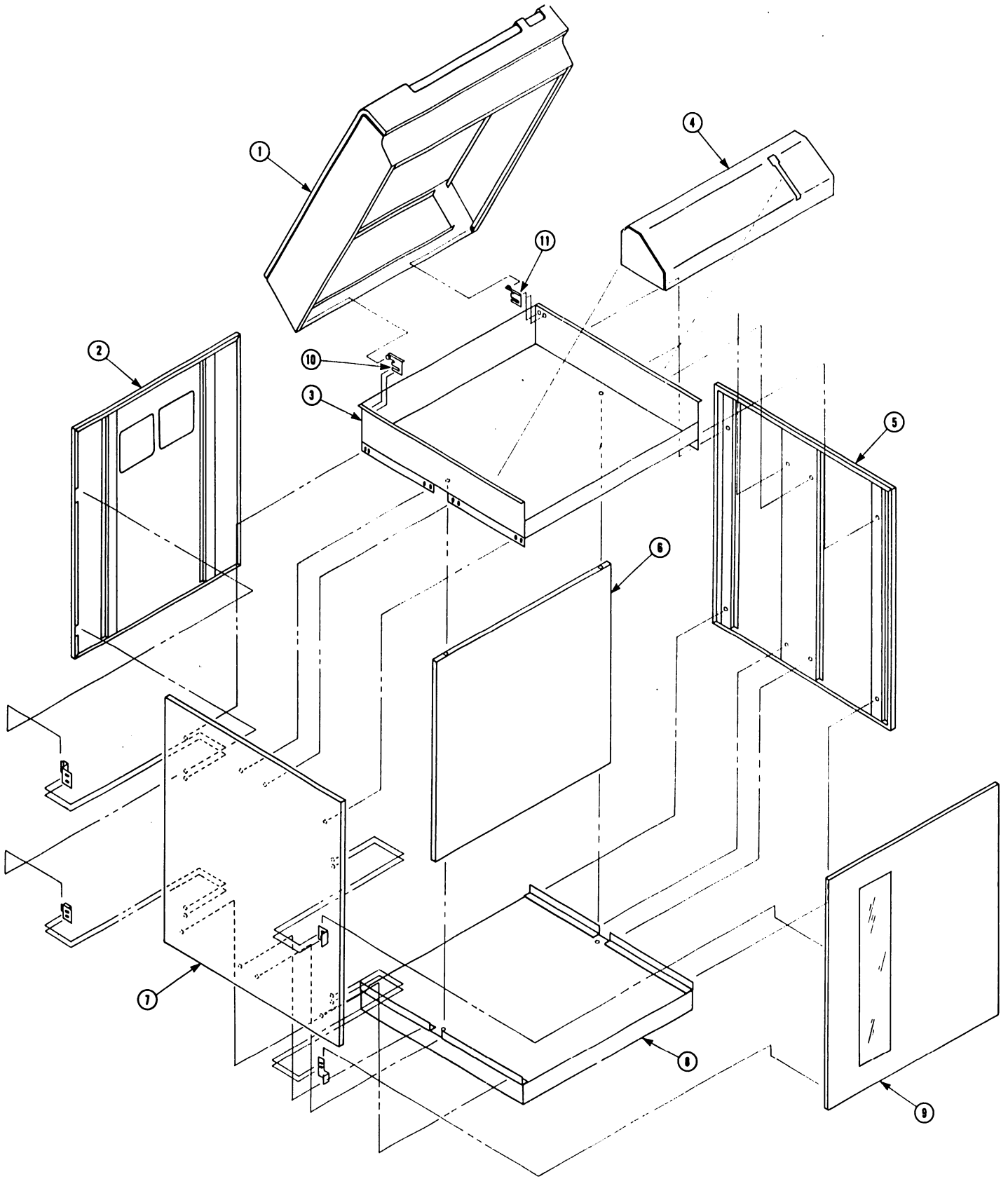
FIGURE 11   COMPLETE CABINET ASSEMBLY

COMPLETE CABINET ASSEMBLY (FIGURE 11)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
ASSY	279-4100	CABINET ASSEMBLY (2261W)	1
1	449-0187	COVER, TOP (FINISHED)	1
2	458-0486	DOOR, REAR (WELDMENT)	1
3	451-1235	PAN, TOP (WELDMENT)	1
4	452-3550	GUARD, QUAD HEADS	1
5	451-3876	PANEL, SIDE (WELDMENT) R.H.	1
6	451-3874	PANEL, MODESTY (WELDMENT)	1
7	451-3875	PANEL, SIDE (WELD) L.H.	1
8	451-1234	PAN, BASE (WELDMENT)	1
9	458-0485	DOOR, FRONT (FAB & WELD)	1
10	451-4594	BKT, COVER (WELD) L.H.	1
11	451-4595	BKT, COVER (WELD) R.H.	1
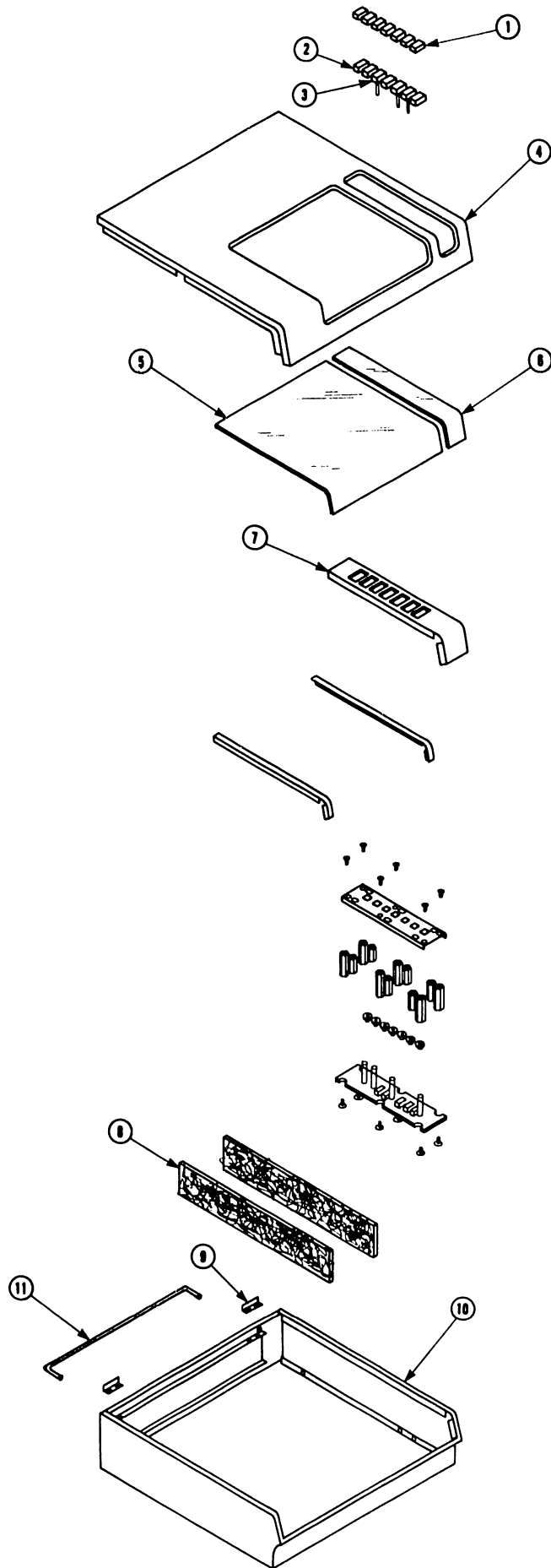
FIGURE 12   TOP COVER

TOP COVER (FIGURE 12)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	550-0007	KEY CAPS, LG GRN	7
2	550-0072	KEY STEM SH, BLK (2261W)	4
3	550-0073	KEY STEM LG, BLK (2261W)	3
4	449-0187	COVER	1
5	446-0037	WINDOW, COVER SIGHT	1
6	446-0036	WINDOW, COVER - CONTROLS SS	1
7	279-5077-69	WINDOW, COVER CONTROL ASSY (61W)	1
8	660-0587	FOAM, FRAME COVER SIDES	2
9	478-0364	HOLDER, ROD (PAPER CHUTE)	2
10	458-0487	FRAME, COVER (WELDMENT)	1
11	461-3197	MP 70 TIE ROD	1
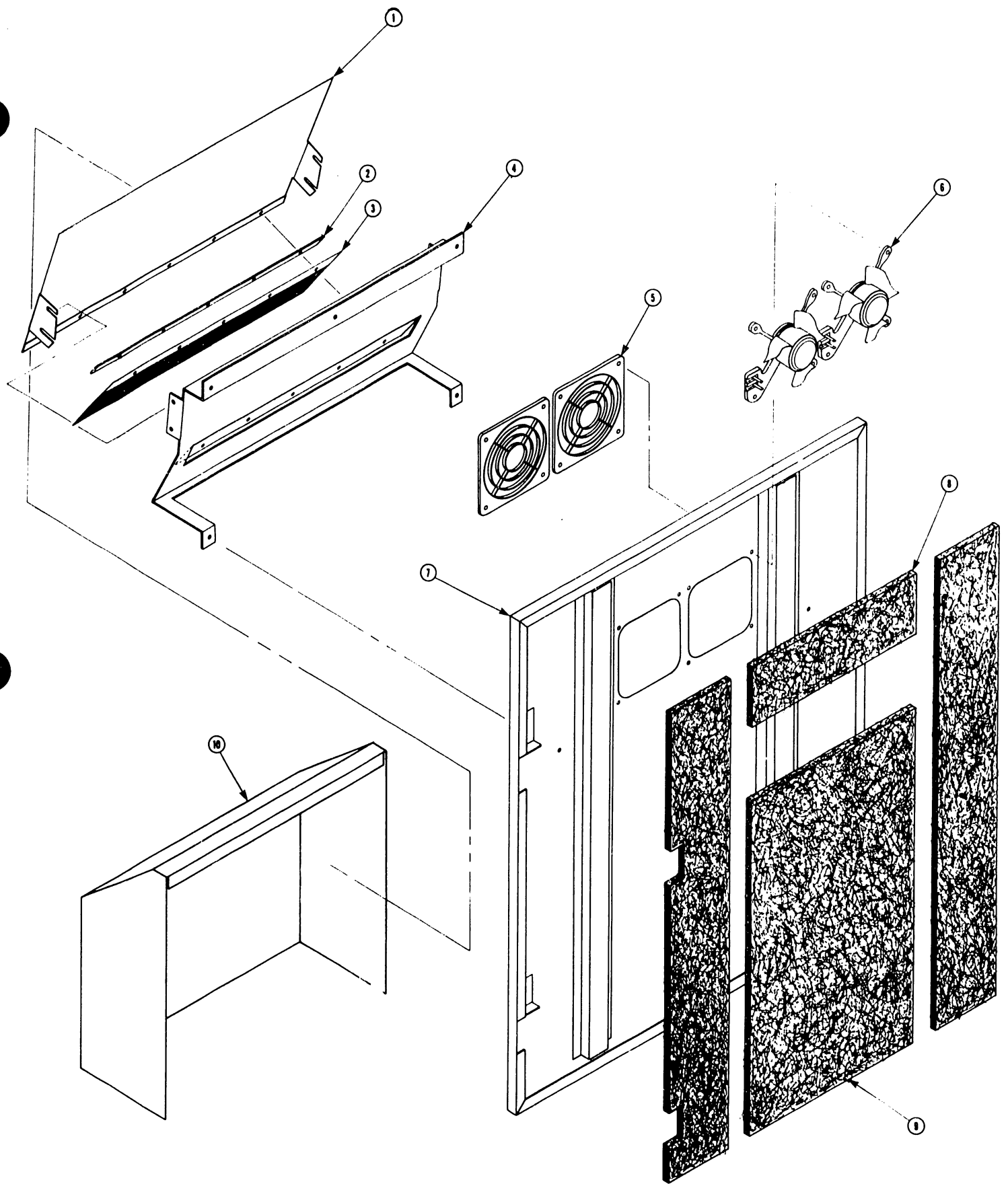
FIGURE 13   REAR DOOR

REAR DOOR (FIGURE 13)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	451-4056	GUIDE, PAPER REAR	1
2	452-2590	CLAMP, BAR (77)	1
3	458-0438	ELIMINATOR, STATIC (77)	1
4	452-1232	SLIDE, PAPER (77)	1
5	449-0101	FAN GUARD, 4" BLACK	2
6	400-1012	FAN, ROTRON WR2A1 (52 CFM)	2
7	458-0486	DOOR, REAR (WELDMENT)	1
8	660-0584	FOAM, REAR DOOR TOP	1
9	660-0588	FOAM REAR DOOR BOTTOM	1
10	451-1233	ENCLOSURE, PAPER GUIDE (77)	1
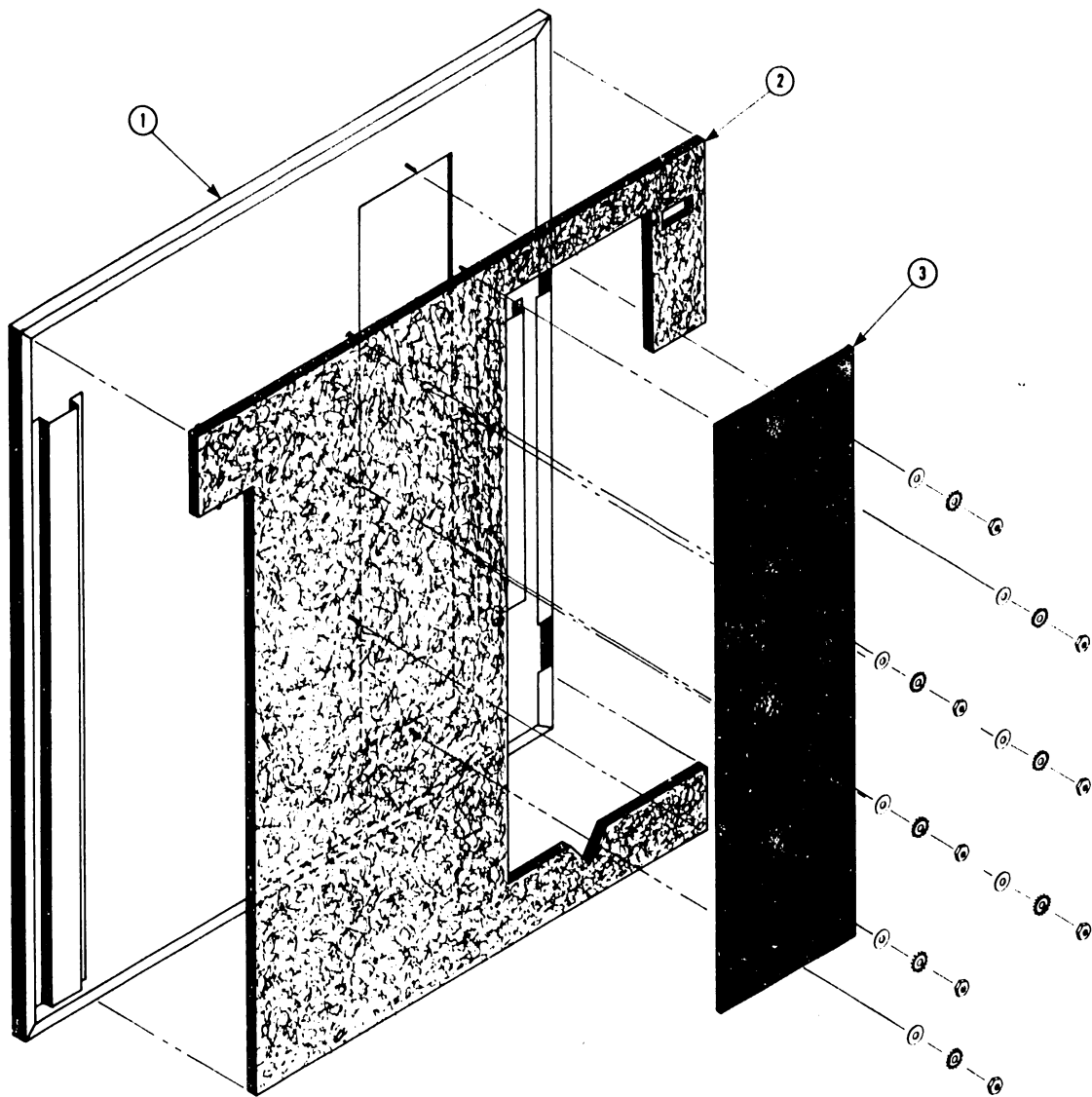
FIGURE 14   FRONT DOOR

FRONT DOOR (FIGURE 14)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	458-0485	DOOR, FRONT (FAB & WELD)	1
2	660-0589	FOAM, FRONT DOOR	1
3	446-0032	PLASTIC (-obsolete-)	1

FIGURE 15   BASE PAN

H-39
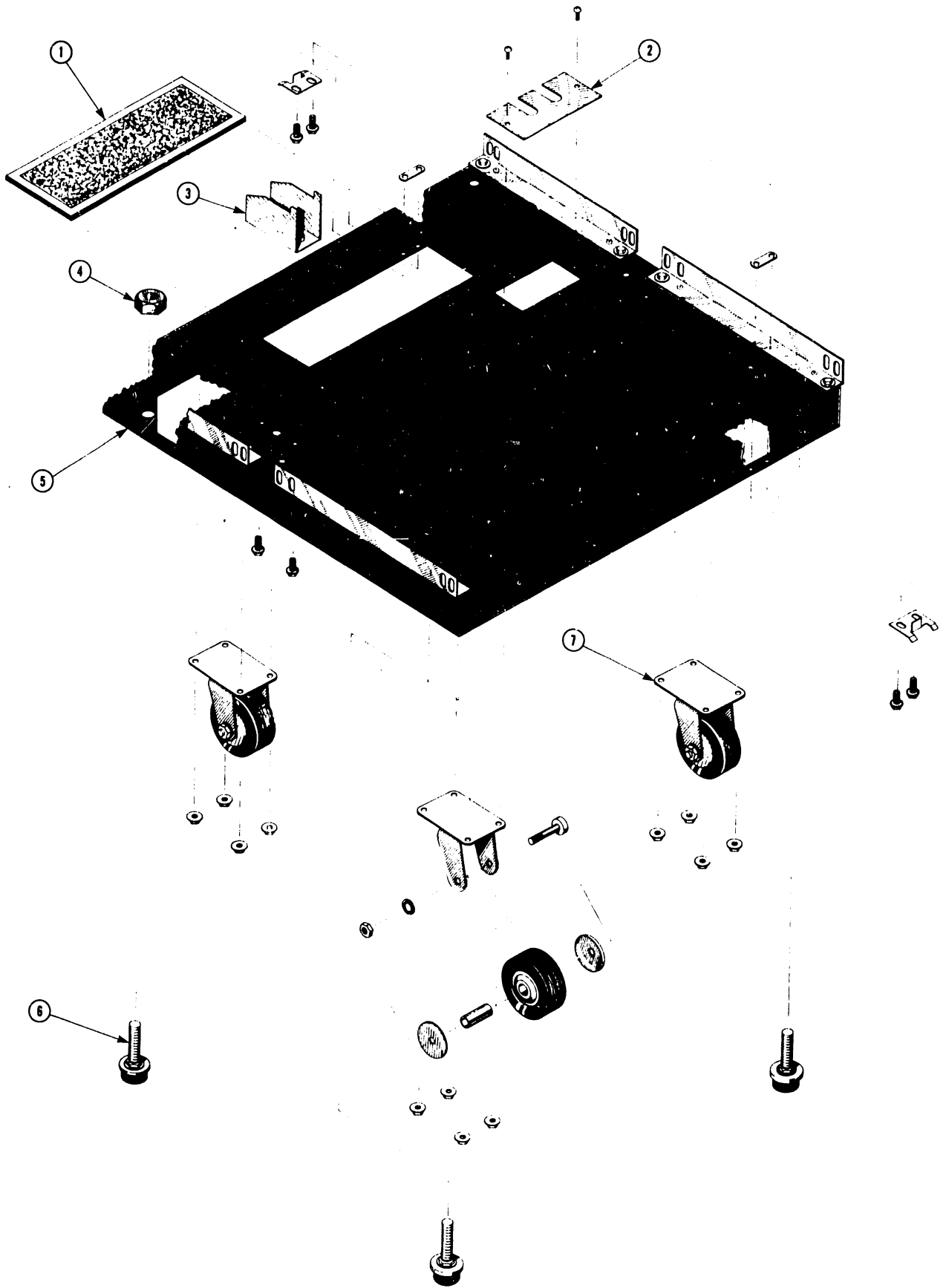
BASE PAN (FIGURE 15)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	458-0439	FILTER, AIR (ALUM MESH) 77	1
2	452-2168	METAL PLATE	1
3	451-4591	BKT., GUIDE PWR SUPPLY	1
4	652-0020	HEX NUTS	4
5	451-1234	PAN, BASE (WELDMENT)	1
6	655-0016	GLIDES, LEVELING	4
7	655-0015	CASTOR, 3" DIAMETER WHEEL	4
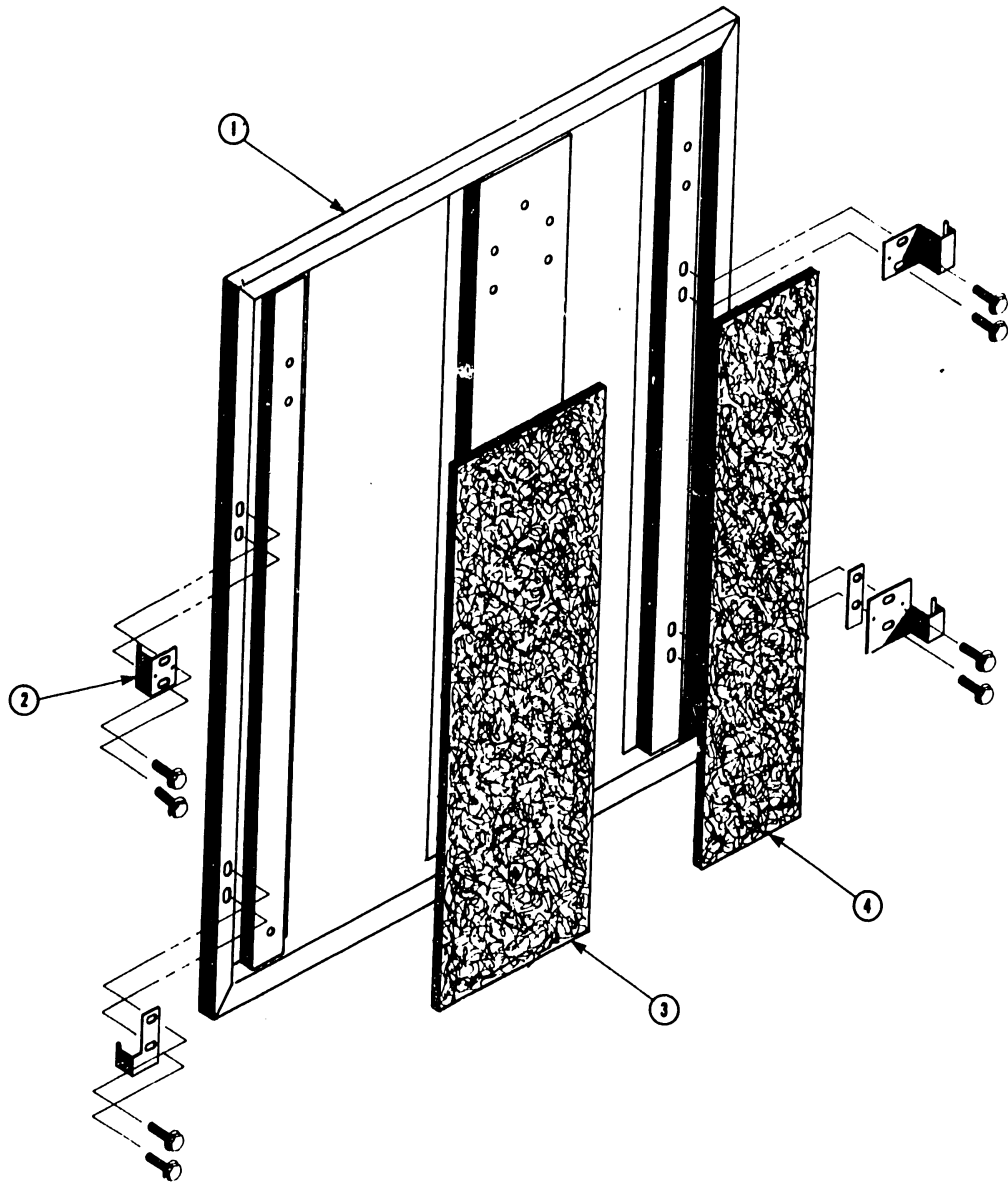
FIGURE 16   RIGHT SIDE PANEL

RIGHT SIDE PANEL (FIGURE 16)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	451-3875	PANEL, SIDE (WELDMENT) R.H.	1
2	465-0826	HINGE, FRONT DOOR L.H. (77)	1
3	660-0585	FOAM, SIDE PANEL A	1
4	660-0586	FOAM, SIDE PANEL B	1
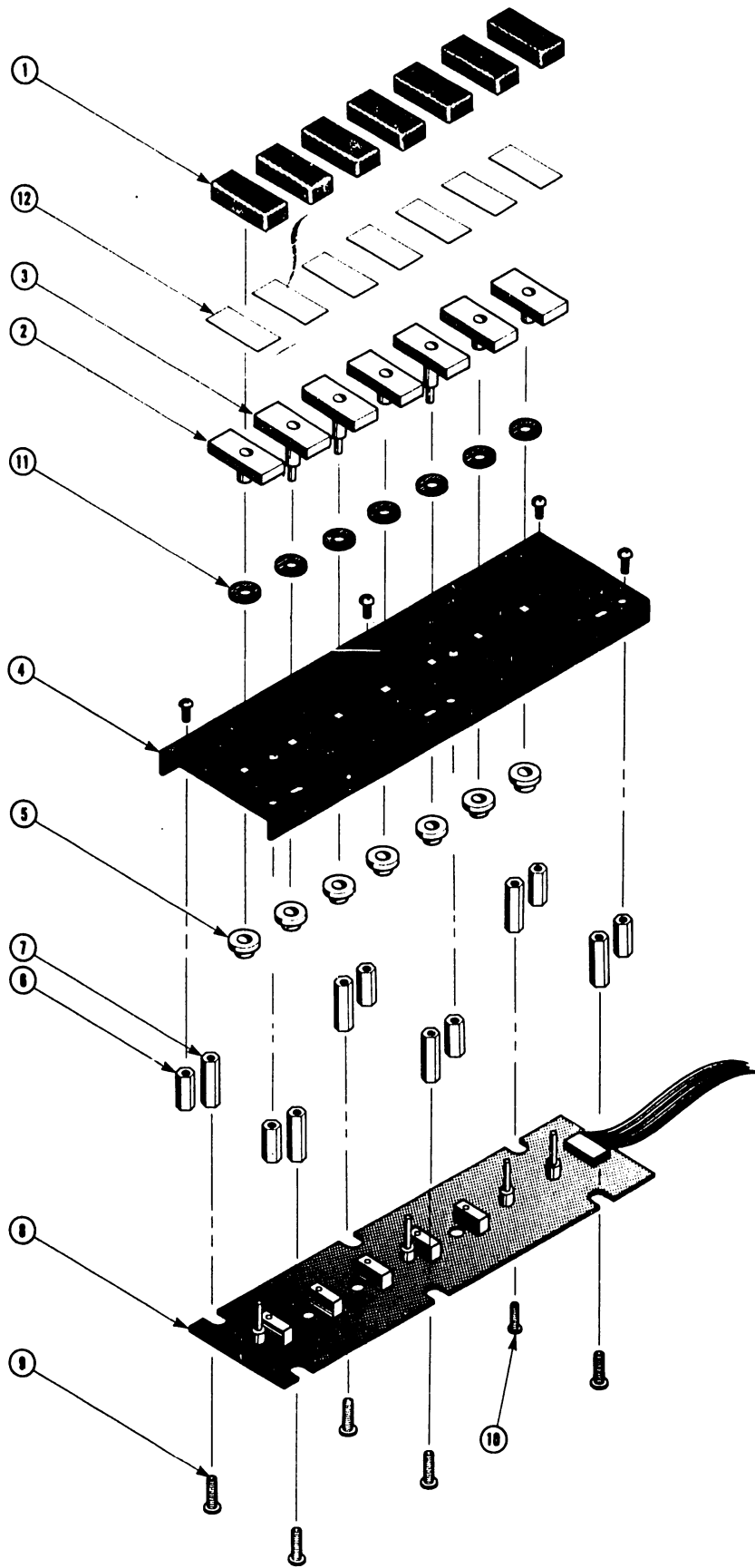
FIGURE 17   KEYBOARD ASSEMBLY

KEYBOARD ASSEMBLY (FIGURE 17)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
ASSY	271-1135	KEYBOARD ASSY	1
1	550-0007	KEY CAPS, LG GRN	7
2	550-0072	KEY STEM SH, BLK (2261W)	4
3	550-0073	KEY STEM LG, BLK (2261W)	3
4	452-1057	PLATE, BEARING	1
5	550-0013	KEY, RETAINER	7
6	462-0020	CA SPACER, KB 4-40 TAP	6
7	462-0013	EN SPACER, SMITH 8844	6
8	210-7130	PCA 2261W IOP CNTL PANEL	1
9	650-2087	SCREW	5
10	650-2081	SCREW	1
11	654-1209	GROMMET, ¼" ID	7
12	550-0748	NO. 48 INSERT GROUP	1
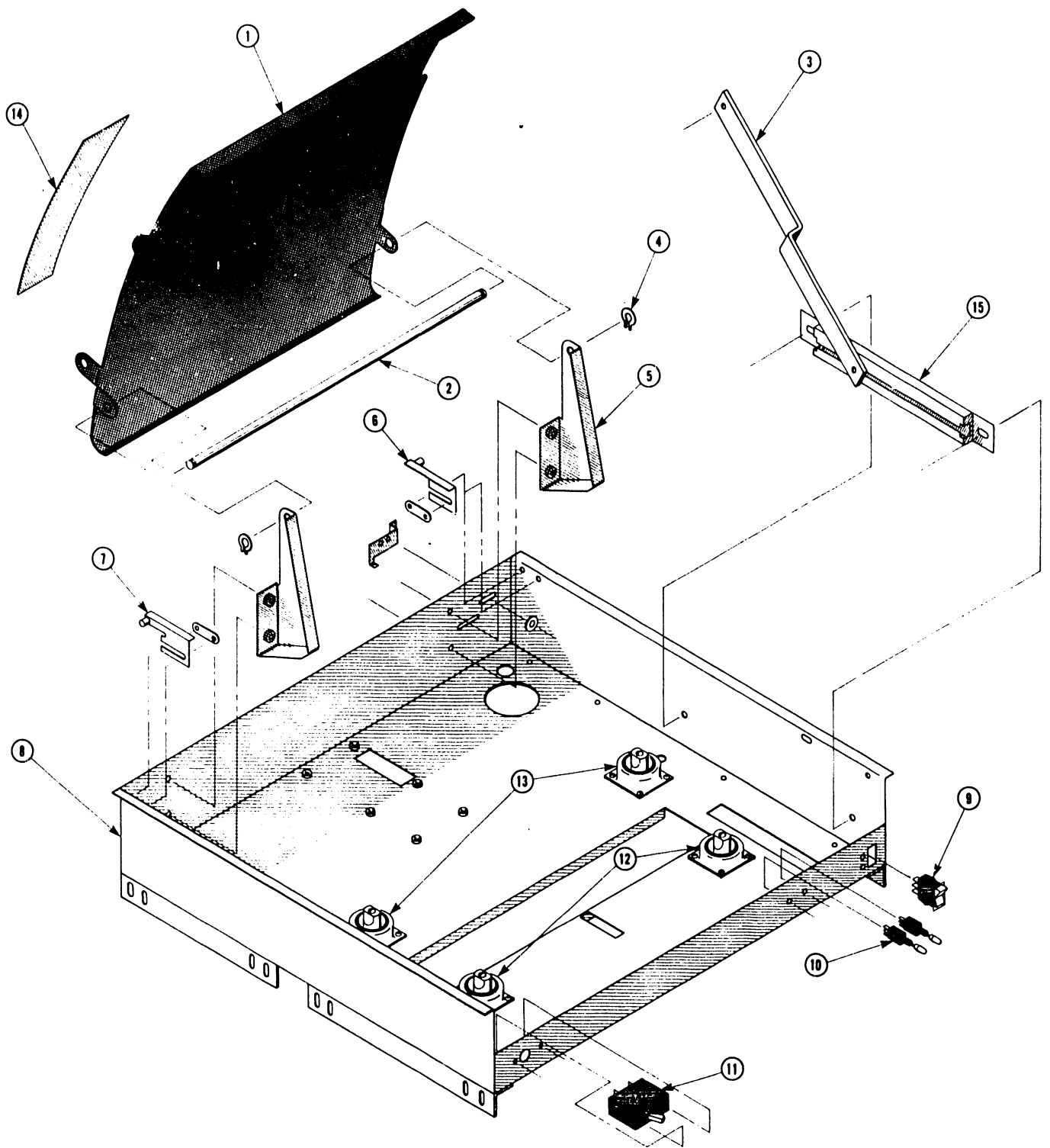
FIGURE 18   TOP TRAY

TOP TRAY (FIGURE 18)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	452-4055	GUIDE, PAPER (LOWER)	1
2	461-3343	ROD, PIVOT PAPER CHUTE	1
3	458-ᴜ429	BAR, PROP	1
4	651-1728	CIRCLIP, LOCK	2
5	451-4590	BKT, PAPER GUIDE	2
6	451-4594	BRACKET, COVER PIVOT (WELD) L.H.	1
7	451-4595	BRACKET, COVER PIVOT (WELD) R.H.	1
8	451-1235	PAN, TOP (WELDMENT)	1
9	325-0021	SWITCH, POWER ON	1
10	279-5077-67	SWITCH 6/8 LINE; 10/12 PITCH ASSEMBLY WITH WIRE HARNESS	1
11	325-2513	CKT. BKR.	1
12	655-0245	SHOCK MOUNT, FRONT	2
13	655-0246	SHOCK MOUNT, REAR	2
14	615-1349	LABEL, PITCH AND LINE	1
15	451-4598	BKT., STOP BAR	1
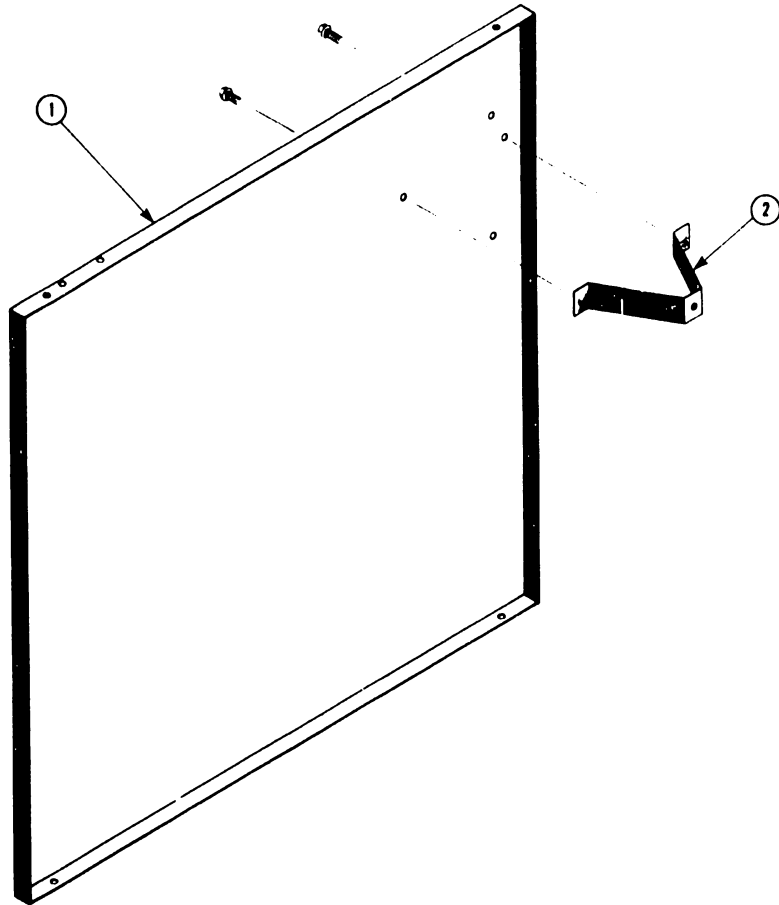
FIGURE 19   MODESTY PANEL

MODESTY PANEL (FIGURE 19)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	451-3874	PANEL, MODESTY	1
2	451-4591	BRKT., GUIDE PWR SUPPLY	1
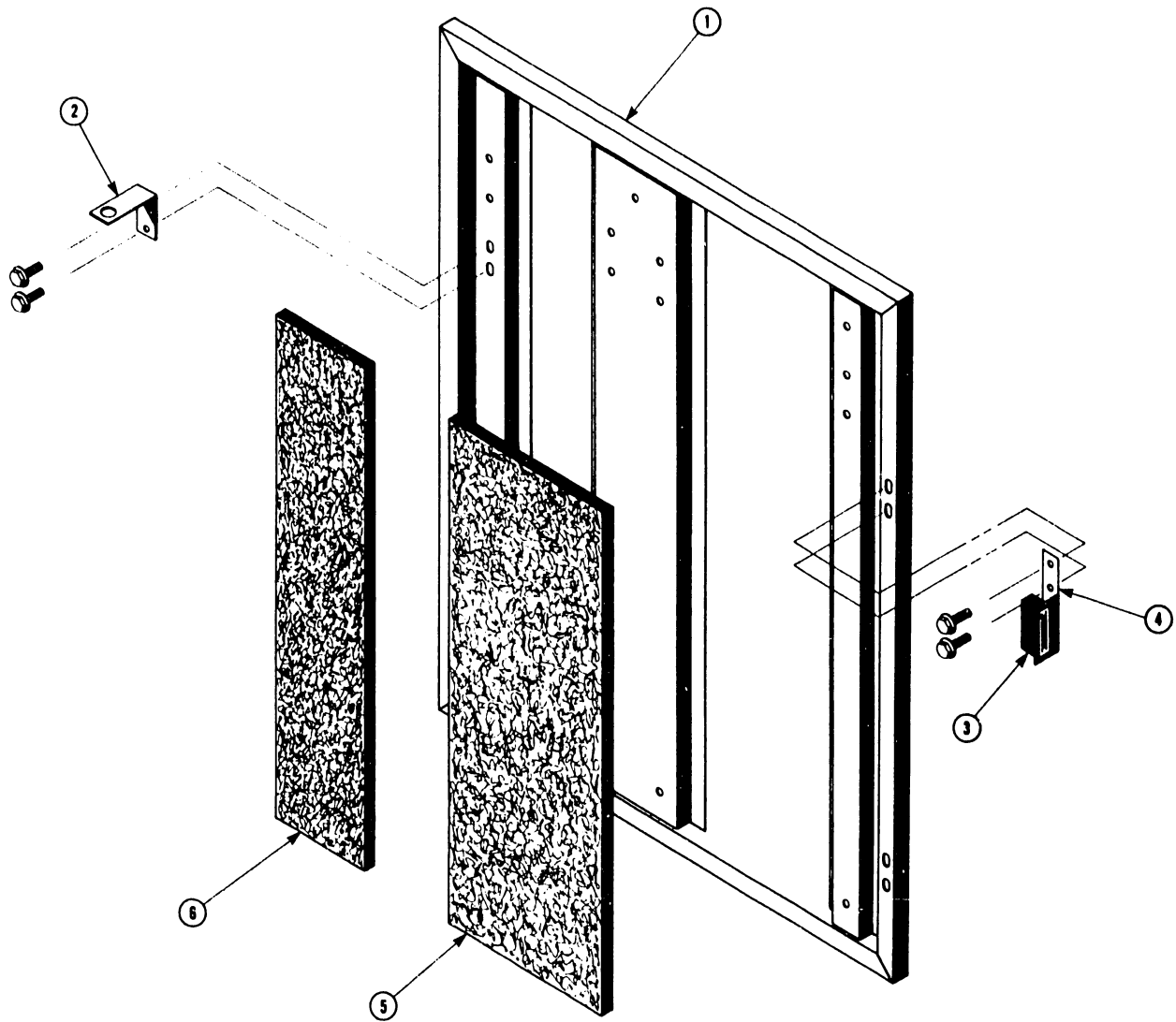
FIGURE 20   LEFT SIDE PANEL

LEFT SIDE PANEL (FIGURE 20)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	451-3876	PANEL, SIDE (WELDMENT) L.H.	1
2	451-4589	BRKT, MTG PWR SUPPLY (UPPER)	1
3	451-4648	BRACKET, MAGNET	2
4	655-0017	MAGNET CATCH	2
5	660-0585	FOAM, SIDE PANEL A	1
6	660-0586	FOAM, SIDE PANEL B	1
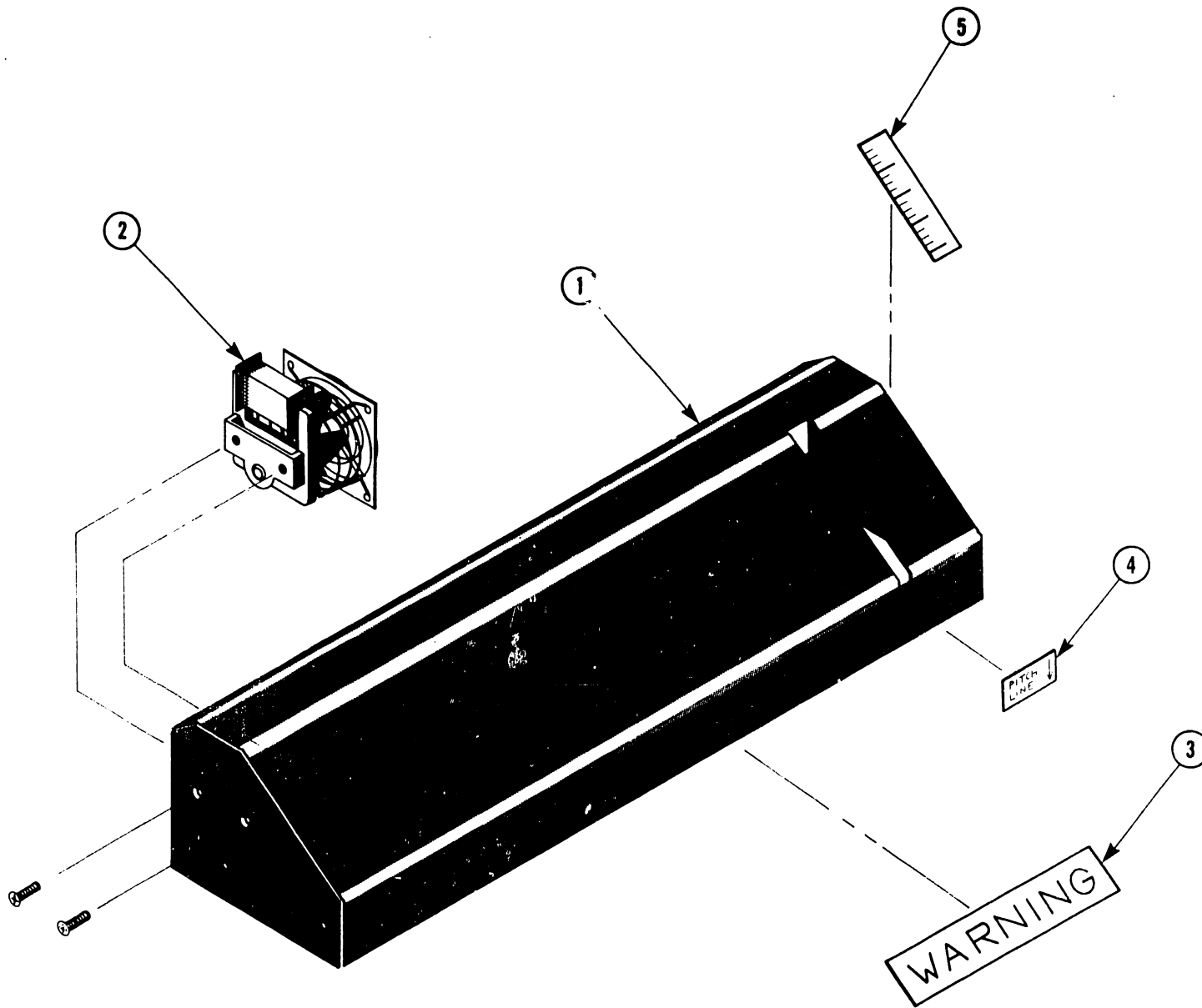
FIGURE 21   SILENCER HOOD

SILENCER HOOD (FIGURE 21)

ITEM NO.	PART NO.	DESCRIPTION	QTY. PER ASSEMBLY
1	452-3550	GUARD, QUAD HEADS	1
2	279-0104	FAN, SUB ASSY.	1
3	615-1357	LABEL, HEAD SHIELD WARNING	1
4	615-1336	LABEL, 10/12 PITCH SCALE	1
5	615-1345	LABEL, HEAD POSTION	1

PERIPHERALS #33

MODEL 2261W INCORRECT PHOTOCELL PART NUMBER

In the "Model 77 Quad Head Printer Manual, Addendum A - March 19, 78", the margin sensor photocell (page H-24 #38) is incorrectly called out as part #279-5077-31. The <u>correct</u> part number is 375-2107.

The 279-5077-31 has a mask on it and is used for timing fence sensors only.

NO. 157	DATE: 12/23/77

IMMEDIATE SERVICE NOTICE

CATEGORY
PERIPHERALS #14

SUBJECT
MODEL 77 (2261W) MATRIX PRINTER SOLENOID WIRE BREAKAGE

Some Model 77 (2261W) Matrix Printers have experienced solenoid wire breakage problems. The most common cause of these print head failures is incorrect striker plate alignment. If the print head bearing to striker plate clearance is less than .005" when the head adjustment arm is set to maximum penetration (due to incorrect alignment), the solenoid wires may break during firing.

By the procedures that follow, check the clearance from the print head bearings to striker plate. If the clearance is less than .005" when the print heads are set to maximum penetration (with ribbon and paper removed), adjust the striker plate to obtain the correct gap of .005" + .001"-.000".

The following procedures are for checking and performing striker plate alignment. The procedures given below are essentially the same as those given in the Maintenance Manual for the Model 77 Quad Head Matrix Printer; the main difference is the clearance specification for the striker plate to print head bearing. In the Maintenance Manual, the gap specified is .006"; in this service notice the gap specified is .005". The .005" gap setting should be used only on printers which are experiencing solenoid wire breakage; on other printers, the gap should not be changed.

Other possible causes of print solenoid failure are listed at the end of this service notice.

A) STRIKER PLATE ADJUSTMENT CHECK

1. Turn the main power off and remove the steel fan and head cover assembly (print head shield).

2. Remove the ribbon and the paper.

3. Set the head adjustment arm to the maximum penetration position (heads all the way forward).

.005" +.001 -.000

MOUNTING SCREWS   STRIKER PLATE   MOUNTING SCREWS

① ② ③ ④
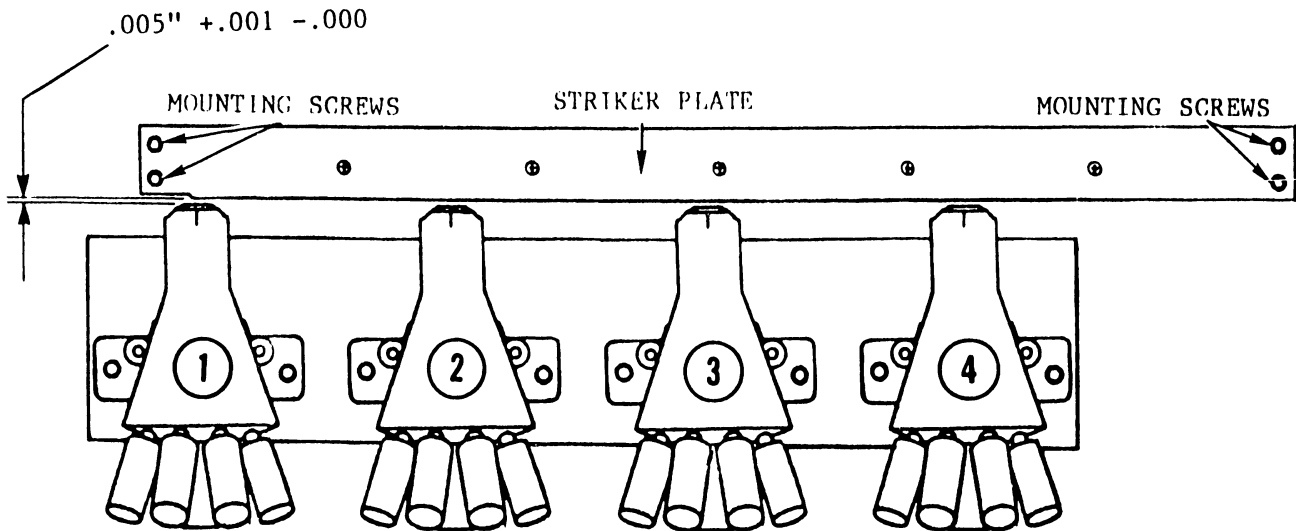
FIGURE 1

4. Move the carriage assembly to the left margin.

5. Using a feeler gauge, measure the gap from print head bearing #1 (leftmost head) to the striker plate. See Figure 1. This gap should be .005" + .001"-.000". Note the exact measurement and continue with the next step.

6. Move the carriage assembly to the right margin. Again measure the gap from print head bearing #1 to the striker plate. The second measurement should be within .001" of the first, but never less than .005".

7. Repeat this procedure for each of the remaining print heads. For each individual print head, the difference in gaps at the left and right margins should not exceed .001", nor should any head be closer than .005" to the striker plate. If any heads vary more than .001", proceed with a striker bar adjustment or print head adjustment as required.

NOTE:

Because the striker plate alignment and print head alignment are interdependent, it is important to perform only one of these adjustments at a time. If the mounting screws for both the striker plate and print heads were to be loosened at the same time, there would be no reference point to guide these adjustments.

B) STRIKER PLATE ADJUSTMENT

1. Loosen the two Allen head screws at each end of the striker plate.

2. Move the striker plate forward or back (the rear paper guide will also move) until it is parallel to the main carriage. Tighten the Allen head lock screws and perform the striker plate adjustment check.

3. Repeat steps 1 and 2 until the gap from the striker plate to the print head bearings changes less than .001" as each print head moves from margin to margin.

C) PRINT HEAD ADJUSTMENTS

1. If it is necessary to adjust the individual heads for a gap of .005" minimum or .006" maximum, loosen the four Allen head screws on the head mounting bracket. Turn the eccentric (1/4 inch nut, front-left on bracket) clockwise or counterclockwise until the correct gap is obtained.

D) OTHER CAUSES OF SOLENOID WIRE BREAKAGE

1. The firing pulse may be greater than 425 microseconds (7134 PCB, L17 pin 7).

3

2. The solenoid wires may be projecting more than .002" from the print head bearing (ideal rest position is flush with the bearing).

3. The servo speed may indicate a full cycle of less than 900 microseconds.

4. The 10 or 12 pitch window signal may have a greater than 50% duty cycle. See Figure 5-6 in the Maintenance Manual for the Model 77 Quad Head Matrix Printer (Figure 5-3 in Preliminary Manual).

5. The customer himself may be causing the failures by increasing the penetration of the heads to get better print quality with an old inked ribbon. If this appears to be the case, explain to the customer that this practice is poor economy since it could result in long periods of down time for his printer.

   Even if the minimum clearance (.005") from the print head to the striker plate is maintained, the customer may still cause broken solenoid wires by using thicker than normal single-ply and multi-ply paper and carbons and, at the same time, increasing the head penetration beyond a normal setting.

   The customer should be advised not to exceed, by more than one detent position, the head penetration setting needed to give good print quality with a new ribbon. For example, with a specific form of 4-ply paper and 3-ply carbon, good print quality can be obtained at a setting of 3 on the head penetration indicator immediately after a new ribbon is installed. The customer should not increase this head penetration setting by more than one detent position on the detent bracket. If the customer does go beyond one detent (approximately .002"), he can expect failures in the solenoid wires.

4

Some Model 77 (2261W) Matrix printers have experienced failures in the 7132 OPTICAL SIGNAL, PAPER FEED & MOTOR CONTROL PCB. The symptom of this problem is excessive carriage speed.

The tachometer circuit on this board has a mylar capacitor (C7) across the signals TACH+ and TACH-. When this capacitor has been punctured and shorted out by the sharp pins of adjacent boards, the two tachometer signals are then shorted together, leaving the tachometer inoperative. The carriage servo motor is left with no tachometer to govern its speed, and the carriage moves at more than twice its normal rate.

CAUTION:

Do not operate a failing printer for any sustained period; it could damage the printer mechanism.

Capacitor C7 is the yellow, 100VDC, .15 Microfarad mylar capacitor near the side of the board (See Figure 1). If these symptoms occur, replace the capacitor (WLI #300-2215).

The capacitor is damaged when the board is shipped or handled improperly. To prevent this problem, do not stack any boards on the component side of the 7132 board. Always isolate the 7132 board by wrapping it in Styrofoam packing material or by keeping it separate in its own shipping envelope.

Figure 1 shows the location of capacitor C7 on the 7132 board. On artwork Rev 2 boards, the capacitor is closer to the edge of the board, near potentiometers R5 and R7.

CAPACITOR (C7)
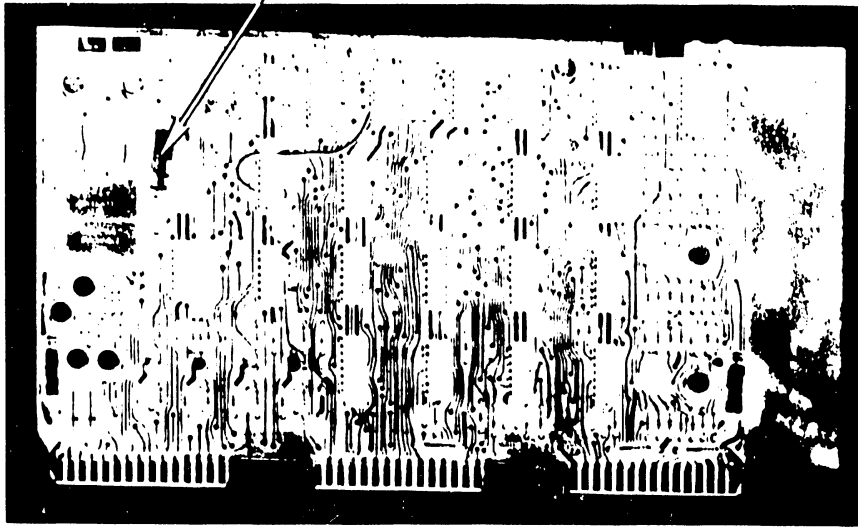
FIGURE 1   7132 PCB OPTICAL SIGNAL, PAPER FEED & MOTOR CONTROL

PRINTER CONVERSION PROCEDURE

MODEL 2261W TO MODEL 2261V

N/A   ECN # 7480   PCB # 210-7131

N/A   PCB # 210-7132

5   ECN # 7481   PCB # 210-7137

A.   REASON FOR CHANGE

To convert the 2261W printer to a 2261V printer for 2200VS
systems. When used with the 2200VS, the standard 2261W skips two
lines and/or will not print.

B.   CORRECTION/SOLUTION

Modify the 7131, 7132, and 7137 PC boards to correct microcode,
I/O interface, optical signal, and paper feed problems. The 7132
board will be modified to create a 7232 board.

C.   PREREQUISITES

1.   The 7131 board must be at least E-Rev level 1 (ECN #7165
     previously installed).

2.   The 7132 board must be at E-Rev level 3 (ECN #7969
     previously installed). If the board is above E-Rev level 3,
     replace it with a 210-7232 PCB and omit part 2 of the
     procedure that follows.

3.   The 7137 board must be at E-Rev level 4 (ECN #7358
     previously installed). If the 7137 board is below E-Rev
     level 4, order a new board. If the new board is E-Rev level
     5, omit part 3 of the procedure that follows.

4.   The 210-7112 workstation/printer adapter must be at E-Rev
     level 1 (ECN #7516). (Ref: CSNL #38)
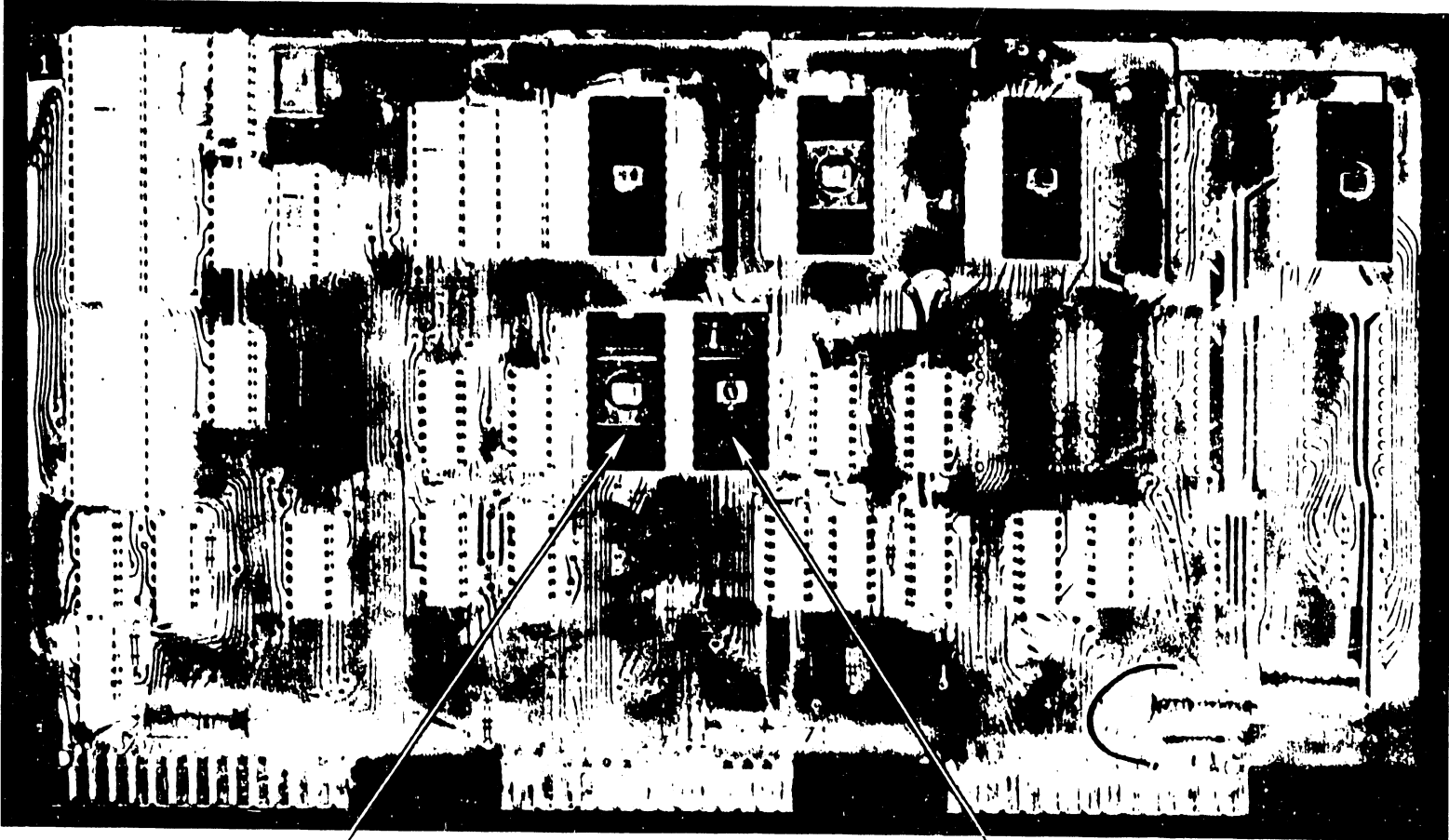
REPLACE WITH
378-2160R1

REPLACE WITH
378-2159R1 PROM

FIGURE 1   7131 PCB

D. **TIME REQUIRED**

3.5 hours.

E. **PARTS REQUIRED**

Two 100 pf, 10%, ceramic capacitors, WLI #300-1100.

One .02 uf, 20%, ceramic capacitors, WLI #300-1904.

Two 470 ohm, 1/4 watt, resistors, WLI #330-2047.

Eight 1K ohm, 1/4 watt, resistors, WLI #330-3010.

One 10K ohm, 1/4 watt, resistors, WLI #330-4010.

One PROM chip, WLI #378-2159 R1.

One PROM chip, WLI #378-2160 R1.

Length of #24 gauge solid wire, WLI #600-9012.

F. **PROCEDURE**

1. 210-7131 board. See Figure 1.

    a. Remove the PROM chip, WLI #378-2086 R2, from location L21
    and replace it with PROM chip WLI #378-2159 R1.

    b. Remove the PROM chip, WLI #378-2087 R2, from location L22
    and replace it with PROM chip WLI #378-2160 R1.

    c. Do not increment the E-Rev level of the board.

2. 210-7132 board. The following changes will create a
    210-7232 board, E-Rev level 0.

    a. On the component side of the board: See Figure 2.

        (1) Remove the 150 pf capacitor C2, located to the left
             of L17 pin 1.

        (2) Cut the etch between L17 pin 6 and L10 pin 4. Make
             this cut close to L10 pin 4.

    b. On the non-component side of the board, cut the following
       etches. See Figure 3.

        (1) Between L19 pin 6 and L5 pin 5. Be sure that the
             running time meter jumper between L5 pin 5 and L14
             pin 5 remains intact.

3

± 0V   CUT ETCH   ADD JUMPER
L10 PINS 3 & 4

RUNNING TIME
METER JUMPER

ADD JUMPER
L18 PINS 9 & 10

REMOVE
C2
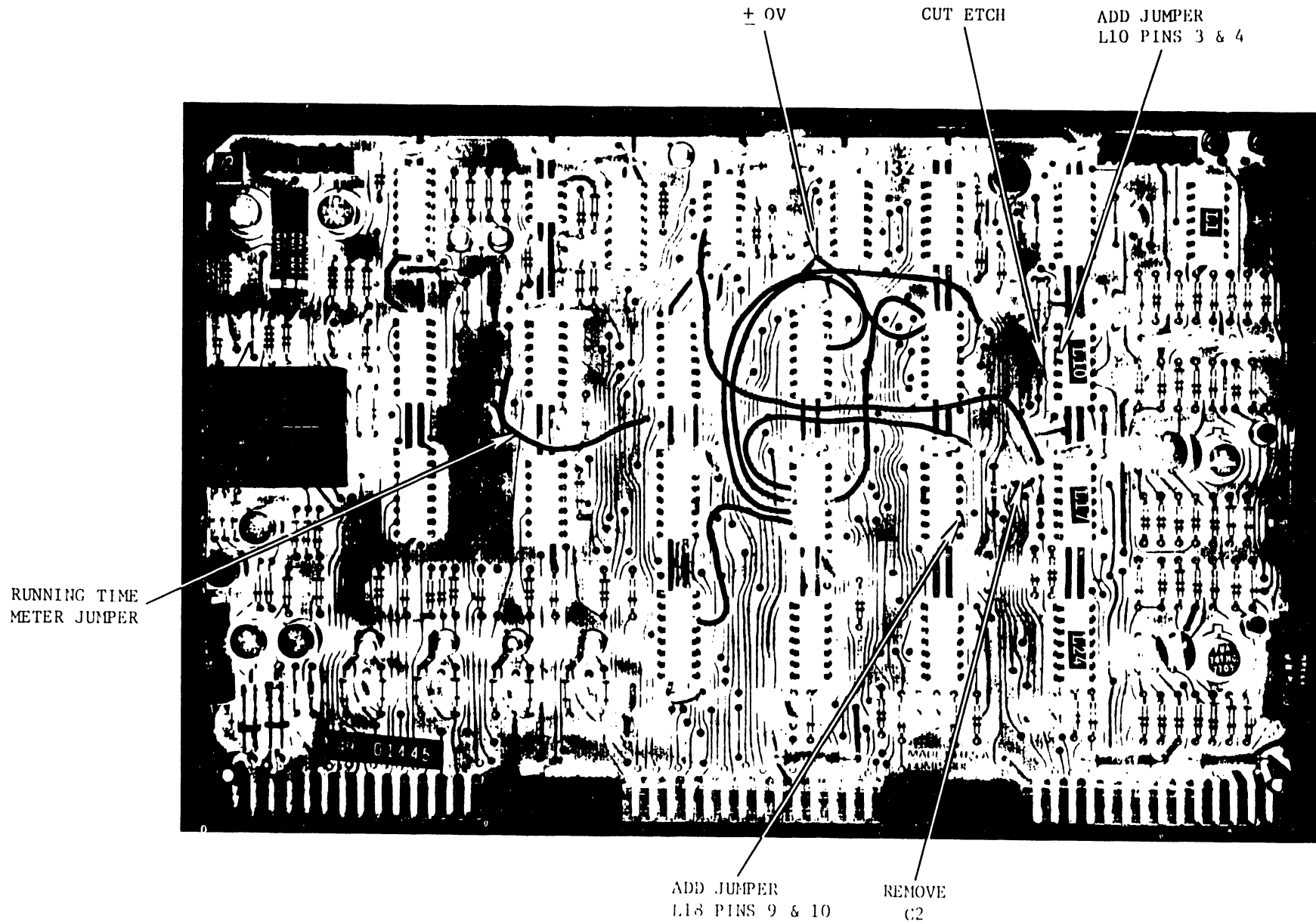
FIGURE 2 7132 PCB

(2) Between L11 pin 4 and L19 pin 4. Make this cut close to L19 pin 4.

(3) Between L11 pin 9 and L19 pin 5. Make this cut close to L19 pin 5.

(4) Between L11 pin 1 and L19 pin 3. Make this cut close to L19 pin 3.

(5) Between L11 pin 10 and L19 pin 11. Make this cut close to L19 pin 11.

(6) Between L11 pin 7 and L12 pin 13. Make this cut close to L12 pin 13.

(7) Between L27 pin 14 and L5A pin 10. Make this cut close to L5A pin 10.

(8) Between L11 pin 7 and L18 pin 10. Make this cut close to L18 pin 10.

c. On the component side of the board, add the following jumper wires. The correct installation of these jumpers is shown in Figure 2.

(1) From L19 pin 3 to L11 pin 10.

(2) From L19 pin 4 to L11 pin 2.

(3) From L19 pin 5 to L11 pin 12.

(4) From L19 pin 6 to L27 pin 14.

(5) From L19 pin 11 to L11 pin 1.

(6) From L12 pin 13 to $\pm$0 volts.

(7) From L5 pin 5 to L17 pin 2.

(8) From L10 pin 3 to L10 pin 4.

(9) From L18 pin 9 to L18 pin 10.

d. The board may now be labeled WLI #210-7232, E-Rev level 0.

3. 210-7137 board. See Figure 4. Also, refer to the 7137 schematic in the Model 77 Quad Head Maintenance Manual, #03-0061, Appendix E, page 10.

CUT ETCH   CUT ETCH   CUT ETCH

CUT ETCH   CUT ETCHES
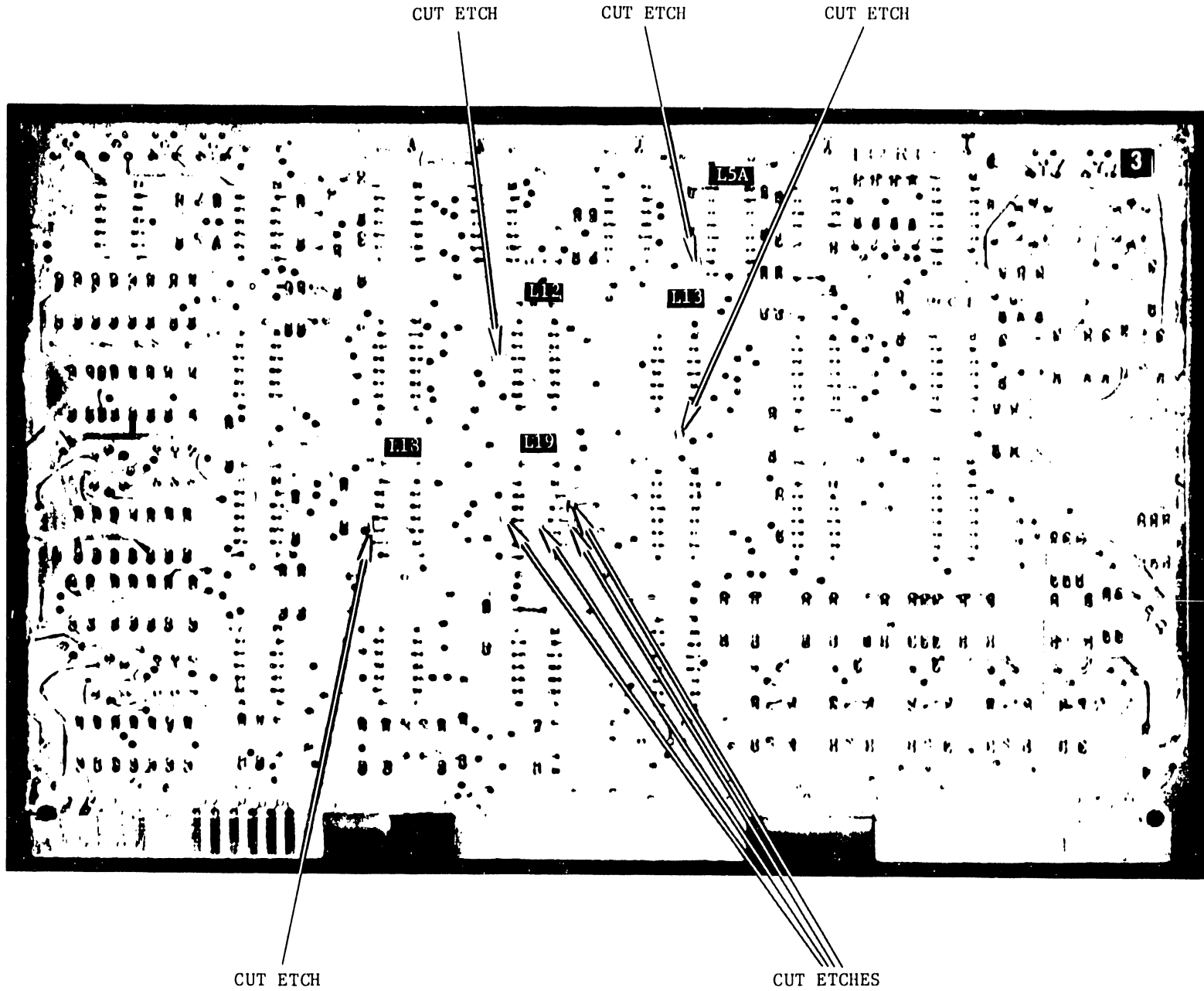
FIGURE 3   7132 PCB
(NON COMPONENT SIDE)

a. Remove the ten 220 ohm, 1/4 watt resistors, R1 thru R10 and the ten 180 ohm, 1/4 watt, resistor, R11 thru R20.

b. Replace R9 and R10 with two 100 pf, 10%, capacitors, WLI #300-1100.

c. Replace R11 thru R18 with eight 1K ohm, 1/4 watt, resistors, WLI #330-3010.

d. Replace R19 and R20 with two 470 ohm, 1/4 watt, resistors, WLI #330-2047.

e. Remove diode D2, located to the lower right of L15.

f. Replace diode D2 with a jumper wire.

g. Unsolder and lift pin 4 of L18 from the feed-thru hole. This will remove pin 4 from its present signal run. Cut the pin close to the feed-thru if necessary, but leave enough of the pin to accomplish step k. Be careful to preserve the surrounding etches. If the IC is damaged, replace it. (WLI #376-0276)

h. Unsolder and lift pin 1 of L17 from its feed-thru hole. This will remove pin 1 from its present signal run. Observe the same precautions as in the previous step. Leave enough of pin 1 to accomplish step s. The part number for the IC at L17 is WLI #376-0003.

i. Unsolder and remove the jumper wire between L11 pin 12 and L13 pin 12.

j. Some manufactured boards do not correspond to the revised schematic of the 7137 board after ECN #7358 (E-Rev level 4) was installed. Before proceeding to the next step, verify the wiring of chip L6A, as described below, and correct if necessary:

   (1) A jumper should be present between L6A pin 1 and L29 pin 7.

   (2) A jumper should be present between L6A pin 2 and L6 pin 13.

   (3) A jumper should be present between L6A pin 3 and pin 10 of connector 3.

   (4) No other elements of L6A should be in use.

7

TO L9 PIN 6

LIFT
L18 PIN 4

LIFT
L17 PIN 1

ADD JUMPER
L18 PINS 3 & 4

R17
R7
R18
R8
R19
R9
R10
R20
R14
R4
R15
R5
R16
R6
R11
R1
R12
R2
R13
R3

5

8

ADD
.02 uf

ADD
10K

DIODE
D2

TO CONNECTOR 3
PIN 10

TO L29
PIN 7
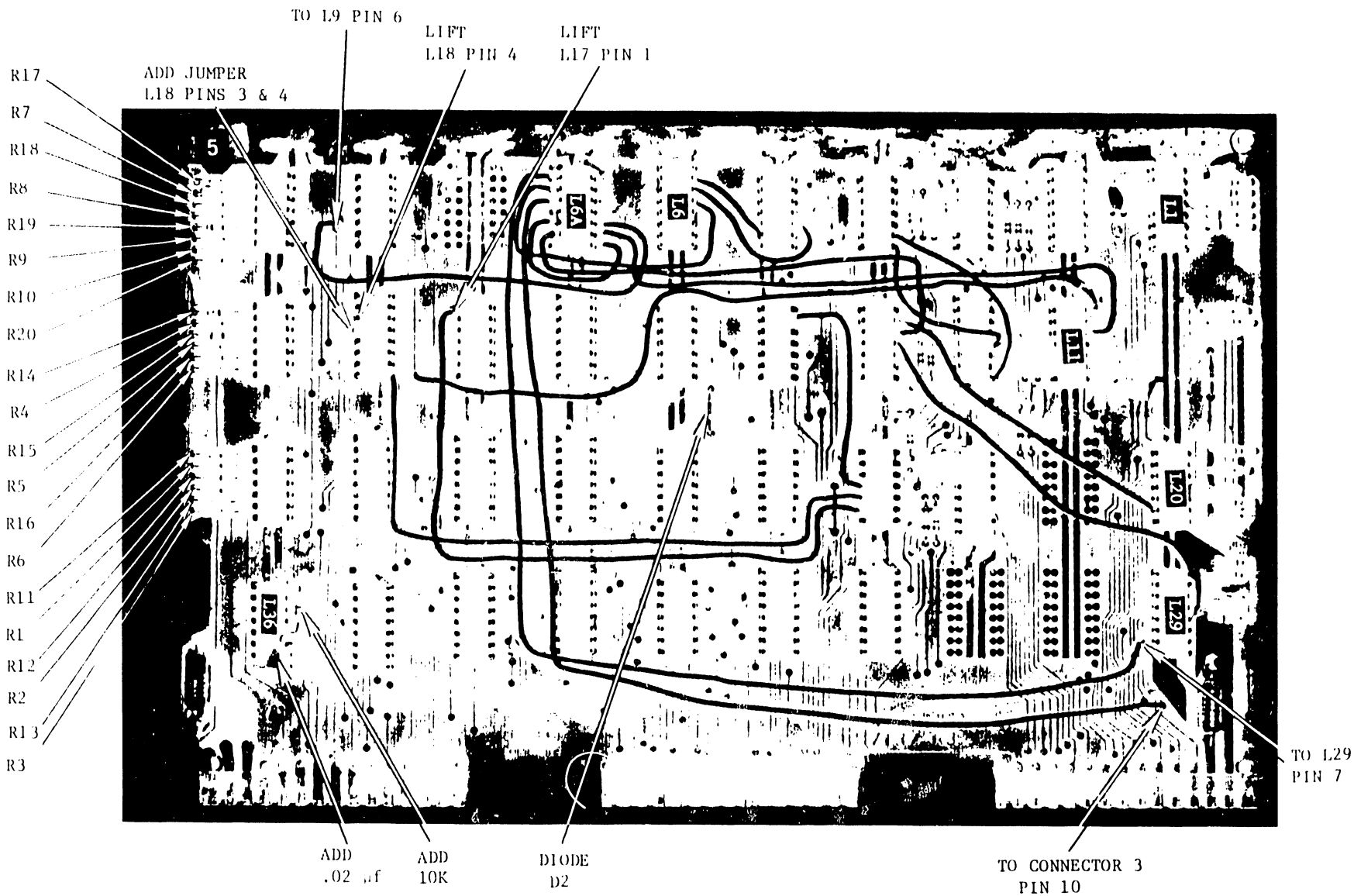
FIGURE 4   7137 PCB

k. Add a jumper wire between L18 pin 3 and L18 pin 4.

l. Add a jumper wire between L9 pin 6 and L6A pin 10.

m. Add a jumper wire between L11 pin 12 and L6A pin 9.

n. Add a jumper wire between L6A pin 4 and L6A pin 5.

o. Add a jumper wire between L6A pin 5 and L6A pin 8.

p. Add a jumper wire between L6A pin 6 and L13 pin 12.

q. Add a jumper wire between L14 pin 13 and L22 pin 4.

r. Add a jumper wire between L22 pin 5 and L18 pin 9.

s. Add a jumper wire between L22 pin 6 and L17 pin 1.

t. Add a 10K ohm, 1/4 watt, resistor (WLI #330-4010) between L36 pin 12 and L36 pin 16 (+5VR).

u. Add a .02 uf, 20%, capacitor, (WLI #300-1904) between L36 pin 12, and L36 pin 8 (+0 volts).

v. Increment the E-Rev sticker to level 5.

4. The left and right carriage bumper screws (Figures 5 and 6) must be adjusted to prevent the carriage from striking the carriage springs/backstops and then bouncing back into the photocell area. As the carriage approaches either the left or right margin, the corresponding bumper screw should barely make contact with its respective margin spring.

5. Servo speed and window duty cycle electrical adjustments must be completed on the 7132 card as described on page 125 of the 2200VS Preventive Maintenance Manual (#03-0066), or on page 5-6 of the Model 77 Quad Head Matrix Printer Maintenance Manual (#03-0061).

CAUTION:

A new and untested 7132 board may be so far out of electrical adjustment that, initially, there will be no carriage movement. Especially critical are the 10/12 pitch 50% window signal duty cycle adjustments.
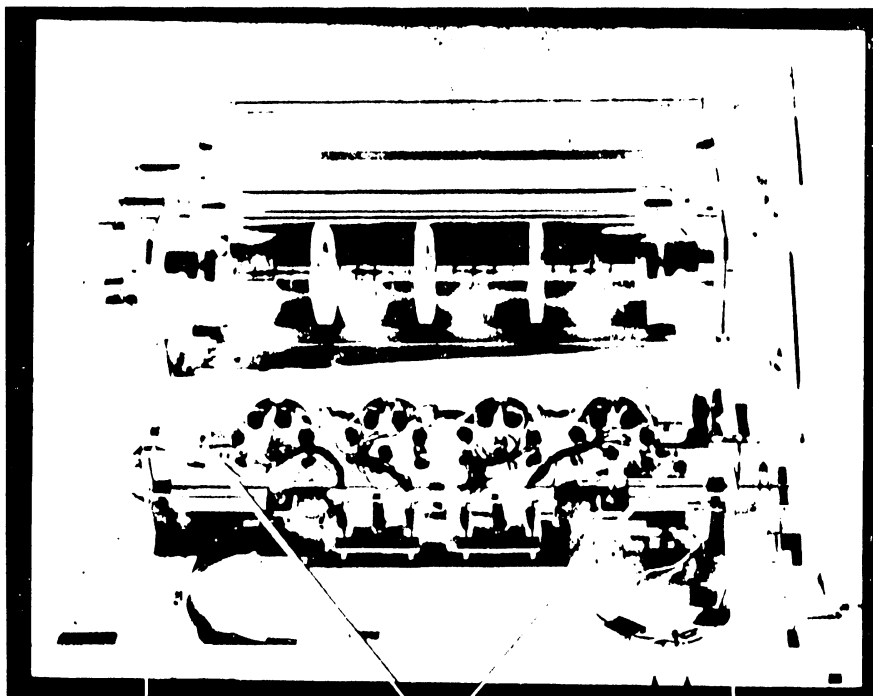
SPRING & BACKSTOP BUMPER SCREWS SPRING & BACKSTOP

FIGURE 5 LOCATION OF BUMPER SCREWS

RIGHT CARRIAGE RETURN BUMPER CARRIAGE SPRINGS CARRIAGE STOP
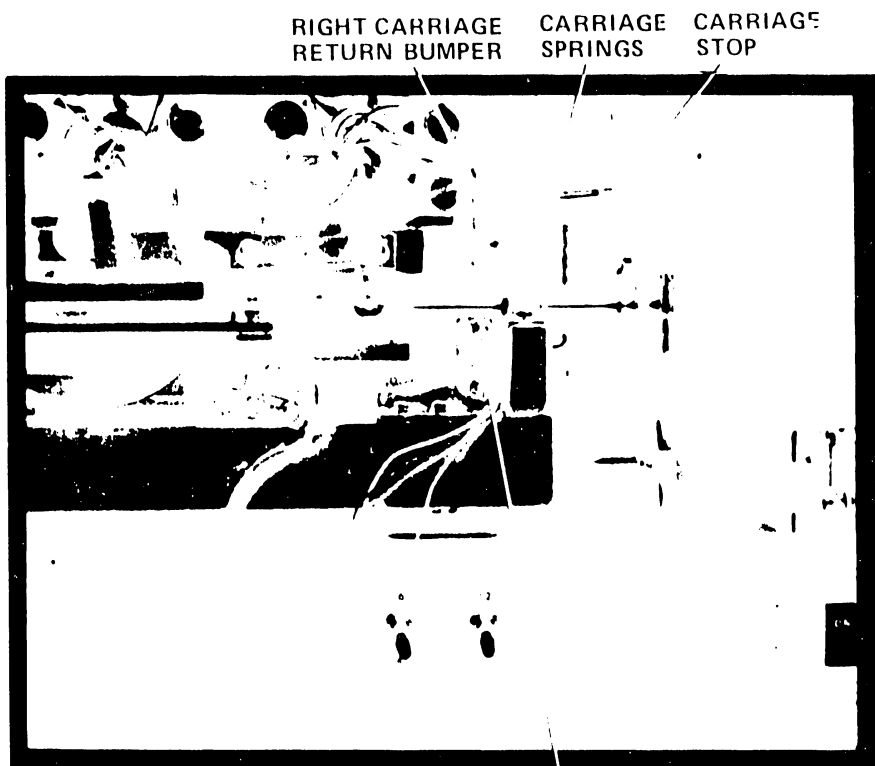
RIGHT MARGIN PHOTOCOUPLER

FIGURE 6 BUMPER SCREW ADJUSTMENT

10

6. Run diagnostic "PRTEST" on the printer to check for proper operation.

7. Correct the 7132 schematic, sheet 1 of 1, to include these changes. The updated 7137 schematic has been published and is available.

8. Amend the parts lists for the 7131, 7132, and 7137 boards to include these changes.

APPENDIX E

ELEC-
TRICAL
SCHE-
MATICS

APPENDIX E
ELECTRICAL SCHEMATICS

E-1

Schematic diagram with the following key labels and tables:

Q1-Q8 2N6488
D1-D8 68V, 5W
Q 9-16 TYPICAL
Q16 2N3467
R1 220Ω
D9 EM403
R2 2.2K
R4 4Ω 3% 5W
R3 10K

Component Table:

COMPONENT	W.L. PART NO.	QTY.
Q1-8	375-1054	8
Q9-16	375-1026	8
Q9-16	375-9001	8
D1-8	380-2131	8
D9	380-4000	8
R1	330-2022	8
R2	330-3022	8
Q1-8	375-9016	8
R4	334-0027	8
R3	330-4016	8
J1	350-0037	1

COMPONENT LAYOUT

7035 R3

E-REV
0

SIGNAL-TERMINAL DESIGNATIONS, VIEW FROM BOTTOM (WIRING) SIDE OF CONNECTOR

CONN. 1
+37V
±0V

CONN. 2

CONN. 3
+12VR
±0V

COMP. SIDE   WIRING SIDE

WANG LABORATORIES INC.
TEWKSBURY, MASS.

MODEL NO.	DRAWN	10-1-75	APP.	10/1/75
77	CHECKED	10/18/75	APP.	

TITLE
SCHEMATIC LOGIBLOC
SINGLE HEAD SOLENOID DRIVER

W.O. NO.	DWG. NO.	REV.
210-7035	C 7035	3

C7035

E-2

E-3

HOLE LEGEND

	HOLE DIA	TOL
DRILLED OR PUNCHED HOLE TOLERANCES	0135 to 125	+ 003 − 001
	126 to 250	+ 004 − 001
	251 to 500	+ 005 − 001

IDENT.	DESCRIPTION	QT
A		

SOLDER POINTS

±0V

D+

R1 22K

Q1 2N3014

PTPE

PE

+5V

COMPONT.	WL PT NO.
Q1	375·0017
R1	330·4022

B 7129

FROM SENSOR   FROM 420-0051 SHIELDED CABLE

PTPE, BLU

WHT

WHT

GRN

Q1

7129 R1

PE, WHT

+5V, RED

D+, GRN

±0V, BLK

E. REV.

0

	EBA	EBA
DRWN	3-1-77	5·5·77
	ORIGINATED PER DWG E304 APP'D: (sig) 3-4-77	REVISED PER ECN 6870 APP'D: (sig) 5.4.77
REVISION	0/0	1/0
N2		

WANG PART NO.	ITEM	QTY.		NAME	MATERIAL	DESCRIPTION			
Qty. Per Unit	FIRST USED ON	ASSY USED ON			BY	DATE	APPROVED BY	DATE	
					DWN EBA	3-1-77	E ENGR p Ch. w	3/8/77	
					CHK H.S.	3-8-77	M ENGR		
			MATERIAL		E. C. CONTROL		MFG ENGR		
				MODEL NO. 77(226IW)					
				SEE ENGRG SPECIFICATIONS No.	TITLE OPTICAL SCANNER BD.				
			FINISH	TOL. EX. AS NOTED .XX ± .010 FRAC. ± 1/64 .XXX ± .005 ANG ± 1°30′ FINISH	210-7129	B	7129	1	
				SCALE SHT 4 OF 5	WANG PART NUMBER	SIZE	DRAWING NUMBER	REV	

WANG LABORATORIES, INC.   TEWKSBURY, MASS. U. S. A.

DO NOT SCALE

HOLE LEGEND

		HOLE	DIA	TOL
DRILLED OR PUNCHED HOLE TOLERANCES		0135 to 125		
		126 to 250		
		251 to 500		

IDENT	DESCRIPTION	QTY
A		

+5VR

POWER LIGHT

N.O. — 6, CLEAR
N.C.

ALARM LIGHT — (8) AL. LIGHT

N.O. — 9, FORM OVERRIDE
N.C.

PAPER OUT LIGHT — (14) P.O. LIGHT

N.O. — 5, TOP OF FORM
N.C.

N.O. — 13, LINE OUT
N.C.

SELECT LIGHT — (2) SEL. LIGHT

N.O. — (10) DSEL
N.C. — (11) SEL

±0V

J1

+5VR — (1) (14) — PAPER OUT
SEL. LIGHT — (2) (13) — LINE OUT
(3) (12)
(4) (11) — SEL
TOP OF FORM — (5) (10) — DESEL
CLEAR — (6) (9) — FORM OVERRIDE
±0V — (7) (8) — ALARM LIGHT

COMPONENT	W.L PART NO
SW1 - SW5	325 - 2305
L1 - L4	370 - 0015
L1 - L4 (HIDDEN)	370 - 1020
J1	220 - 3027

7130   R1

J1

POWER LIGHT L1   ALARM LIGHT L2

CLEAR SW1   FORM OVERRIDE SW2   PAPER OUT LIGHT L3   TOP OF FORM SW3   LINE FEED SW4   SELECT SW5   SELECT LIGHT L4

REVISION

ORIGINATED PER DWR # E339 APP'D: ___ 5/15/77
REVISED PER ECN # 682 APP'D: ___ 5/15/77

WANG PART NO. | ITEM | QTY | NAME | MATERIAL | DESCRIPTION

Qty. Per Unit | FIRST USED ON | ASSY USED ON

WANG LABORATORIES, INC.
TEWKSBURY, MASS. U.S.A.

	BY	DATE	APPROVED BY	DATE
DWN	A.K.	5-3-77	E ENGR	5/5/77
CHK			M ENGR	
E. C. CONTROL			MFG ENGR	

MATERIAL

MODEL NO. 77

SEE ENGRG SPECIFICATIONS No. ___

FINISH

TOL. EX. AS NOTED
.XX ± .010 FRAC. ± 1/64
.XXX ± .005 ANG ± 1°30' FINISH √

TITLE

IOP CONTROL PANEL

210-7130	C	7130	1
WANG PART NUMBER	SIZE	DRAWING NUMBER	REV

SCALE ___ | SHT 4 OF 5

PROM CHART

210 = 209 + 377 or 378

MODEL	L1	L4	L6	L8	L31	L32
2261W	378-2064	378-2063	378-2061	378-2062	378-2064	378-2067

COMPONENT	W.L. PART NO.
R1, 3, 5, 6	330-4010
R2, 4	330-3047
R7	330-3010
C1	300-1906
C2	300-1100
C3-18, 21	300-1900
C19, 20, 22	300-4021
C23, C24	300-4022
XTAL	361-0018
L1-8, 21, 22	376-9003
L9, 10	376-9010
L11	376-9006
L13	376-9011
L26	376-9015

LOCATION	W.L. PART NO.	12mm as 20V	12mm as +5VR
L1-8, 21, 22	377-0317	12	24
L9, 10	377-0308	8	22
L11	377-0337	8	16
L12, 15, 20, 25	376-0176	8	16
L13	377-0249	2	20
L19, L30	376-0006	8	16
L23, 24	376-0082	8	16
L26	377-0338	14	28
L28A, 35	376-0061	7	14
L29	376-0093	7	14
L31	376-0002	7	14
L32	376-0004	7	14
L33, 34	376-0011	10	3
L36, 38	376-0066	7	14
L37	376-0010	7	16

LOCATION	TYPE	SPARES
L31	7400	2
L37	7406	1
L28A	7408	3

NOTES:
1. L15-18, 27, 28 ARE NOT USED.

7131 R3

COMPONENT LAYOUT

E-6

P.S. REGULATOR & DC MOTOR DRIVE & PAPER FEED

WANG LABORATORIES INC.

MODEL NO. ML 77

210-7136 D 7136

E-9

DO NOT SCALE

6 5 4 3 2 1

ASSM.	COMP	PT. NO.
210-7174	Q 1, 2, 3, 4	375-2014
210-7174-1	Q 1, 2, 3,	375-2014
210-7174-2	Q 1, 2	375-2014

MODEL NO. 77	MODEL NO. 72	MODEL NO. 61, 62
PC. BOARD 210-7174	PC BOARD 210-7174-1	P.C. BOARD 210-7174-2
HARNESS	HARNESS 270-3053	HARNESS 270-3062

SIGNAL NAME & WIRE COLOR

FFPE YELLOW	FFPE YELLOW	FFS YELLOW
VTPE BLUE	VTPE BLUE	VTS BLUE
PEPE GRAY	PEPE GRAY	NOT USED Q3 NOT LOADED
SKTPE BROWN	NOT USED Q4 NOT LOADED	NOT USED Q4 NOT LOADED
+5 VOLTS RED	+5 VOLTS RED	+5 VOLTS RED

7174-R1

Q1 — CHANNEL 7 TOP OF FORM

Q2 — CHANNEL 5 VERTICAL TAB

Q3 — CHANNEL 2 END OF DOCUMENT

Q4 — SPROCKET HOLE CHANNEL

E. REV. 0

HOLE LEGEND

DRILLED OR PUNCHED HOLE TOLERANCES	HOLE DIA	TOL
	0135 to 125	± .003 / .001
	126 to 250	± .004 / .001
	251 to 500	± .005 / .001

IDENT	DESCRIPTION	QTY
A		

REVISION

	BY	EBA
D C B A	DATE	4-13-77

ORIGINATED PER PWR E303 APPD: ...

NO | 0/0

WANG PART NO.	ITEM	QTY	NAME	MATERIAL	DESCRIPTION

WANG LABORATORIES, INC. TEWKSBURY, MASS. U.S.A.

	BY	DATE	APPROVED BY	DATE
DWN	EBA	4-13-	E ENGR	5/1/77
CHK			M ENGR	
E C CONTROL			MFG ENGR	

MATERIAL

MODEL NO 77 (2661W)

SEE ENGRG SPECIFICATIONS No

FINISH

TOL EX AS NOTED
XX ± .010 FRAC ± 1/64
XXX ± .005 ANG ± 1°30' FINISH

TITLE: PHOTO TRANSISTOR BD

210-7174	B	71 74	0
WANG PART NUMBER	SIZE	DRAWING NUMBER	REV

SCALE | SHT OF

E-12

HOLE LEGEND

DRILLED OR PUNCHED HOLE TOLERANCES:	HOLE DIA.	TOL.
	.0135 to .125	± .003 / .001
	.126 to .250	± .004 / .001
	.251 to .500	± .005 / .001

IDENT	DESCRIPTION	QTY
A		

BD NO.	COMP	W.L. PT NO
210-7175	LED 1,2,3,4	380-0104
210-7175-1	LED 1,2,3	380-0104
210-7175-2	LED 1,2	380-0104

MODEL 77	MODEL 72	MODEL 61, 62
P.C. BOARD 210-7175	P.C. BOARD 210-7175-1	PC BOARD 210-7175-2
HARNESS	HARNESS 270-3053	HARNESS 270-3062

SIGNAL NAME & WIRE COLOR

MODEL 77	MODEL 72	MODEL 61, 62
FFD+ VIOLET	FFD+ VIOLET	FFD VIOLET
VTD+ ORANGE	VTD+ ORANGE	VTD ORANGE
PED+ GREEN	PED+ GREEN	NOT LOADED
SKT D+ WHITE/RED	NOT LOADED	NOT LOADED
±0V BLACK	±0V BLACK	±0V BLACK
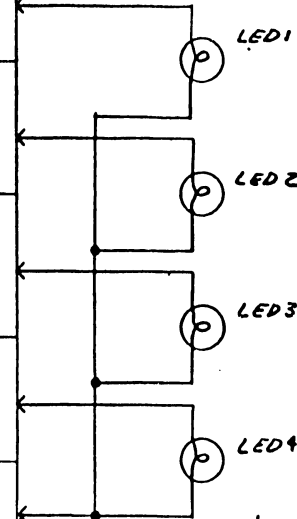
LED1
LED2
LED3
LED4

7175 R1

0

REVISION	BY	EBA

ORIGINATED PER DWR # E302 APP'D 5/1/77

ORIGINATED PER DWR # E302 APP'D 5/1/77

0/0

Qty Per Unit	WANG PART NO	ITEM	QTY	FIRST USED ON	ASSY USED ON

WANG LABORATORIES, INC.
TEWKSBURY, MASS. U.S.A.

NAME

MATERIAL

MODEL NO. 2221W

SEE ENGRG SPECIFICATIONS No. _____

MATERIAL

FINISH

TOL. EX AS NOTED
.XX ± .010 FRAC ± 1/64
.XXX ± .005 ANG ± 1°30' FINISH √ 125

	BY	DATE	APPROVED BY	DATE
DWN	EBA	4-15-77	E ENGR	5/1/77
CHK			M ENGR	
E C CONTROL			MFG ENGR	

TITLE

LED BOARD

210-7175	B	7175	0
WANG PART NUMBER	SIZE	DRAWING NUMBER	REV

SCALE   SHT 4 OF 5

IN1200A (10) 380-3000

POWER SUPPLY
2261 W

END