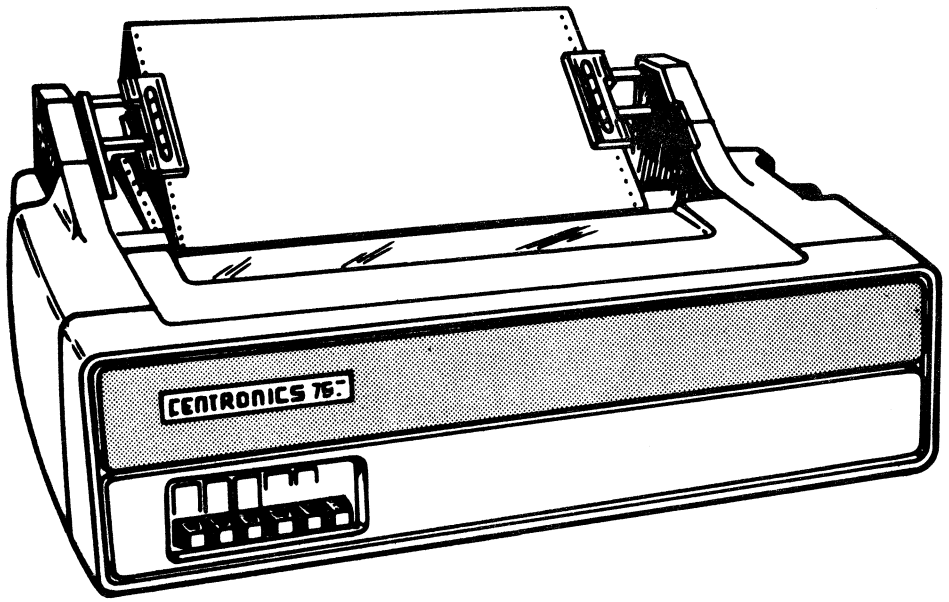
TECHNICAL MANUAL

MODEL 780 PRINTER



APRIL 1978
Centronics No. 37400490 Rev. A

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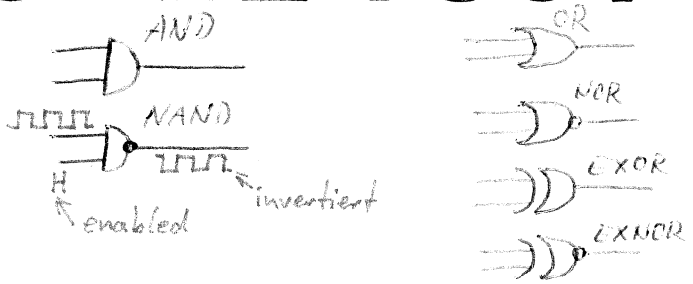

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SECTION 1
INTRODUCTION

This technical manual describes the Model 780 printer, manufactured by Centronics Data Computer Corporation. The manual provides a general description of the printer, followed by a detailed theory of operation and spare parts information enabling field engineering personnel to service the printer. The manual is aimed at subassembly level maintenance.

A separate Operators Manual is published which describes all operator controls and functions. Special interface information is also covered in separate manuals, each written for a particular interface.

The manual is subdivided into the following sections.

SECTION 1 - INTRODUCTION, presents the scope and contents of the manual and provides the reader with a general description of the unit.

SECTION 2 - THEORY OF OPERATION, provides a description of each functional operation in the printer, based on a subassembly level.

SECTION 3 - REMOVAL, REPLACEMENT AND ADJUSTMENT, contains a functional description; removal/replacement/adjustment procedures and part numbers for each replaceable subassembly in the printer.

SECTION 4 - MAINTENANCE, includes preventive maintenance and trouble-shooting procedures, as well as assembly, schematic and wiring diagrams of the printer.

APPENDIX A - PARALLEL INTERFACE SPECIFICATIONS, contains detailed information describing the standard interface timing signals, connectors and other specifications.

1.1 GENERAL DESCRIPTION

The Model 780, illustrated in Figure 1-1, is a 60 character-per-second, unidirectional impact printer with an effective throughput of 21 to 90 lines per minute. The standard unit prints 80 columns at 10 characters per inch on roll paper up to 9.8 inches (250 mm) wide. The optional tractor feed allows the 780 to print 80 columns, also at 10 characters per inch, on paper up to 12.1 inches (307 mm) wide. For special printing requirements, the optional pin feed platen unit can be used to print on forms up to 9 inches (229 mm) wide.

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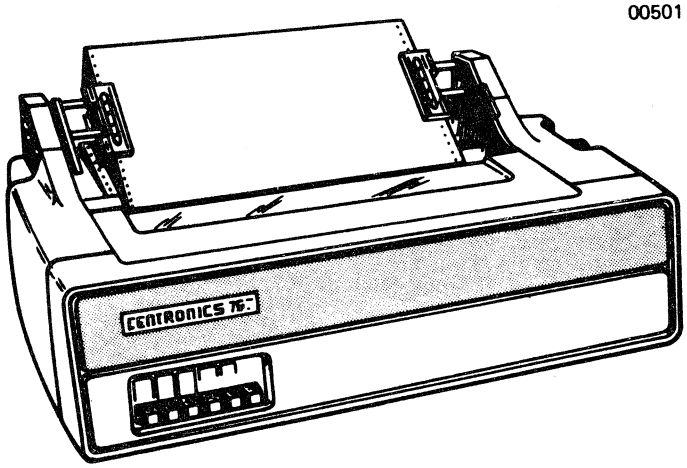

FIGURE 1-1. MODEL 780 PRINTER

Characters are formed by a 5x7 (or optional 9x7) dot matrix. In addition to the standard ASCII, a variety of character sets, including upper/lower case and many national sets give great flexibility in character formation. The printer will accommodate up to 128 characters. Use of the optional condensed printing feature, coupled with the standard elongated character capability, allows printing characters in four different widths.

All the electronics, including logic and driver circuits, and power supplies are contained on two printed circuit boards. The logic is implemented by custom MOS (medal-oxide semiconductor) LSI (Large Scale Integration) circuits, thereby minimizing component parts.

1.2 PRINTER OPERATION

The printer contains a line buffer which allows parallel data to be received at rates up to 75,000 characters per second. Optional interfaces are available as required by the user. A basic block diagram of the Model 780 is shown in Figure 1-2.

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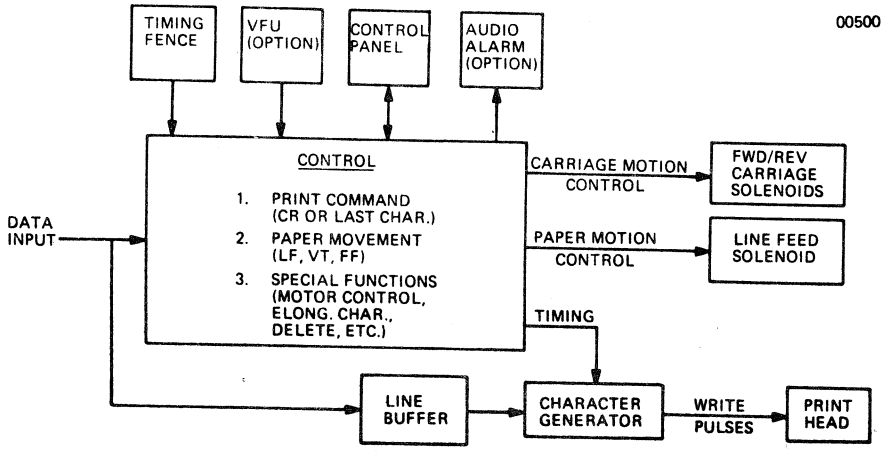

FIGURE 1-2. BASIC BLOCK DIAGRAM

Basically all printer functions can be grouped into one of three categories: (1) character printing, (2) paper motion, and (3) special functions such as automatic motor control, audio alarm, etc.

1.2.1 Character Printing

In the Model 780, characters are printed by selectively activating seven print wires, aligned in a vertical column in the print head. As the print head moves from left to right across the paper, the appropriate print wires are momentarily activated, driving them against the ribbon, paper and platen to form the specified dot pattern.

The print commands to the seven print wires are developed by read-only memories (ROM's). A variety of character sets is obtainable by simply changing these ROM's. Each character within a ROM is addressed by a 7 or 8 bit character code, and each column within a character is specified by timing signals internal to the printer.

As shown in Figure 1-3, the print head and ribbon cartridge are attached to the carriage assembly. By activating either of the two carriage solenoids, the carriage attaches to a continuously rotating band. Activating the forward carriage solenoid attaches the carriage to the upper half of the band and moves the print head in the forward (left to right) direction. Activating the reverse carriage solenoid attaches the carriage to the lower half of the band and moves the head in the reverse direction.

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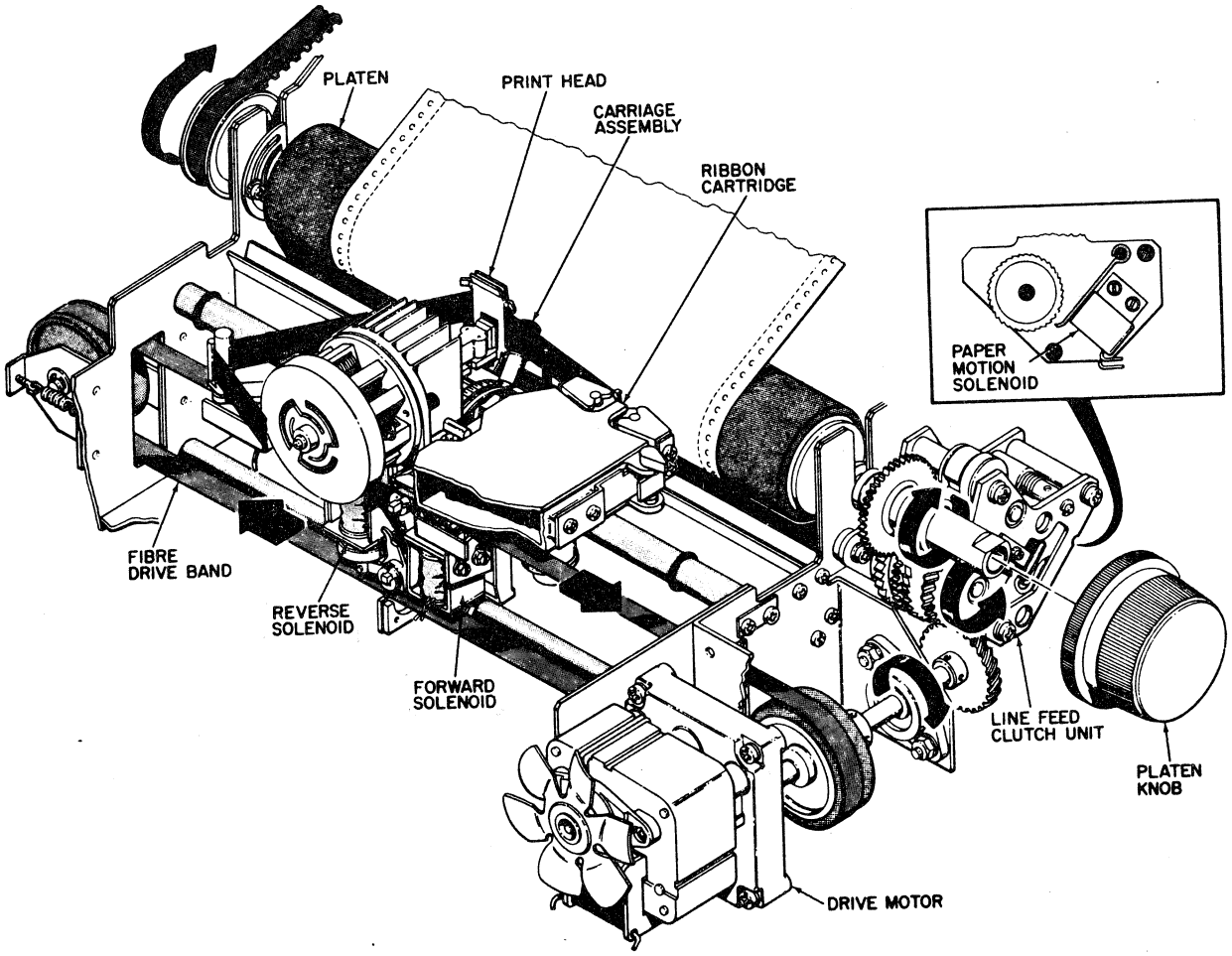

FIGURE 1-3. CHARACTER PRINTING/PAPER MOTION

1.2.2 Paper Motion

Paper can be moved manually by pushing in and rotating the platen knob, or automatically by any of three paper motion commands: line feed, vertical tab or form feed.

As shown in Figure 1-3, power from the drive motor is applied via a line feed clutch to the platen and forms handling mechanisms (pinch roller, tractor drive or pin feed platen) drive gears. Paper is advanced one line by momentarily activating the paper motion solenoid in the line feed clutch, allowing the drive gears to rotate and advance the paper one line. When using the optional tractor drive or pin feed platen with the optional vertical format unit (VFU), vertical tab and form feed operations are accomplished by activating the paper motion solenoid until a hole is detected in the VFU paper tape. Channel 5 of the tape controls vertical tabs and Channel 7 controls form feeds.

Depending on the machine configuration, if the VFU is not used, then the vertical tab and form feed commands are either ignored and no printer action occurs, or a line feed operation is performed.

1.2.3 Special Functions

As a standard feature, the Model 780 contains an automatic motor control which turns off the drive motor when no data is received over a nine-second interval. The motor is then automatically turned on whenever a print or paper motion command is detected.

An optional audio alarm is available for alerting the operator of a special condition. This alarm can be activated remotely via a bell code (Octal 007) or locally by a paper empty condition.

In addition to printable character codes, the printer also recognizes certain special control codes. Refer to subsection 2.4.2 for a list of these control codes and the printer actions performed upon receiving these codes.

1.3 SPECIFICATIONS SUMMARY

DATA INPUT

DATA FORMAT	7/8 bit ASCII parallel, TTL levels.
INPUT CODE	64 character ASCII.
DATA RATE	Up to 75,000 characters per second.
BUFFER	One line character buffer.
INPUT GATING	Data Strobe is normally gated with acknowledge of previous character.

PRINTING

PRINTING METHOD	Impact, character by character, uni-directional.
DOT MATRIX	5x7, optional 9x7.
PRINT FORMAT	10 characters per inch standard. 12, 15 and 16.5 characters per inch optional.
PRINT RATE	60 characters per second.
NUMBER OF COPIES	Prints original and one carbon copy. (With optional tractor drive, prints original and up to four carbon copies).
CHARACTER SET	Standard 64 character ASCII. Optional 5x7, 9x7, 64 and 96 and 128 character sets available.

PAPER ADVANCE

VERTICAL FORMAT	6 lines per inch.
PAPER ENTRY	Rear Paper Feed.
AUTO LINE FEED	Automatic line feed on carriage return. Disable by option.
PAPER FEED	Standard: Pinch Roller; 9.8 inches/250 mm wide paper. Optional: Tractor Drive; 12.1 inches/307mm maximum width. 10.2 inches/259 mm maximum print width. Pin Feed Platen; 9 inches/229 mm maximum paper width.

CONTROLS/INDICATORS

SWITCHES	Standard:	Select and Override.
	Optional:	Single Line Feed. Double Line Feed. Top of Form. Alternate Print.
INDICATORS	Standard:	Power, Select and Alert.
	Optional:	Elapsed Time Indicator. Audio Alarm.
MANUAL CONTROLS	Forms Thickness, Paper Positioning Knob.	

PHYSICAL/ENVIRONMENTAL/ELECTRICAL

HEIGHT	8 inches (203 mm).	
DEPTH	19.5 inches (495 mm).	
WIDTH	19.8 inches (503 mm).	
TEMPERATURE	Operating:	40° to 100°F (4.4° to 37.7°C)
	Storage:	-35° to 160°F (-37.2° to 71.1°C)
HUMIDITY	Operating:	20% to 90% (No condensation)
	Storage:	5% to 90% (No condensation)
INPUT VOLTAGE	50/60 Hz, 115/230 VAC; +10%/-15% of nominal. Multitap transformer (100, 110, 115, 120, 200, 220, 230, 240 VAC).	

SECTION 2
THEORY OF OPERATION

2.1 INTRODUCTION

This section contains a description of each major function performed by the Model 780 printer electronics. The section is organized as follows:

2.2 Block Diagram Discussion
2.3 Initializing the Printer
2.4 Data Input
2.5 Character Printing
2.6 Carriage and Ribbon Movement
2.7 Paper Motion
2.8 Special Functions
2.9 Power Supplies

Each function is discussed at a subassembly level, supplemented with block diagrams showing signal flow between major subassemblies and the connector/pin locations of each signal. Figure 2-1 is a simplified block diagram of the overall printer electronics.

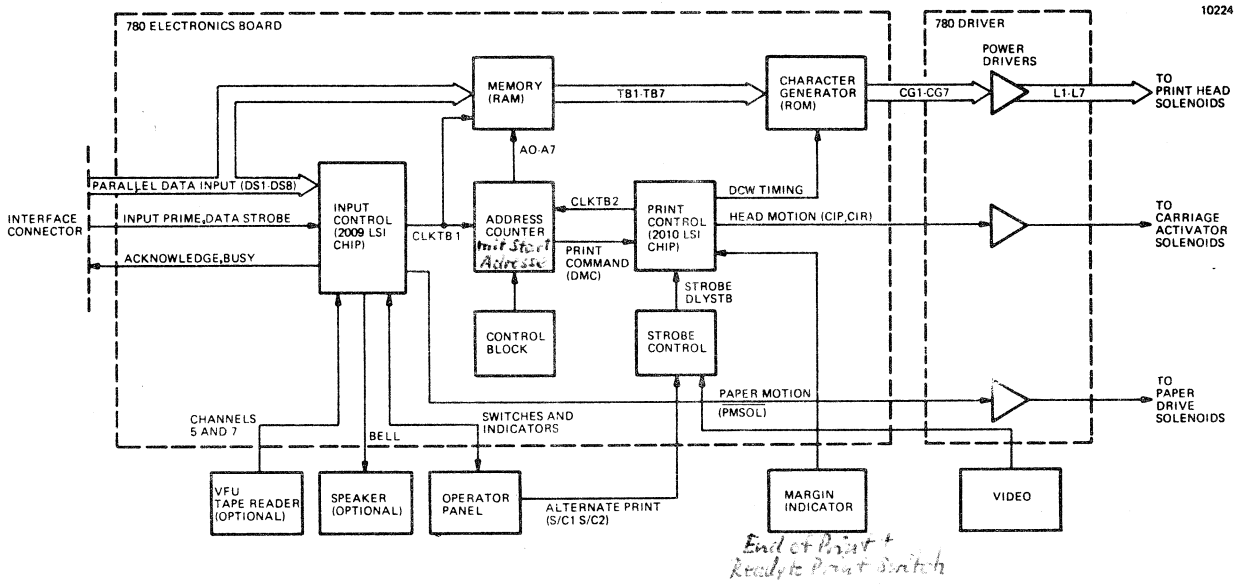

FIGURE 2-1. SIMPLIFIED BLOCK DIAGRAM, 780 ELECTRONICS

NOTE

THE NOTATION (N) AFTER A SIGNAL MNEMONIC IS USED TO INDICATE THE "NOT" OR INVERSE FUNCTION OF THE SIGNAL. FOR EXAMPLE: CIP(N) IS THE NOT FUNCTION OF THE CIP SIGNAL. THE (N) NOTATION IS EQUIVALENT TO THE BAR APPEARING OVER A SIGNAL AS SHOWN ON THE SCHEMATIC.

2.2 BLOCK DIAGRAM DISCUSSION (Figure 2-1)

The 780 is a unidirectional printer, whose print head moves right when printing and left when returning the carriage. The seven print wires in the print head are selectively activated to form the dot matrix pattern for the specified character. The print commands to seven print wires (seven high dot matrix) are developed by the character generator which consists of read-only-memories (ROM's). Attached to the carriage assembly are the print head and ribbon cartridge. By activating either of the two carriage solenoids, the carriage attaches to a continuously rotating fibre band moving the print head and ribbon cartridge across the paper. The forward carriage solenoid is activated during the print cycle and the reverse carriage solenoid is activated to return the carriage.

Paper is advanced one line by momentarily activating the paper drive solenoid. Paper movement can also be initiated by a vertical tab or form feed function, which require the optional vertical format unit (VFU) to terminate paper movement by means of a perforated paper tape.

The 780 printer electronics is contained on two printed circuit boards. As shown in Figure 2-1, printable data goes from left to right across the print head, with control of this data coming largely from the two LSI (Large Scale Integration) chips, the input control chip 2009 and print control chip 2010. When the printer is first turned on, the printer logic is initialized and the printer is in the deselected state. To receive data, the printer must then be selected by receiving a select code from the input device or by depressing the select switch on the operator panel.

If the printer is deselected and not busy, the input data is loaded into the printer by the data strobe signal from the input device. The printer responds with an acknowledge pulse to acknowledge reception of the data. Printable data, after being inverted by the input gating, is loaded into the Random Access Memory (RAM), consisting of two 4-bit by 256 maximum character memories. The address counter generates the eight address inputs (A0-A7) for the RAM. The RAM can be programmed via the control block for different storage capacities, allowing the customer to select the appropriate column width. Control codes are decoded by the input control chip which initiates the appropriate action dictated by the control data received.

Printable data will continue to be loaded until the memory is filled or a carriage return control code is received by the printer. In either case, the printer goes busy and starts the print cycle by activating the forward carriage solenoid (CIP). This attaches the carriage to the rotating fibre band, moving the carriage from left to right across the page. The address counter is clocked (CLKTB2) to address the appropriate location in memory for the character to be printed. The character is translated by the character generator (ROM), which generates the impulse signals to drive the print head solenoids.

At the end of the printed line, the forward solenoid is deactivated and the reverse solenoid (CIR) is activated to return the carriage to the left margin. The printer remains busy until the end of the print cycle. At the end of the last printed line, the paper drive solenoid is momentarily activated, causing the paper to advance one line.

When the carriage has returned to the left margin, the reverse solenoid is deactivated, the busy signal goes away, the acknowledge signal is generated and the next line of data is taken in.

The left margin indicator signals the logic when the carriage reaches the extreme left margin of the printer. As the carriage moves, the video input provides the control for print timing. Holes detected in the paper tape in the optional VFU terminate paper motion during vertical tab and form feed operations.

2.3 INITIALIZING THE PRINTER (Figure 2-2)

Before the printer can accept input data, it must first be PRIME'd and SELECT'ed. The prime operation initializes the printer logic to a ready state. The select operation, after causing a prime condition (which can be disabled by jumper option), resets the busy line to the interface connector and makes the printer able to receive data.

2.3.1 Prime

The PRIME signal, generated by the LSI chip 2010, is generated by any of the following conditions:

A. Power Turn-On - PWRPRM(N) causes a decoded prime signal DCPRM(N), which generates a PRIME pulse.

B. Printer Selection - Generates SLCT signal which causes PRIME.

C. End of a Printed Line - CIP(N) goes high causing a PRIME pulse.

D. Upon Receiving A Delete Code (Octal 177) - Generates DCPRM(N) signal which produces PRIME.

E. Upon Receiving An Input Prime (IP) - Also generates DCPRM(N) signal to produce PRIME.

In all of the above cases, the high PRIME signal out of the LSI chip 2010 resets the printer logic.

2.3.2 Select

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Before the printer can receive data, it must be selected. This can be done by depressing the SELECT switch on the operator panel or by receiving an Octal 021 code on the input data lines and a data strobe pulse. The SELECT lamp on the operator panel is lit when the printer is selected.

The printer is deselected by either depressing the SELECT switch or by receiving an Octal 023 code on the data lines and a data strobe pulse. Alternately depressing the SELECT switch alternately selects and deselects the printer. Note that when power is turned on, the printer initially appears in a deselect state.

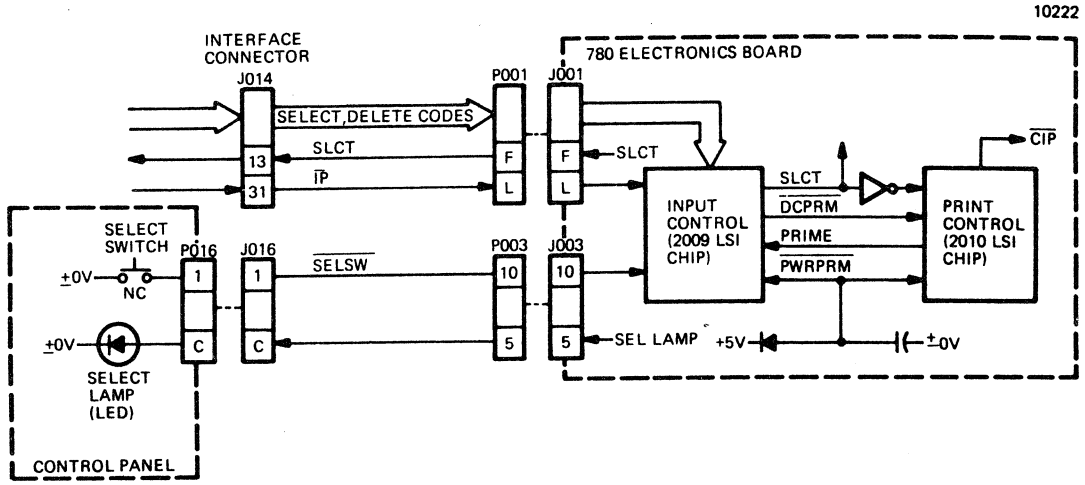

FIGURE 2-2. INITIALIZING THE PRINTER

2.4 DATA INPUTS (Figure 2-3)

Inputs to the printer consist of seven standard parallel data lines (DS1-DS7), an optional DS8 line, an active low data strobe (DSTA(N)) input, and an active low input prime (IP(N)) line. The first seven data lines represent the 7-bit USASCII code (refer to the operators manual). The optional eighth bit is used as a control bit either for specifying an elongated character or for selecting an additional character set. The data strobe pulse is used to synchronize the input data with the printer electronics. The prime line is used to initialize the printer electronics.

In response to received data the printer generates an acknowledge (ACK(N)) pulse to acknowledge reception of a character. If the received character caused the printer to perform a certain function such as paper movement, character printing, etc., the printer responds with a BUSY signal.

A high select (SLCT) at the interface connector indicates the printer is selected and ready to receive data. The light detect (LD) line indicates an error condition in which no video signal is detected as the print head travels across the page. The fault line (FAULT(N)) when low, indicates any one of the following conditions:

A. Printer is deselected,
B. A paper time-out condition exists,
C. Printer is out of paper,
D. Video signal failure (LD high).

2.4.1 Data Input Timing

In general, the data transfer sequence consists of the input device placing the appropriate code on the data lines to the printer and then generating a data strobe. The printer, after a slight delay, responds with an acknowledge pulse. Or if the received data caused a busy condition, the printer first activates the busy line for the duration of the busy condition and then responds with an acknowledge pulse.

Refer to Appendix A for timing involved in transferring data, which does not cause a busy condition, and the timing involved in receiving any character, which causes a busy condition in the printer.

2.4.2 Function Decoder

In addition to monitoring the input data for the first printable character, the function decoder monitors the data for special control codes. The data lines are decoded and if a control code is detected, the following action occurs:

CONTROL CHARACTER 780

Function	Octal Code	Printer Action
a. Bell	007	If Printer contains optional speaker, a bell code generates a two-second tone to alert the operator.
b. Line Feed*	012	Advances the paper one line.
c. Vertical Tab*	013	Advances the paper until the next hole in Channel 5 of the VFU paper tape is reached. Requires optional VFU. If there is no VFU, the VT code is either ignored or a line feed is performed.
d. Form Feed*	014	Advances the paper until the next hole in Channel 7 of VFU paper tape is reached. Requires optional VFU. If there is no VFU, the FF code is either ignored or a line feed is performed.
e. Carriage Return	015	Causes the received line of characters to be printed.
f. Elongated Characters	016 (SO)	Causes all the characters in the received line to be printed at double their normal width.
g. Select	021	Selects the Printer by jumper option. During select, the prime operation can be disabled

* If the DSC option is used, LF, VT and FF also cause the received line of characters to be printed.

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Function	Octal Code	Printer Action
h. Delete	177	Primes the printer by clearing memory and initializing Printer electronics. As an option, this function can be inhibited.
i. Deselect	023	Deselects the Printer.
j. Set Bit 8	034	
k. Reset Bit 8	035	

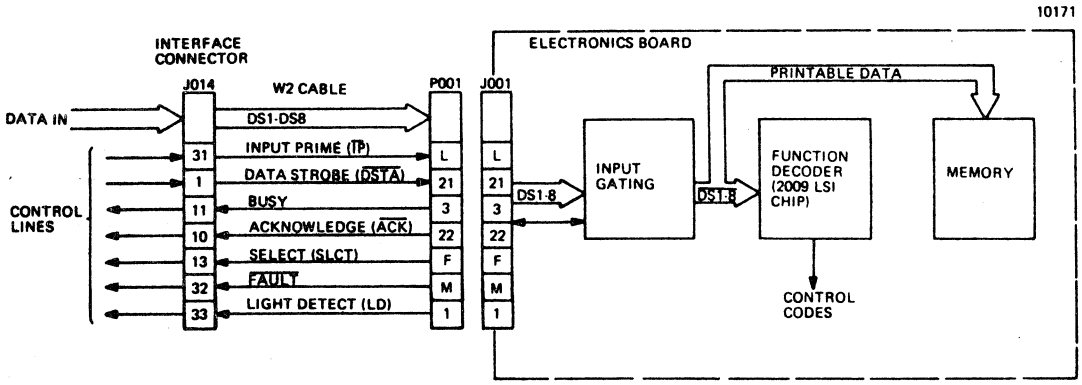

FIGURE 2-3. DATA INPUT

2.5 CHARACTER PRINTING (Figure 2-4)

As the print head moves across the page, the timing fence and optics block on the video amplifier generate timing inputs to the video amplifier board. These timing signals are used by the logic to register the five full columns of dots in the printed character.

The logic uses two ROM (Read-Only-Memory) elements for each character set. One ROM defines the dot pattern for the five full-step columns, the other defines the dot pattern for the half-step columns in a 9x7 dot matrix (optional).

When the memory is full or a carriage return code is detected in the input data, the print command (CIP) is generated. The buffer full (CO(N)) or the decoded carriage return (DSCR(N)) signal generates the DMC command to the 2010 LSI chip. The DMC signal generates CIP out of the 2010 chip, causing the carriage and attaching print head to move across the page. The address counter is set to count up, then, clocked to select, via the eight address lines A0-A7, the appropriate character location in the RAM. The read/write (R/W) input to the RAM is held high during the print cycle. Conversely, the R/W input is pulsed low during the data input cycle. The 7-bit character code TB1-TB7, specifying the character, is sent to the ROM.

As the print head moves across the page, the DCW timing inputs are used by the ROM's to register the columns of dots in the printed character. Depending on whether a 5x7 or a 9x7 dot matrix is used for character generation, either one or two ROM's are used for each character set.

The ROM, in response to the character code and timing signals, generates seven logic signals (CG1-CG7) which are amplified and sent to the seven solenoids in the print head. There the signals activate the solenoids driving the print wires (seven high dot matrix) to form the appropriate dot pattern for the addressed character and column.

2.6 CARRIAGE AND RIBBON MOVEMENT (Figure 2-5)

Mounted to the carriage assembly are the print head, ribbon cartridge and two carriage solenoids. The carriage assembly moves from left to right along the platen during the print cycle and from right to left when returning the carriage. During the printing operation, the ribbon is automatically advanced allowing full use of the ribbon. Carriage movement is the direct result of drive signals from the 780 electronics, causing the forward or reverse carriage solenoid to seize the band.

2.6.1 Left and Right Margin Indicators

Located on the left frame of the printer is a light emitting diode (LED) and phototransistor device which indicates if the print head is in the start position or at the left hand margin. If the carriage is sitting at the left hand margin, then the RTP (Ready to Print) carriage actuator arm extends into the slot in the device, preventing light from the LED from energizing the phototransistor. This generates a low ready to print (RTPSW(N)) signal to the print control logic. When the carriage is to the right of the indicator, the arm is out of the slot, permitting light to energize the phototransistor and thus making RTPSW high. The (RTPSW(N)) signal is high when the carriage is not over the indicator.

2.6.2 Carriage Drive

The carriage is driven by the motor, rotating band and forward/reverse carriage solenoids. Both solenoids are mounted on the carriage assembly so that when either solenoid is activated the lock arm of the solenoid seizes the band, thus moving the carriage in the direction of the rotating band. The motor turns at a constant speed always rotating the band clockwise. If the forward solenoid is energized, the lock arm seizes the top half of the band moving the carriage to the right. Energizing the reverse solenoid attaches the lock arm to the bottom half of the band, moving the carriage to the left.

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2.6.3 Carriage Drive Signals

The signals for driving the carriage forward and reverse are generated by the LSI chip 2010. When the printer is ready to print the received line of data, the 2010 chip activates the forward solenoid. The forward drive signal remains active until a carriage return code is detected in the data at the end of a line or until the buffer full condition occurs at the end of a full line of data. Either of these conditions causes chip 2010 to deactivate the forward drive signal and activate the reverse drive signal and return the carriage to the left margin.

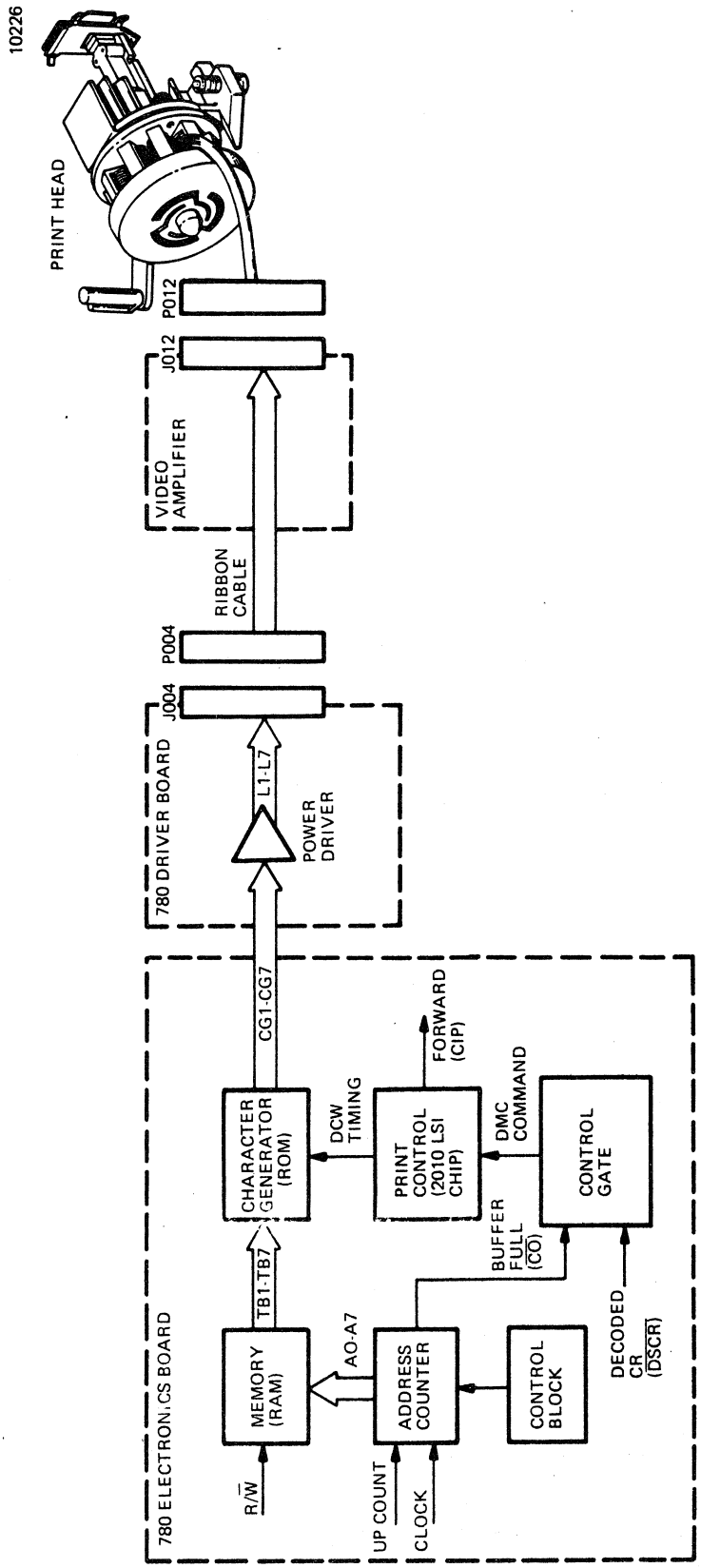

FIGURE 2-4. CHARACTER PRINTING

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2.6.4 Ribbon Drive

In the 780 printer, the ribbon is advanced during the print cycle and carriage return. The ribbon drive shaft rotates clockwise feeding the mobius loop ribbon out of the rear of the cartridge, across the front of the print head, and back into the front of the cartridge. The ribbon drive shaft is driven by two one-way drive pulleys, which contain a slip clutch. The ribbon drive rope is looped one-half turn, counterclockwise, around the top pulley and clockwise around the bottom pulley. The top pulley is engaged when the carriage moves forward; the bottom pulley is engaged when the carriage moves in reverse.

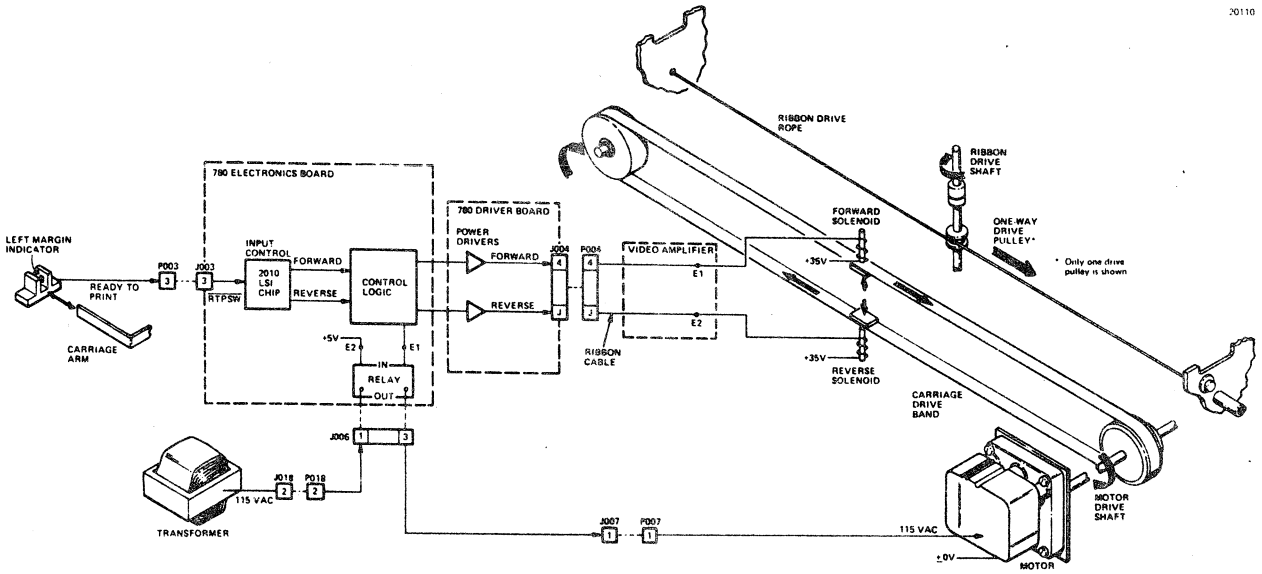

FIGURE 2-5. CARRIAGE AND RIBBON MOVEMENT

2.7 PAPER MOTION (Figure 2-6)

In addition to the platen knob, which is rotated manually by the operator to move paper, three separate printer functions can cause paper movement: line feed, form feed and vertical tab. Each of these functions causes the paper to move by activating the paper motion solenoid, which in turn activates a clutch that mechanically links the drive motor to the platen and paper feed tractors.

For each line feed operation, the solenoid is energized 11 milliseconds for single line feeds. At the end of this interval, a 60-90 millisecond line feed delay (DLYLF) is generated to allow the clutch mechanism to stop before another paper movement operation is performed.

In response to a form feed or vertical tab command, the printer acknowledges the command and either ignores it or performs a line feed operation, depending on the printer configuration. However, if the optional VFU and tractor drive or pin feed platen are installed, the paper motion is terminated when a hole is detected in the appropriate channel of the VFU paper tape.

2.7.1 Line Feed

The line feed (LF) operation can be generated by any of the following three conditions:

1. After printing a line of characters (and the automatic line feed is not disabled);
2. Receiving a line feed code (Octal 012);
3. Pressing the LINE FEED switch on the operator panel.

The width of the line feed pulse generated by any of the above conditions is 11 milliseconds.

During a line feed operation, the paper motion solenoid is activated via the power driver (PMSOL(N)).

2.7.2 Form Feed

A form feed (FF) operation can be generated by either of the following two conditions:

1. Receiving a form feed code (Octal 014);
2. Pressing the optional TOP OF FORM switch on the operator panel.

Either of these conditions activates the paper motion (PMSOL(N)) command to the paper motion solenoid. The paper motion solenoid remains activated until a hole is detected in Channel 7 of the paper tape in the VFU.

For as long as (PMSOL(N)) is active, the printer remains in a busy condition.

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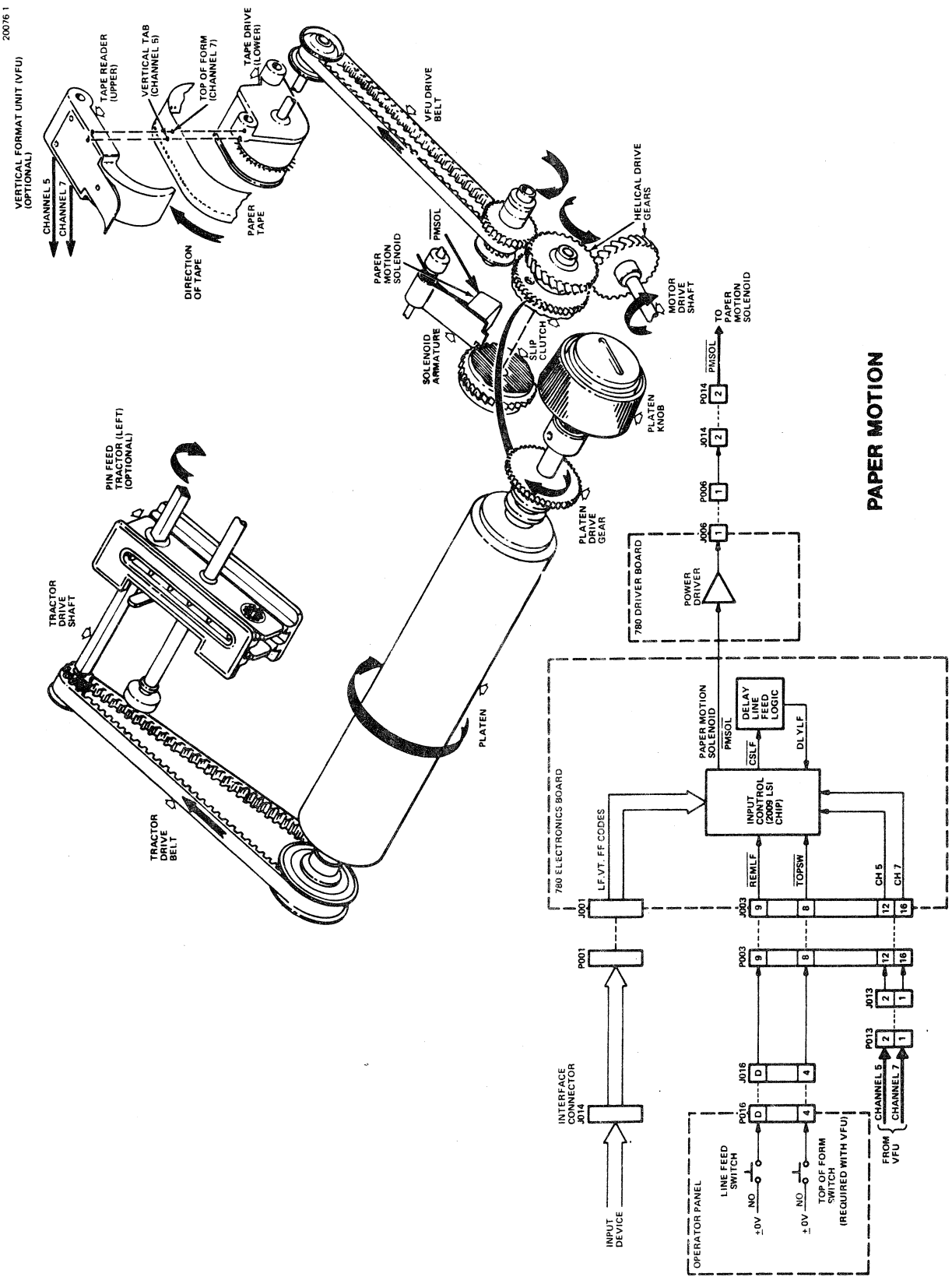
2.7.3 Vertical Tab

A vertical tab (VT) operation is generated by receiving a vertical tab code (Octal 013). LSI chip 2009 decodes the vertical tab character and generates a paper motion command. If the DSC option is used, the line is printed before (PMSOL(N)) is activated.

The low (PMSOL(N)) signal initiates the paper motion and generates a busy condition. This continues until a hole is detected in Channel 5 of the paper tape in the VFU.

For as long as (PMSOL(N)) is active, the printer remains busy.



PAPER MOTION

FIGURE 2-6. PAPER MOTION

2.7.4 Vertical Format Unit (Optional)

The vertical format unit (VFU) consists of a standard 8-channel paper tape reader, located on the upper right side of the printer. The paper tape is used for vertical tab and form feed control. Movement of the paper tape is caused by direct mechanical linkage to the gear train that drives the platen and paper feed tractors.

The vertical format unit is installed only on printers using the optional tractor drive assembly or pin feed platen.

2.8 SPECIAL FUNCTIONS (Figure 2-7)

In addition to the character printing and paper movement functions, the printer also performs the following special functions: Bell (optional), Delete, Paper Empty, Motor Control and Elapsed Time Indicator (optional).

2.8.1 Bell (Optional)

If the optional speaker is installed in the printer, reception of a bell code (007) or detection of a paper empty (PE) condition causes a BELL signal to be generated from LSI chip 2009. This BELL signal is a 0.8 to 1.6 KHZ output approximately one to two seconds in duration. It is amplified and then sent to drive the speaker.

2.8.2 Delete

Reception of a delete code (Octal 177) on the input data lines resets the printer logic by generating a prime condition. An option is available which can inhibit delete.

2.8.3 Paper Empty

A paper empty condition in the printer is detected by the paper empty switch located in the path of the paper. With paper in the printer, the switch is held closed. After the last page passes over the switch, the switch opens, causing a BELL signal and a FAULT output from LSI chip 2009, and lights the ALERT lamp on the operator panel.

To allow the printer to print the last form, the operator can press the FORMS OVERRIDE switch on the operator panel. This action overrides the paper empty condition as long as the switch is depressed.

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2.8.4 Motor Control

The purpose of the motor control feature is to automatically turn the motor off when the printer has not received a print or paper movement command for 9 seconds. A solid-state relay is deactivated which removes the 115 VAC from the transformer to the drive motor. No other voltages are affected.

The motor remains off until the next print or paper motion command is received, at which time the relay is automatically activated and 115 VAC is immediately applied to the motor. If a print command is received, printing is not initiated until the motor is up to normal speed. This prevents the possibility of any distortion in the first few printed characters.

2.8.5 Elapsed Time Indicator (Optional)

The elapsed time indicator option is used to record the actual printing time of the printer. The elapsed time indicator is activated only when the printer is in the print cycle.

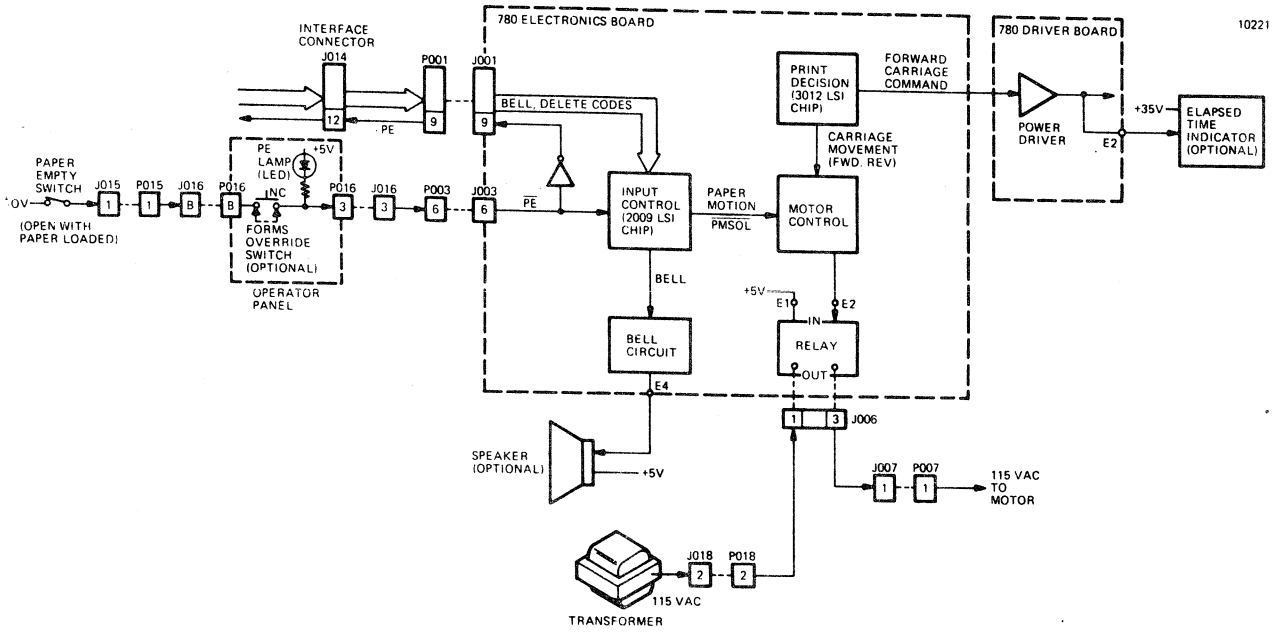

FIGURE 2-7. SPECIAL FUNCTIONS

2.9 POWER SUPPLIES

The standard power input to the printer is 115 VAC, 60 Hz. For the 230 VAC, 50 Hz option, a different motor is installed.

The power input is applied through an ON/OFF circuit breaker (S1) at the rear of the printer and then through a line filter to the multitap transformer (T1). From the transformer, the main power goes through the motor control relay to the motor.

The secondary windings of the transformer develop the following voltages:

VOLTAGE	WINDINGS
12 VAC	(11-12)
35 VAC	(13-14-15)
27.5 VAC	(16-17)

The 12 VAC and 35 VAC voltages are used as inputs to the +5 VDC and -12 VDC power supplies on the electronics board, where they are rectified, filtered and regulated. The 27.5 VAC is used to generate the +5 VDC unregulated output.

2.9.1 +5 VDC Regulator (Figure 2-8)

The 12 VAC output from the secondary winding of the transformer is rectified by the full-wave diode bridge located on the electronics board and filtered. The unregulated, filtered output of the +15 VDC is fused and supplied to the power driver circuits. This +15 VDC is also regulated to maintain the +5 VDC output.

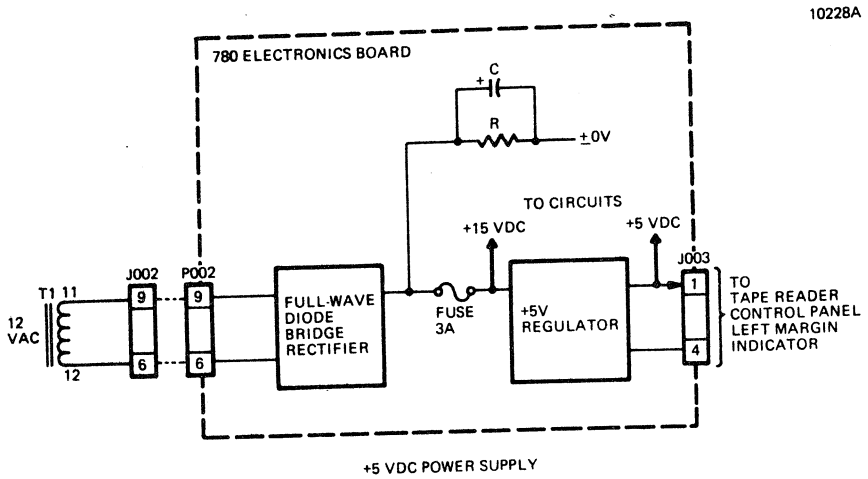

FIGURE 2-8. +5 VDC POWER SUPPLY

2.9.2 -12 VDC Regulator (Figure 2-9)

The voltage generated by the 35 VAC center-tapped secondary winding of the transformer is used as input to the -12 VDC regulator. This input is rectified, filtered, fused and then regulated to maintain the -12 VDC output.

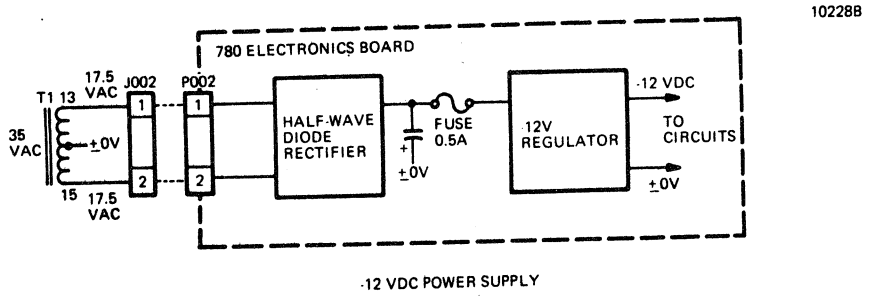

FIGURE 2-9. -12 VDC POWER SUPPLY

2.9.3 +35 VDC Power Supply (Figure 2-10)

The 27.5 VAC output from the transformer is rectified by a full-wave diode bridge and filtered to generate the +35 VDC unregulated voltage for the power driver circuits and paper motion solenoid.

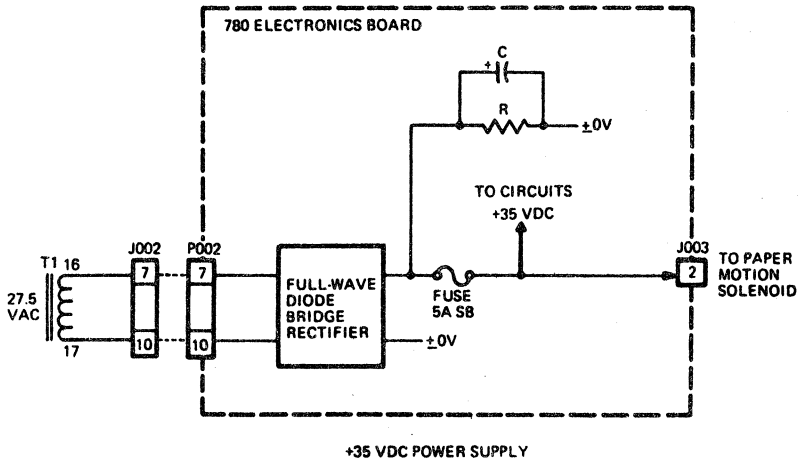

FIGURE 2-10. +35 VDC POWER SUPPLY

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SECTION 3
PRINTER SUB-ASSEMBLIES
REMOVAL, REPLACEMENT AND ADJUSTMENT PROCEDURE

3.1 INTRODUCTION

This section describes the function, removal/replacement, adjustment and preventive maintenance procedures of the printer sub-assemblies in the Model 780 printer. This section is aimed at a sub-assembly level.

This section is organized as follows:

Subsection:

3.2 PRINTER SUB-ASSEMBLIES
3.3 COVER ASSEMBLIES
3.4 PRINT HEAD ASSEMBLY
3.5 VIDEO AMPLIFIER ASSEMBLY
3.6 TIMING FENCE ASSEMBLY
3.7 RIBBON CARTRIDGE ASSEMBLY
3.8 CARRIAGE ASSEMBLY
3.9 DRIVE MOTOR ASSEMBLY
3.10 PLATEN DRIVE ASSEMBLY
3.11 VERTICAL FORMAT UNIT
3.12 PLATEN ASSEMBLY
3.13 PINCH ROLLER ASSEMBLY
3.14 TRACTOR DRIVE AND PIN FEED ASSEMBLIES
3.15 PIN FEED PLATEN ASSEMBLIES
3.16 COLUMN SCALE/TEAR BAR ASSEMBLIES
3.17 CONTROL PANEL ASSEMBLY
3.18 PRIMARY VOLTAGE ASSEMBLIES
3.19 ELECTRONIC MODULE ASSEMBLY
3.20 LOGIC BOARD ASSEMBLY
3.21 POWER DRIVER BOARD ASSEMBLY
3.22 INTERFACE ADAPTER BOARD ASSEMBLY
3.23 SPEAKER ASSEMBLY
3.24 SPECIAL TOOLS
3.25 HARDWARE KIT

3.2 PRINTER SUB-ASSEMBLIES

Figure 3-1 illustrates and lists the major sub-assemblies used in the printer. Following this overall diagram is a brief functional description, removal/replacement/adjustment and preventive maintenance procedures for each individual sub-assembly.

NOTE: THE MAJORITY OF THE SUB-ASSEMBLIES ARE PACKAGED IN KIT FORM. THE KIT CONTAINS THE SUB-ASSEMBLY AND HARDWARE NECESSARY TO MOUNT THE SUB-ASSEMBLY. IF NOT PACKAGED IN KIT FORM, JUST THE SUB-ASSEMBLY IS ILLUSTRATED AND LISTED.

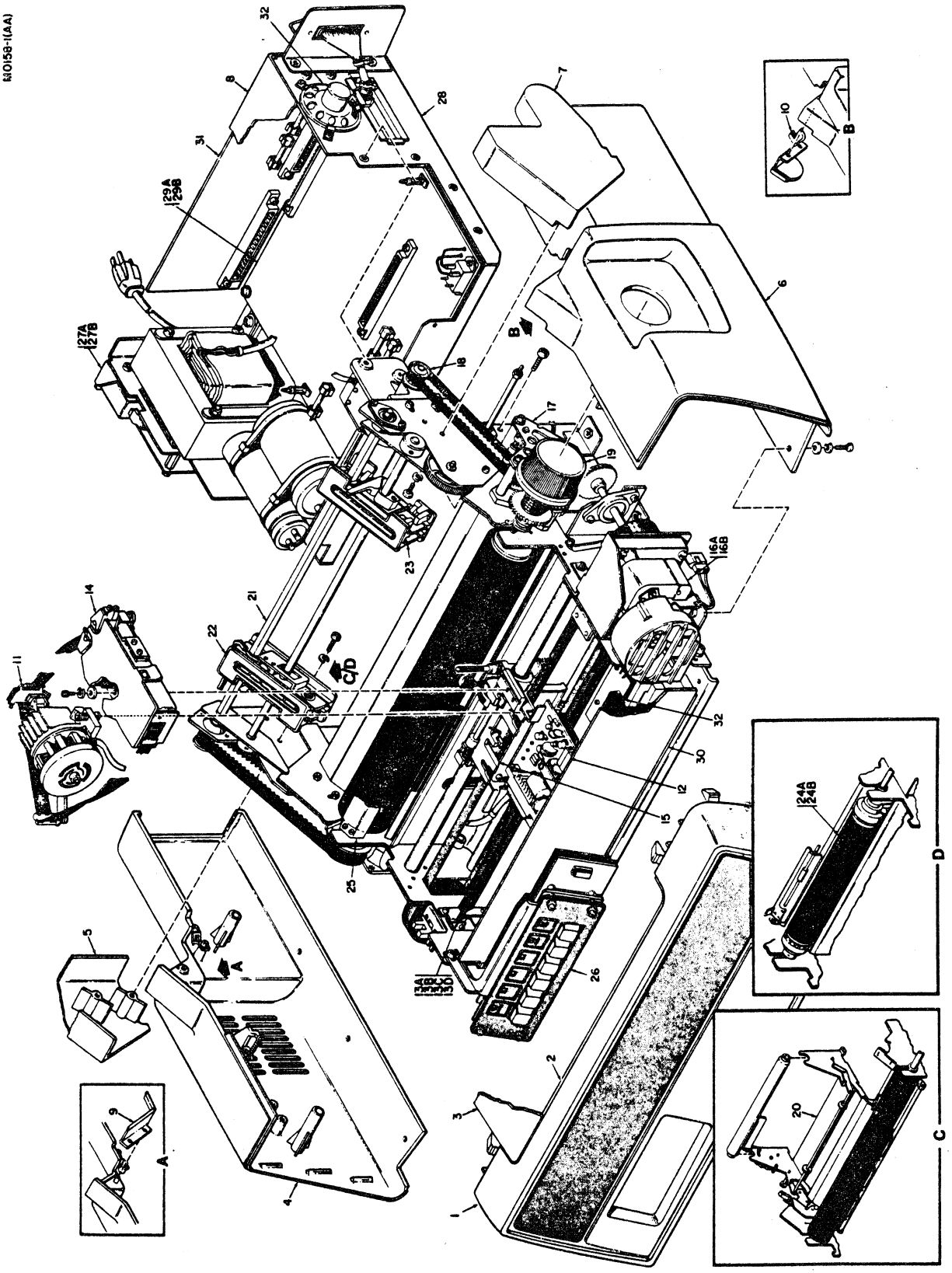

Figure 3-1. PRINTER SUB-ASSEMBLIES, MODEL 780

LIST OF MATERIALS
PRINTER SUB-ASSEMBLIES
MODEL 780
(REFERENCE FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
1	535139001-5070	Cover, Front	1
2	535146001-2001	Decorator Plate	1
3	535143001-2001	Cover, Top, Clear	1
4	535645001-5070	Cover, Left	1
5	535136001-2070	Cover, Left, Tractor Drive (optional)	A/R
6	535644001-5070	Cover, Right	1
7	535137001-2070	Cover, Right, Tractor Drive (optional)	A/R
8	63780126-2002	Cover, Electronic Module	1
9	535067001-2070	Cover, Left, Pinch Roller	1
10	535068001-2070	Cover, Right, Pinch Roller	1
11	62001136-5002	Print Head Assembly	1
12	63780157-6001	Kit, Video Amplifier Assembly	1
13A	63780113-6001	Kit, Timing Fence Assy., 10/12 CPI	1
13B	63780113-6002	Kit, Timing Fence Assy., 10/15 CPI (optional)	A/R
13C	63780113-6003	Kit, Timing Fence Assy., 10/16.5 CPI (optional)	A/R
13D	63780113-6004	Kit, Timing Fence Assy., 12/15 CPI (optional)	A/R
13E	63780113-6005	Kit, Timing Fence Assy., 12/16.5 CPI (optional)	A/R
13F	63780113-6006	Kit, Timing Fence Assy., 15/16.5 CPI (optional)	A/R
13G	63780113-6007	Kit, Timing Fence Assy., 16.5 CPI (optional)	A/R
14	63700289-6001	Kit, Ribbon Cartridge Assembly	1
15	535340001-5001	Carriage Assembly	1
16A	63780152-6001	Kit, Drive Motor Assembly, 60 Hz	1
16B	63780152-6002	Kit, Drive Motor Assembly, 50 Hz (optional)	A/R
17	63700643-6003	Kit, Platen Drive Assembly	1
18	63701440-6001	Kit, Vertical Format Unit (optional)	A/R
19	63780154-6001	Kit, Platen Assembly	1
20	535220001-6001	Kit, Pinch Roller Assembly	1
21	63780153-6001	Kit, Tractor Drive Assembly (optional)	A/R
22	63701467-5001	Pin Feed Tractor Assembly, (Left) (optional)	A/R
23	535501001-5001	Pin Feed Tractor Assembly, (Right) (optional)	A/R
24A	63701290-6002	Kit, Pin Feed Platen Assembly 80 col. (optional)	A/R
24B	63701290-6003	Kit, Pin Feed Platen Assembly 50 col. (optional)	A/R
25	535734000-2001	Column Scale/Tear Bar Assembly, Blank (optional)	A/R
26	63780150-6001	Kit, Control Panel Assembly	1
27A	63703115-6001	Kit, Primary Voltage (100V-120V)	1
27B	63703115-6002	Kit, Primary Voltage (200V-240V) (optional)	A/R
28	63780128-5001	Electronic Module Assembly	1
29A	63780147-6001	Kit, Logic Board Assembly	1
29B	63780147-6002	Kit, Logic Board Assembly, Inhibit (optional)	A/R
30	63780146-6001	Kit, Power Driver Board Assembly	1
31	63780120-6001	Kit, Interface Adapter Assembly (optional)	A/R
32	63780137-6001	Kit, Speaker (optional)	A/R
33	63701194-6001	Kit, Special Tools (optional)	A/R
34	63780141-6001	Kit, Hardware (optional)	A/R

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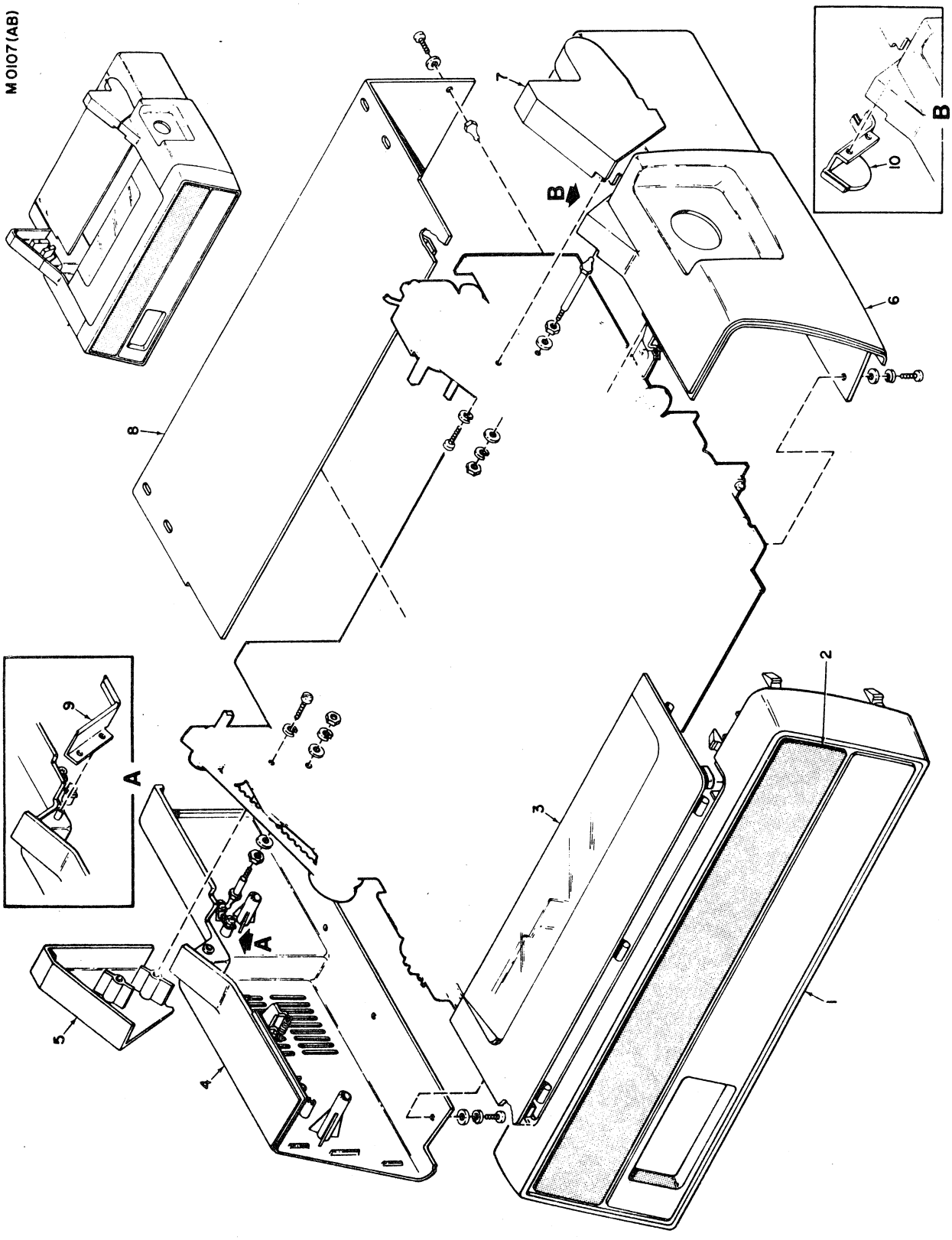

Figure 3-2. COVER ASSEMBLIES

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REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
-	63780130-6070	Kit, Cover Assemblies, Pinch roller NOTE: This it includes items 1, 2, 3, 4, 6, 8, 9, and 10.	1
-	63780131-6070	Kit, Cover Assemblies, Tractor Drive (optional) NOTE: This kit includes items 1, 2, 3, 4, 5, 6, 7, and 8.	A/R
1	535139001-5070	Cover, Front	1
2	535146001-2001	Decorator Plate	1
3	535143001-2001	Cover, Top, Clear	1
4	535645001-5070	Cover, Left	1
5	535136001-2070	Cover, Left, Tractor Drive (optional)	A/R
6	535644001-5070	Cover, Right	1
7	535137001-2070	Cover, Right, Tractor Drive (optional)	A/R
8	63780126-2002	Cover, Electronic Module	1
9	535067001-2070	Cover, Left, Pinch Roller	1
10	535068001-2070	Cover, Right, Pinch Roller	1

A. FUNCTION

The one metal and eight plastic covers enclose the printer to minimize noise and protect the printer assembly.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips and Slotted Head Screwdriver

1. Cover, Front

   a. Unsnap the six front cover clips from left and right covers.

2. Decorator Plate

   a. On inside of front cover, push decorator plate tabs out and remove plate.

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3. Cover, Top, Clear

   a. Lift cover to release tension on clamping springs and remove cover.

4. Cover, Left

   a. Remove the three screws, lockwashers, and flatwashers securing the left cover to the printer base.

COVER ASSEMBLIES
(ITEMS 1-10, FIGURE 3-1)

5. Cover, Left, Tractor Drive (optional)

   a. Remove the two screws and flatwashers mounting the left tractor drive cover to left frame.

6. Cover, Right

   a. Remove three screws, lockwashers and flatwashers mounting right cover to printer base.

7. Cover, Right, Tractor Drive (optional)

   a. Remove two screws and flatwashers mounting the right tractor drive cover to right frame.

8. Cover, Electronic Module

   a. Remove two screws, lockwashers and flatwashers from back of printer and remove cover.

9. Cover, Left, Pinch Roller

   a. Remove left pinch roller cover from two mounting pins on left frame.

10. Cover, Right, Pinch Roller

   a. Remove right pinch roller cover from two mounting pins on right frame.

NOTE: ALL REMOVAL/REPLACEMENT PROCEDURES FOR THE REMAINING SUB-ASSEMBLIES ARE WRITTEN ASSUMING THE COVERS HAVE BEEN REMOVED FROM THE PRINTER.

C. ADJUSTMENTS

1. Cover, Left and Right (4, 6)

   a. Ensure that left (4) and right (6) covers align and snap into standoffs on left and right frame, once secured to the printer base.

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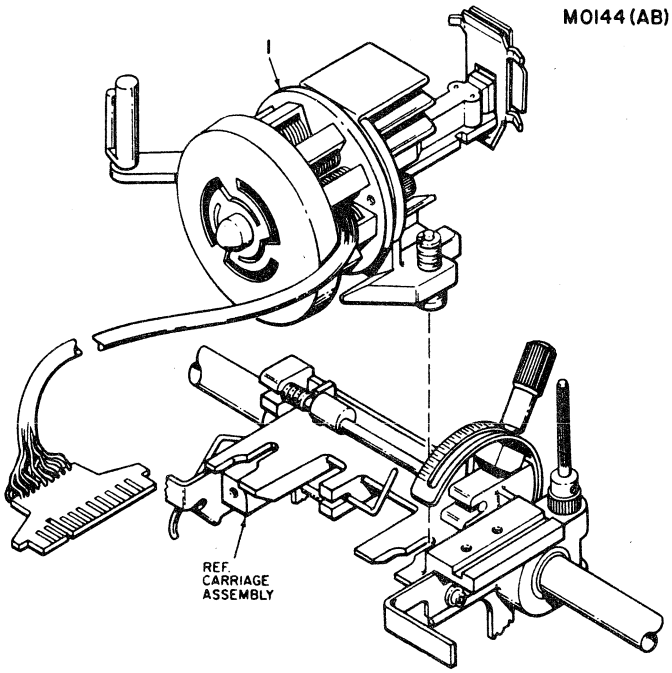
D. PREVENTIVE MAINTENANCE

1. Clean all cover assemblies using a mild detergent.

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
11		Print Head Assembly	1



1	62001136-5002	Print Head Assembly	1

A. FUNCTION

As the print head assembly moves across the print line, the print wires are selectively fired to graphically construct the characters in a dot matrix pattern. Standard print format is a 5x7 dot matrix, with an optional 9x7 dot matrix available. Since the print wires are not attached to the coil armature the print head is commonly referred to as the "free flight head."

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B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: None

1. Remove the ribbon from the print head ribbon guides.

2. Remove the fingerboard P012 on the print head cable from connector J012 on the video amplifier.

3. Release clamping spring tension, on left side of carriage assembly, by pulling spring up and over spring retainer.

PRINT HEAD ASSEMBLY
(ITEM 11, FIGURE 3-1)

4. Remove the print head by sliding off carriage assembly towards the front of the printer.

NOTE: RELEASING TENSION ON CLAMPING SPRING WILL ENABLE PRINT HEAD TO BE REMOVED. WHEN INSTALLING PRINT HEAD ASSEMBLY, ENSURE THE CLAMPING SPRING CATCHES THE LIP UNDERNEATH THE HEAD, THEN PULL SPRING UP AND OVER SPRING RETAINER.

C. ADJUSTMENTS

1. Print Head Penetration (Refer to Figure 3-3)

   a. Loosen penetration control knob and hardware securing the head adjusting indicator.

   b. Move penetration control knob away from platen and as close as possible, but not contacting, the print head.

   c. Lightly tighten indicator hardware.

   d. Insert a 0.177 mm (0.007 in.) feeler guage between the print head and the platen. Move penetration control knob towards platen until the 0.177 mm (0.007 in.) gap is met. Tighten penetration control knob.

   e. Loosen the hardware securing the head adjusting indicator, while holding penetration control knob, and position indicator against penetration control knob.

   f. Tighten head adjusting indicator hardware.

   g. Loosen penetration control knob and move back and forth.

   h. Retighten control knob against indicator and recheck for 0.177 mm (0.007 in.) gap.

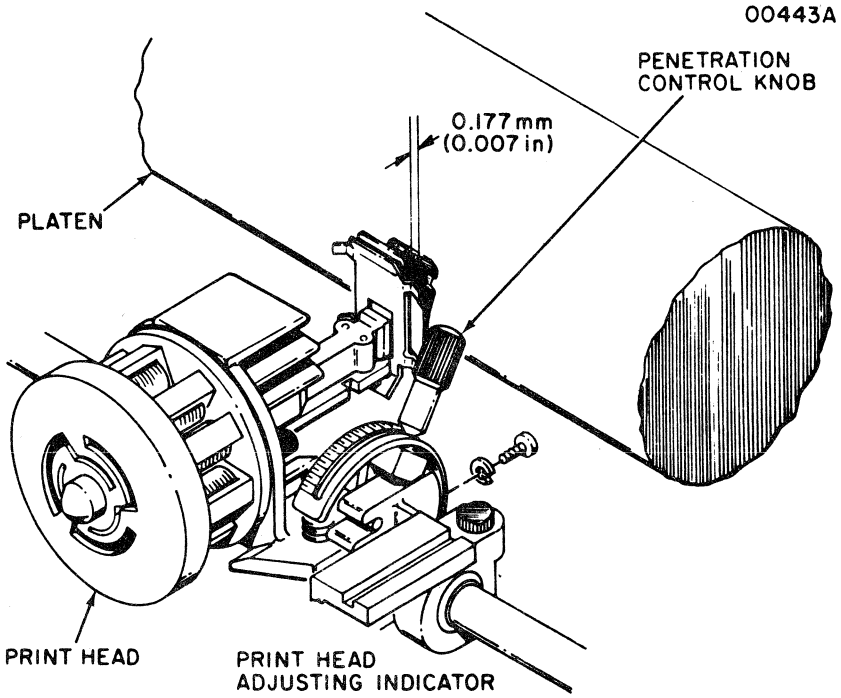

Figure 3-3. PENETRATION CONTROL ADJUSTMENT, PRINT HEAD ASSEMBLY

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the print head assembly.

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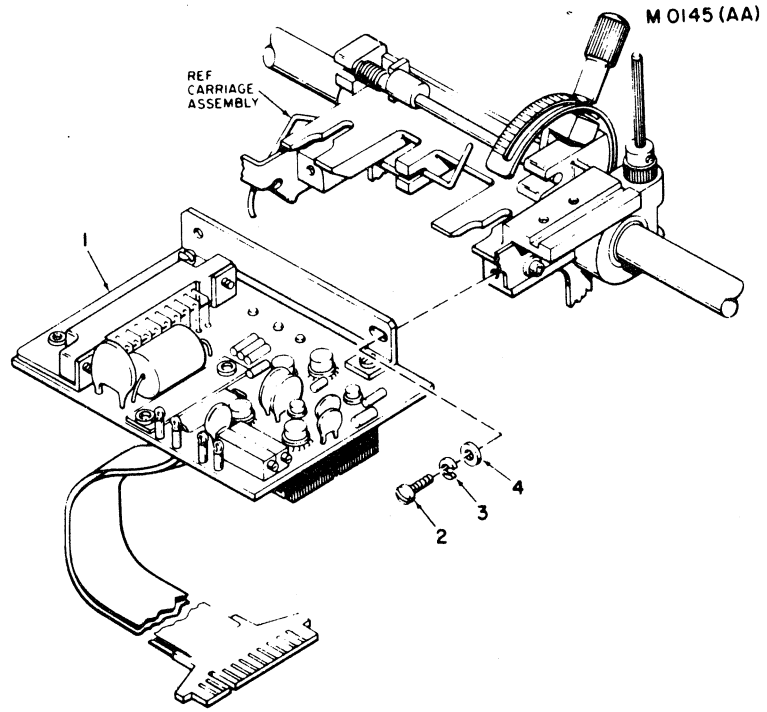
VIDEO AMPLIFIER ASSEMBLY
(ITEM 12, FIGURE 3-1)

3.5 VIDEO AMPLIFIER ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
12	63780157-6001	Kit, Video Amplifier NOTE: This kit includes items 1 through 4.	1



1	63703164-4004	P.C. Bd. Assembly, Video Amp.	1
-	63701275-6002	Kit, Video Amp. Mounting Hardware NOTE: This kit includes items 2, 3 and 4.	1
2	34000351-2019	Screw, M3 x 10 mm Lg., Pan Hd. Phillips	2
3	34000455-2004	Washer, SplitLock, M3	2
4	34000452-2004	Washer, Flat, M3	2

A. FUNCTION

The video amplifier amplifies the timing pulse generated by the timing fence to establish the timing for pulsing of the solenoid print wires for horizontal character registration.

VIDEO AMPLIFIER ASSEMBLY
(ITEM 12, FIGURE 3-1)

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver

1. Remove the print head cable fingerboard P012 from connector J012 on video amplifier.

2. Remove connector P004, on cable of video amplifier, from connector J004 on power driver board.

3. Remove the four carriage solenoid wires attached to the bottom of the video amplifier.

4. Remove the two screws (2) lockwashers (3) and flatwashers (4) and remove video amplifier from printer.

C. ADJUSTMENTS

NOTE: THE VIDEO AMPLIFIER CONTAINS AN OPTICAL PICKUP ASSEMBLY WHICH MUST BE ADJUSTED. STEPS 1 AND 2 DETAIL THE MECHANICAL ALIGNMENT OF THE OPTICAL PICKUP ASSEMBLY, WHILE STEP 3 OUTLINES THE ELECTRICAL ADJUSTMENT.

1. Optical Pickup Alignment With Respect to Timing Fence (Refer to Figure 3-4)

   a. Loosen the hardware supporting the video amplifier to the carriage assembly.

   b. Ensure the timing fence is centered in the slot of the optical pickup assembly. If required, loosen optical pickup mounting hardware and position pickup assembly so that timing fence is centered in slot and tighten hardware.

   c. Ensure the bottom of the optical pickup assembly is parallel with the bottom of timing fence, once positioned.

   d. When above conditions have been met, tighten video amplifier mounting hardware.

VIDEO AMPLIFIER ASSEMBLY
(ITEM 12, FIGURE 3-1)

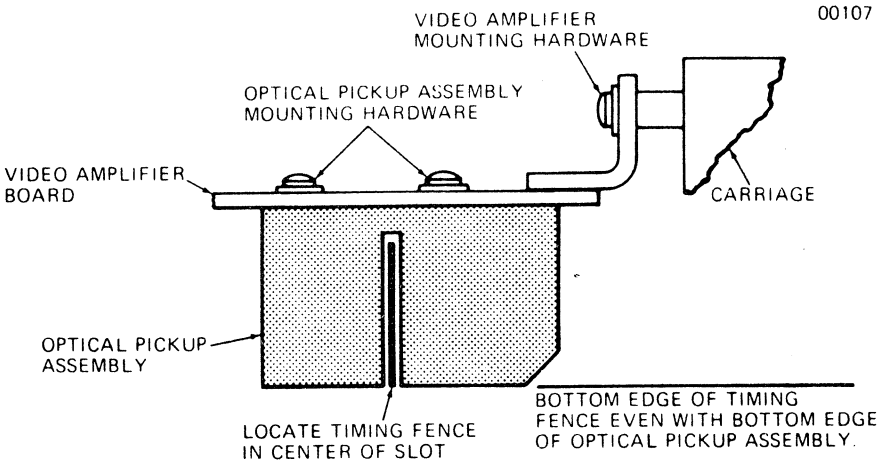


Figure 3-4. OPTICAL PICKUP ASSEMBLY ADJUSTMENT WITH RESPECT TO TIMING FENCE

2. Vertical and Horizontal Alignment of Optical Pickup Assembly (Refer to Figure 3-5)

   a. Sight right edge of optical pickup assembly and ensure parallel alignment with respect to timing fence encoder lines. If not parallel, loosen right side mounting hardware mounting the video amplifier to carriage and adjust video amplifier until optical pickup assembly is parallel with encoder lines.

   b. Sight bottom edge of horizontal pickup assembly and ensure parallelism with bottom edge of timing fence.

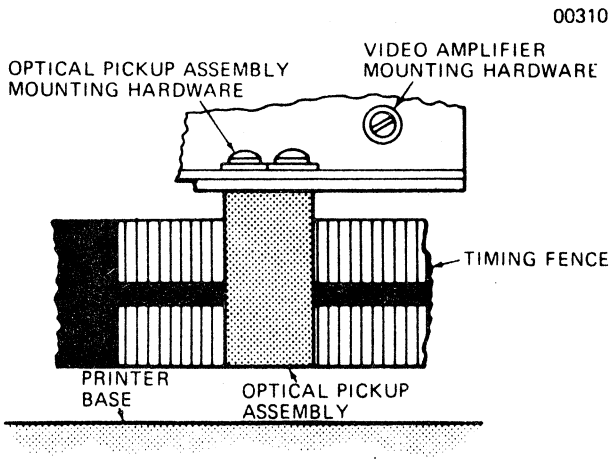


Figure 3-5. VERTICAL AND HORIZONTAL ALIGNMENT OF OPTICAL PICKUP ASSEMBLY

3. Electrical Adjustment of Video No. 1 and No. 2 (Refer to Figure 3-6).

NOTE: THE VIDEO AMPLIFIER GENERATES THE TIMING SIGNALS USED FOR HORIZONTAL CHARACTER REGISTRATION. THE STANDARD 780 PRINTER REQUIRES ONLY A SINGLE CHANNEL VIDEO AMPLIFIER. THE VIDEO SIGNALS ARE GENERATED AND AMPLIFIED BY THE VIDEO AMPLIFIER AS THE AMPLIFIER OPTICS BLOCK MOVES ACROSS THE TIMING FENCE. IF THE SWITCHABLE CONDENSED PRINT OPTION IS INSTALLED IN THE PRINTER, THEN A DUAL CHANNEL VIDEO AMPLIFIER IS USED, ONE CHANNEL FOR NORMAL PRINT AND OTHER FOR CONDENSED PRINT. IN EITHER CASE, THE VIDEO CHANNEL OUTPUT ($\overline{V1}$) OR OUTPUTS ($\overline{V1}$ AND $\overline{V2}$) ARE ADJUSTED FOR A 50% DUTY CYCLE AS FOLLOWS.

a. Ensure that the optics block on the underside of the video amplifier board is centered over the timing fence, so that the block does not rub the timing fence as the print head is manually moved right and left.

b. Monitor voltage level at TP1 with an oscilloscope while manually moving the carriage to the right and left.

NOTE: VOLTAGE VARIES AS OPTICAL PICKUP ASSEMBLY PASSES OVER LIGHT AND OPAQUE LINES ON TIMING FENCE. RECORD HIGHEST VOLTAGE LEVEL OBSERVED.

c. Monitor voltage level at TP2 and set voltage level to one-half the level recorded at TP1 by adjusting R4. This reference voltage set-up approximates the proper video output duty cycle.

d. Monitor $\overline{V1}$ at TPV (test connector, pin 3) on the 780 electronics board and check the duty cycle while the print head is moving at a constant speed. FOR A DUAL CHANNEL VIDEO AMPLIFIER, BE SURE THE NORMAL CHARACTER DENSITY IS SELECTED VIA THE ALT PRINT SWITCH ON THE CONTROL PANEL. If the duty cycle is not 50% as shown in Figure 3-6, stop the print head, adjust R4 slightly, start print head motion, and recheck duty cycle. Repeat until 50% duty cycle is achieved.

e. FOR A DUAL CHANNEL VIDEO AMPLIFIER, ADJUST DUTY CYCLE OF $\overline{V2}$ AS FOLLOWS. Repeat above steps (a) through (d) while monitoring voltage at TP3 and TP4, respectively, and adjusting R10. BE SURE THE ALTERNATE CHARACTER DENSITY IS SELECTED VIA THE ALT PRINT SWITCH ON THE CONTROL PANEL.

VIDEO AMPLIFIER ASSEMBLY
(ITEM 12, FIGURE 3-1)

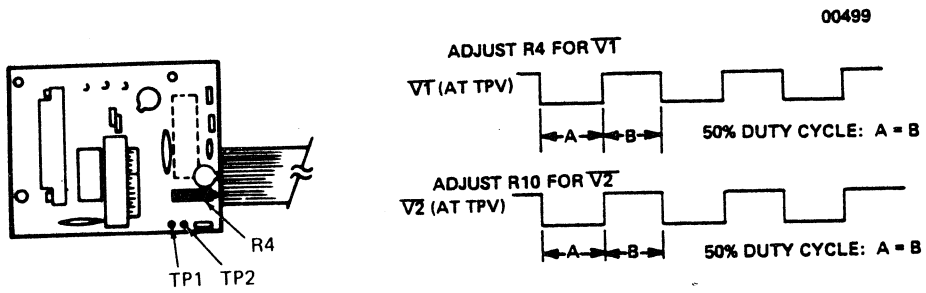


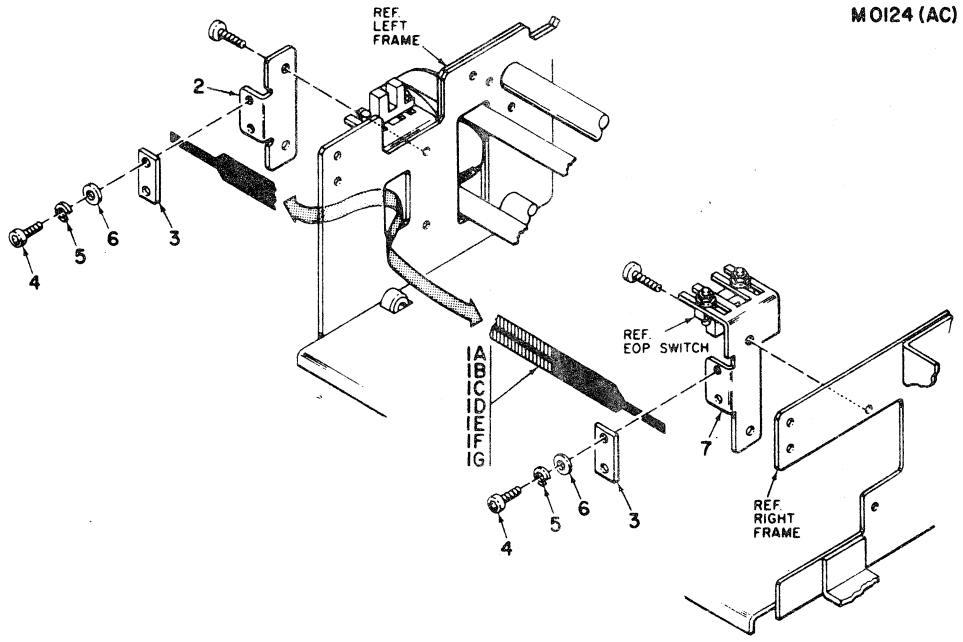
Figure 3-6. DUTY CYCLE ADJUSTMENT

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the video amplifier assembly.

3.6 TIMING FENCE ASSEMBLIES

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
13A	63780113-6001	Kit, Timing Fence, 10/12 CPI NOTE: This kit includes items 1A and 2 through 7.	1
13B	63780113-6002	Kit, Timing Fence, 10/15 CPI (optional) NOTE: This kit includes items 1B and 2 through 7.	A/R
13C	63780113-6003	Kit, Timing Fence, 10/16.5 CPI (optional) NOTE: This kit includes items 1C and 2 through 7.	A/R
13D	63780113-6004	Kit, Timing Fence, 12/15 CPI (optional) NOTE: This kit includes items 1D and 2 through 7.	A/R
13E	63780113-6005	Kit, Timing Fence, 12/16.5 CPI (optional) NOTE: This kit includes items 1E and 2 through 7.	A/R
13F	63780113-6006	Kit, Timing Fence, 15/16.5 CPI (optional) NOTE: This kit includes items 1F and 2 through 7.	A/R
13G	63780113-6007	Kit, Timing Fence, 16.5 CPI (optional) NOTE: This kit includes items 16 and 2 through 7.	A/R



TIMING FENCE ASSEMBLIES
(ITEMS 13A-13G, FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
1A	63780113-3001	Timing Fence, 5x7, 9x7, 10/12 CPI	1
1B	63780113-3002	Timing Fence, 5x7, 9x7, 10/15 CPI (optional)	A/R
1C	63780113-3003	Timing Fence, 5x7, 9x7, 10/16.5 CPI (optional)	A/R
1D	63780113-3004	Timing Fence, 5x7, 9x7, 12/15 CPI (optional)	A/R
1E	63780113-3005	Timing Fence, 5x7, 9x7, 12/16.5 CPI (optional)	A/R
1F	63780113-3006	Timing Fence, 5x7, 9x7, 15/16.5 CPI (optional)	A/R
1G	63780113-3007	Timing Fence, 5x7, 9x7, 16.5 CPI (optional)	A/R
-	63701252-6001	Kit, Hardware, Timing Fence	
		NOTE: This kit includes items 2 through 7	
2	63701284-2001	Bracket, Left	1
3	63701286-2001	Clamp, Timing Fence	2
4	34000355-2010	Screw, M3 x 8 mm. Lg., Socket Hd.	4
5	34000455-2004	Washer, SplitLock, M3	4
6	34000452-2004	Washer, Flat, M3	4
7	63701285-2001	Bracket, Right	1

A. FUNCTION

The timing fence sets-up the horizontal character registration. The fence, a flexible strip with alternately transparent and opaque slots, is mounted between the optical pick-up and light source on the video amplifier. As the print head moves, a series of pulses is generated and used to establish the timing for firing the print wires.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: 3 mm Hex Key

1. Loosen four screws (4) from left and right timing fence mounting brackets (2, 7) and remove fence.

C. ADJUSTMENTS (Refer to Figure 3-7)

1. Loosen four screws (4) and adjust fence so that first window of fence is located 106.6 mm (4.2 inches) from the left frame.

NOTE: THIS ADJUSTMENT ALLOWS FOR THE LEFT-HAND PRINT MARGIN TO ALIGN WITH THE NUMBER 1 ON THE COLUMN SCALE ASSEMBLY.

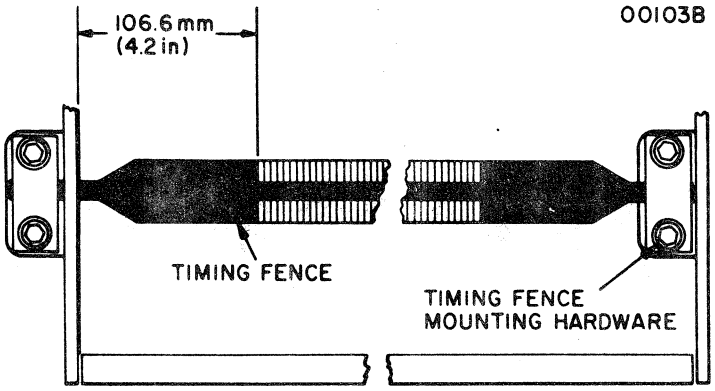


Figure 3-7. TIMING FENCE ADJUSTMENT

D. PREVENTIVE MAINTENANCE

1. Using a soft clean cloth wipe both sides of timing fence.

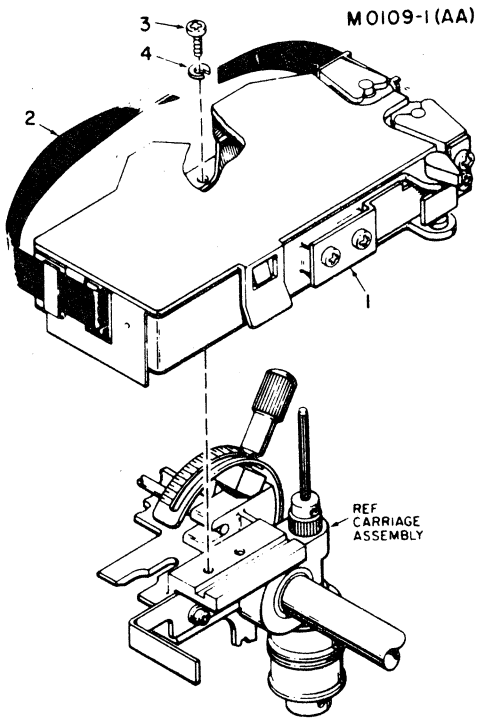
CAUTION

NEVER USE AN ORGANIC SOLVENT
AS THIS WILL DAMAGE THE TIMING FENCE

2. Inspect for scratches in the encoder lines on the timing fence and for proper mechanical alignment.

RIBBON CARTRIDGE ASSEMBLY
(ITEM 14, FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
14	63700289-6001	Kit, Ribbon Cartridge Assembly NOTE: This kit includes items 1 through 4.	1



1	535020001-5001	Ribbon Cartridge Assembly	1
2	37740005-3001	Ribbon, Black	1
3	535482001-2001	Screw, M3 x 8 mm. Lg., Pan Hd. Phillips	2
4	028030242-2001	Washer, Split Lock, M3	2

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A. FUNCTION

The ribbon cartridge assembly mounts to the carriage and contains the print ribbon. The ribbon is advanced during the forward and reverse movement of the carriage by the ribbon drive shaft. The ribbon drive shaft rotates clockwise feeding the ribbon out of the back of the cartridge, around to the front of the print head and then back into the front of the cartridge. Movement of the ribbon drive shaft is the result of two one-way slip clutches, one for forward movement and one for reverse movement.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver

1. Remove the print ribbon (2) from the print head ribbon guides.

2. Remove two screws (3) and lockwashers (4) and lift cartridge (1) from printer.

C. ADJUSTMENTS

OPERATOR'S ADJUSTMENT

1. Refer to the Series 700 OPERATOR'S MANUAL for removal/replacement and adjustment of print ribbon.

D. PREVENTIVE MAINTENANCE

1. Manually move the carriage assembly and verify proper ribbon tracking. Check ribbon pinch rollers for proper meshing.

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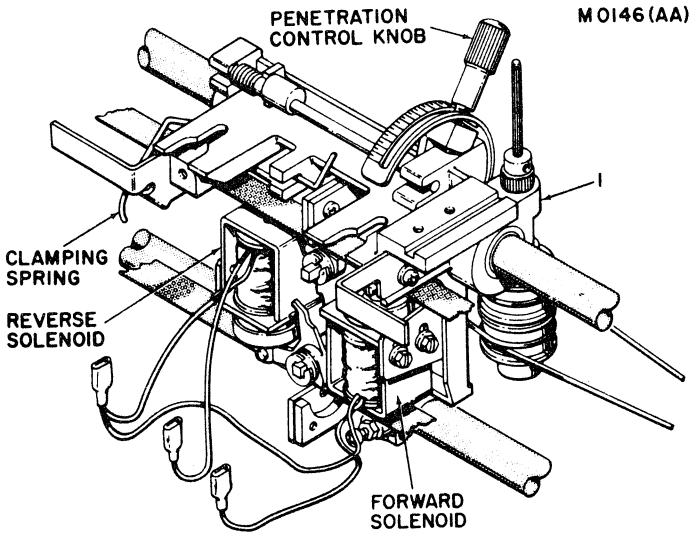
CARRIAGE ASSEMBLY
(ITEM 15, FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
15		Carriage Assembly	1



1	535340001-5001	Carriage Assembly	1

A. FUNCTION

The carriage assembly supports the print head, ribbon cartridge, video amplifier and the ready to print (RTP) and end of print (EOP) actuator arms. The carriage is driven in either the left or right direction by activating one or the other of the carriage solenoids which clamp onto the continuously rotating drive belt.

B. REMOVAL/REPLACEMENT PROCEDURE (Refer to Figure 3-8)
TOOLS REQUIRED: Slotted and Phillips Head Screwdrivers, Snap Ring Tool.

CAUTION

TURN POWER OFF
BEFORE REMOVING CARRIAGE ASSEMBLY

1. Move the carriage assembly to the center of the printer.
2. Remove the ribbon cartridge assembly.
3. Remove the print head and video amplifier assemblies per paragraph 3.4.B and 3.5.B respectively.

4. Loosen the carriage drive belt by turning the two adjusting screws on the idler pulley assembly counterclockwise.

5. Remove the retaining ring on the left end of the upper guide bar.

6. Remove the two screws mounting the upper guide bar to the right side of the frame.

7. Loosen the locknut and screw attaching the bottom of the carriage to the bottom guide bar.

8. Remove the upper and lower ribbon drive wires from the ribbon drive shaft.

9. While supporting the carriage assembly, slide the upper guide bar to the right through the carriage assembly.

NOTE: RETAIN THE RUBBER O-RING REMOVED FROM THE LEFT END OF THE UPPER GUIDE BAR.

10. Remove the carriage assembly from the printer.

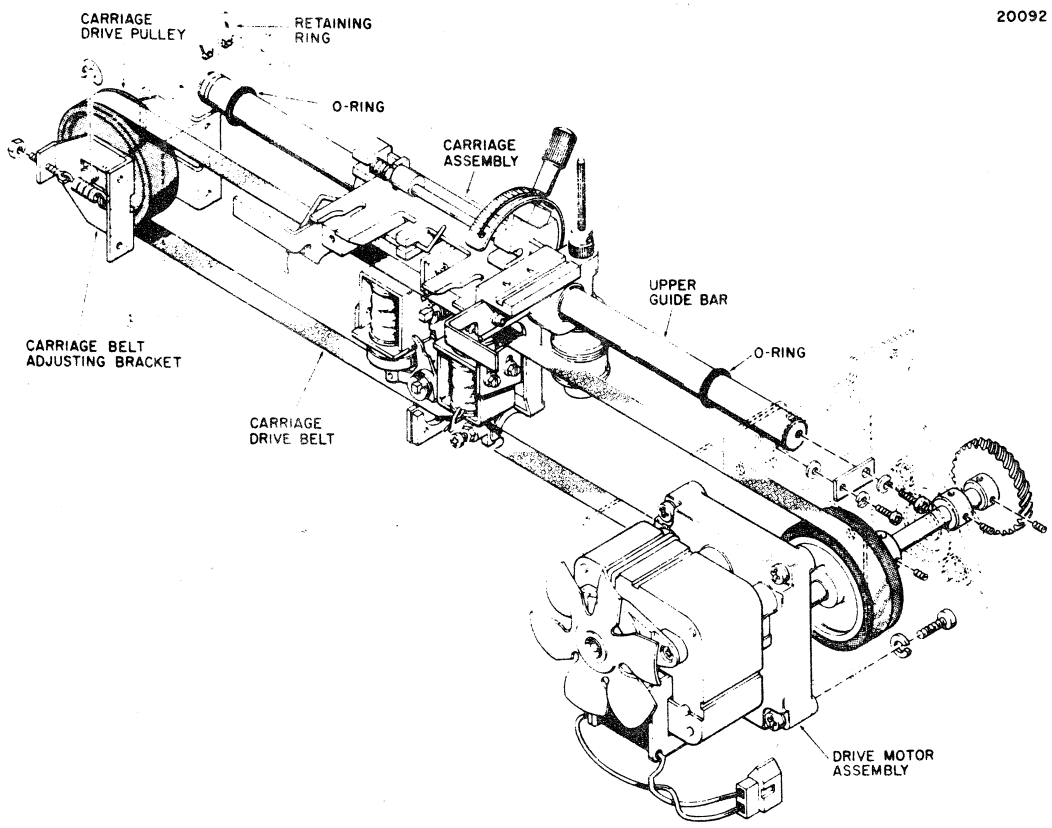


Figure 3-8. CARRIAGE ASSEMBLY, REMOVAL/REPLACEMENT

CARRIAGE ASSEMBLY
(ITEM 15, FIGURE 3-1)

C. ADJUSTMENTS

1. Carriage Solenoid Adjustment (Refer to Figure 3-9)

NOTE: THE FOLLOWING PROCEDURE DETAILS THE ADJUSTMENT OF ONLY ONE CARRIAGE SOLENOID. HOWEVER, BOTH SOLENOIDS SHOULD BE ADJUSTED IN THE SAME MANNER.

a. Insert a 0.013 in. (0.35mm) feeler guage between the anvil clamp and carriage cam lock unit.

b. With the solenoid energized (depressed), loosen the two screws mounting the solenoid and adjust solenoid until the 0.013 in feeler guage can be removed with light resistance.

c. Tighten solenoid mounting screws.

d. After adjusting both solenoids, ensure the 0.013 in. (0.35mm) feeler guage cannot easily be inserted but a 0.011 in. (0.30mm) feeler guage can be inserted without resistance.

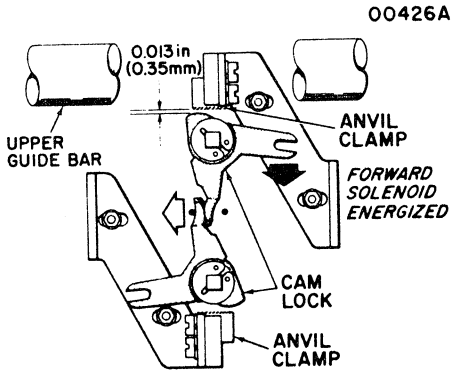


Figure 3-9. CARRIAGE SOLENOID ADJUSTMENT

2. RTF and EOP Actuator Arm Adjustments (Refer to Figure 3-10)

a. Adjust ready to print (RTP) actuator arm parallel to and 59mm (2.3 inches) from the center line of the upper guide bar.

b. Adjust end of print (EOP) actuator arm parallel to and 55mm (2.1 inches) from the centerline of the upper guide bar.

c. Once the actuator arms have been adjusted, slowly move the carriage assembly from left to right ensuring the RTP and EOP actuator arms do not contact the RTP and EOP optical switches.

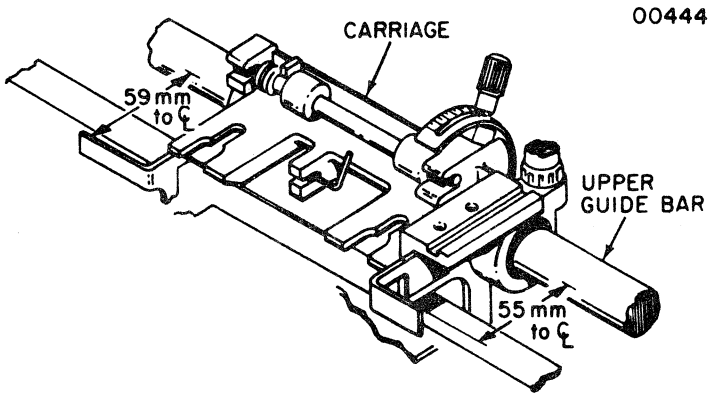


Figure 3-10. RTP AND EOP ACTUATOR ARM ADJUSTMENTS

D. PREVENTIVE MAINTENANCE

1. Wipe the upper and lower guide bars clean using a soft clean cloth.

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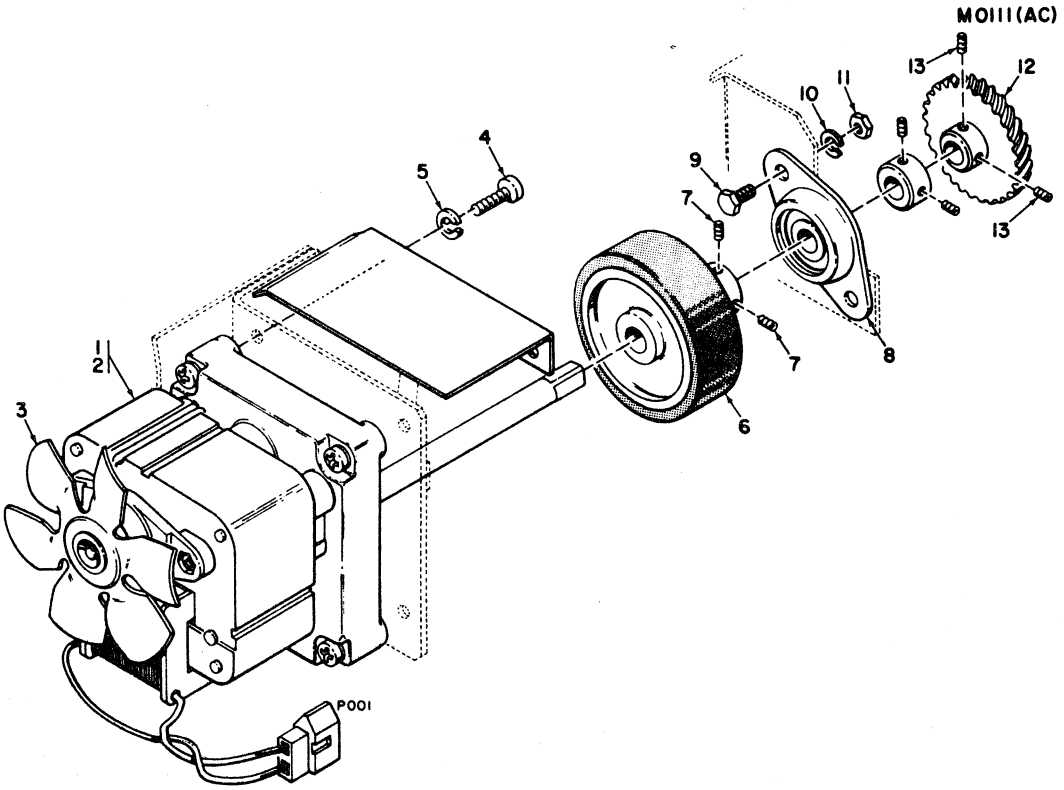
DRIVE MOTOR ASSEMBLY
(ITEMS 16A, 16B, FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
16A	63780152-6001	Kit, Drive Motor Assembly, 60Hz NOTE: This kit includes items 1 and 3 through 13.	1
16B	63780152-6002	Kit, Drive Motor Assembly, 50Hz (optional) NOTE: This kit includes items 2 through 13.	A/R



1	63780152-5001	Drive Motor Assembly, 60Hz	1
2	63780152-5002	Drive Motor Assembly, 50Hz	1
3	535097001-2001	Fan Blade/Main Motor	1
4	535493001-2001	Bolt, M5 x 10 mm Lg., Hex Hd. Slotted	4
5	028050242-2001	Washer, Split Lock, M5	4
6	535141001-2001	Drive Pulley Assembly	1
7	525745001-2001	Set-screw, M4 x 6 mm. Lg.	2
8	535560001-2001	Drive Pulley Bearing Holder Unit	2
9	535544001-2001	Bolt, M4 x 8 mm Lg., Hex Hd. Slotted	2
10	028040242-2001	Washer, Split Lock, M4	2
11	535539001-2001	Nut, Hex, M4	2
12	535547001-2001	Line Feed Clutch Drive Gear	1
13	525743001-2001	Set Screw, M4 x 4 mm. Lg.	2

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DRIVE MOTOR ASSEMBLY
(ITEMS 16A, 16B, FIGURE 3-1)

A. FUNCTION

The drive motor assembly moves the carriage in the left or right direction and transmits power to the platen drive assembly to move paper.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: 4mm Hex Key, Phillips Head Screwdriver and 5mm Nut Driver.

1. Loosen tension on main drive belt by turning two adjusting screws counterclockwise on the idler pulley assembly.

2. Remove the two screws and flatwashers mounting the motor fan cover.

3. Disconnect two pin connector P007 from connector J007.

4. Loosen the set-screws (13) mounting the line feed clutch drive gear (12), drive pulley bearing holder unit (8) and drive pulley assembly (4) to the drive motor shaft.

5. Remove four bolts (4) and lockwashers (5) supporting the drive motor assembly (1, 12) and slide the shaft and motor out of the printer.

C. ADJUSTMENTS (Refer to Figure 3-11)

1. Helical Gear Alignment

   a. Using helical gear alignment tool B (63003455-3002) from special tool kit and insert tool over line feed clutch drive gear and onto shaft of platen drive assembly.

NOTE:. THIS WILL ALIGN CENTER OF LINE FEED CLUTCH DRIVE GEAR AND CENTER OF PLATEN DRIVE GEAR.

2. Drive Pulley Assembly

   a. Ensure the drive pulley assembly is centered in the opening on the right side of the frame.

DRIVE MOTOR ASSEMBLY
(ITEMS 16A, 16B, FIGURE 3-1)

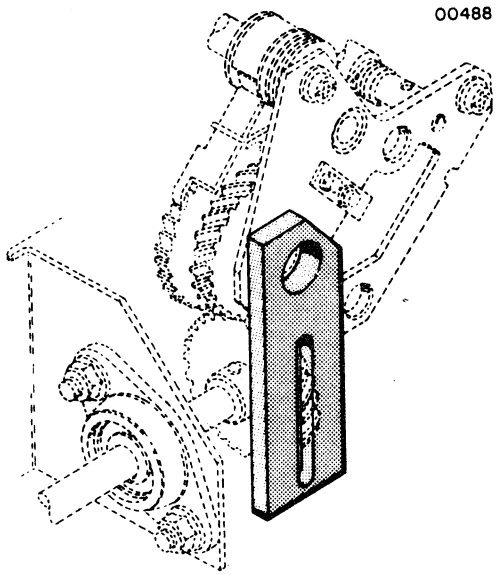


Figure 3-10. LINE FEED CLUTCH DRIVE GEAR ADJUSTMENT

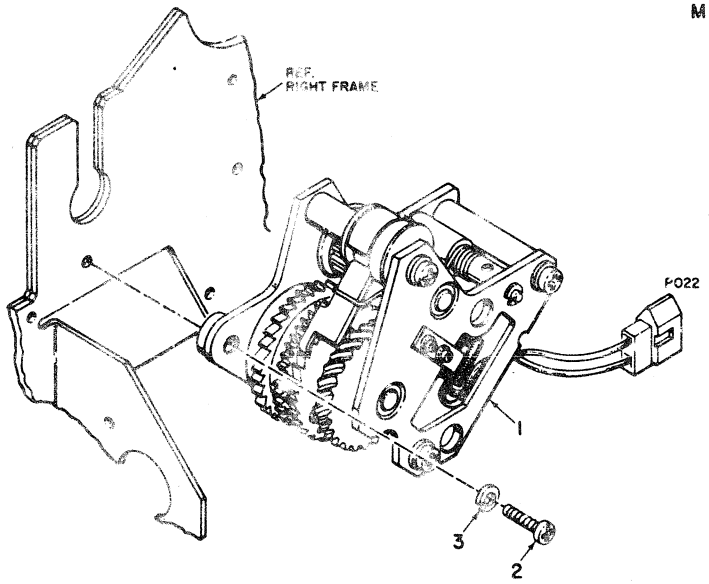
D. PREVENTIVE MAINTENANCE

1. Ensure line feed clutch gear on end of drive motor shaft is perpendicular (centerline to centerline) to the platen drive shaft.

3.10 PLATEN DRIVE ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
17	63700643-6003	Kit, Platen Drive Assembly NOTE: This kit includes items 1, 2 and 3.	1

M0112(AB)



1	63700643-5103	Platen Drive Assembly	1
2	535003001-2001	Screw, M4 x 14 mm Lg., Pan Hd. Phillips	3
3	028040242-2001	Washer, Split Lock, M4	3

A. FUNCTION

The platen drive assembly on command from the logic, advances the paper by rotating the platen.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver, 4 mm Hex Key

1. Disconnect two pin connector P014 from connector J014.

NOTE: IF PRINTER CONTAINS AN OPTIONAL VERTICAL FORMAT UNIT PERFORM STEP 2, IF NOT PROCEED TO STEP 3.

2. Loosen two set-screws on VFU timing pulley and remove timing belt from pulley.

3. Remove three screws (2) and lockwashers (3) and remove the platen assembly from the right side of the frame.

C. ADJUSTMENTS

1. Armature to Releaser Gear Alignment (Refer to Figure 3-12)

   a. Loosen the two screws mounting the line feed clutch solenoid.

   b. With the solenoid and armature in the energized position (armature against solenoid) insert a 0.004 in. - 0.008 in. (0.10 mm - 0.20 mm) feeler guage between armature and release gear.

   c. Adjust solenoid and armature until the 0.004 in. - 0.008 in. (0.10 mm - 0.20 mm) gap is met.

   d. Tighten solenoid mounting screws, once adjusted.

2. Armature to Solenoid Adjustment (Refer to Figure 3-12)

   a. Loosen the two screws mounting the armature stop arm and insert a 0.025 in. - 0.030 in. (0.63 mm - 0.76 mm) feeler guage between the armature and solenoid.

   b. Adjust armature stop arm until 0.025 in. - 0.030 in. (0.63 mm - 0.76 mm) gap exists at the mid point of the solenoid.

   c. Tighten two screws mounting the armature stop arm once adjusted.

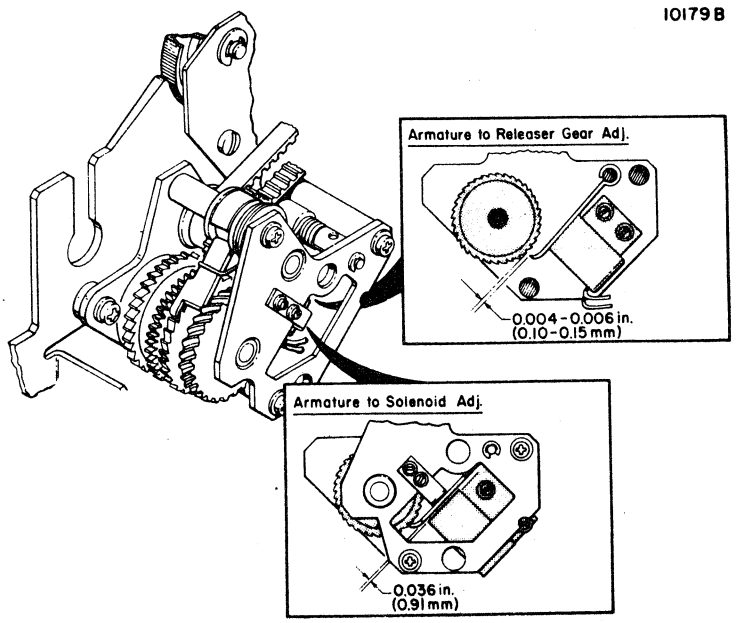


Figure 3-12. ARMATURE TO RELEASER GEAR AND ARMATURE TO SOLENOID ADJUSTMENTS

3. Stopper Screw Adjustment (Refer to Figure 3-13)

NOTE:. THERE ARE TWO PROCEDURES FOR ADJUSTING THE STOPPER SCREW ON THE LINE FEED CLUTCH UNIT. THE TWO PROCEDURES ARE AS FOLLOWS:

ADJUSTMENT PROCEDURE NO. 1

a. Rotate clutch release unit clockwise. The clutch drive gear should rotate freely.

b. Loosen the set screw that secures the stopper screw.

c. Insert a 0.001 in. (0.02 mm) between clutch drive face and rollers.

d. Turn adjusting screw clockwise until drag can be felt on the 0.001 in. (0.02 mm) feeler guage.

e. Tighten set screw securing the stopper screw.

ADJUSTMENT PROCEDURE NO. 2

a. Loosen set screw securing the stopper screw.

b. Turn stopper screw clockwise until it bottoms out.

c. Back off stopper screw one-halfturn. The clutch release unit should move between 0.005 (0.12 mm) and 0.009 in. (0.22 mm) along the circumference of the gear.

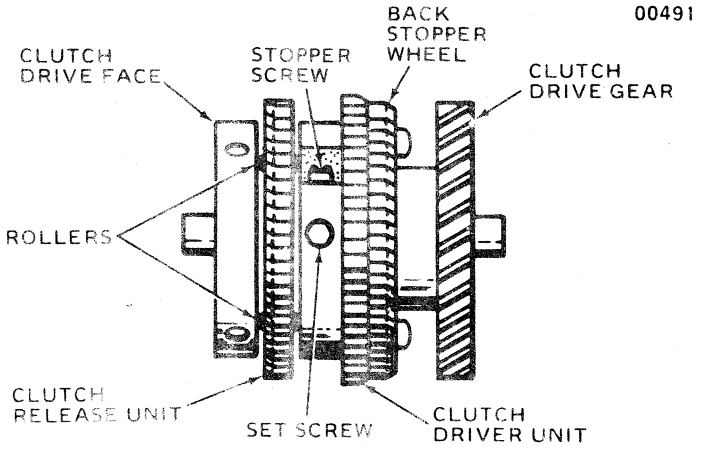


Figure 3-13. STOPPER SCREW ADJUSTMENT PLATEN DRIVE ASSEMBLY

4. Backstopper Adjustment (DYNAMIC) (Refer to Figure 3-14)

   a. Rotate backstopper pawl eccentric forward until it fails to engage after performing top of forms, vertical tabs and single line feeds.

NOTE: PERFORM THE TOP OF FORMS, VERTICAL TABS AND SINGLE LINE FEEDS WITHOUT PAPER INSTALLED IN THE PRINTER.

   b. Move eccentric backwards until backstopper pawl engages during any and all of the above paper motion commands.

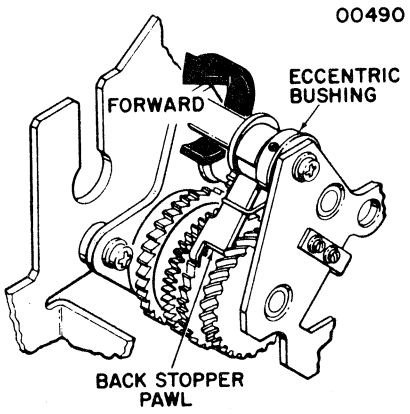


Figure 3-14. BACKSTOPPER PAWL ADJUSTMENT
PLATEN DRIVE ASSEMBLY

5. Line Feed Clutch Helical Gear Adjustment (Refer to Figure 3-15)

   a. Place helical gear alignment tool A (63003455-3001) on drive motor shaft between line feed clutch drive gear and idle pulley stopper collar.

   b. Helical gear of platen drive assembly should align into slot on tool, if not, loosen drive pulley bearing holder unit and move drive shaft until gear snaps into slot.

   c. Once adjusted, tighten hardware.

PLATEN DRIVE ASSEMBLY
(ITEM 17, FIGURE 3-1)

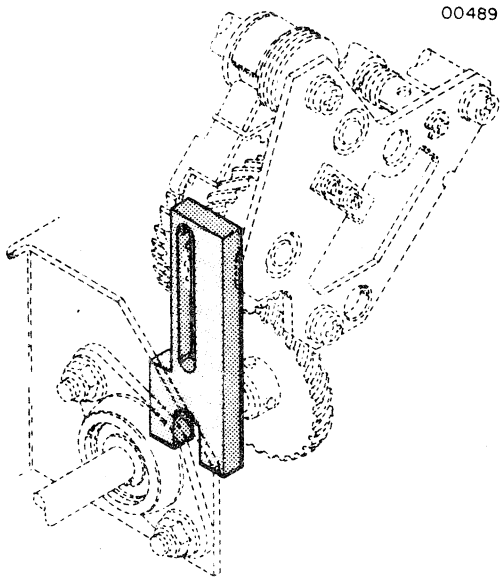


Figure 3-15. LINE FEED CLUTCH
HELICAL GEAR ADJUSTMENT

D. PREVENTIVE MAINTENANCE

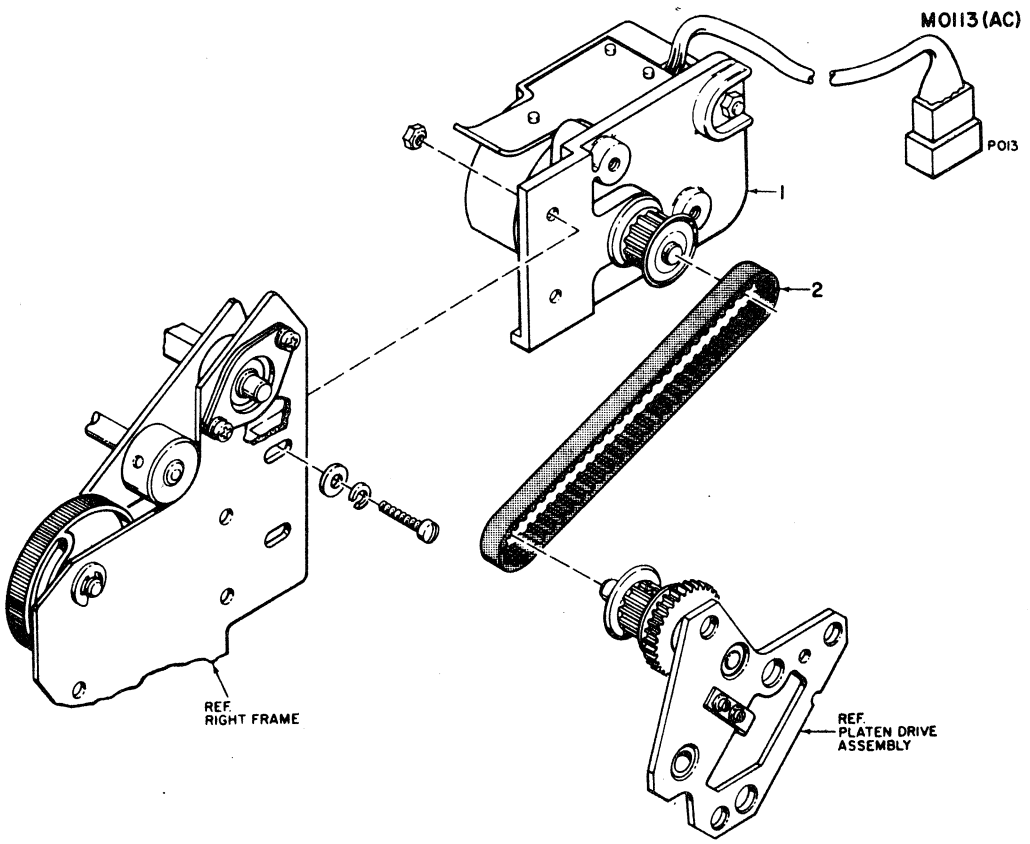
1. Ensure printer is line feeding properly.

2. Lightly grease all gears in the line feed clutch unit.

VERTICAL FORMAT UNIT
(ITEM 18, FIGURE 3-1)

3.11 VERTICAL FORMAT UNIT

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
18	63701440-6001	Kit, Vertical Format Unit NOTE: This kit includes items 1 and 2.	1



1	535249001-5001	Tape Reader Assembly	1
2	535234001-2001	Timing Belt	1

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A. FUNCTION

The optional Vertical Format Unit, operational only with the optional tractor drive assembly or pin feed platen, controls vertical formatting in the printer. A eight channel paper tape is installed in the VFU to control vertical tabs and form feeds. Movement of the paper tape is caused by mechanical linkage of the platen assembly and VFU by a timing belt.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Slotted and Phillips Head Screwdriver

1. Tape Reader Assembly

   a. Disconnect two pin connector P013 from connector J013.

   b. Remove the two screws, lockwashers and flatwashers mounting the tape reader assembly to the right frame and remove the tape reader.

2. Timing Belt (Refer to Figure 3-16)

   a. Remove the three screws and lockwashers mounting the right platen drive support plate.

   b. Remove the upper shaft with timing pulleys and gears in tact and remove the timing belt.

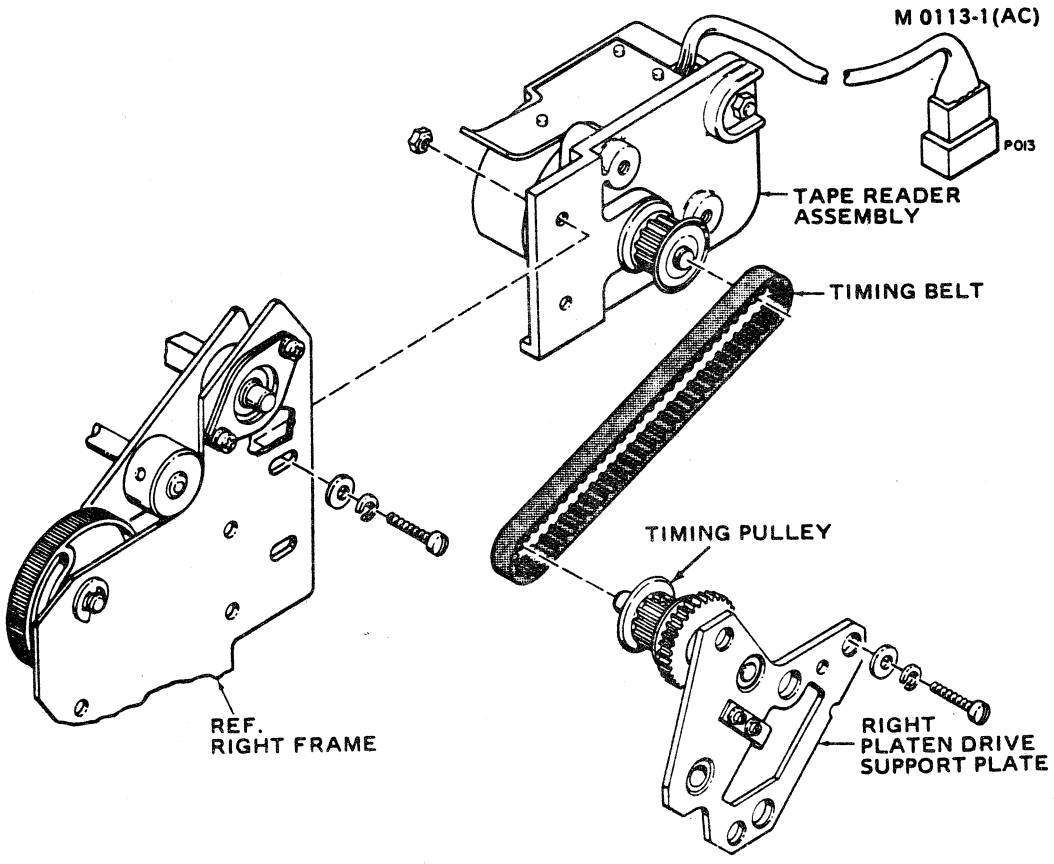

Figure 3-16. VFU TIMING BELT REMOVAL/REPLACEMENT

C. ADJUSTMENTS

1. VFU Paper Tape Adjustment (Refer to Figure 3-17)

NOTE:. THE FOLLOWING ADJUSTMENT PROCEDURE DETAILS THE ALIGNMENT OF THE PAPER TAPE HOLES WITH RESPECT TO THE TAPE READER LIGHT SOURCE IN THE LOWER TAPE READER.

a. Loosen the two set-screws mounting the timing pulley on the end of the tape reader sprocket shaft.

b. Rotate the tape clockwise and observe Top of Form hole (channel 7) and Vertical Tab hole (channel 5).

c. At the point where the Top of Form hole and Vertical Tab hole are centered over the slits in the lower tape reader, stop turning the tape.

d. Tighten two set-screws mounting the timing pulley once step 2.c has been met.

e. When testing for Top of Form, in relation to the print but on the paper, ensure that the paper does not stop one line before or one line beyond Top of Form position.

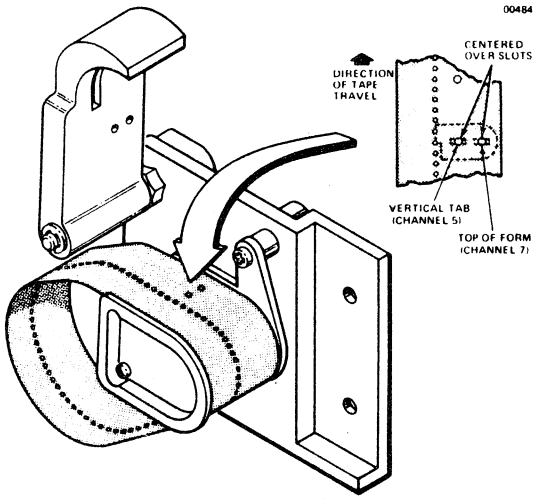

Figure 3-17. PAPER TAPE ADJUSTMENT, VFU

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2. VFU Timing Belt (Refer to Figure 3-18)

a. Loosen hardware mounting the VFU assembly and move assembly forwards or backwards until tension is 5 oz. to 8 oz. with a .25 in. (6.35mm) deflection in the center of the belt.

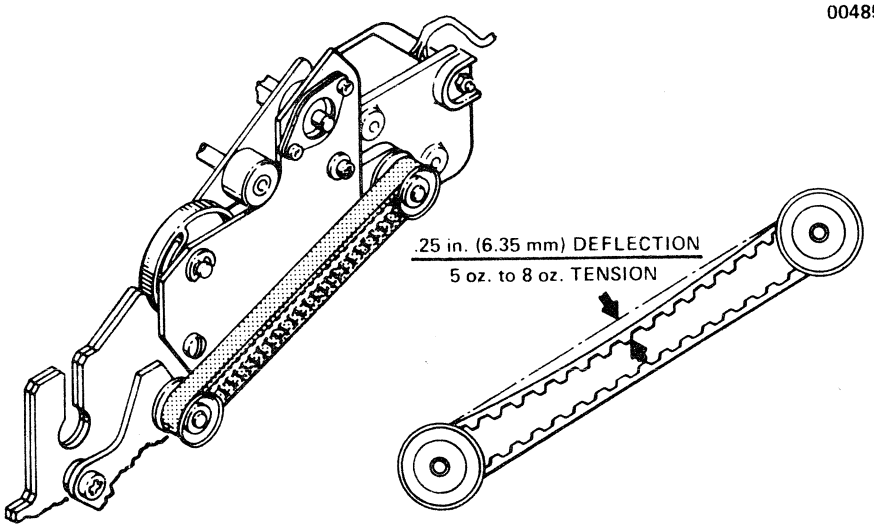

Figure 3-18. VFU TIMING BELT TENSION, ADJUSTMENT

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the VFU assembly.

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PLATEN ASSEMBLY
(ITEM 19, FIGURE 3-1)

3.12 PLATEN ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
19	63780154-5001	Platen Assembly	1
		NOTE: This assembly includes items 1 through 16.	

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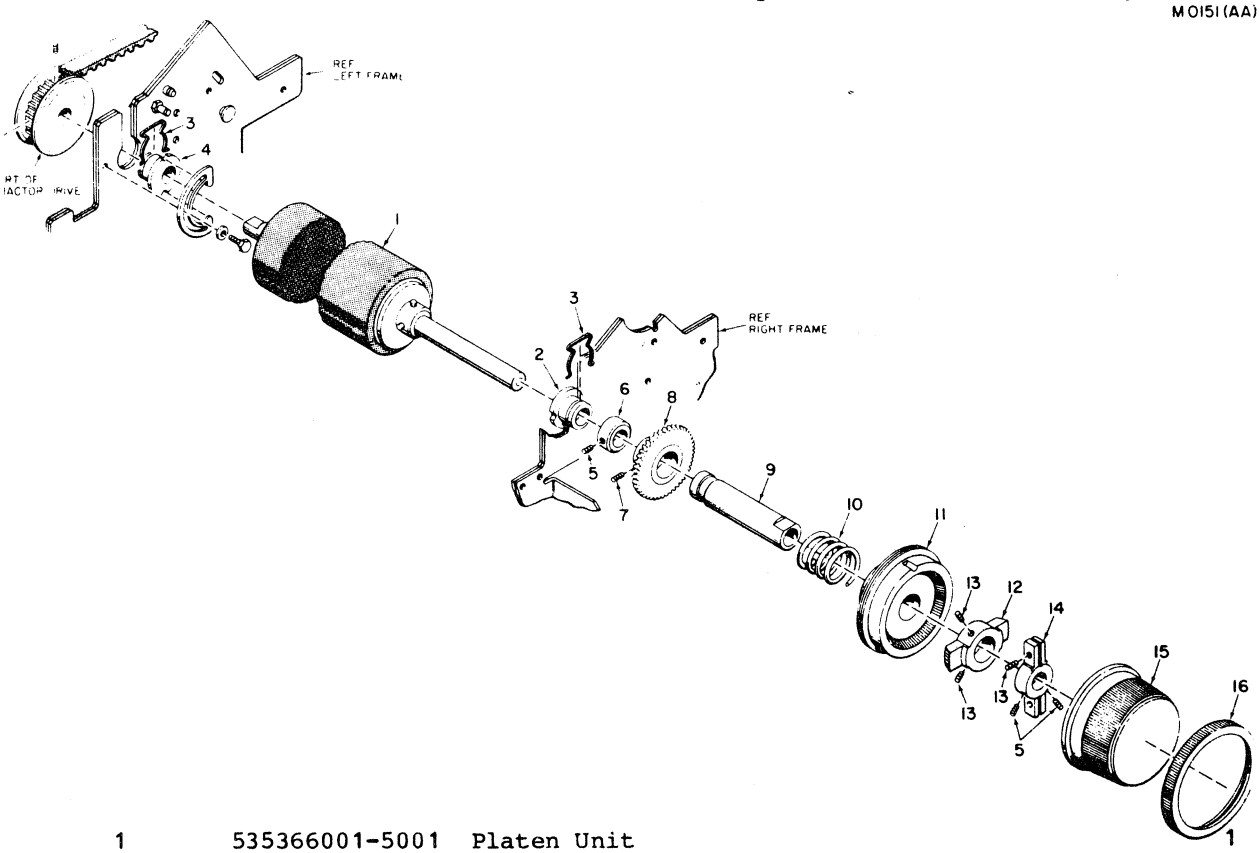

1	535366001-5001	Platen Unit	1
2	535537000-2001	Bushing (Right)	1
3	535538000-2001	Spring Stopper Collar	2
4	535180000-2001	Bushing (Left)	1
5	525745001-2001	Set-screw, M4 x 6 mm. Lg.	4
6	535043001-2001	Spacer	1
7	525745001-2001	Set-screw, M4 x 4 mm Lg.	3
8	535355001-2001	Paper Feed Gear	1
9	535298001-2001	Paper Feed Coupler Sleeve Unit	1
10	535302001-2001	Spring	1
11	535303001-2001	Paper Feed Knob Main	1
12	535304001-2001	Paper Feed Coupler	1
13	525744001-2001	Set-screw, M4 x 5 mm. Lg.	4
14	535305001-2001	Paper Feed Knob Key	1
15	535306001-2001	Paper Feed Knob	1
16	535307001-2001	Paper Feed Knob Joint	1

PLATEN ASSEMBLY
(ITEM 19, FIGURE 3-1)

A. FUNCTION

The platen assembly provides the hard surface for print head solenoid impact. On the right side of the platen assembly is the platen knob which can be pushed in and rotated for manual paper movement.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: 4mm Hex Key, Flat Blade Screwdriver

1. Remove the paper feed knob (15) from the right side of the platen assembly.

2. Remove the two stop collar springs (3) on left and right end of platen assembly.

3. Loosen bolt and flatwasher mounting the adjusting plate from the left end of platen assembly.

4. Slide the two brass bushings (2,4) towards the center of the printer and lift the platen assembly from the printer.

C. ADJUSTMENTS (Refer to Figure 3-19)

NOTE: THE PLATEN ASSEMBLY MUST BE PARALLEL TO THE TRAVEL OF THE CARRIAGE, IF NOT, ADJUST AS FOLLOWS:

1. Operate printer and ensure print quality is uniform for the full 132 characters printed.

2. If print quality is not uniform, loosen bolt and rotate adjusting plate until platen assembly is parallel to the travel of the carriage.

3. Once adjusted, tighten adjusting plate mounting hardware.

PLATEN ASSEMBLY
(ITEM 19, FIGURE 3-1)

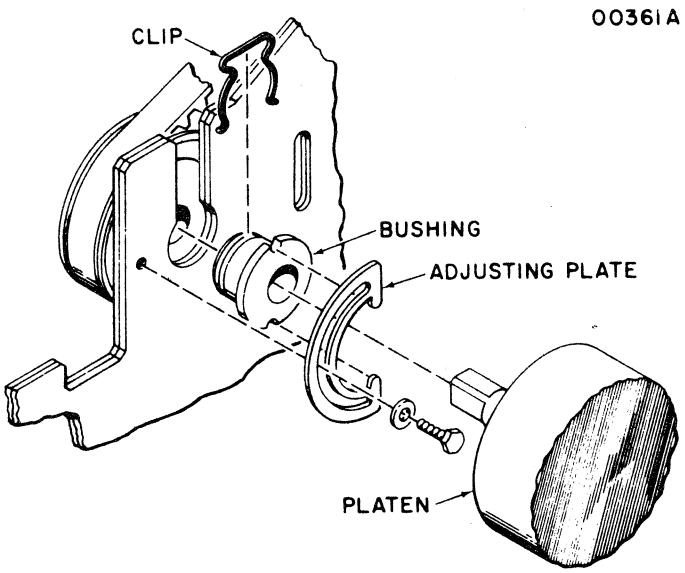

Figure 3-19. PLATEN ASSEMBLY ADJUSTMENTS

D. PREVENTIVE MAINTENANCE

1. Clean platen assembly using a mild detergent.

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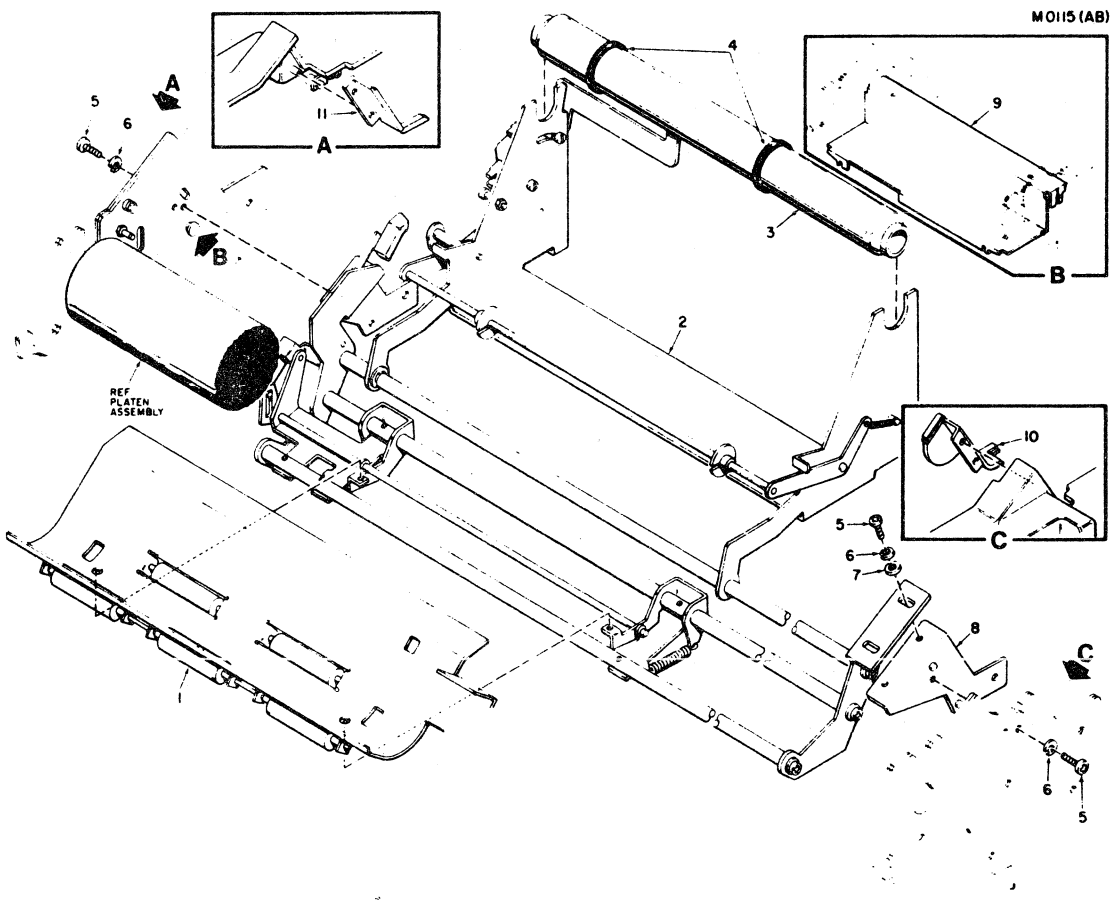
3.13 PINCH ROLLER ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
20	535220001-6001	Kit, Pinch Roller NOTE: This kit includes items 1 through 11.	1



1	535129001-5001	Pinch Roller Assembly	1
2	535385001-5001	Paper Roll PE/Switch Unit	1
3	535286000-2001	Paper Roll Center Shaft	1
4	081022170-2001	O-Ring	2
5	535008001-2001	Screw, M4 x 8 mm Lg., Pan Hd. Phillips	3
6	028040242-2001	Washer, Split Lock, M4	3

PINCH ROLLER ASSEMBLY
(ITEM 20, FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
7	535009001-2001	Washer, Flat, M4	1
8	535119001-2001	Pinch Roll, Bottom Feed Cover	1
9	535581001-2001	Sub-Frame	1
10	535068001-2070	Cover, Lid, Right	1
11	535067001-2070	Cover, Lid, Left	1

A. FUNCTION

The pinch roller assembly is the standard paper unit in the printer. Paper movement is accomplished by pinching the paper between the platen assembly and rollers on the paper roll and as the platen rotates, paper is moved.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Spring Hook, Snap Ring Tool, Phillips Head Screwdriver.

1. Remove the column scale/tear bar assembly per paragraph 3.16B.

2. Remove the platen assembly per paragraph 3.12B.

3. Remove the three screws (5) lockwashers (6) and flatwashers (7) and lift the pinch roller assembly from the printer.

C. ADJUSTMENTS

1. No adjustments are required on the pinch roller assembly.

OPERATOR'S ADJUSTMENT

2. Refer to the Series 700, OPERATOR'S MANUAL for loading of paper into the pinch roller assembly.

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the pinch roller assembly.

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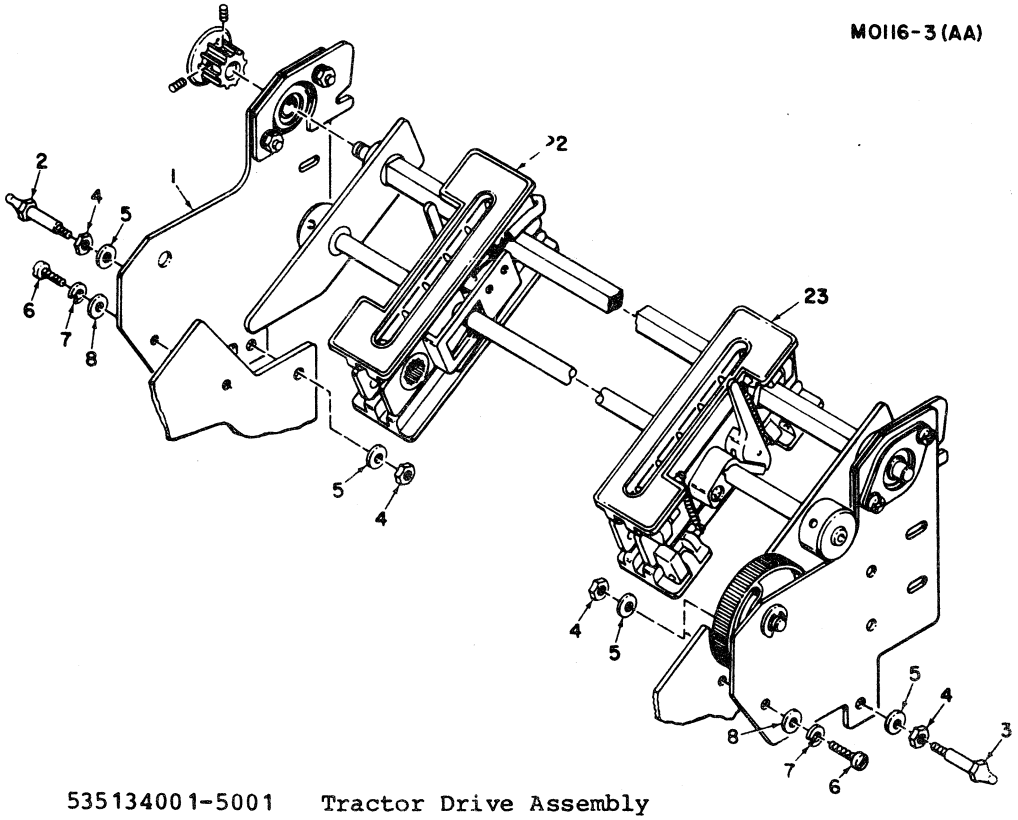
3.14 TRACTOR DRIVE AND PIN FEED ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
21	63780153-6001	Kit, Tractor Drive Assembly (optional) NOTE: This kit includes items 1 through 8.	A/R
22	63701467-5001	Pin Feed Tractor Assembly, Left (optional)	A/R
23	535501001-5001	Pin Feed Tractor Assembly, Right (optional)	A/R



1	535134001-5001	Tractor Drive Assembly	1
2	535033001-2001	Stud Screw (Left Rear Cover)	1
3	535031001-2001	Stud Screw (Right Rear Cover)	1
4	535539001-2001	Nut, Hex, M4	4
5	535009001-2001	Washer, Flat, M4	4
6	34000351-2038	Screw, M4 x 10 mm Lg., Pan Hd. Phillips	2
7	34000455-2006	Washer, Split Lock, M4	2
8	34000452-2006	Washer, Flat, M4	2

TRACTOR DRIVE AND PIN FEED ASSEMBLY
(ITEMS 21, 22, 23, FIGURE 3-1)

A. FUNCTION

The optional tractor drive assembly supports and guides fan fold, tractor fed paper using rear feed. The major components are two side frames, guide bars for guiding and driving the pin feed tractors and two pin feed tractors . The two pin feed tractors are horizontally adjustable from 4-1/2 inches (11.43mm) minimum to 9 inches (228.6mm) maximum. The pin feed tractor projects 15 pins with 5 pins always engaged in the paper. The left hand tractor also contains the paper empty switch.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Slotted Head and Phillips Head Screwdriver.

1. Tractor Drive Assembly

   a. Disconnect two pin connector J009 of paper empty switch harness assembly from connector P009.

   b. Remove left (2) and right (3) stud screws, four flatwashers (5) and four nuts (4) supporting the tractor drive assembly.

   c. Remove the two screws (6) lockwashers (7) and flatwashers (8) and remove tractor drive assembly (1).

2. Pin Feed Assemblies Left and Right

   a. Remove tractor drive assembly (1) per paragraph 3.14.B.1.

   b. Loosen set-screw mounting drive pulley on left side of tractor drive assembly and remove pulley and side plate.

   c. Loosen set-screw mounting drive pulley on left side of tractor drive assembly and remove pulley and side plate.

   d. Slide the left and right pin feed assemblies off drive shaft and support bar of the tractor drive assembly.

C. ADJUSTMENTS

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1. Tractor Drive Timing Belt (Refer to Figure 3-20)

   a. Using the adjustable tensioner on left hand side of frame, adjust tension on timing belt so belt will deflect .25 in. (6.35mm) when a force of 5-8 oz. is applied in the middle of the belt.

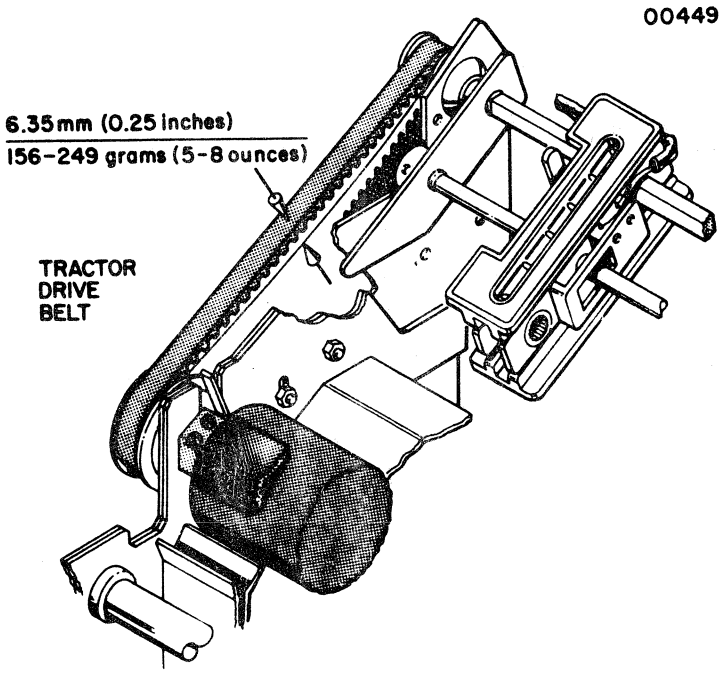

Figure 3-20. TRACTOR DRIVE TIMING BELT TENSION

2. Paper Tension Adjustment (Refer to Figure 3-21)

   a. Using the eccentric knob on the right side of the tractor drive assembly, adjust the pin feed tractors so that the plane of paper travel (top side of tractor unit) is tangent to the platen.

TRACTOR DRIVE AND PIN FEED ASSEMBLY
(ITEMS 21, 22, 23, FIGURE 3-1)

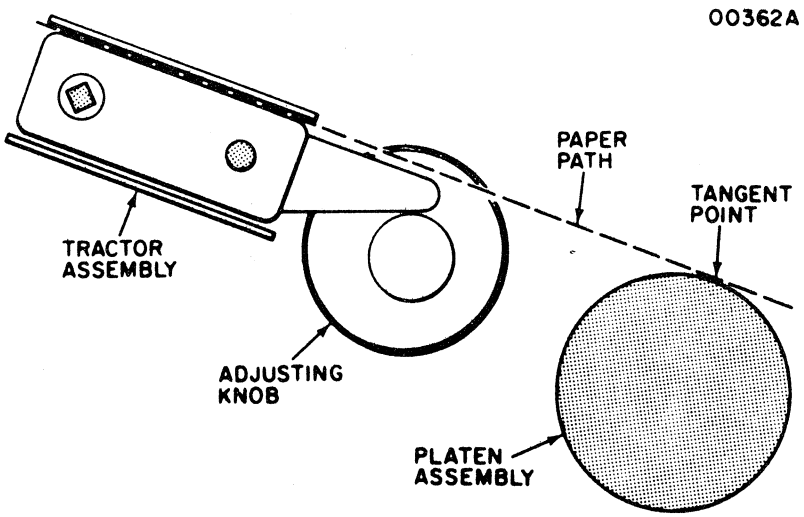

Figure 3-21. PAPER TENSION ADJUSTMENT
TRACTOR DRIVE ASSEMBLY

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the tractor drive and pin feed assemblies.

3.15 PIN FEED PLATEN ASSEMBLIES

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
24A	63701290-6002	Kit, Pin Feed Platen Assembly, 80 Column (optional) NOTE: This kit includes items 2, 5, 7 and 8 through 12.	A/R
24B	63701290-6003	Kit, Pin Feed Platen Assembly, 50 Column (optional) NOTE: This kit includes items 3, 4, 6 and 8 through 12.	A/R

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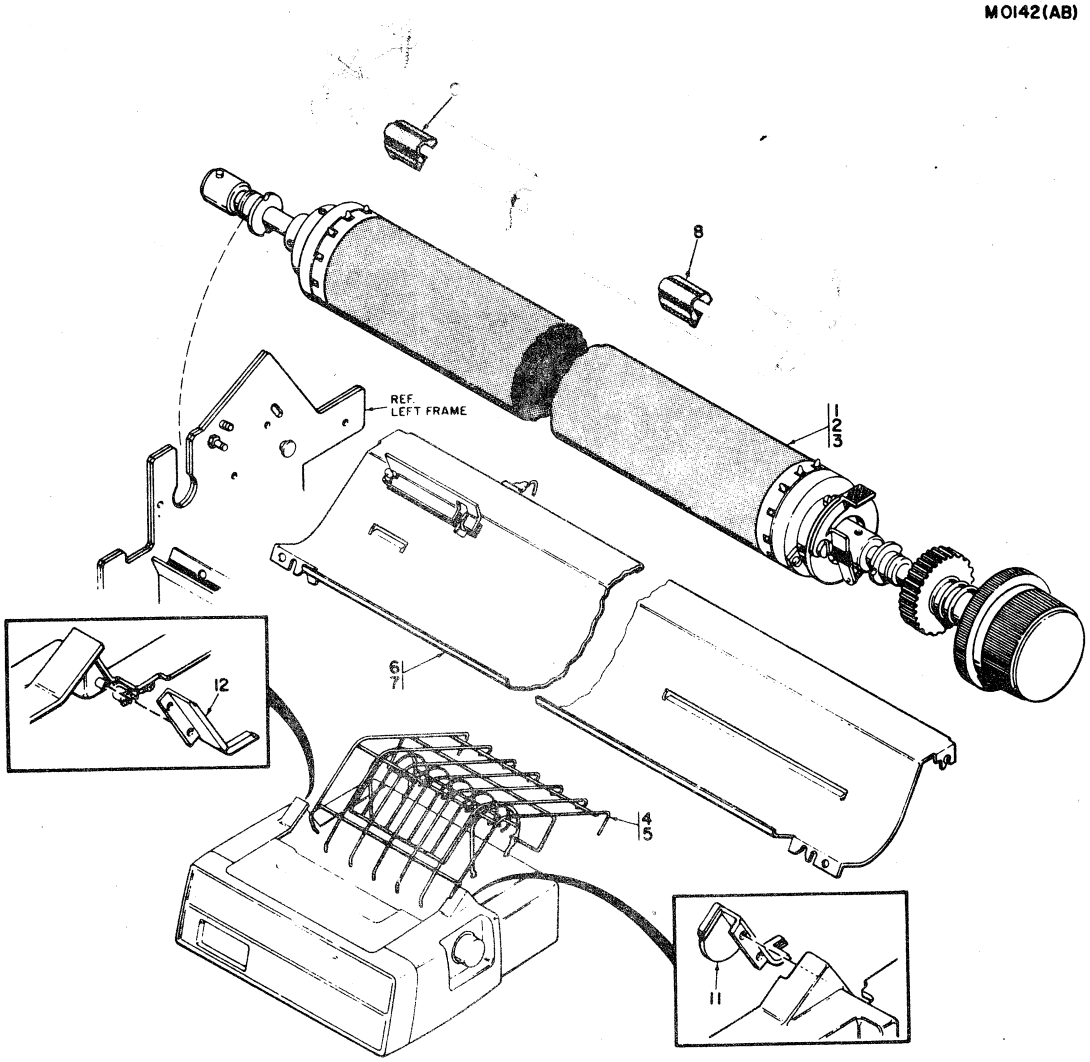

2	63701276-5002	Pin Feed Platen Assembly, 80 Column	1
3	63701276-5003	Pin Feed Platen Assembly, 50 Column	1
5	63701305-5002	Paper Rack Assembly, Pin Feed, 80 Column	1
7	63701333-5002	Paper Pan Assembly, 80 Column	1
8	63701291-2001	Paper Pan Hold Down, Right Hand	1
9	63701291-2002	Paper Pan Hold Down, Left Hand	1
10	63701165-4001	Assembly, Static Eliminator, 132 Column	1
11	535068001-2070	Cover, Lid, Right	1
12	535067001-2070	Cover, Lid, Left	1

PIN FEED PLATEN ASSEMBLIES
(ITEMS 24A, 24B, FIGURE 3-1)

A. FUNCTION

The pin feed platen assembly is the other optional method (besides the tractor drive assembly) of moving paper in the printer. Two pin feed platen assemblies, an 80 column and a 50 column platen are available. The pin feed platens are designed to move fan fold paper by means of a platen and two cam operated pin feed assemblies. Platen motion can be controlled by the optional vertical format unit. The option is designed for rear paper feeding.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: 4mm Hex Key, Flat Blade Screwdriver

1. Remove the column scale/tear bar assembly from the printer.

2. Remove the two stop collar springs on left and right ends of the pin feed platen assembly.

3. Loosen bolt and flatwasher mounting the adjusting plate from the left end of the pin feed platen assembly.

4. Slide the two brass bushings (2, 4) towards the center of the printer and lift the pin feed assembly.

C. ADJUSTMENTS

1. Pin Feed Platen Assembly Parallelism (Refer to Figure 3-22)

NOTE: THE PIN FEED PLATEN ASSEMBLY MUST BE PARALLEL TO THE TRAVEL OF THE CARRIAGE, IF NOT, ADJUST AS FOLLOWS.

a. Operate printer and ensure print quality is uniform for the full 80 characters printed.

b. If print quality is not uniform, loosen bolt and rotate adjusting plate until platen assembly is parallel to the travel of the carriage.

c. Once adjusted, tighten adjusting plate mounting hardware.

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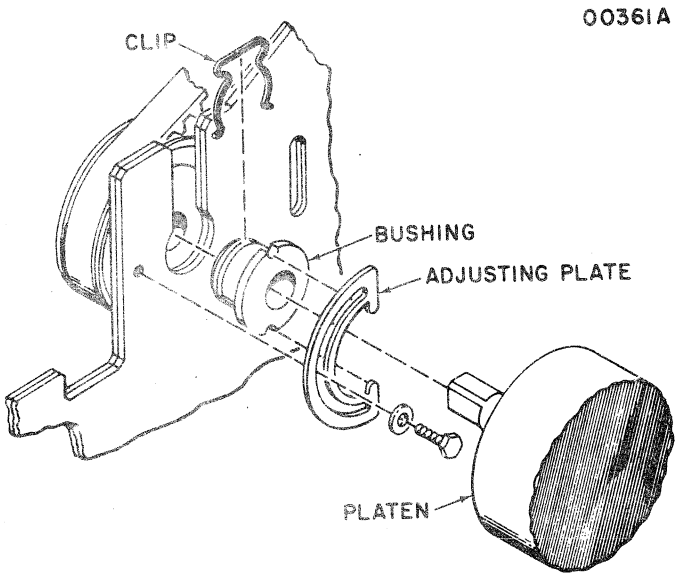

Figure 3-22. PIN FEED PLATEN ASSEMBLY PARALLELISM

2. Left to Right Pin Justification (Refer to Figure 3-23)

NOTE: THE PINS ON THE LEFT AND RIGHT PIN FEED CAMS MUST BE CENTER TO CENTER IN THE HORIZONTAL PLANE, IF NOT, ADJUST AS FOLLOWS.

a. Rotate the pins on right pin feed cam until the back edge of one pin aligns with the front edge of the cam locating pin.

b. Loosen the set-screw on the inside collar on the left side of the platen.

c. Rotate the pins on the left pin feed cam until the back edge of one pin aligns with the front edge of the cam locating pin.

d. Tighten set-screw once adjusted.

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PIN FEED PLATEN ASSEMBLIES
(ITEMS 24A, 24B, FIGURE 3-1)

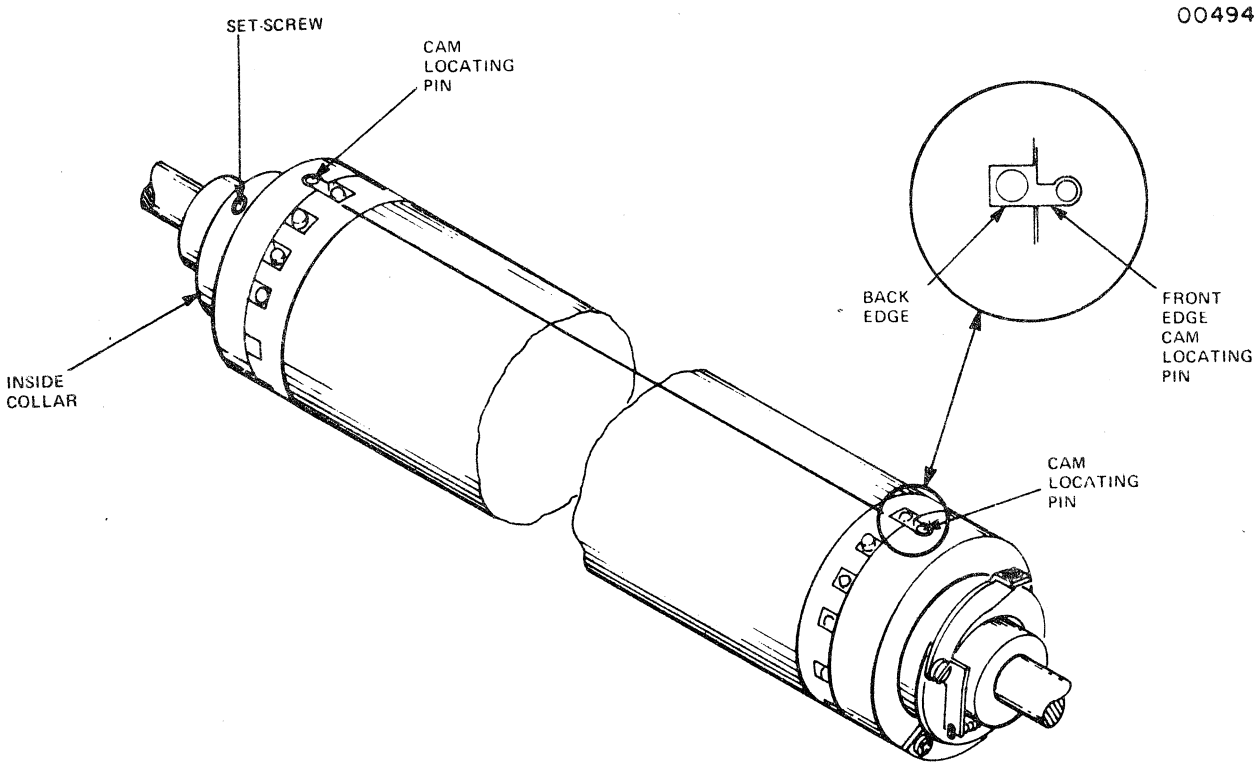

Figure 3-22. LEFT TO RIGHT PIN JUSTIFICATION

D. PREVENTIVE MAINTENANCE

1. Clean pin feed platen assembly using a mild detergent.

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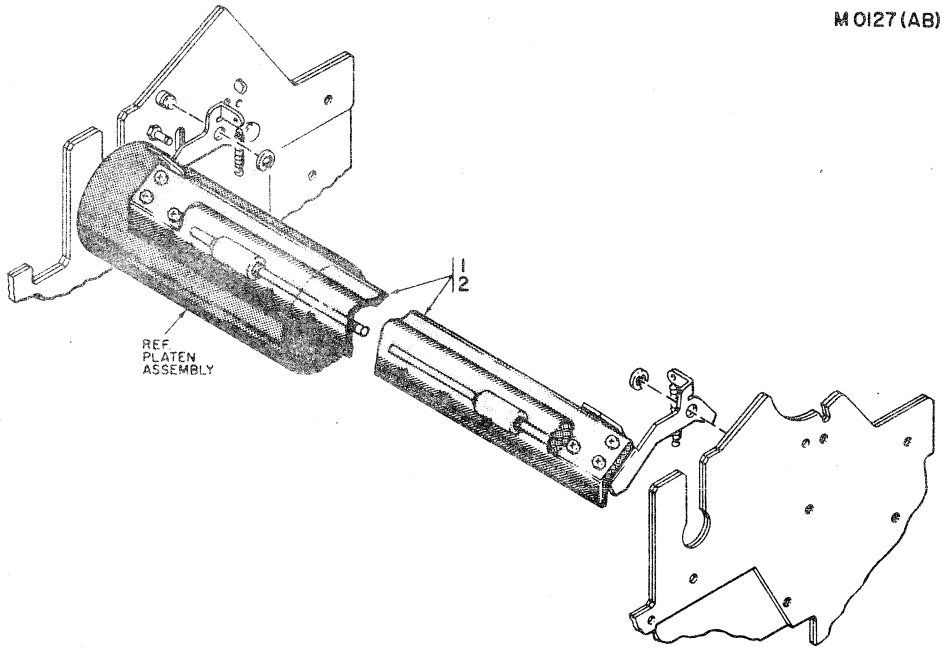
3.16 COLUMN SCALE/TEAR BAR ASSEMBLIES

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
25	535734000-2001	Column Scale/Tear Bar Blank (optional)	A/R

M0127(AB)



1	535734000-2001	Column Scale/Tear Bar, Blank	1

A. FUNCTION

The column scale/tear bar serves as a tear bar allowing the operator to tear forms cleanly from the printer.

B. REMOVAL/REPLACEMENT PROCEDURE

TOOLS REQUIRED: Spring Hook, Snap Ring Tool

1. Remove the two springs from left and right ends of the column scale/tear bar.

2. Remove the snap ring from the left end of the column scale/tear bar assembly and remove columns scale/tear bar from printer.

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C. ADJUSTMENTS

1. No adjustments are required on the column scale/tear bar assembly.

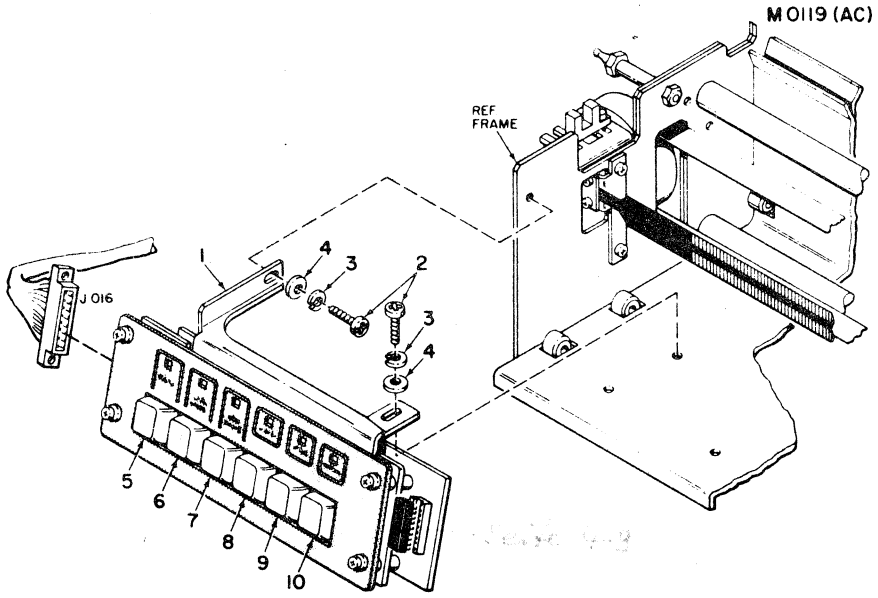
D. PREVENTIVE MAINTENANCE

1. Clean column scale/tear bar using a mild detergent.

CONTROL PANEL ASSEMBLY
(ITEM 26, FIGURE 3-1)

3.17 CONTROL PANEL ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
26	63780150-6001	Kit, Control Panel Assembly NOTE: This kit includes items 1 through 10.	1



1	63780106-4001	P.C. Bd. Assembly, Control Panel	1
-	63761186-6001	Kit, Control Panel Mounting NOTE: This kit includes items 2 through 4.	1
2	34000351-2047	Screw, M5 x 10 mm Lg., Pan Hd. Phillips	3
3	34000455-2007	Washer, Split Lock, M5	3
4	34000452-2007	Washer, Flat, M5	3
-	63700171-6001	Kit, Keyset NOTE: This kit includes items 5 through 10.	2
5	39095525-2005	Button, Keyboard, SELECT	1
6	39095525-2006	Button, Keyboard, ALT. PRINT	1
7	39095523-2001	Button, Keyboard, Blank	1
8	39095525-2002	Button, Keyboard, OVERRIDE	1
9	39095525-2003	Button, Keyboard, TOF	1
10	39095525-2001	Button, Keyboard, LINE FEED	1

80

A. FUNCTION

For a detailed functional description of the control panel assembly refer to the SERIES 700, OPERATOR'S MANUAL (Part No. 37400471-9001).

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver

1. Remove connector J016 from fingerboard P016 on the control panel assembly.

2. Remove the three screws (2) lockwashers (3) and flatwashers (4) mounting the control panel assembly (1) to the printer base and left side of the frame.

C. ADJUSTMENTS

1. No adjustments are required on the control panel assembly.

D. PREVENTIVE MAINTENANCE

1. Using a mild detergent, clean the control panel overlay.

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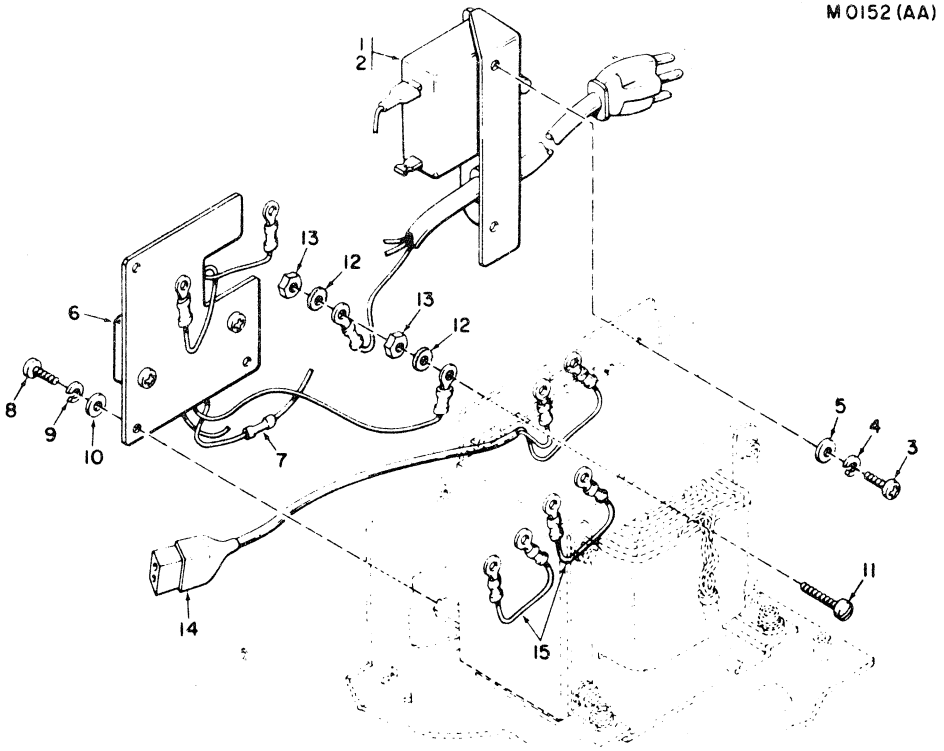
PRIMARY VOLTAGE ASSEMBLIES
(ITEMS 27A, 27B, FIGURE 3-1)

3.18 PRIMARY VOLTAGE ASSEMBLIES

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
27A	63703115-6001	Kit, Primary Voltage Assy., 100-120V NOTE: This kit includes items 1 and 3 through 15.	1
27B	63703115-6002	Kit, Primary Voltage Assy., 200-240V (optional) NOTE: This kit includes items 2 through 15.	A/R



1	63703116-5001	Power Bracket Assy., 115 VAC	1
2	63703116-5002	Power Bracket Assy., 230 VAC	1
3	34000351-2038	Screw, M4 x 10mm Lg., Pan Hd. Phillips	2
4	34000455-2006	Washer, Split Lock, M4	2
5	34000452-2006	Washer, Flat, M4	2
6	63703144-5001	Line Filter Assembly	1
7	525674001-2001	Splice	1
8	34527125-2001	Screw, No. 6-32 x .38 Lg., Pan Hd. Phillips	3
9	34828005-2001	Washer, Split Lock, No. 6	3
10	34923105-2001	Washer, Flat, No. 6	3
11	34000351-2040	Screw, M4 x 16mm Lg. Pan Hd. Phillips	1
12	34000451-2056	Washer, Split Lock, Ext. Tooth, M4	1
13	34000652-2006	Nut, Hex, M4	2
14	63761184-4001	Cable Assembly Adapter	1
15	63779114-4001	Jumper Wires, Transformer	2

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A. FUNCTION

The power bracket assembly contains the ON/OFF switch and extending from bracket is the AC power cord. The line filter assembly filters transients generated by the ON/OFF switch or transformer.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver

1. Disconnect all wires from the power bracket assembly (1, 2) and line filter assembly (6).

2. Remove the two screws (3) lockwashers (4) and flatwashers (5) supporting the power bracket assembly to the electronic module.

3. Remove screw (11), two external tooth lockwashers (12) and nuts (13) connecting ground wire of AC power cord and remove the power bracket assembly.

4. Remove the three screws (8) lockwashers (9) and flatwashers (10) and remove the line filter assembly.

C. ADJUSTMENTS

1. No adjustments are required on the primary voltage kit.

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the primary voltage kit.

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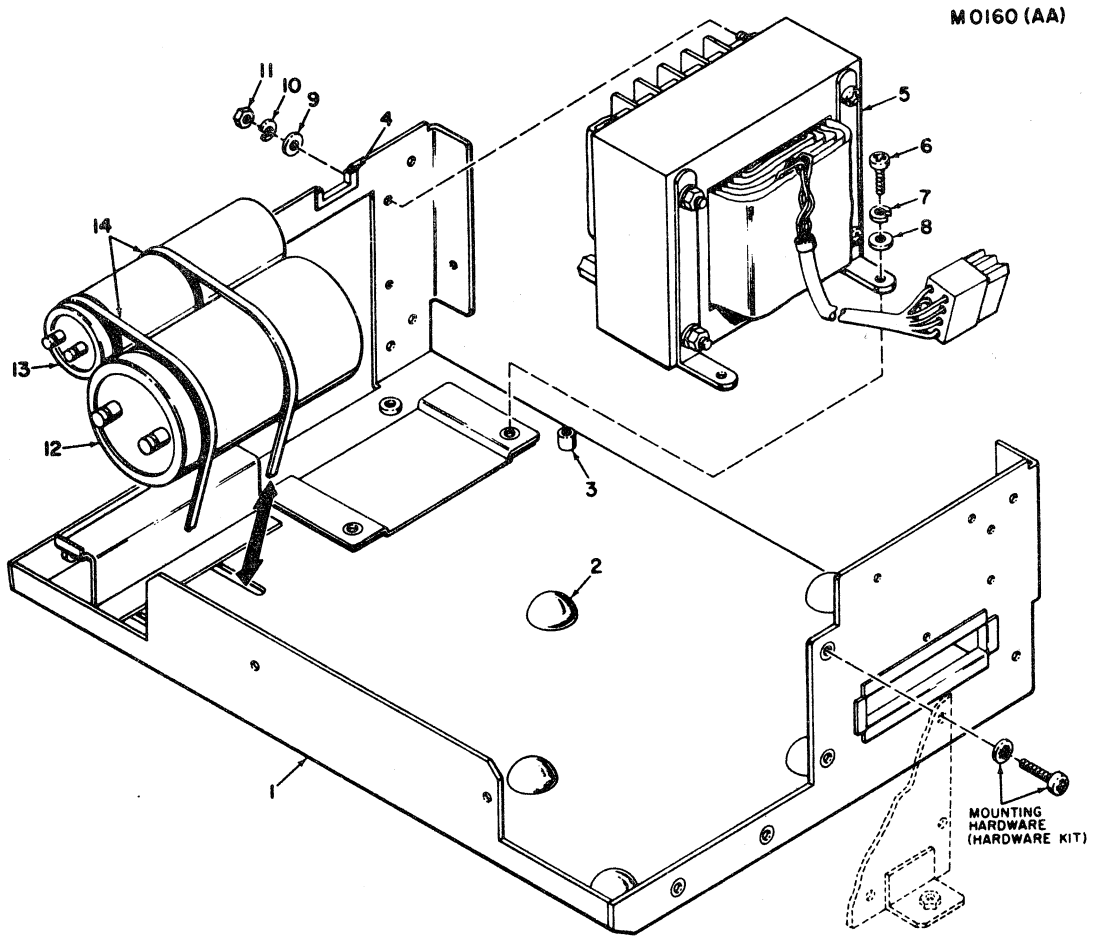
ELECTRONIC MODULE ASSEMBLY
(ITEM 28, FIGURE 3-1)

3.19 ELECTRONIC MODULE ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
28	63780128-5001	Electronic Module Assembly NOTE: This assembly includes items 1 through 14.	1



1	63780121-5001	Frame Assembly	1
2	36200018-2008	Bumper	6
3	63703153-2001	Logic Board Standoff	2
4	36000000-0002	Grommet Strip	.8
5	63780129-4001	Transformer Assembly	1
6	34000351-2037	Screw, M4 x 8 mm Lg., Pan Hd. Phillips	2
7	34000455-2006	Washer, Split Lock, M4	2
8	34000452-2006	Washer, Flat, M4	2

ELECTRONIC MODULE ASSEMBLY
(ITEM 28, FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
9	34932007-2001	Washer, Flat, No. 8	2
10	34838007-2001	Washer, Split Lock, No. 8	2
11	34732007-2001	Nut, Hex, No. 8-32	2
12	22938000-1001	Capacitor, 9300 uf, 50V	1
13	22558001-1001	Capacitor, 5500 uf, 25V	1
14	39690010-2009	Cable Strap	2

A. FUNCTION

The electronic module assembly houses the electronics in the printer (minus the power driver board). For a detailed functional description of the components (transformer and capacitors) in the module assembly, refer to Section 2, THEORY OF OPERATION.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver

1. Remove the four screws, lockwashers, and flatwashers (total of eight) from right and left sides mounting the electronic module to printer frame.

C. ADJUSTMENTS

1. No adjustments are required on the electronic module assembly.

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the electronic module assembly.

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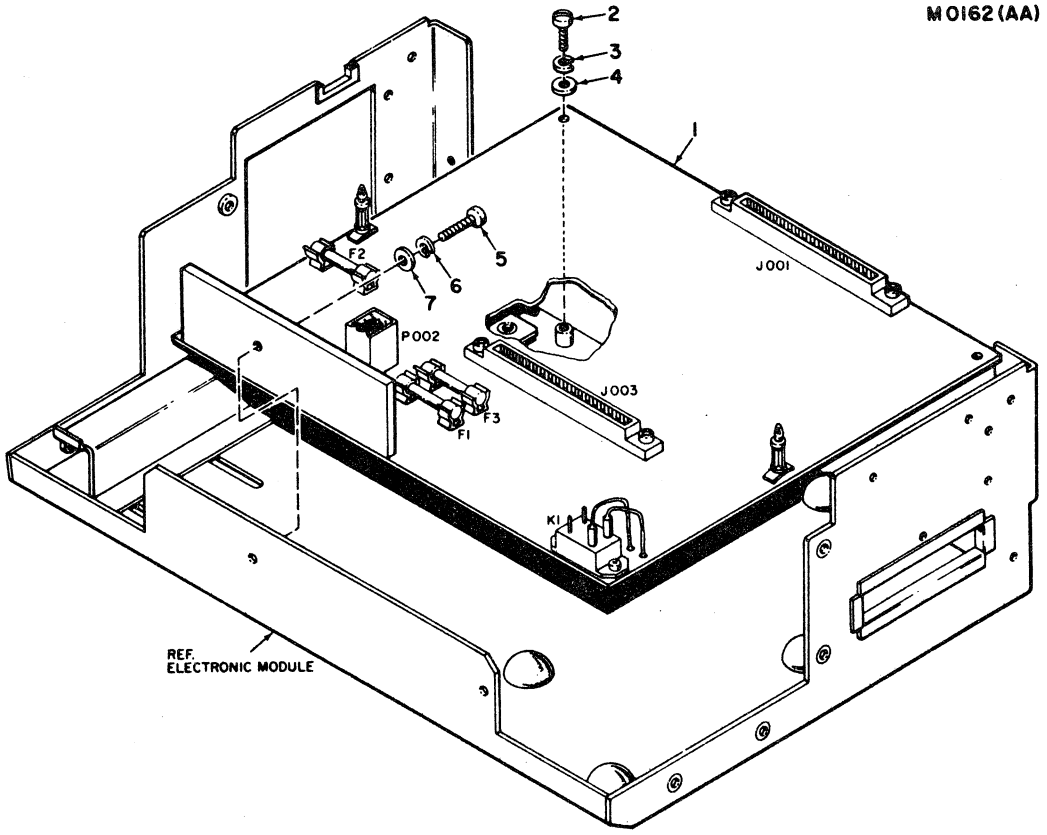
LOGIC BOARD ASSEMBLY
(ITEMS 29A, 29B, FIGURE 3-1)

3.20 LOGIC BOARD ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
29A	63780147-6001	Kit, Logic Board Assembly NOTE: This kit includes items 1 through 7.	1
29B	63780147-6002	Kit, Logic Board Assembly, Inhibit (optional) NOTE: This kit includes items 2 through 8.	A/R



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1	63780115-4001	P.C. Bd. Assembly, Logic Board	1
-	63701250-6004	Kit, Logic Board Mtg. Hardware NOTE: This kit includes items 2 through 7.	1
2	34000351-2039	Screw, M4 x 2 mm Lg., Pan Hd. Phillips	1

LOGIC BOARD ASSEMBLY
(ITEMS 29A, 29B, FIGURE 3-1)

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
3	34000455-2006	Washer, Split Lock, M4	1
4	34000452-2006	Washer, Flat, M4	1
5	34000351-2017	Screw, M3 x 6 mm Lg., Pan Hd. Phillips	2
6	34000455-2004	Washer, Split Lock, M3	2
7	34000452-2004	Washer, Flat, M3	2
8	63780115-4002	P.C. Bd. Assembly Logic Board, Inhibit (optional)	A/R

A. FUNCTION

For a detailed functional description of the logic board assembly, refer to Section 2, THEORY OF OPERATION.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver

1. Remove the following connectors from one another:

CONNECTOR ON LOGIC BOARD	DISCONNECT FROM
J001	P001 of W2 Cable Assembly
J003	P003 of Signal Harness Assembly
P006	J006 of Motor Harness Assembly
P002	J002 of Transformer Assembly

2. Remove the two screws (5), lockwashers (6) and flatwashers (7) mounting rear of logic board to printer base.

3. Remove screws, lockwasher, and flatwasher (2, 3, 4) mounting the front of the logic board to the electronic module.

C. ADJUSTMENT

1. The following table details the electrical adjustments required on the logic board assembly.

LOGIC BOARD ASSEMBLY
(ITEMS 29A, 29B, FIGURE 3-1)

ITEM	FUNCTION	SIGNAL NAME	ELEMENT - PIN	ADJ. RESISTOR	PULSE WIDTH
1	STROBE PULSE	STD	ME30-1	R59	450 usec.
2	DELAYED STROBE PULSE	DLYSTB	ME30-15	R62	450 usec.
3	DOUBLE LINE FEED	DLF	ME31-1	R84	40 msec.
4	LINE FEED	LF	ME31-1	R83	15 msec.

TABLE I
ELECTRICAL ADJUSTMENTS, 780 LOGIC BOARD

D. PREVENTIVE MAINTENANCE

1. **Ensure all connectors are properly seated on the logic board assembly.**

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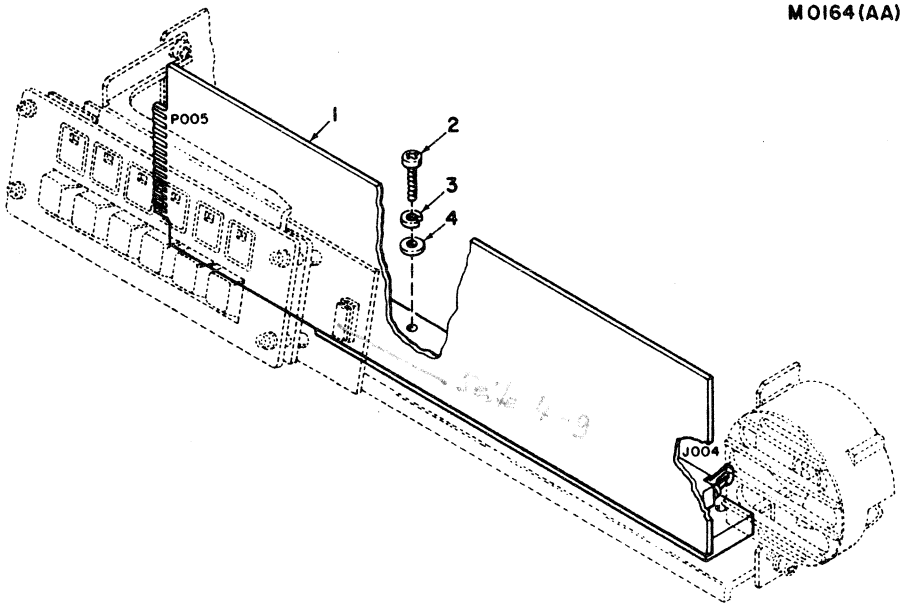
3.21 POWER DRIVER BOARD ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
30	63780146-6001	Kit, Power Driver Board Assembly NOTE: This kit includes items 1 through 4.	1

M0164(AA)



1	63780108-4001	P.C. Bd. Assembly Power Driver	1
-	63701246-6002	Kit, Power Driver Bd. Mtg. Hardware NOTE: This kit includes items 2, 3 and 4.	1
2	34000351-2040	Screw, M4 x 16 mm Lg., Pan Hd. Phillips	2
3	34000455-2006	Washer, Split Lock, M4	2
4	34000452-2006	Washer, Flat, M4	2

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A. FUNCTION

For a detailed functional description of the power driver board assembly refer to Section 2, THEORY OF OPERATION.

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver.

1. Disconnect connectors J005 and P004 from the power driver board assembly.

POWER DRIVER BOARD ASSEMBLY
(ITEM 30, FIGURE 3-1)

2. Remove the three screws (2), lockwashers (3) and flatwashers (4) mounting the power driver board to the base of the printer and remove the board from the printer.

C. ADJUSTMENTS

1. No adjustments are required on the power driver board assembly.

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the power driver board assembly.

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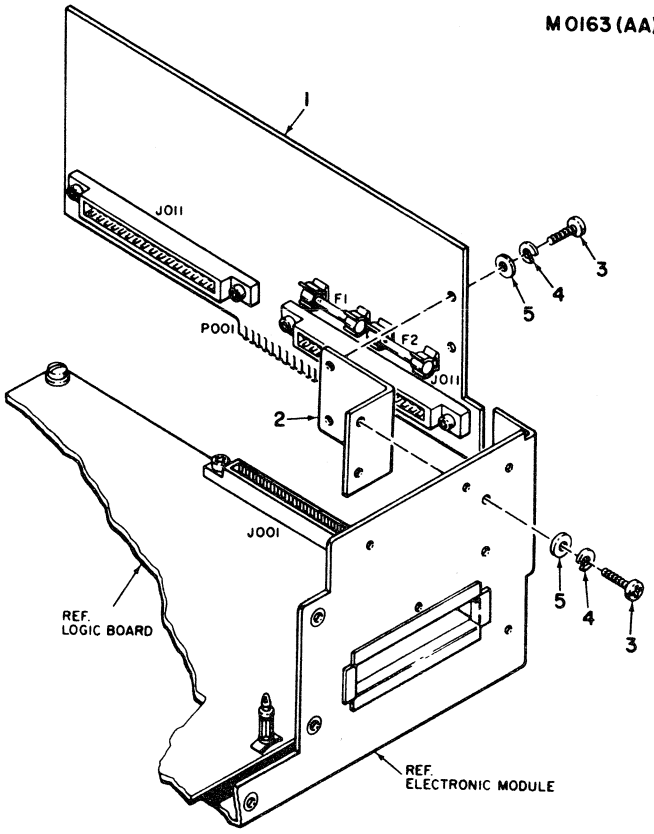
3.22 INTERFACE ADAPTER BOARD ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
31	63780120-6001	Kit, Interface Adapter Board Assembly NOTE: This kit includes items 1 through 5.	1



1	63780117-4001	P.C. Bd. Assembly, Interface Adapter	1
2	63780135-2001	Bracket Adapter, P.C. Board	1
3	34000352-2003	Screw, M3 x 8 mm Lg., Pan Hd. Slotted	4
4	34000455-2004	Washer, Split Lock, M3	4
5	34000452-2004	Washer, Flat, M3	4

A. FUNCTION

The optional interface adapter board provides the connector from the optional interface to the printer. The interface adapter board plugs into the electronic board assembly and contains one slot for an optional interface.

INTERFACE ADAPTER BOARD ASSEMBLY
(ITEM 31, FIGURE 3-1)

B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Slotted Head Screwdriver

1. Remove the two screws (3), lockwashers (4) and flatwashers (5) mounting the interface adapter board (1) to the adapter bracket (2).

2. Remove the interface adapter board from the printer.

C. ADJUSTMENTS

1. No adjustments are required on the interface adapter board.

D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the interface adapter board.

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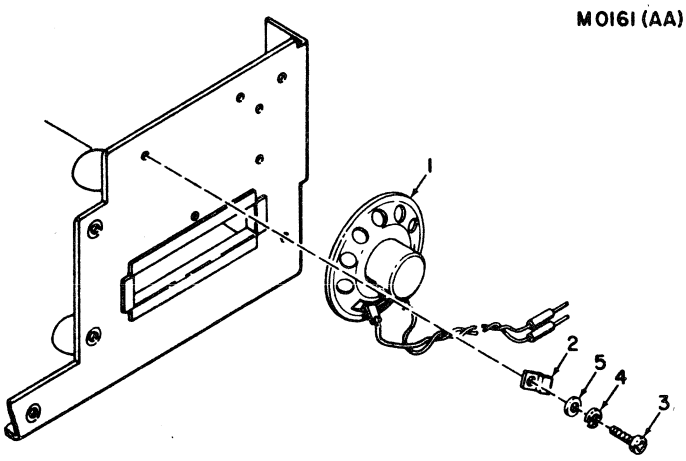
3.23 SPEAKER ASSEMBLY

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
32	63780137-6001	Kit, Speaker Assembly NOTE: This kit includes items 1 through 5.	1



1	63780136-5001	Speaker Assembly	1
2	526767001-2001	Support Clamp, Speaker	3
3	34000351-2018	Screw, M3 x 8 mm Lg., Pan Hd. Phillips	3
4	34000455-2004	Washer, Split Lock, M3	3
5	34000452-2004	Washer, Flat, M3	3

A. FUNCTION

Reception of a bell code (octal 007) or detection of a paper empty (PE) condition will cause the optional speaker assembly to generate a two second (approximately) audible tone to alert the operator of this condition.

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B. REMOVAL/REPLACEMENT PROCEDURE
TOOLS REQUIRED: Phillips Head Screwdriver

1. Unsolder two leads on speaker assembly from logic board assembly.

2. Remove the three clamp supports (2), screws (3) lockwashers (4) and flatwashers (5) and remove the speaker assembly (1) from the printer.

SPEAKER ASSEMBLY
(ITEM 32, FIGURE 3-1)

C. ADJUSTMENTS

1. No adjustments are required on the speaker assembly.

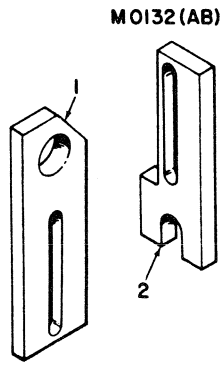
D. PREVENTIVE MAINTENANCE

1. No maintenance is required on the speaker assembly.

8A

3.24 SPECIAL TOOLS

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
30	63701194-6001	Kit, Special Tools (optional) NOTE: This kit includes items 1 and 2.	A/R



1	63003455-3001	Helical Gear Alignment Tool A (optional)	A/R
2	63003455-3002	Helical Gear Alignment Tool B (optional)	A/R

A. FUNCTION

The two special helical gear alignment tools are used for the adjustment of the line feed clutch drive gear and platen drive gear. Use of these two tools simplifies the adjustment of the gears.

NOTE: REFER TO SECTION 3.9, DRIVE MOTOR ASSEMBLY, AND 3.10, PLATEN DRIVE ASSEMBLY, FOR ADJUSTMENTS USING THE TWO TOOLS.

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3.25 HARDWARE KIT

REFERENCE ASSEMBLY	PART NUMBER	DESCRIPTION	QTY.
29	63780141-6001	Kit, Hardware (optional) NOTE: This kit includes items 1 through 25.	A/R
1	34000360-2013	Set Screw, M3 x 3 mm Lg., Cup Point	2
2	34000360-2030	Set Screw, M4 x 6 mm Lg., Cup Point	2
3	34000352-2011	Screw, M2 x 6 mm Lg., Hd. Slotted	4
4	34000351-2017	Screw, M3 x 6 mm Lg., Hd. Phillips	4
5	34000351-2018	Screw, M3 x 8 mm Lg., Hd. Phillips	4
6	34000355-2010	Screw, M3 x 8 mm Lg., Soc. Hd.	4
7	34000351-2020	Screw, M3 x 12 mm Lg., Pan Hd. Phillips	4
8	34000351-2036	Screw, M4 x 6 mm Lg., Pan Hd. Phillips	4
9	34000351-2037	Screw, M4 x 8 mm Lg., Pan Hd. Phillips	4
10	34000351-2039	Screw, M4 x 12 mm Lg., Pan Hd. Phillips	4
11	535003001-2001	Screw, M4 x 14 mm Lg., Pan Hd. Phillips	4
12	34000351-2040	Screw, M4 x 16 mm Lg., Pan Hd. Phillips	4
13	535492001-2001	Bolt, M5 x 10 mm Lg.	4
14	535377001-2001	Bolt, M5 x 12 mm Lg.	4
15	34000452-2002	Washer, Flat, M2	4
16	34000452-2004	Washer, Flat, M3	4
17	34000452-2006	Washer, Flat, M4	4
18	34000455-2002	Washer, Split Lock, M2	4
19	34000455-2004	Washer, Split Lock, M3	4
20	028030242-2001	Washer, Split Lock, M3 (Black)	4
21	34000455-2006	Washer, Split Lock, M4	4
22	34000451-2056	Washer, Split Lock, M4, Ext. Tooth	4
23	34000455-2007	Washer, Split Lock, M5	4
24	028050242-2001	Washer, Split Lock, M5 (Block)	4
25	535571001-2001	Nut, Hex, M5	4

A. FUNCTION

A hardware kit containing spare hardware items (screws, washers and nuts) is orderable with the printer. The kit is based on those hardware pieces most commonly used in the printer.

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SECTION 4
MAINTENANCE

This section contains general information for maintenance of the printer. The information is grouped as follows:

4.1 Recommended Tools

4.2 Preventive Maintenance

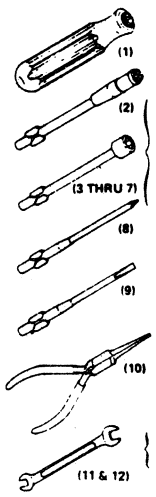
4.3 Troubleshooting Guide

4.4 Engineering Drawings

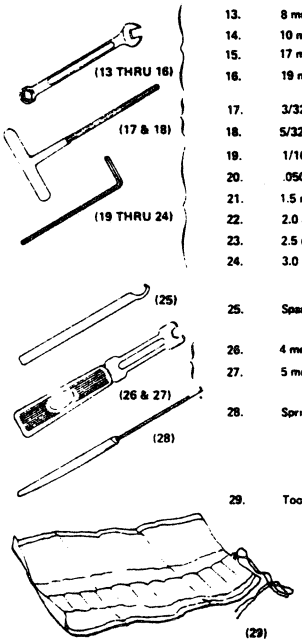
4.1 RECOMMENDED TOOLS

CENTRONICS data computer corp. HUDSON, NEW HAMPSHIRE U.S.A.

CENTRONICS TOOL KIT
(63002399-6001)



ITEM	DESCRIPTION	PART NUMBER
1.	Universal Handle	30800002 - 3001
2.	Extension 4-Inch	30800002 - 3002
3.	4 mm Nut Driver	30800002 - 3003
4.	5.5 mm Nut Driver	30800002 - 3004
5.	7 mm Nut Driver	30800002 - 3005
6.	8 mm Nut Driver	30800002 - 3006
7.	10 mm Nut Driver	30800002 - 3007
8.	Philips Head Screwdriver	30800002 - 3009
9.	Slotted Head Screwdriver	30800002 - 3008
10.	Needle Nose Plier	30800002 - 3010
11.	5 x 5.5 mm Open End Wrench	30800002 - 3023
12.	6 x 7 mm Open End Wrench	30800002 - 3011



ITEM	DESCRIPTION	PART NUMBER
13.	8 mm Combination Open End, Box Wrench	30800002 - 3012
14.	10 mm Combination Open End, Box Wrench	30800002 - 3013
15.	17 mm Combination Open End, Box Wrench	30800002 - 3014
16.	19 mm Combination Open End, Box Wrench	30800002 - 3015
17.	3/32-Inch "T" Handle Hex Key	30800002 - 3016
18.	5/32-Inch "T" Handle Hex Key	30800002 - 3017
19.	1/16-Inch Hex Key	30800002 - 3025
20.	.050-Inch Hex Key	30800002 - 3024
21.	1.5 mm Hex Key	30800002 - 3020
22.	2.0 mm Hex Key	30800002 - 3019
23.	2.5 mm Hex Key	30800002 - 3021
24.	3.0 mm Hex Key	30800002 - 3022
25.	Spanner Wrench	63003105 - 3001
26.	4 mm Snap Ringer Holder	63002399 - 3018
27.	5 mm Snap Ring Holder	63002399 - 3019
28.	Spring Hook	63002399 - 3020
29.	Tool Pouch	30800002 - 3018

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4.2 PREVENTIVE MAINTENANCE (P.M.)

The recommended Preventive Maintenance (P.M.) schedule, if followed closely and accomplished at the intervals noted, will ensure proper operating efficiency and maximum mean time between failures.

A.	Frequency of P.M.:	6 Months
B.	Time Required:	3/4 Hr. (Approximately)
C.	Cleaning Material Required:	Medium-Bristle Cleaning Brush Two Soft Clean Cloths Mild Detergent
D.	Recommended Lubricants:	Rheolube, No. 723 ms CDCC Spec. No. 30050070-0001
E.	Recommended Tools:	Refer to Section 4.1 of the Maintenance Section
F.	Preparation:	Obtain print sample prior to beginning P.M. Clean printer with vacuum cleaner, if available.

PREVENTIVE MAINTENANCE REQUIRED	
ASSEMBLY	PREVENTIVE MAINTENANCE
1. COVER ASSEMBLIES	CLEAN all cover assemblies using a mild detergent and clean cloths.
2. TIMING FENCE ASSEMBLY	a) CLEAN both sides of timing fence assembly using a soft clean cloth. CAUTION: NEVER USE AN ORGANIC SOLVENT AS THIS WILL DAMAGE THE TIMING FENCE. b) INSPECT for scratches in the timing fence and for proper mechanical alignment.
3. RIBBON CARTRIDGE ASSEMBLY	INSPECT ribbon cartridge assembly and verify proper ribbon tracking, while manually moving the carriage assembly. Check ribbon pinch rollers for proper meshing.
4. CARRIAGE ASSEMBLY	CLEAN the upper and lower carriage guide bars using a soft clean cloth.
5. DRIVE MOTOR ASSEMBLY	INSPECT and verify correct main drive belt tension.
6. PLATEN DRIVE ASSEMBLY	LUBRICATE all gears in the line feed clutch unit.
7. PLATEN ASSEMBLY	CLEAN platen assembly using a mild detergent.
8. COLUMN SCALE/TEAR BAR ASSEMBLIES	CLEAN column scale/tear bar assemblies using a mild detergent.
9. CONTROL PANEL ASSEMBLY	CLEAN control panel overlay using a mild detergent.
10. GENERAL	INSPECT: a) All connectors for proper connection. b) All belts for correct tension.

NOTE: After performing preventive maintenance operate printer to ensure proper operation.

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TROUBLESHOOTING GUIDE

The following information is intended to aid service personnel in troubleshooting the printer.

When servicing the printer for any reason, a brief inspection and verification of the printer areas described below may well prevent potential failures in the future.

To perform this inspection, first remove the printer covers. Then with the power turned off, check the following areas:

1. **Verify that the timing fence is centered in the slit of the optics block on the video amplifier assembly.**
2. **Verify that the carriage guide bars are clean and free of caked-on dirt.**
3. **Verify proper main drive belt tension.**
4. **Verify smooth, free carriage motion.**
5. **Check that the RTP and EOP switches are not loose.**
6. **Verify proper pin alignment on the pin-feed tractor units.**

SYMPTOM	ACTION
1. Printer does not print with POWER switch in ON position.	a) Check power cord and line fuse at rear of printer, depress SELECT switch. b) Check for proper voltage levels at the appropriate test points.
2. Printer does not print, but SELECT lamp is illuminated.	a) Ensure interface cable at rear of printer is secure. b) Power printer down and check for proper mating of all connectors and seating of all I.C. modules.
3. Upon initial power up, print head does not return to the left hand margin.	Check the RTP and EOP optical sensor switches.
4. Print head pin fire on power up or power down of printer.	Replace logic board.
5. Continuous print head motion with no printing or no paper movement.	Check video signals on logic board test points.
6. Erratic carriage or paper motion.	Check fuses on logic board, if O.K., replace logic board.
7. Erratic line to line spacing.	Check adjustment of helical gears and backstop pawl on platen drive assy.
8. Erratic carriage motion (jerking) at the sensor switches.	Adjust sensor switches to the right or left.
9. Malformed or missing dots in printed character.	a) Carefully wipe timing fence with clean soft cloth. b) Check for proper adjustment of video amplifier board. c) Check PICO fuses on logic board.
10. Poor print quality (e.g., smudging or light print).	Adjust head penetration as outlined in forms thickness control procedure.
11. In ribbon tracking problem.	Ensure ribbon is installed as outlined in ribbon installation procedure.
12. Paper Skewing	Position paper feed tractors (optional) and secure locking lever.
13. Form Feed or Vertical Tab problem.	Check Vertical Format Unit (optional).
14. No Print or erratic print operation.	Install extra option prom that is shipped with printer (ME49).

4.4 ENGINEERING DRAWINGS

The following pages contain schematic, wiring and assembly diagrams for the Model 780 printer. A list of these drawings is as follows:

FIGURE	DESCRIPTION	DRAWING NO.
4-1	780 LOGIC BOARD SCHEMATIC	63780116 (Sheet 1 of 2)
4-2	780 LOGIC BOARD SCHEMATIC	63780116 (Sheet 2 of 2)
4-3	POWER DRIVER SCHEMATIC	63780109
4-4	VIDEO AMPLIFIER SCHEMATIC	63703165
4-5	CONTROL PANEL SCHEMATIC	63780107
4-6	INTERCONNECTING WIRING DIAGRAM	63780102
4-7	PRIMARY VOLTAGE WIRING DIAGRAM	63703115 (Sheet 1 of 2)
4-8	PRIMARY VOLTAGE WIRING DIAGRAM	63703115 (Sheet 2 of 2)
4-9	780 LOGIC BOARD ASSEMBLY	63780115
4-10	POWER DRIVER ASSEMBLY	63780108
4-11	VIDEO AMPLIFIER ASSEMBLY	63703164
4-12	CONTROL PANEL ASSEMBLY	63780106
4-13	PARALLEL INPUT CABLE	63002258

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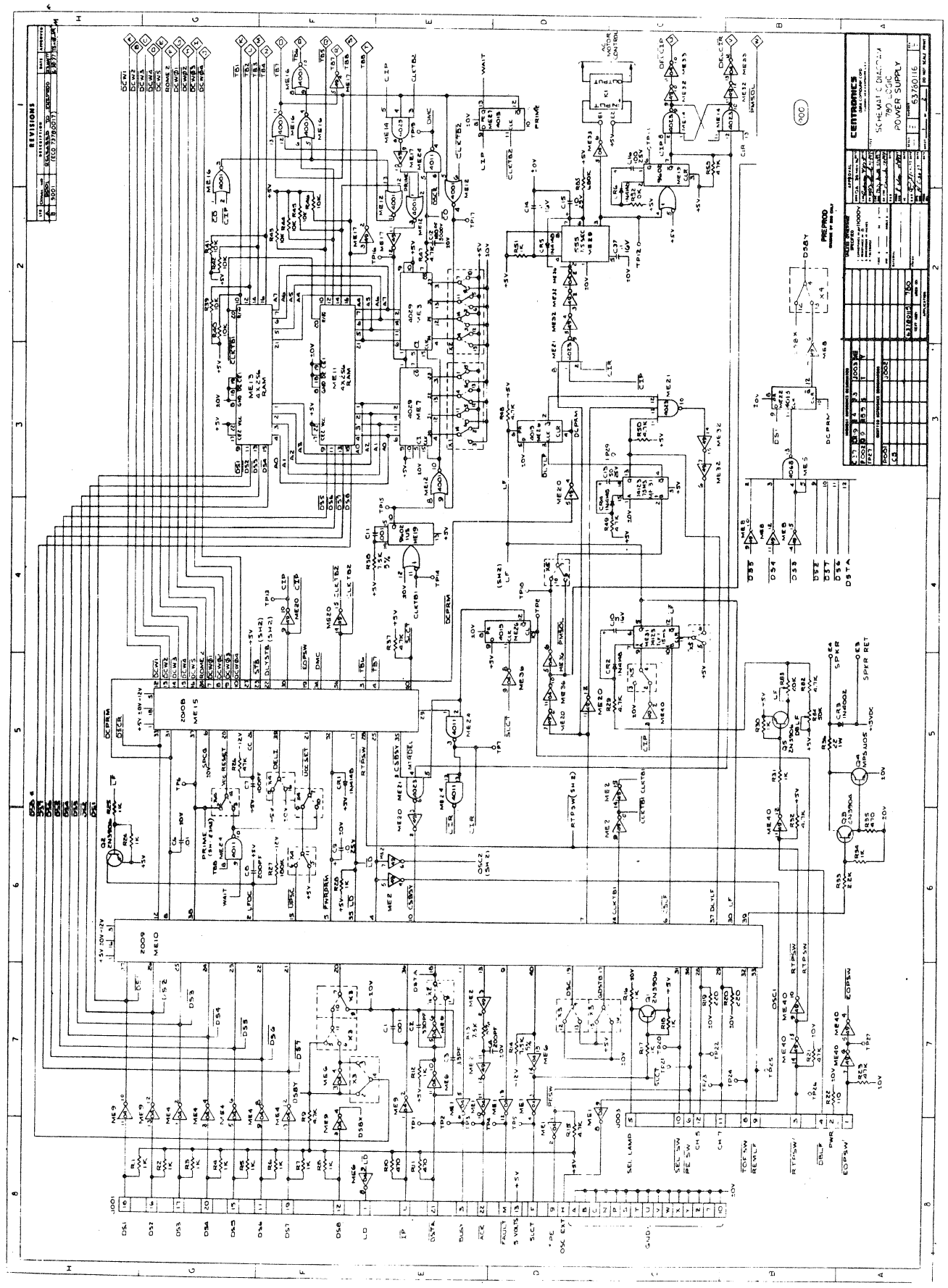


FIGURE 4-1. SCHEMATIC DIAGRAM, 780 LOGIC BOARD (SHEET 1 of 2)

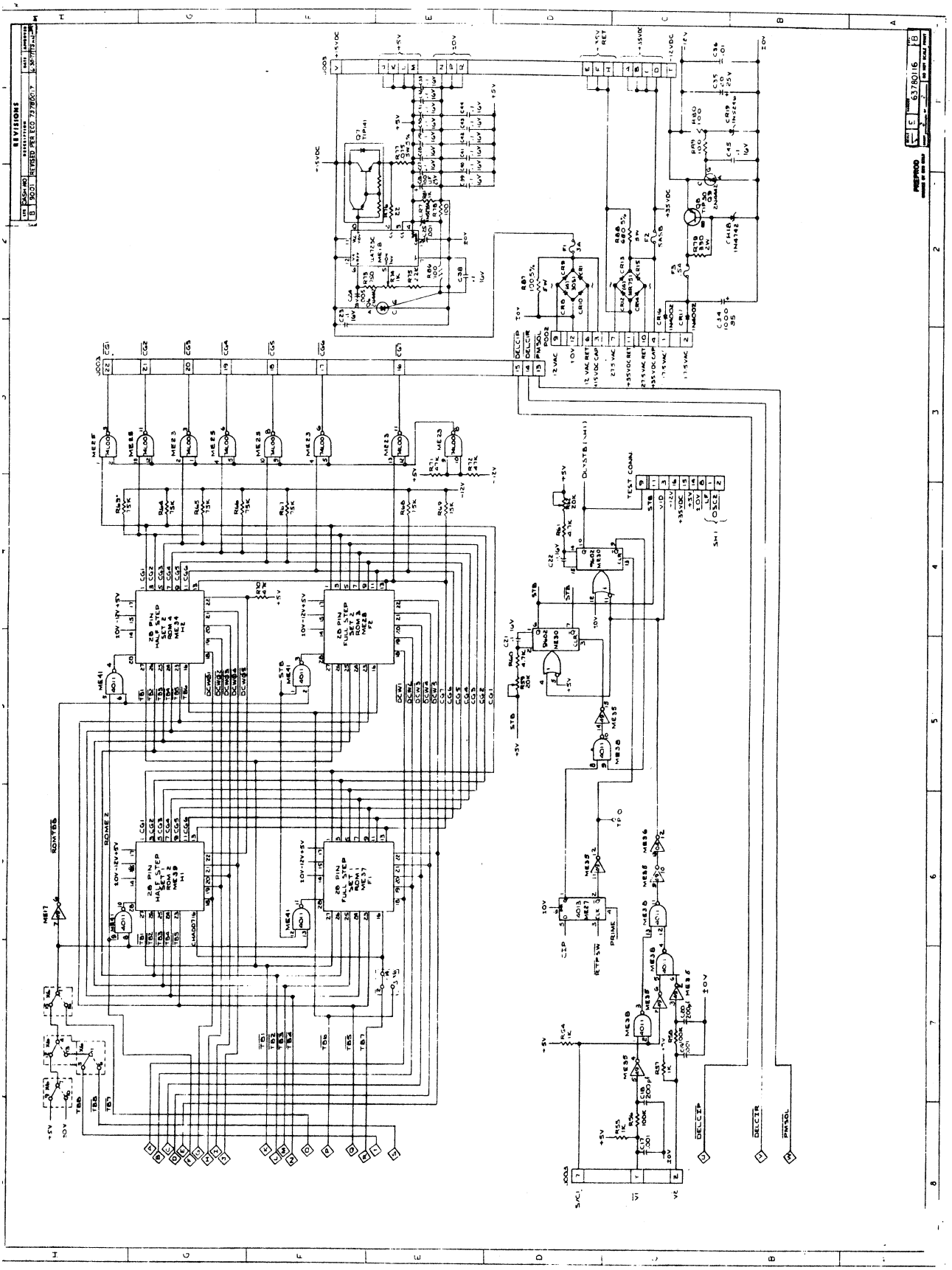
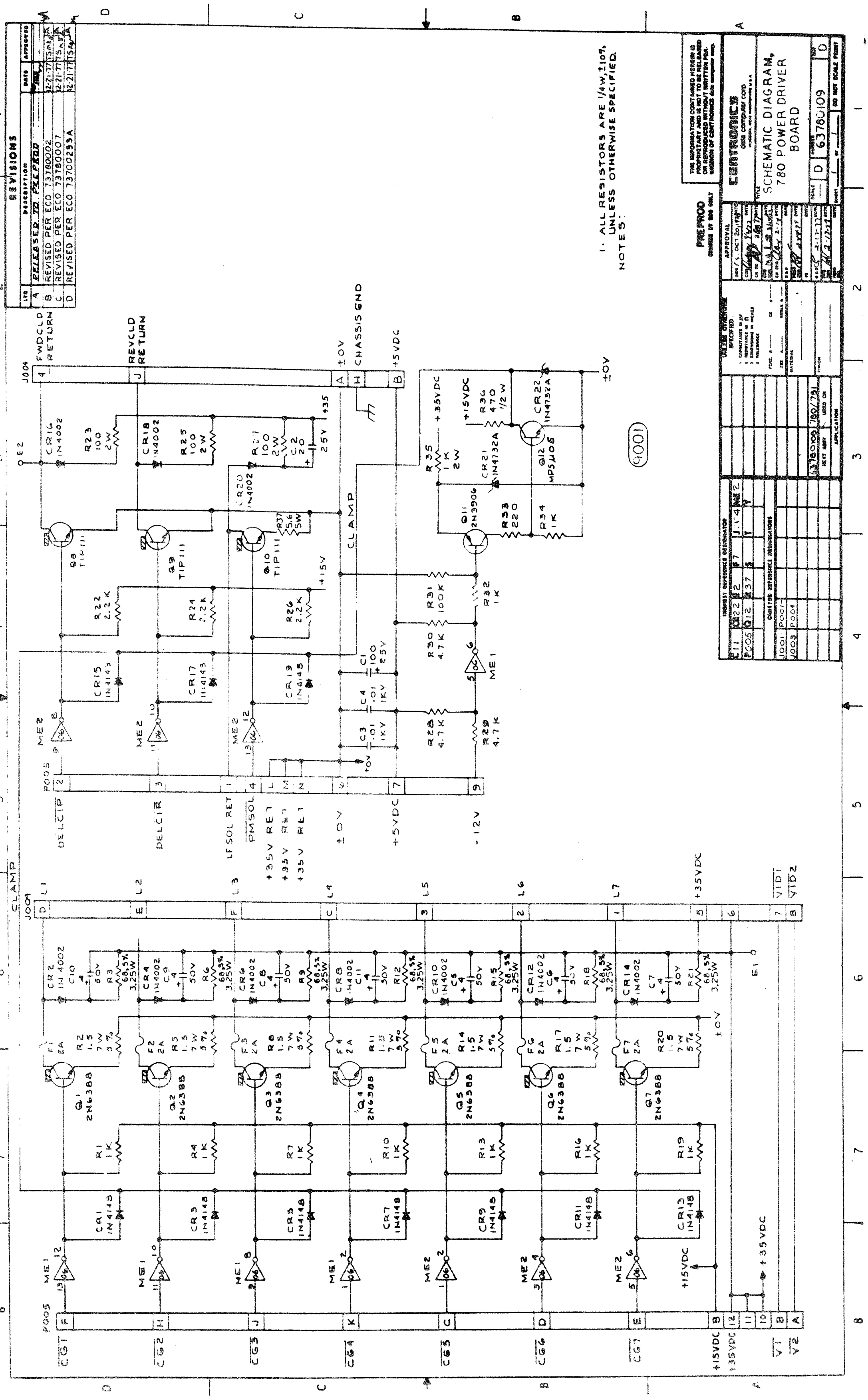


FIGURE 4-2. SCHEMATIC DIAGRAM, 780 LOGIC BOARD (SHEET 2 of 2)


SCHEMATIC DIAGRAM, 780 POWER DRIVER BOARD
CENTRONICS data computer corp
PREPROD
REVISIONS
RELEASED TO PREPROD
REVISED PER ECO 73780002
REVISED PER ECO 73780007
REVISED PER ECO 73700293A
1. ALL RESISTORS ARE 1/4W, ±10% UNLESS OTHERWISE SPECIFIED. NOTE 5:
CLAMP
FWDCLD RETURN
REVCLD RETURN
CHASSIS GND
+5VDC
+35VDC
+15VDC
DELCIP
DELCIR
LF SOL RET
PMSOL
-12V
J004
J004
P005
P005

93

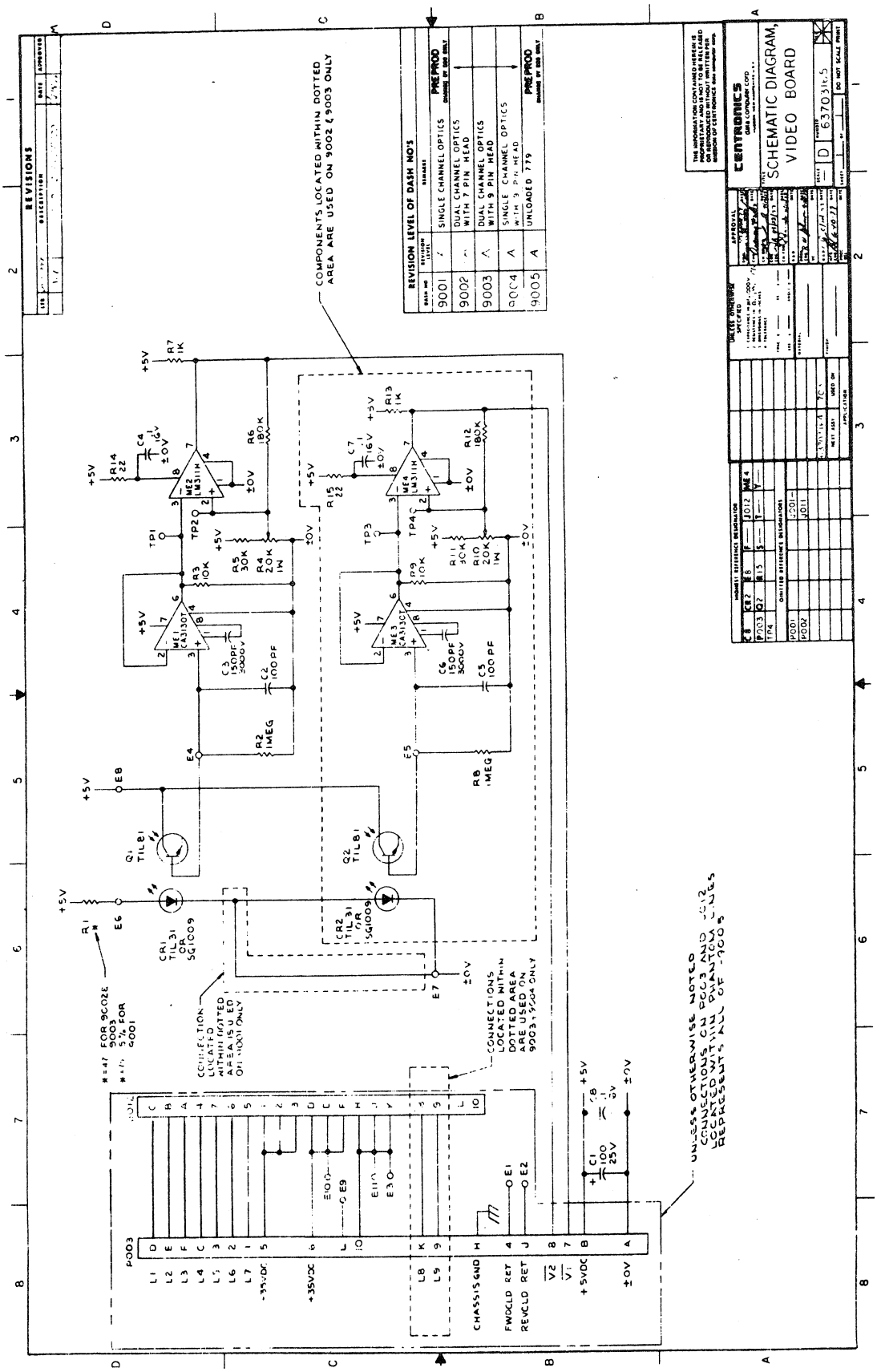


FIGURE 4-4. SCHEMATIC DIAGRAM, VIDEO AMPLIFIER

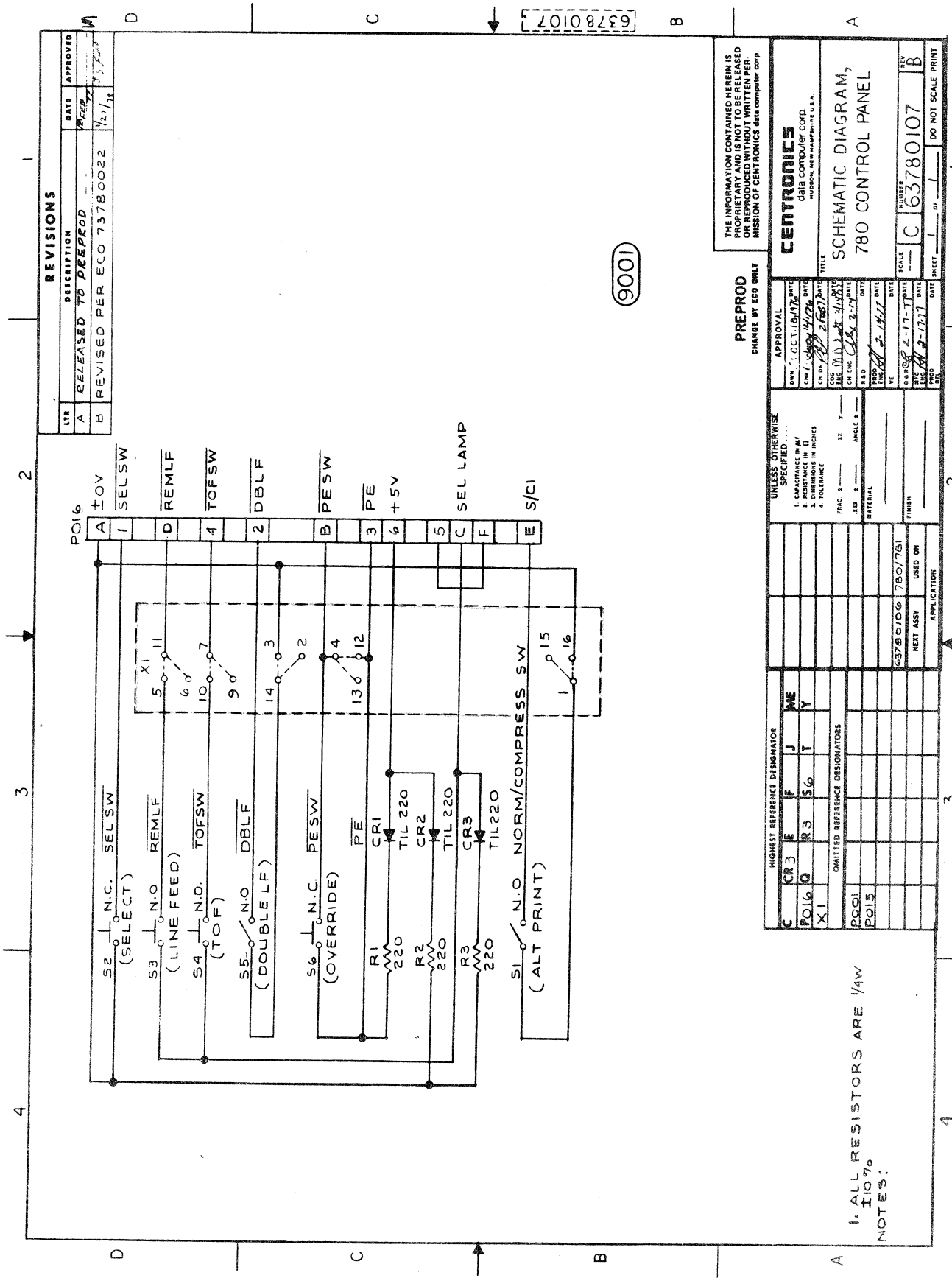


FIGURE 4-5. SCHEMATIC DIAGRAM, CONTROL PANEL

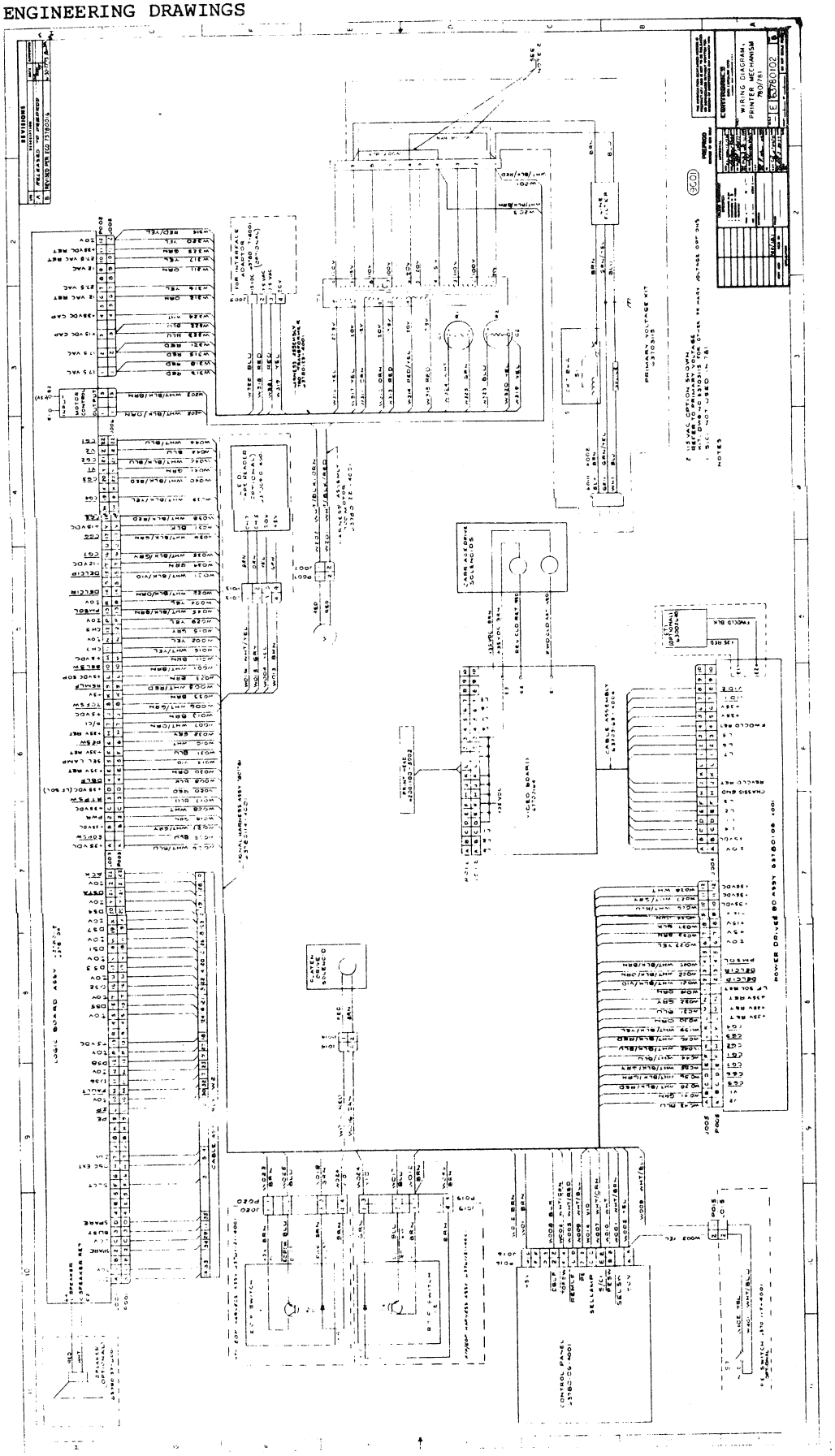


FIGURE 4-6. INTERCONNECTING WIRING DIAGRAM

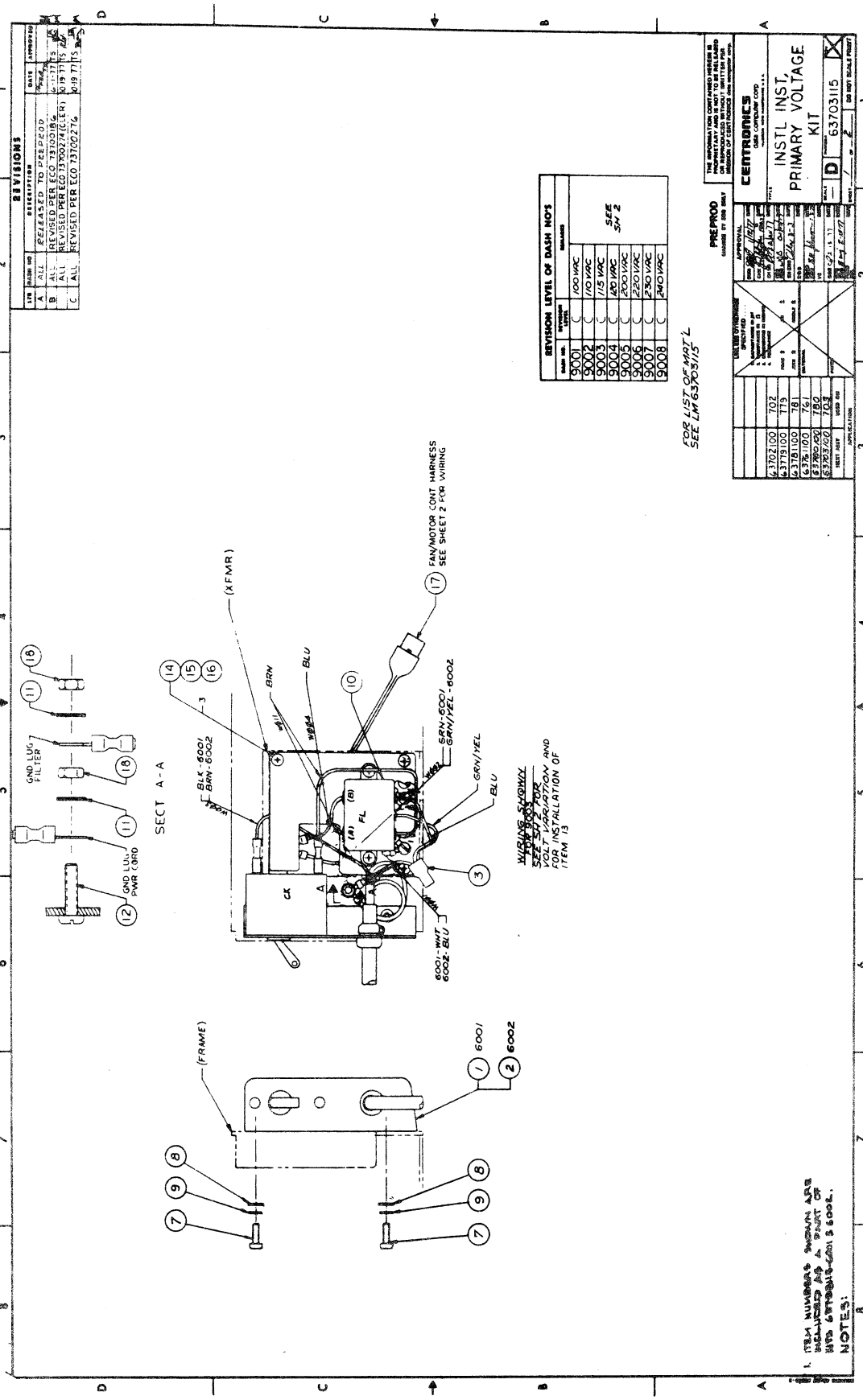


FIGURE 4-7. WIRING DIAGRAM, PRIMARY VOLTAGE (Sheet 1 of 2)

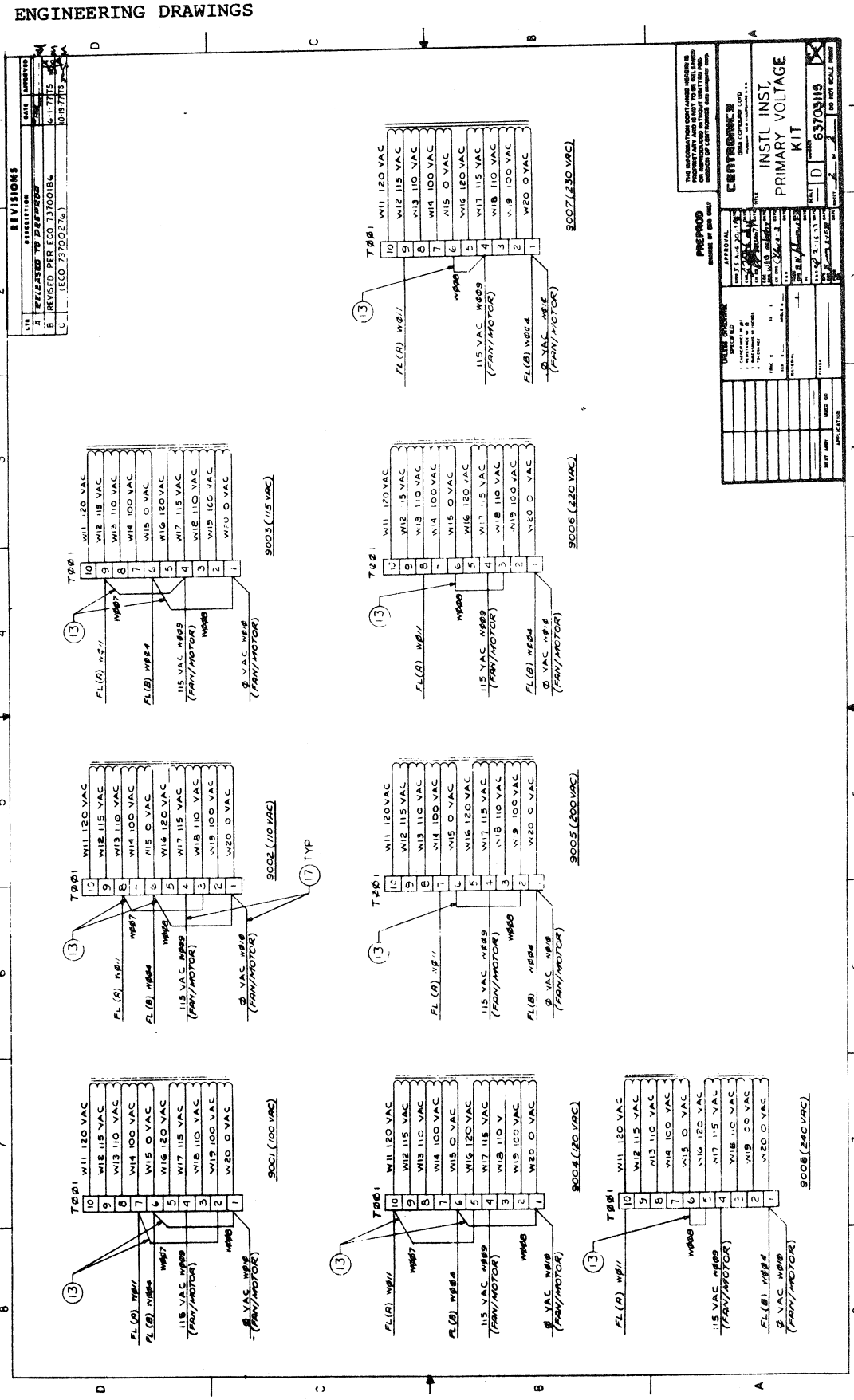


FIGURE 4-8. WIRING DIAGRAM, PRIMARY VOLTAGE (Sheet 2 of 2)

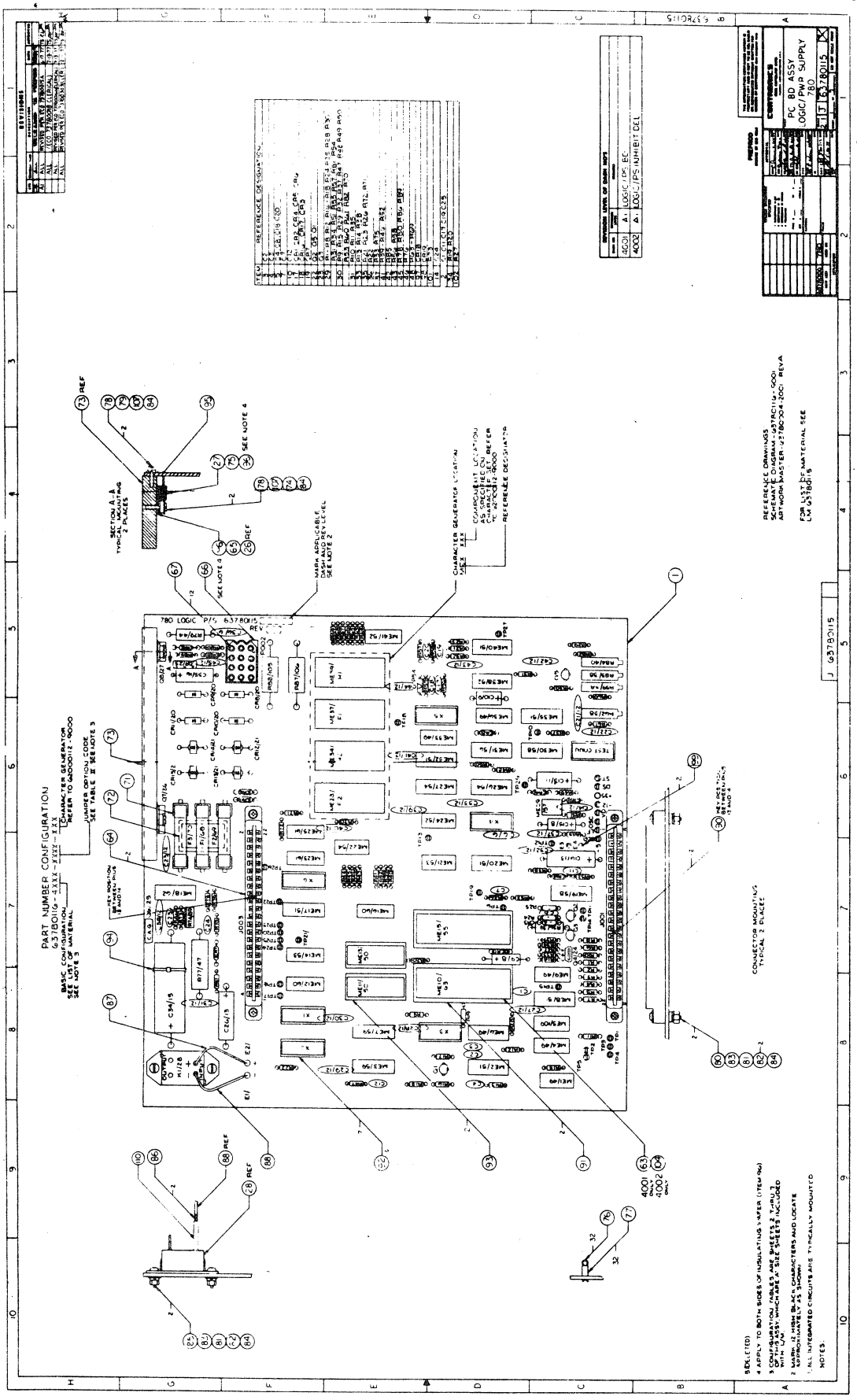


FIGURE 4-9. LOGIC BOARD ASSEMBLY

LIST OF MATERIALS
PC BD ASSY,LGC/PS BD,780

ITEM	PART NO	DESCRIPTION	QTY
1	63780004-2001	PC BD AW,LGC/PS BD,780	1.0000
2	21102000-1001	CAP CER DISC 1000PF 1KV 20%	5.0000
3	21331001-1001	CAP CER DISC 330PF 1KV 20%	1.0000
4	21330001-1001	CAP CER DISC 33PF 1KV 20%	1.0000
5	21201000-1001	CAP CER DISC 200PF 1KV 20%	4.0000
6	21103003-1001	CAP CER DISC .01UF 1KV 20%	2.0000
7	21101001-1001	CAP CER DISC 100PF 1KV 20%	1.0000
8	22106002-1001	CAP ELCTLT 10UF 25V -10+75%	2.0000
9	22505002-1001	CAP ELCTLT 5UF 16V -10+75%	1.0000
10	21181000-1001	CAP CER DISC 180PF 3KV 20%	1.0000
11	22506002-1001	CAP ELCTLT 50UF 25V -10+75%	1.0000
12	21104001-1001	CAP CER DISC .1UF 16V -20+80%	20.0000
13	22107002-1001	CAP ELCTLT 100UF 25V -10+75%	2.0000
14	21502001-1001	CAP CER DISC 5000PF 1KV 20%	1.0000
15	22108001-1001	CAP ELCTLT 1000UF 35V -10+150%	1.0000
16	22206002-1001	CAP ELCTLT 20UF 25V -10+75%	1.0000
17	38100904-1001	SEMICOND DIODE TBAX 1N4148	5.0000
18	38040020-1001	SEMICOND DIODE TBAX 1N4002	3.0000
19	38052351-1001	SEMICOND DIODE TBAX 1N5235A	1.0000
20	38130901-1001	SEMICOND DIODE TBAX	4.0000
21	38000002-1001	SEMICOND DIODE SILICON TBAX	4.0000
22	38239060-1001	SEMICOND XSTR PNP GP 2N3906	3.0000
23	38239040-1001	SEMICOND XSTR GP 2N3904	1.0000
24	38300050-1001	SEMICOND XSTR NPN HV AMPL	1.0000
25	38244420-1001	SEMICOND THYR PWR 2N4442	2.0000
26	38201410-1001	SEMICOND XSTR NPN PWR TIP141	1.0000
27	38200300-1001	SEMICOND XSTR PNP W/MICA TIP30	1.0000
28	39070226-1002	RELAY SOLID STATE PNL MTG	1.0000
29	41102926-1001	RES CARBON 1K OHM 1/4W 10%	23.0000
30	41472926-1001	RES CARBON 4.7K OHM 1/4W 10%	14.0000
31	41471926-1001	RES CARBON 470 OHM 1/4W 10%	3.0000
33	41752925-1001	RES CARBON 7.5K OHM 1/4W 5%	3.0000
34	41221926-1001	RES CARBON 220 OHM 1/4W 10%	2.0000
35	41473926-1001	RES CARBON 47K OHM 1/4W 10%	5.0000
36	41111925-1001	RES CARBON 110 OHM 1/4W 5%	1.0000
37	41222926-1001	RES CARBON 2.2K OHM 1/4W 10%	2.0000
38	46203381-1001	POT PC MTG 20K OHM 1W 10%	3.0000
39	41220016-1001	RES CARBON 22 OHM 1W 10%	1.0000
40	46503003-1001	POT PC MTG 50K OHM 1/2W 10%	1.0000
41	41103926-1001	RES CARBON 10K OHM 1/4W 10%	9.0000
42	41684926-1001	RES CARBON 680K OHM 1/4W 10%	1.0000
43	41104926-1001	RES CARBON 100K OHM 1/4W 10%	2.0000
44	41331026-1001	RES CARBON 330 OHM 2W 10%	1.0000
45	41101926-1001	RES CARBON 100 OHM 1/4W 10%	4.0000
46	41220926-1001	RES CARBON 22 OHM 1/4W 10%	1.0000
47	40077005-1001	RES WW .075 OHM 5W 5%	1.0000
48	41753926-1001	RES CARBON 75K OHM 1/4W 10%	7.0000
49	35474040-1001	IC HEX INVERTER 7404	6.0000
50	35514039-1003	IC RNDM ACCESS MEM 256X4 4039	2.0000
51	35740490-1001	IC HEX INVERTING BUFFER 4049	7.0000
52	35740110-1001	IC QUADR NAND 2-INPUT 4011	3.0000
53	35740230-1001	IC TRIPLE NAND 3-INPUT 4023	2.0000
54	35740130-1001	IC DUAL D-TYPE FLIP-FLOP 4013	3.0000
55	35512010-1001	IC LSI 2010	1.0000
56	35474123-1001	IC DUAL MONOSTABLE MV 74123	1.0000
57	35205550-1001	IC LINEAR TIMER 555	1.0000
58	35496020-1001	IC DUAL MONOSTABLE MV 9602	2.0000
59	35740291-1001	IC UP/DOWN CNTR FAST 4029	2.0000
60	35740010-1001	IC QUADR NOR 2-INPUT 4001	2.0000
61	35574000-1001	IC QUADR NAND 2-INPUT 74L00	2.0000
62	35207233-1001	IC VOLTAGE REGULATOR 723	1.0000
63	35512011-1002	IC LSI SMC REV H + ABOVE 2009	1.0000
64	31230037-1001	CONN EDGE 22POSN 2-ROW MDM	2.0000
65	35070003-2001	PAD XSTR MTG TIP .002THK	1.0000
66	31300008-1002	CONN PLUG 12POSN .093	1.0000
67	31240021-2002	CONTACT CONN PC MTG PIN .093	12.0000
68	39030011-1001	FUSE GL .25DIA 3A 250V 1.25L	1.0000
69	39030004-1001	FUSE GL .25DIA 5A SLOW 1.25L	1.0000
70	39030018-1001	FUSE GL .25DIA .5A 250V 1.25L	1.0000
71	31350003-2001	CLIP FUSE W/EAR PC MTG .25DIA	6.0000
72	62000111-3001	WARNING DECAL FUSE RATING	1.0000
73	63780119-2001	HEATSINK,LGC/PS BD	1.0000
74	35000004-2001	WSHR SHOULDER #4X.031L NYL	2.0000
75	35070003-2002	PAD XSTR MTG TIP .002THK RECT	1.0000
76	33250003-2003	PIN COTTER .046D X.50L BRS	32.0000
77	36612103-2040	SPACER .12DIA #0 CLR .18L NYL	32.0000
78	34000353-2023	SCR PNH SLTD M2.5X0.45X10 SST	4.0000
79	34000454-2003	WSHR LOCK SPLIT M2.5 SST SI	2.0000

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LIST OF MATERIALS
PC BD ASSY,LGC/PS BD,780

ITEM	PART NO	DESCRIPTION		QTY
81	34000454-2004	WSHR LOCK SPLIT M3 SST	SI	2.0000
82	34000453-2004	WSHR FL M3X7 0.5THK SST	SI	2.0000
83	34000651-2004	NUT HEX M3X0.5X2.4THK SST	SI	2.0000
84	30000000-0001	VARNISH INSULATING RED		A/R
85	34000353-2033	SCR PNH SLTD M3X0.5X8 SST	SI	2.0000
86	31240020-2004	CONTACT CRP SKT .093 22-18AWG		2.0000
87	39640000-0006-2	WIRE TYPE E 22AWG RED		.2000
88	39640000-0006-9	WIRE TYPE E 22AWG WHITE		.2000
89	46101501-1002	POT PC MTG 1K OHM 1/2W 10%		1.0000
90	31240456-2002	KEY PLZ BETW CONTACT		2.0000
91	31410246-2003	SOCKET IC 40PIN SLDR DIP .600W		2.0000
92	31410247-2003	SOCKET IC 16PIN SLDR DIP .300W		7.0000
93	31410248-2004	SOCKET IC 22PIN SLDR DIP .400W		2.0000
94	39695231-2001	STRAP CABLE ADJ LKG .625BDL		1.0000
95	30070000-0001	SOLDER 60/40 .032D WIRE		A/R
96	30050000-0001	COMPOUND THRM CNDCT SILICONE		A/R
97	38047420-1001	SEMICOND DIODE TBAX 12V 1N4742		1.0000
98	38052460-1001	SEMICOND DIODE TBAX 1N5246		1.0000
99	31280005-1001	JACK PRINTED CIRCUIT .040DIA		2.0000
101	41751925-1001	RES CARBON 750 OHM 1/4W 5%		1.0000
102	41184926-1001	RES CARBON 180K OHM 1/4W 10%		1.0000
105	43681055-1001	RES WW 680 OHM 5W 5%		1.0000
106	43101055-1001	RES WW 100 OHM 5W 5%		1.0000
107	34000453-2003	WSHR FL M2.5X6.5 0.5THK SST	SI	4.0000
109	35740680-1001	IC SGL NAND 8-INPUT 4068		1.0000
110	39690001-0004	SLEEVING SHRINK 50% .125ID BLK		.1000
999	62000112-9001	CHAR GENERATOR LOCATION CHART		A/R
999	63080164-9000	OPTION SUMMARY JUMP PLAT STD		A/R
999	63780005-9001	PC BD DD,LGC/PS BD,780		A/R
999	63780116-9001	SCHEM DIAG,LGC/PS BD,780		A/R

ALPHA-NUMERIC CONVERSION TABLE

0	10/A	20/L	30/X
1	11/B	21/M	31/Y
2	12/C	22/N	
3	13/D	23/P	
4	14/E	24/Q	
5	15/F	25/R	
6	16/G	26/T	
7	17/H	27/U	
8	18/J	28/V	
9	19/K	29/W	

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Sheet 2	Number 63780115

PLATFORM CONFIGURATION TABLE I

PLATFORM LOCATION	GROUP	OCTAL CODE	BINARY CODE	PLATFORM PIN FROM	PLATFORM PIN TO	SIGNAL FUNCTION	REMARKS
X1	I	20	1	1	16	ME6-3 = +0V	USED FOR COLUMN
			0	1	15	ME6-3 = +5V	WIDTH SELECTION
	II	10	1	14	3	ME6-4 = +0V	
			0	14	2	ME6-4 = +5V	
	III	4	1	4	13	ME6-13 = +5V	
			0	4	12	ME6-13 +0V	
	IV	2	1	11	6	ME6-12 = +0V	Used FOR COLUMN
			0	11	5	ME6-12 = +5V	WIDTH SELECTION
	V	1	1	7	10	NOT USED	
X1			0	7	9	NOT USED	
X2	I	20	1	1	16	INV. DATA STROBE	
			0	1	15	STD. DATA STROBE	
	II	10	1	14	3	ME12-12 = +0V	USED FOR COLUMN
			0	14	2	ME12-12 = +5V	WIDTH SELECTION
	III	4	1	4	13	ME12-4 = +5V	
			0	4	12	ME12-4 = +0V	
	IV	2	1	11	6	ME12-13 = +0V	
			0	11	5	ME12-13 = +5V	
	V	1	1	7	10	ME12-3 = +5V	USED FOR COLUMN
X2			0	7	9	ME12-3 = +0V	WIDTH SELECTION

SHEET 3

NUMBER 63780115

PLATFORM CONFIGURATION TABLE I

PLATFORM LOCATION	GROUP	OCTAL CODE	BINARY CODE	PLATFORM PIN FROM	PLATFORM PIN TO	SIGNAL FUNCTION	REMARKS
X3	1	20	1	1	16	NON GATED STROBE	
			0	1	15	GATED STROBE	
	II	10	1	14	3	$\overline{DS8}^{*}$ = DS8	BIT 8 LOW
			0	14	2	$\overline{DS8}^{*}$ = $\overline{DS8}$	BIT 8 HIGH
	III	4	1	4	13	DSC	
			0	4	12	NOT DSC	
	IV	2	1	11	6	$\overline{DS8}'$ = DS8	X3-7 TO X3-10
			0	11	5	$\overline{DS8}'$ = $\overline{DS8}$	X3-7 TO x3-10
	V	1	1	7	10	$\overline{DS8}'$ = DS8 OR $\overline{DS8}$	SEE X3 GROUP IV
X3			0	7	9	$\overline{DS8}'$ = $\pm$0V	
X4	I	20	1	1	16	SELECT DOES NOT CAUSE PRIME	
			0	1	15	SELECT CAUSES PRIME	
	II	10	1	14	3	UCC RESET = $\overline{TB8}$	IN LINE ELONGATED
			0	14	2	UCC RESET = PRIME	FULL LINE OR NO ELONGATED
	III	4	1	4	13	DECODED BIT 8	OCTAL 34 SETS, 35 RESETS
			0	4	12	STD BIT 8	
	IV	2	1	11	6	$\overline{UCCSET}$ = $\overline{UPSC}$	X4-7 TO x4-9 FULL LINE ELONGATED
			0	11	5	$\overline{UCCSET}$ = +5V	X4-7 TO X4-9 NO ELONGATED
	V	1	1	7	10	$\overline{UCCSET}$ = $\overline{TB8}$	IN LINE ELONGATED
X4			0	7	9	$\overline{UCCSET}$ = $\overline{UPSC}$ OR +5V	SEE X4 GROUP IV

SHEET 4 NUMBER 63780115

PLATFORM CONFIGURATION TABLE I

PLATFORM LOCATION	GROUP	OCTAL CODE	BINARY CODE	PLATFORM PIN FROM	PLATFORM PIN TO	SIGNAL FUNCTION	REMARKS
X5	I	20	1	1	16	NOT USED	
			0	1	15	NOT USED	
	II	10	1	14	3	NO AUTO LF	
			0	14	2	AUTO LF	
	III	4	1	4	13	NOT USED	
			0	4	12	NOT USED	
	IV	2	1	11	6	PERFORMS LF WHEN VT OR TOF IS SENT	X5-7 TO X5-10
			0	11	5	IGNORES VT OR TOF OR DOES NOT NOT IGNORE VT OR TOF	SEE X5 GROUP V
	V	1	1	7	10	IGNORES VT OR TOF OR PERFORMS LF WHEN VT OR TOF IS SENT	SEE X5 GROUP IV
X5			0	7	9	DOES NOT IGNORE VT OR TOF	X5-11 TO X5-5
X6	I	20	1	1	16	ROMTB8 = $\overline{TB7}$	
			0	1	15	ROMTB8=TB8 OR $\overline{TB8}$ OR +5V OR $\pm$0V	SEE X6 GROUP III
	II	10	1	14	3	CHADD7 =$\overline{TB6}$	
			0	14	2	CHADD7=TB7	
	III	4	1	4	13	ROM TB8=TB8 OR $\overline{TB8}$	SEE X6 GROUP IV X6-1 TO X6-15
			0	4	12	ROM TB8=+5V OR $\pm$0V	SEE X6 GROUP V X6-1 to X6-15
	IV	2	1	11	6	ROM TB8 = $\overline{TB8}$	X6-13 TO X6-4 X6-15 TO X6-1
			0	11	5	ROM TB8 = TB8	X6-13 TO X6-4 X6-15 TO X6-1
	V	1	1	7	10	ROM TB8 = $\pm$0V	X6-12 TO X6-4 X6-15 TO X6-1
X6			0	7	9	ROM TB8 = +5V	X6-12 TO X6-4 X6-15 TO X6-1

SHEET 5 NUMBER 63780115

ELECTRONIC OPTION TABLE

J7	J8	J9	J10	OPTION	PLATFORM CODE X1	X2	X3	X4	X5	X6
0	0	0	0	BASE VALUE (ADD FOR ALL CONFIG) 10 CHAR/IN 80 LINE, (4001)	04	07	10	02	01	00
4	0	0	0	INHIBIT DELETE (4002)						
1	-	-	-	CUT LINE FEED	-	-	-	-	10	-
2	-	-	-	NON GATED STROBE	-	-	20	-	-	-
G	-	-	-	INV. DATA STROBE	-	20	-	-	-	-
-	1	-	-	AUTO CR ON PM	-	-	04	-	-	-
-	2	-	-	INHIBIT PRIME ON SELECT	-	-	-	20	-	-
-	4	-	-	VT OR TOF = L.F.	-	-	-	-	02	-
-	8	-	-	VFU ENABLE	-	-	-	-	(-01)	-
-	G	-	-	DECODED BIT 8	-	-	-	04	-	-
-	-	*4	-	16.5 CHAR/IN	(-04)	(-07)	-	-	-	-
-	-	*8	-	15 CHAR/IN	20	10	-	-	-	-
-	-	*G	-	12 CHAR/IN	-	06	-	-	-	-
-	-	*J	-	10/12 CHAR/IN	-	06	-	-	-	-
-	-	*A	-	10/15 CHAR/IN	20	10	-	-	-	-
-	-	*6	-	10/16.5 CHAR/IN	(-04)	(-07)	-	-	-	-
-	-	*Q	-	12/15 CHAR/IN	20	10	-	-	-	-
-	-	*L	-	12/16.5 CHAR/IN	(-04)	(-07)	-	-	-	-
-	-	*C	-	15/16.5 CHAR/IN	(-04)	(-07)	-	--	-	-
-	-	-	1	BIT 8 HIGH	-	-	(-10)	-	-	-
-	-	-	2	96 CHAR SET	-	-	-	-	-	20
-	-	-	4	128 CHAR SET	-	-	--	-	-	06
-	-	-	8	SINGLE EL CHAR	-	-	-	11	-	-

SUM OF BINARY NUMBERS
EQUALS JUMPER OPTION CODE
(SEE PART NUMBER CONFIGURATION
ON ASSEMBLY DRAWING)

*Select Only One Option For J9

SUM OF NUMBERS SELECTED
EQUALS X1, X2, X3, X4, X5, X6 PLATFORM
REFER TO 63080164-9000

SHEET 7 NUMBER 63780115

Werte immer aufaddieren zum Standartwert

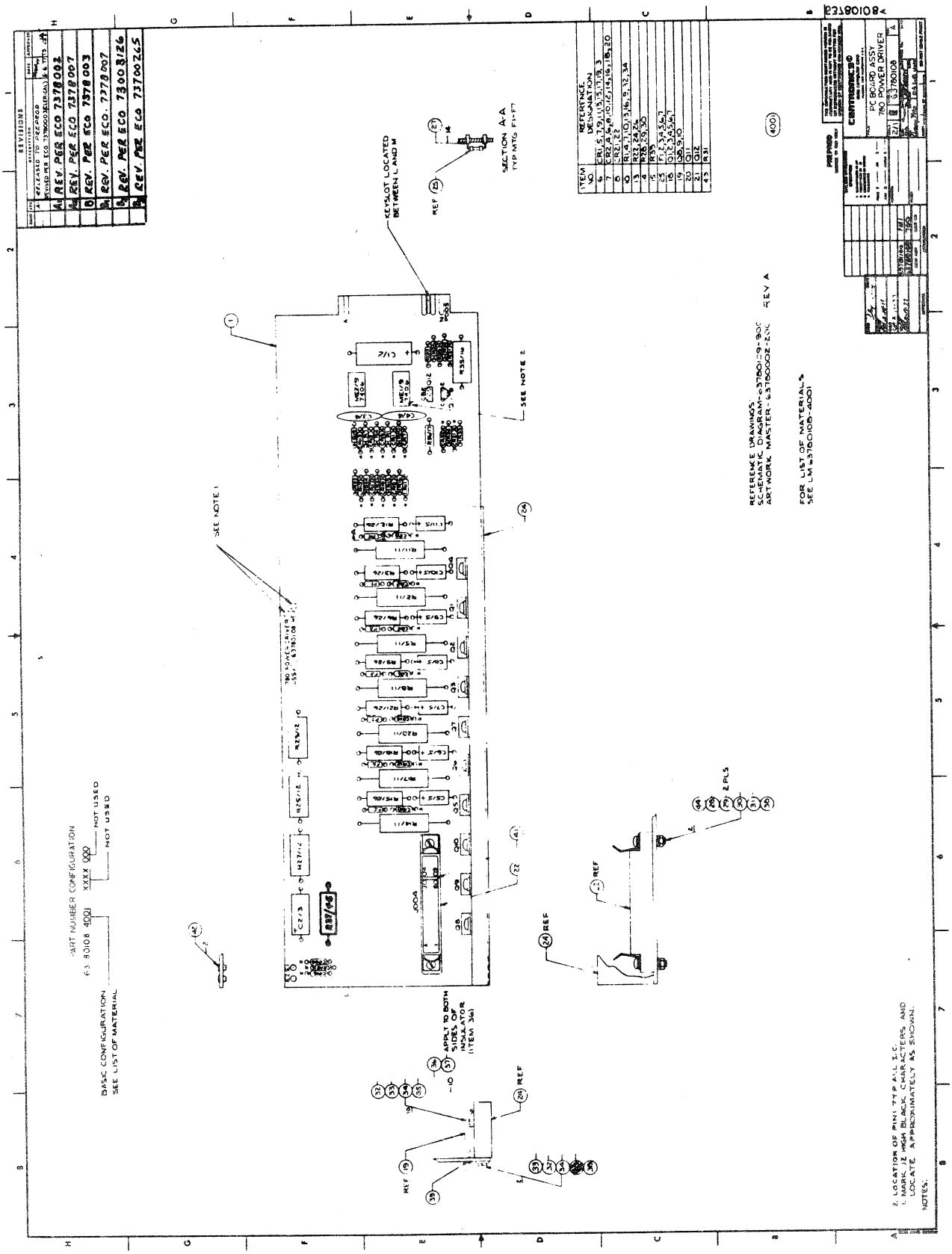

Figure 4-10. POWER DRIVER BOARD ASSEMBLY

LIST OF MATERIALS
PC BD ASSY 780 POWER DRIVER

ITEM	PART NO	DESCRIPTION	QTY
1	63780002-2001	PC BD AW 780 POWER DRIVER	1.0000
2	22107002-1001	CAP ELCTLT 100UF 25V -10+75%	1.0000
3	22206002-1001	CAP ELCTLT 20UF 25V -10+75%	1.0000
4	21103003-1001	CAP CER DISC .01UF 1KV 20%	2.0000
5	22405003-1001	CAP ELCTLT 4UF 50V -10+75%	7.0000
6	38100904-1001	SEMICOND DIODE TBAX 1N4148	10.0000
7	38040020-1001	SEMICOND DIODE TBAX 1N4002	10.0000
8	38000004-1001	SEMICOND DIODE TBAX 4.7V	2.0000
9	35474060-1001	IC HEX INVERTER BFR/DRVR 7406	2.0000
10	41102926-1001	RES CARBON 1K OHM 1/4W 10%	9.0000
11	40158075-1001	RES WW 1.5 OHM 7W 5%	7.0000
12	41101026-1001	RES CARBON 100 OHM 2W 10%	3.0000
13	41222926-1001	RES CARBON 2.2K OHM 1/4W 10%	3.0000
14	41472926-1001	RES CARBON 4.7K OHM 1/4W 10%	3.0000
15	41221926-1001	RES CARBON 220 OHM 1/4W 10%	1.0000
16	41102026-1001	RES CARBON 1K OHM 2W 10%	1.0000
17	41471946-1001	RES CARBON 470 OHM 1/2W 10%	1.0000
18	38263880-1001	SEMICOND XSTR NPN PWR 2N6388	7.0000
18A	38202646-1001	SEMICOND XSTR PWR (141) EP2646	A/R
19	38202647-1001	SEMICOND XSTR PWR (111) EP2647	3.0000
20	38239060-1001	SEMICOND XSTR PNP GP 2N3906	1.0000
21	38300050-1001	SEMICOND XSTR NPN HV AMPL	1.0000
22	31230011-1001	CONN EDGE 10POSN 2-ROW MDM	1.0000
24	63780110-2001	HEATSINK,POWER DRIVER	1.0000
25	39030030-1004	FUSE INSUL .093DIA 2A PC MTG	7.0000
26	40680325-1001	RES WW 68 OHM 3.25W 5%	7.0000
27	31280004-1001	JACK PRINTED CIRCUIT .025DIA	14.0000
32	34000353-2023	SCR PNH SLTD M2.5X0.45X10 SST	12.0000
33	34000454-2003	WSHR LOCK SPLIT M2.5 SST SI	12.0000
34	34000453-2003	WSHR FL M2.5X6.5 0.5THK SST SI	12.0000
35	35000004-2001	WSHR SHOULDER #4X.031L NYL	10.0000
36	35070003-2002	PAD XSTR MTG TIP .002THK RECT	10.0000
37	30050000-0001	COMPOUND THRM CNDCT SILICONE	A/R
38	30000000-0001	VARNISH INSULATING RED	A/R
39	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
41	31240456-2002	KEY PLZ BETW CONTACT	1.0000
42	31280005-1001	JACK PRINTED CIRCUIT .040DIA	2.0000
43	41104926-1001	RES CARBON 100K OHM 1/4W 10%	1.0000
45	43548056-1001	RES WW 5.6 OHM 5W 10%	1.0000
999	63780003-9001	PC BD DD 780 POWER DRIVER	A/R
999	63780109-9001	SCHEM DIAG 780 POWER DRIVER	A/R

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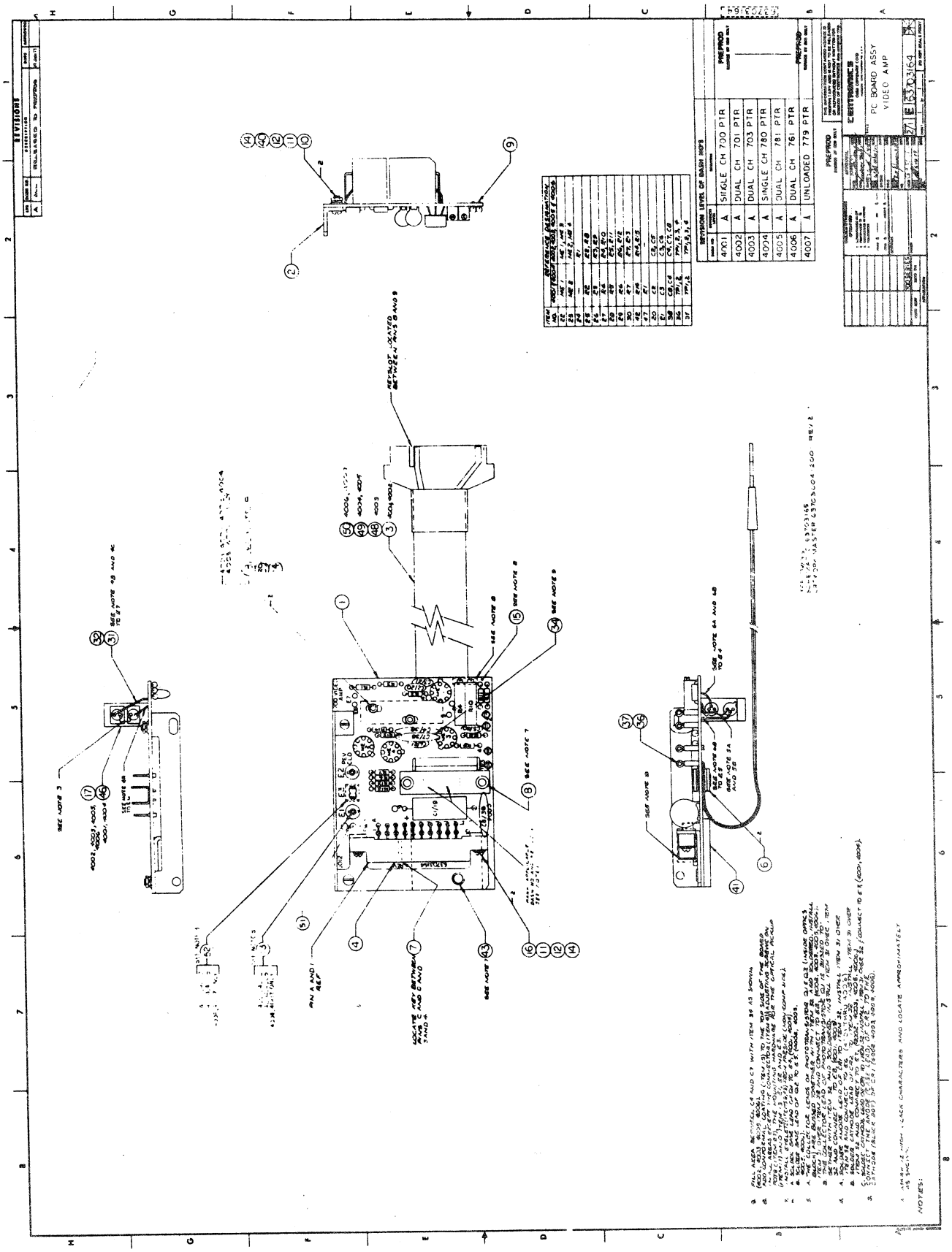

Figure 4-11. VIDEO AMPLIFIER ASSEMBLY

LIST OF MATERIALS
PC BD ASSY VIDEO AMP S CH 780

ITEM	PART NO	DESCRIPTION	QTY
1	63703004-2001	PC BD AW VIDEO AMP 7W/9W	1.0000
2	63703154-2001	BRACKET, VIDEO BOARD	1.0000
4	31230015-1001	CONN EDGE 10POSN 2-ROW RTANG	1.0000
6	63701441-5001	CLAMP ASSY	2.0000
7	31240456-2002	KEY PLZ BETW CONTACT	1.0000
8	33490001-2022	EYELET FLANGE .121D X.250L BRS	2.0000
9	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
10	34000353-2033	SCR PNH SLTD M3X0.5X8 SST SI	2.0000
11	34000453-2004	WSHR FL M3X7 0.5THK SST SI	4.0000
12	34000454-2004	WSHR LOCK SPLIT M3 SST SI	4.0000
13	31460018-2001	TERM TAB PC MTG	2.0000
14	30000000-0001	VARNISH INSULATING RED	A/R
15	30040000-0001	CONFORMAL COATING	A/R
16	34000353-2034	SCR PNH SLTD M3X0.5X10 SST SI	2.0000
18	34104087-2001	SCR CAP HEX SOC 2-56X.25L	2.0000
19	22107002-1001	CAP ELCTLT 100UF 25V -10+75%	1.0000
20	21101001-1001	CAP CER DISC 100PF 1KV 20%	1.0000
21	21151000-1001	CAP CER DISC 150PF 3KV 20%	1.0000
22	35203130-1001	IC OPERATIONAL AMPLIFIER 3130	1.0000
23	35203110-1003	IC VOLTAGE COMPARATOR 311	1.0000
25	41105926-1001	RES CARBON 1MEG OHM 1/4W 10%	1.0000
26	41103926-1001	RES CARBON 10K OHM 1/4W 10%	1.0000
27	46203381-1001	POT PC MTG 20K OHM 1W 10%	1.0000
28	41303926-1001	RES CARBON 30K OHM 1/4W 10%	1.0000
29	41184926-1001	RES CARBON 180K OHM 1/4W 10%	1.0000
30	41102926-1001	RES CARBON 1K OHM 1/4W 10%	1.0000
31	39690200-0018	TUBING PLSTC 18AWG ID NAT	.1000
32	39610000-0003	WIRE UN-INSUL SOLID 26AWG	.1000
36	33250003-2003	PIN COTTER .046D X.50L BRS	2.0000
37	36612103-2040	SPACER .12DIA #0 CLR .18L NYL	2.0000
38	21104001-1001	CAP CER DISC .1UF 16V -20+80%	2.0000
39	34902087-2001	WSHR FLAT #2X.25 .032THK	2.0000
40	34000651-2004	NUT HEX M3X0.5X2.4THK SST SI	2.0000
41	35060003-0163	TAPE FOAM .125THK X1.25W GRAY	.1000
42	41220926-1001	RES CARBON 22 OHM 1/4W 10%	1.0000
43	33490001-2020	EYELET FLANGE .121D X.187L BRS	1.0000
46	63002634-5005	OPT PICKUP SINGLE TRK PHODIODE	1.0000
47	41750925-1001	RES CARBON 75 OHM 1/4W 5%	1.0000
49	63703169-4004	ASSY RIBBON CABLE 10 COND 780	1.0000
51	39610000-0006	WIRE UN-INSUL SOLID 20AWG	.3000
52	31460030-2001	TERM TAB DUAL 90DEG PC MTG	1.0000
999	63703005-9001	PC BD DD VIDEO AMP 7W/9W	A/R
999	63703165-9001	SCHEM DIAG VIDEO AMP SINGLE CH	A/R

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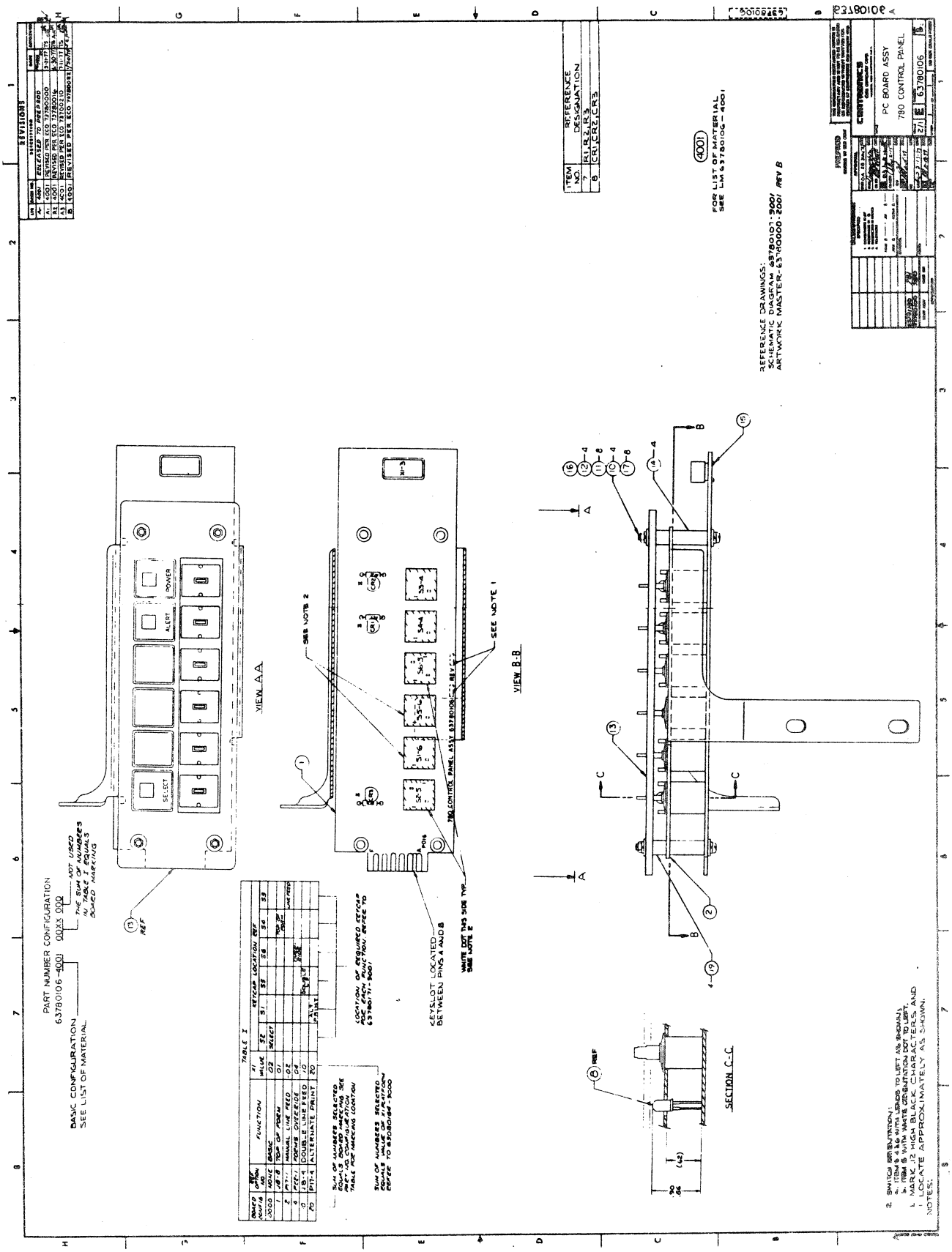

Figure 4-12. CONTROL PANEL ASSEMBLY

LIST OF MATERIALS
PC BD ASSY 780 CTRL PANEL

ITEM	PART NO	DESCRIPTION		QTY
1	63780000-2001	PC BD AW 780 CTRL PANEL		1.0000
2	63700905-2001	BRACKET, CONTROL PANEL		1.0000
3	31410247-2003	SOCKET IC 16PIN SLDR DIP .300W		1.0000
4	39095522-1001	SWITCH SPST PB MOM KYBD		2.0000
5	39095521-1001	SWITCH SPST PB MOM KYBD		2.0000
6	39095520-1001	SWITCH SPST PB KYBD		2.0000
7	41221926-1001	RES CARBON 220 OHM 1/4W 10%		3.0000
8	38100211-1001	SEMICOND LED W/LEADS		3.0000
10	34000652-2004	NUT HEX M3X0.5X2.4THK	SI	4.0000
11	34000452-2004	WSHR FL M3X7 0.5THK	SI	8.0000
12	34000352-2043	SCR PNH SLTD M3X0.5X35	SI	4.0000
13	63700345-3001	CONTROL PANEL MARKING,700		1.0000
14	36614410-2040	SPACER .25DIA #6 CLR .62L NYL		4.0000
15	30070000-0001	SOLDER 60/40 .032D WIRE		A/R
16	30000000-0001	VARNISH INSULATING RED		A/R
17	34000455-2004	WSHR LOCK SPLIT M3	SI	8.0000
19	36614404-2040	SPACER .25DIA #6 CLR .25L NYL		4.0000
20	39610003-0001	WIRE COATED BLUE 30AWG		.1000
999	63080164-9000	OPTION SUMMARY JUMP PLAT STD		A/R
999	63780001-9001	PC BD DD 780 CTRL PANEL		A/R
999	63780107-9001	SCHEM DIAG 780 CTRL PANEL		A/R

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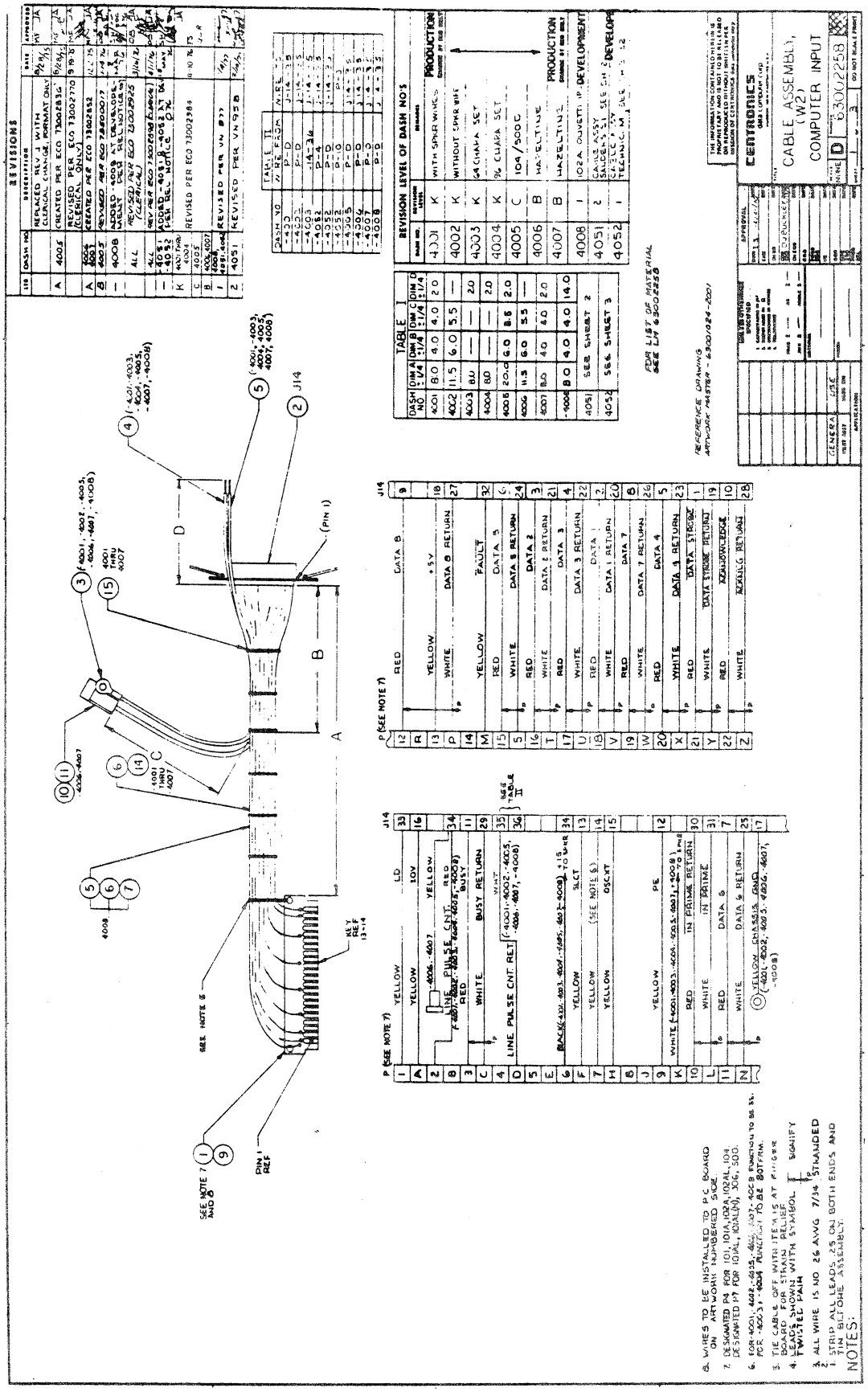


Figure 4-13. PARALLEL INPUT CABLE

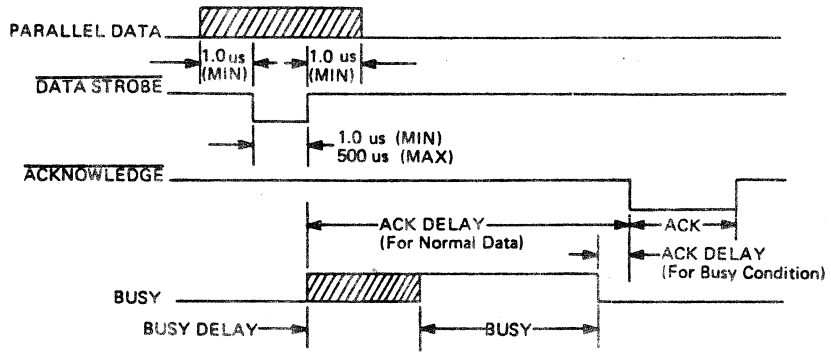
LIST OF MATERIALS
CABLE ASSY W2 WITH SPKR WIRES

ITEM	PART NO	DESCRIPTION	QTY
1	63001024-2001	PC BD AW PARALLEL TIMER FIN BD	1.0000
2	31310019-1016	CONN RCPT PNL 36POSN NON-PLZ	1.0000
3	31460015-2003	TERM RING INSUL #8 26-22AWG	1.0000
4	39648505-0004-0	WIRE TYPE B 26AWG BLACK	2.1000
5	39648505-0004-9	WIRE TYPE B 26AWG WHITE	2.0000
6	39648505-0004-4	WIRE TYPE B 26AWG YELLOW	11.0000
9	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
14	39660015-0001	CABLE 1TW PR 26AWG	10.1000
15	39695231-2001	STRAP CABLE ADJ LKG .625BDL	6.0000
999	63001025-9001	PC BD DD PARALLEL TIMER FIN BD	A/R

APPENDIX A
PARALLEL INTERFACE SPECIFICATIONS

The Centronics Model 780 printer contains a 7-bit parallel interface. An optional eighth bit is available, as required by the user. Detailed information describing the standard interface timing, signal descriptions, connectors and other specifications are contained in this appendix. The intent of this information is to provide the user with the technical information required to interface directly to a 780 printer.

INTERFACE TIMING



NORMAL DATA INPUT TIMING

ACK DELAY	2.5-10.0 usec.
ACK	2.5-5.0 usec.

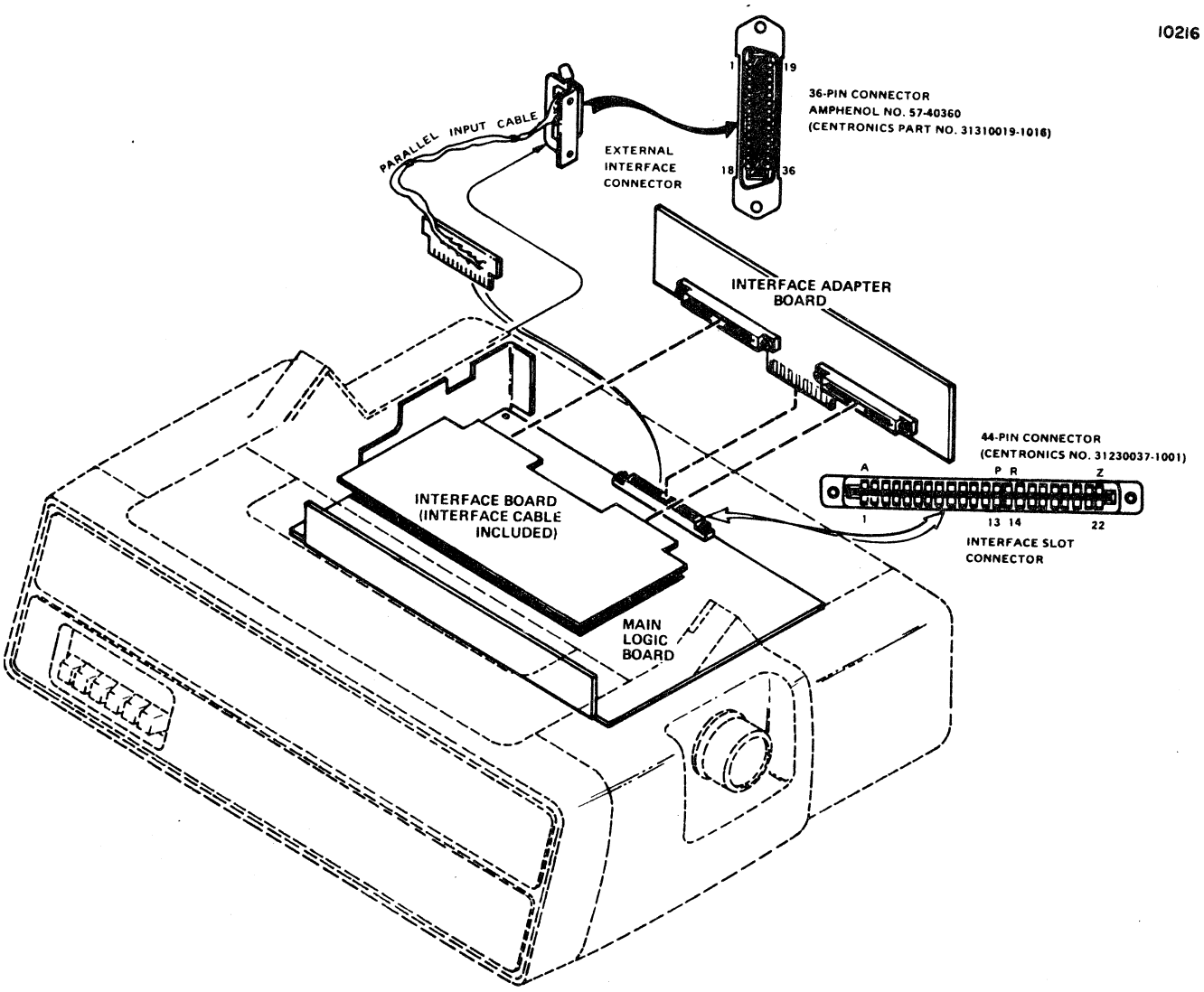
BUSY CONDITION TIMING

BUSY DELAY	0-1.5 usec.
ACK DELAY	0-10 usec.
ACK	2.5-5.0 usec.
BUSY DURATION:	
Line Feed	75-105 msec.
Vertical Tab (1-inch)	240-270 msec.
Form Feed (11-inch)	2.07-2.11 sec.
Delete	100-400 usec.
Bell	0
Select*	100-400 usec.
Deselect	Until printer is selected
Print Command	16.7 msec/char.
Return time (no-busy)	1.6 sec. (max)

*No busy if inhibit prime on select option is used.

STANDARD INTERFACE SIGNALS

The following table describes the standard interface signals available at both the interface slot connector and the external interface connector. The illustration shows the parallel interface cable and the location of the interface card, if used.



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STANDARD INTERFACE SIGNALS

SIGNAL NAME	INTER-FACE CONN.	INTER-FACE SLOT	SOURCE	DESCRIPTION
DATA STROBE (N)	Pins 1, 19	Pins 21, Y	Input Device	A 1.0 usec pulse (min.) used to clock data from the processor to the printer logic.
DATA 1	2, 20	18, V	Input Device	Input data levels. A high represents a binary ONE, a low represents a binary a ZERO. All printable characters (i.e., codes having a ONE in DATA 6 or DATA 7) are stored in the printer buffer. Control characters (i.e., codes having a ZERO in both DATA 6 and DATA 7), are used to specify special control functions. These codes are not stored in the buffer except when they specify a print command and are preceded by at least one printable character in that line.
DATA 2	3, 21	16, T	Input Device	
DATA 3	4, 22	17, U	Input Device	
DATA 4	5, 23	20, X	Input Device	
DATA 5	6, 24	15, S	Input Device	
DATA 6	7, 25	11, N	Input Device	
DATA 7	8, 26	19, W	Input Device	
DATA 8	9, 27	12, P	Input Device	
ACKNLG (N)	10, 28	22, T	Printer	Acknowledge pulse indicates the input of a character into memory or the end of a functional operation.
BUSY	11, 29	3, C	Printer	A level indicating that the printer cannot receive data. Also indicates the existence of a paper empty or fault condition. For other conditions causing BUSY, refer to Busy Condition Timing Table.
PE	12	9	Printer	A level indicating that the printer is out of paper.
SLCT	13	F	Printer	A level indicating that the printer is selected.
±OV	14	7	Printer	Signal ground.
OSCXT	15	H	Printer	A 100-200 KHz signal.
±OV	16	A		Signal ground
Chassis Gnd	17	-	Printer	Frame ground
+5V	18	13	Printer	+5 Volt power bus
INPUT PRIME (N)	31, 30	L, 10	Input Device	A level which clears the printer buffer and initializes the logic.
FAULT (N)	32	M	Printer	A level that indicates a printer fault condition such as paper empty, light detect, or a deselect condition.
Line Count Pulse	Not used			
Light Detect (LD)	33	1		A level that indicates the video circuit is not functioning.
Not Used	36			

NOTES:

1. Second pin number indicates twisted pair return (±OV).
2. Active low signals are specified by the notation "(N)" after the signal name. Active high signals have no notation.

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