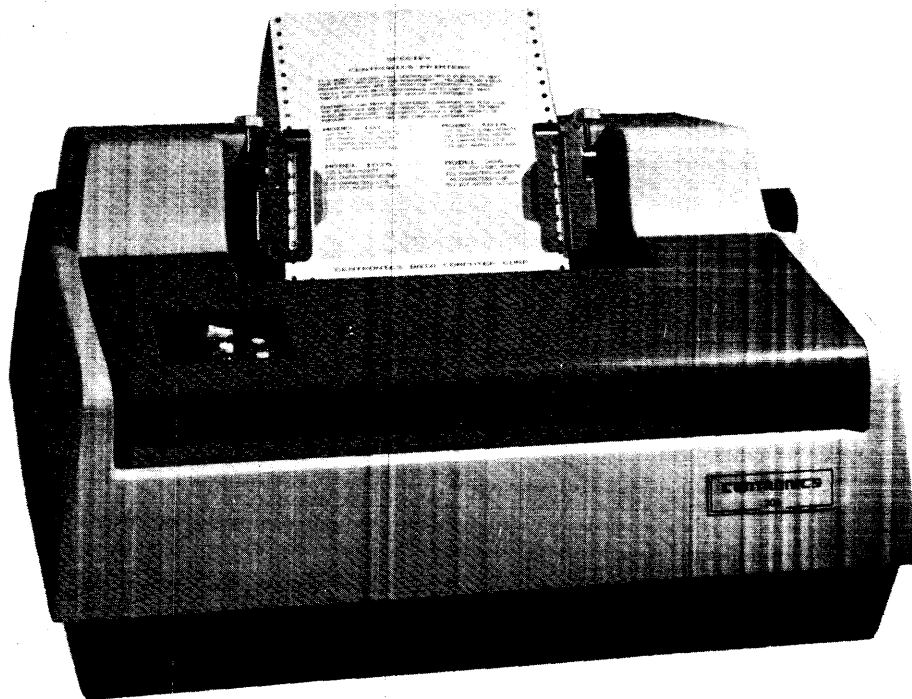


# TECHNICAL MANUAL

## MODEL 306 PRINTER



MAY 1977

Centronics No. 37400040— Rev. 1

# **CENTRONICS**

data computer corp.

HUDSON, NEW HAMPSHIRE 03051

TELEPHONE (603) 883-0111

# TECHNICAL MANUAL

## MODEL 306 PRINTER

REVISION I

MAY 1977

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### NOTE

Refer to the Engineering Change Notice (ECN) sheets shipped with the printer for changes made to the printer which have not yet been incorporated into the drawings in this technical manual. Always keep these Engineering Change Notice sheets with the manual.

Revision level indications at the lower right-hand corner of a page reflect at what revision of the manual that page was updated.



# SECTION 1

## INTRODUCTION

This manual describes the Model 306 printer, manufactured by Centronics Data Computer Corporation. It provides general information, detailed theory of operation and maintenance information enabling field service personnel to service the printer. For serial input or other detailed interface information, a separate document for each interface is published for your reference.

The manual is subdivided into eight sections, each with its specific purpose.

SECTION 1	INTRODUCTION, introduces the reader to the scope and content of the manual, and provides the reader with a general description of the printer.
SECTION 2	INSTALLATION, contains unpacking and installation instructions for the printer.
SECTION 3	OPERATION, describes the use of all operator controls and indicators.
SECTION 4	THEORY OF OPERATION, contains a detailed description of each major operation performed by the printer electronics, including flow charts, timing diagrams and circuit diagrams.
SECTION 5	REMOVAL, REPLACEMENT AND ADJUSTMENT PROCEDURES, includes step-by-step removal and replacement procedures for all major assemblies and sub-assemblies in the printer.
SECTION 6	MAINTENANCE, includes electrical adjustments, preventive maintenance procedures, and a troubleshooting guide.
SECTION 7	ELECTRICAL DRAWINGS AND LIST OF MATERIALS, contains a complete set of schematic, wiring and component board layout diagrams and their associated list of materials for the electrical portion of the printer.
SECTION 8	MECHANICAL DRAWINGS AND PARTS LISTS, includes all printer assembly drawings and their associated part lists for the mechanical portion of the printer.
APPENDIX	(A) Logic Board Timing (B) Parallel Interface Timing

### 1.1 GENERAL DESCRIPTION (Figure 1-1)

The Model 306 printer is a medium speed impact printer which uses a standard 5 x 7 or optional 9 x 7 dot matrix for character generation.

The unit prints at a rate of 120 characters per second, which is approximately one full 80-character line per second (including carriage return time). Paper is sprocket-fed, and paper widths from 4 inches to 9½ inches (10.2 cm -24.1 cm) can be accommodated. The printer can produce one original and four copies. Standard print format consists of 10 characters per inch horizontally and 6 lines per inch vertically.

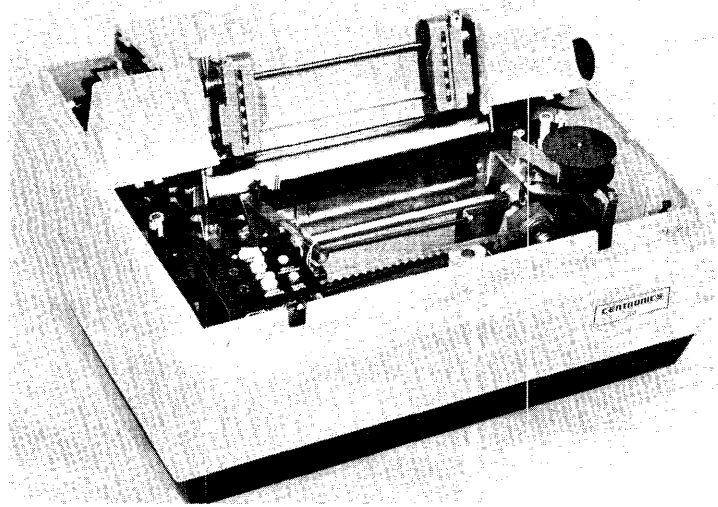


Figure 1-1. MODEL 306 PRINTER (TOP AND VFU COVERS REMOVED)

## 1.2 LOGIC FLOW DIAGRAM (Figure 1-2)

The standard printer contains an 80-character buffer. For serial data inputs, optional serial interfaces allow data to be received at rates from 100 to 9600 baud. Several other optional interfaces are available as required by the user.

Once a line of printable characters is stored in the buffer, head motion is initiated by activating the forward clutch, causing the print head to move from left to right across the paper. With the head in motion, data is transmitted from the buffer to the character generator. From there, character write pulses are sent to the driver circuits, which energize the print head solenoids causing the print wires to form the character on the paper.

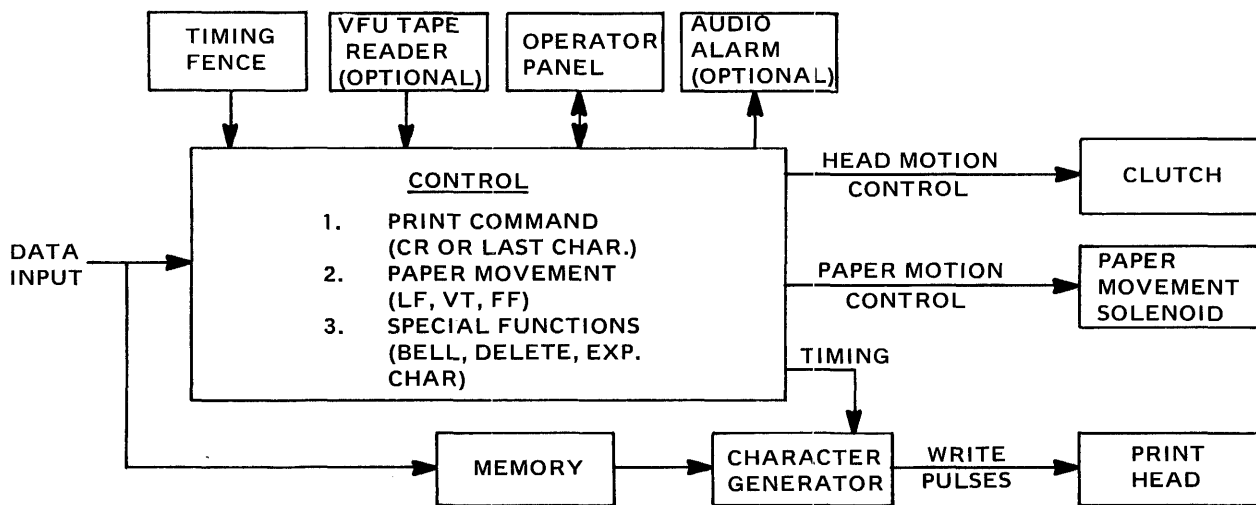


Figure 1-2. BASIC BLOCK DIAGRAM

Paper movement is initiated by a line feed, vertical tab and form feed function. In the standard 306 printer, vertical form movement is software controlled by means of line count pulses, rather than hardware - controlled. However, an option Vertical Format Unit (VFU) is available for hardware-controlled vertical formatting, identical to the Series 100 printers.

In addition, the printer recognizes the following special control codes: bell, delete and elongated character, as described in Section 1.3.3.

### 1.3 PRINTER OPERATION

Basically, all printer functions can be grouped into one of the following three categories: 1) character printing, 2) paper movement, and 3) other auxiliary functions such as bell, delete, etc.

#### 1.3.1 CHARACTER PRINTING (Figures 1-3, 1-4)

A small aluminum carriage supports the print head assembly. During printing operation, the carriage travels along the print line from left to right. Printing is accomplished by selectively firing the print wires as the print head moves from left to right across the print line. Printing impulses energize the print solenoids and drive the print wires against the ribbon, paper and platen to form the characters in a dot matrix pattern. When the solenoids are de-energized, the wires are withdrawn so that they are flush with the surface of the jewel. Each solenoid can fire independently up to five times for any one character. Figure 1-3 shows an example of the dot matrix forming the letter H. All character formation in the 5 x 7 and 9 x 7 standard ASCII character set are shown in the Series 300 Operator Manual.

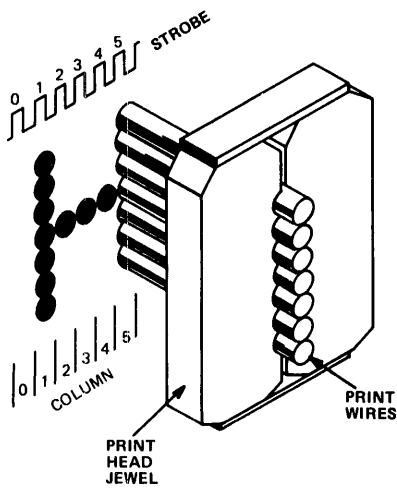


Figure 1-3. PRINTING THE LETTER (H)

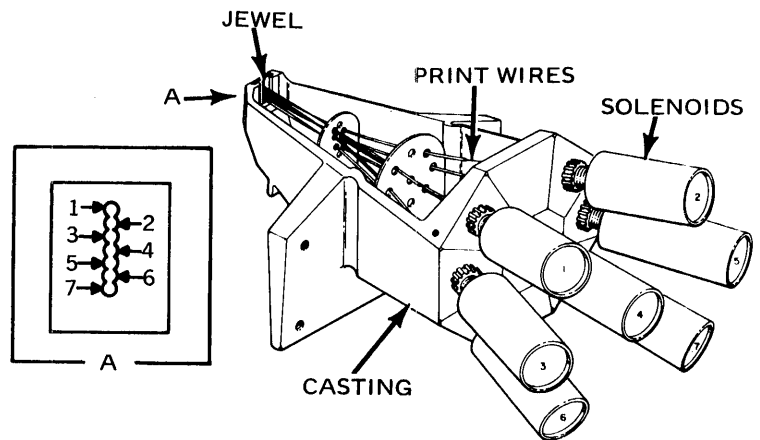


Figure 1-4. PRINT HEAD COMPONENTS



The print head (Figure 1-4) consists of the jewel, casting and seven solenoids with attached print wires. The seven print solenoids and their attached print wires are arranged radially inside the print head but aligned vertically at the nose (Ref. Fig. 1-3, 1-4). The free ends of the print wires pass through a wire guide at the front of the print head, which properly spaces the wires so that the correct wires pass through the correct hole in the print jewel.

Printing action is initiated when the input buffer has been filled or a carriage return (CR) code has been received. The print head then sweeps across the page until a CR command is decoded at the buffer output or the head reaches the 80-column limit switch. At this time, the print head returns to the left margin and an automatic line feed is performed. As an option, the automatic line feed can be disabled.

### 1.3.2. PAPER MOVEMENT (Figure 1-5)

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

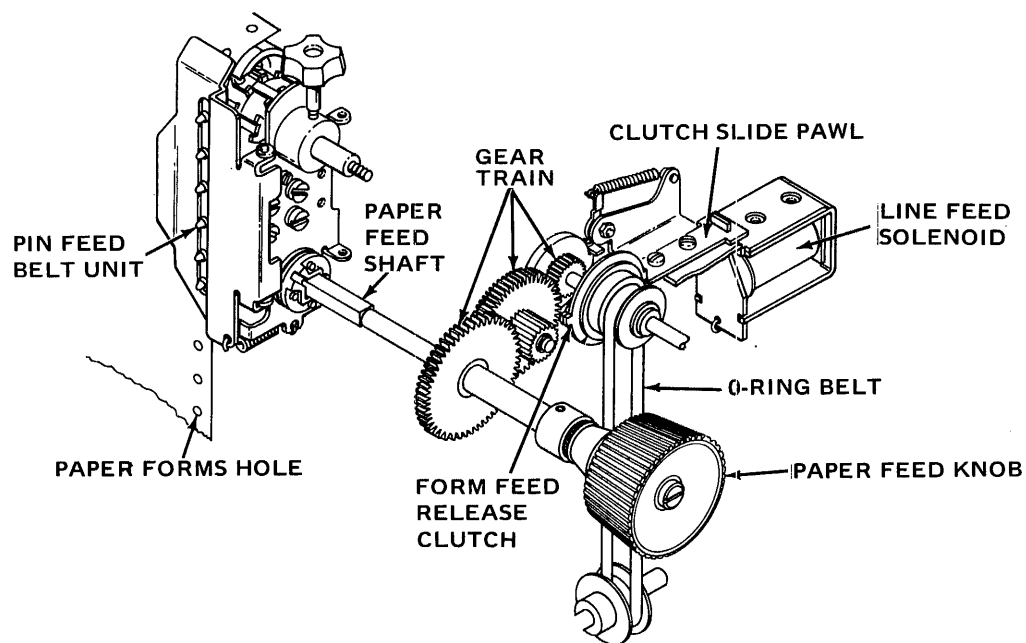


Figure 1-5. PAPER MOVEMENT MECHANISM

Power to drive the pin feed belt units controlling paper movement, is transmitted from the main motor through an O-ring belt to the form feed mechanism, where it is then transferred via the paper drive shaft to drive pulley for pin feed belt units. The form feed mechanism consists of a form feed or release clutch, a line feed solenoid with slide unit, and a gear train mechanically linking the main motor to the paper feed tractors.

To initiate a single line feed, the line feed solenoid is momentarily energized. Upon completion of the line feed command, a delay interval is generated, allowing the clutch pawl and clutch mechanism to return home before another line feed is allowed.

Vertical forms movement is accomplished by applying a DC level to the paper feed solenoid. In the standard 306 printer, this paper movement continues until it is either terminated by the reception of a delete code (octal 177) or an INPUT PRIME signal at the interface connector, or a paper time-out condition. However, if the optional Vertical Format Unit (VFU) is used, the paper movement is terminated when a hole is detected in the appropriate channel of the vertical format paper tape.

As paper moves in the printer, each line advance causes a line count switch located in the form feed mechanism to open and close. The two wires from this switch go to the interface connector via the logic card. As a result, a line count level from the input device is switched on and off by the printer for each line advance. If the 306 contains no optional VFU, the user's software can control vertical formatting by counting these line count pulses and terminating the paper movement operation when appropriate.

When the printer runs out of paper, a sensing switch activates a two-second audible tone in a speaker (option) located at the rear. The printer also stops printing and lights the PAPER EMPTY light on the control panel.

### 1.3.3 SPECIAL FUNCTIONS

In addition to the printable characters and the carriage return, line feed, form feed, and vertical tab codes previously described, the printer also recognizes the following special control codes.

**Delete (Octal 177)** — Primes the printer electronics and clears the buffer.

**Bell (Octal 007)** — With Bell option only - Generates a two-second audible tone in the speaker at the front of the printer.

**Select (Octal 021)** — Allows printer to receive data, same as activating SELECT switch.

**De-Select (Octal 023)** - Inhibits printer from receiving data, same as deactivating SELECT switch.

**Elongated Boldface Characters (Octal 016)** - Prints elongated characters on a line-by-line basis (character-by-character controlled by bit 8, optional).

## 1.4 SPECIFICATIONS SUMMARY

### Data Input

Data Format	7-bit parallel interface 8 bits (optional)
Input Code	64-character ASCII
Data Rate	Up to 75,000 characters/second
Buffer	One-line character buffer
Input Gating	Data Strobe is normally gated with Acknowledge of previous character. Non-gated strobe available as an option.

### Printing

Printing Method	Impact, character-by-character
Dot Matrix	5 x 7 (std.), 9 x 7 (opt.)
Elongated Characters	By line, via octal 016 By character, via bit 8 (opt.)
Character Density	10 characters/inch (horizontal)
Print Format	80-characters/line (max.)
Print Rate	120 characters per second
Number of Copies	Prints original and up to four carbon copies.
Character Sets	Standard 64-character ASCII, lower case prints as upper case. Optional sets up to 128 characters, available.

### Paper Advance

Slew Rate	4 inches/second
Vertical Format	6 lines/inch
Vertical Format Control	2-Channel paper tape (option)
Paper Entry	Bottom and Rear Paper Feed
Paper Timeout	10-second Paper Runaway Inhibit
Paper Feed	Sprocket Feed, adjustable to 9½ inch (24cm) paper.
Auto Line Feed	Automatic line feed on carriage return Disabled by option.

### Controls/Indicators

Switches	ON/OFF, SELECT, FORMS OVERRIDE TOP OF FORM (OPT.) MANUAL LF (OPT.) SINGLE/DOUBLE LF (OPT.)
Indicators	ON/OFF, SELECT, PAPER OUT
Manual Controls	Forms, Thickness, Paper Advance Knob
Auto Motor Control (Opt.)	Drive motor automatically turns off and on as required by the incoming data.
Audio Alarm (Opt.)	Momentarily sounds a buzzer in response to a Bell code or paper empty condition.

### Physical/Environmental/Electrical

Height	12-¾ inches (32.4 cm)
Depth	18-¾ inches (47.6 cm)
Width	23-¼ inches (59 cm)
Weight	66 pounds (30 kg.)
Temperature	40° to 100° F (4° to 37.5° C) (Operating) -40° to 160° F (-40° to 71° C) (Storage)
Input Voltage	115 VAC ± 10%, 60 Hz (Std.) 230 VAC ± 10%, 50 Hz (Opt.)

## Other Options

Auto Carriage Return on Line Feed, Vertical Tab and Form Feed  
Bottom of Form  
Inhibit Delete Code  
Serial Communications Interface  
Popular Parallel Computer Interfaces

## Ribbons

The printer uses a 1-inch nylon ribbon mounted on 3-inch diameter spools. The following four colors are available:

Black - Part No. 63002293-5001  
Red - Part No. 63002293-5002  
Green- Part No. 63002293-5003  
Blue - Part No. 63002293-5004

Centronics nylon ribbons are designed specifically for use in Centronics matrix printers. The fabric design and proprietary ink formulation ensures optimum print quality, as well as long print head and ribbon life.

Note: Centronics reserves the right to void the warranty with regard to any parts damaged through the use of non-qualified ribbons.

## Paper

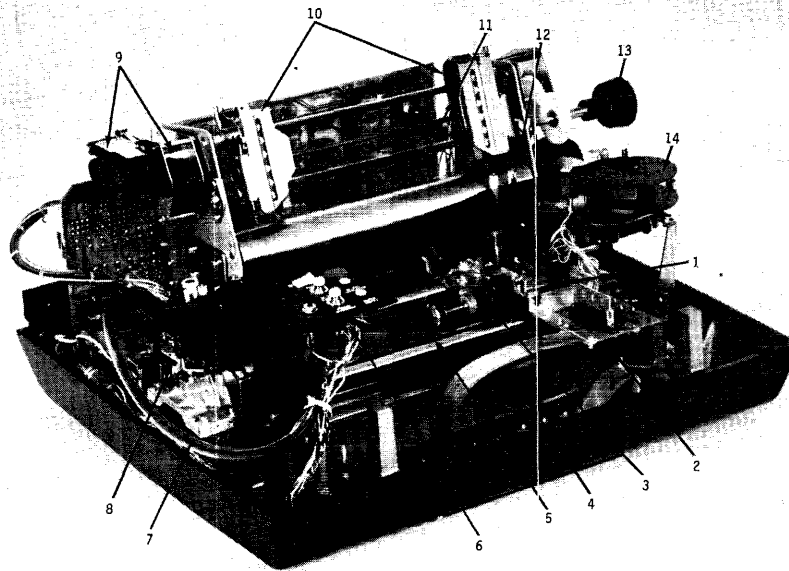
The printer used continuous form paper with standard feed holes on each edge. Paper widths from 4 to 9½ inches (10.2 cm - 24.1 cm) can be accommodated by the printer. Using multiple-part form, one original and up to 4 copies can be printed, all very legible. Paper weight specifications are as follows:

Single-Part Forms:	15 to 12 lb.
Multiple-Part Forms:	Original - 12 to 15 lb. Copies - 9 to 12 lb., last copy 15 lb. (Maximum of five parts)
Carbon Paper:	7¼ lb. with medium hardness

## 1.5 PHYSICAL DESCRIPTION

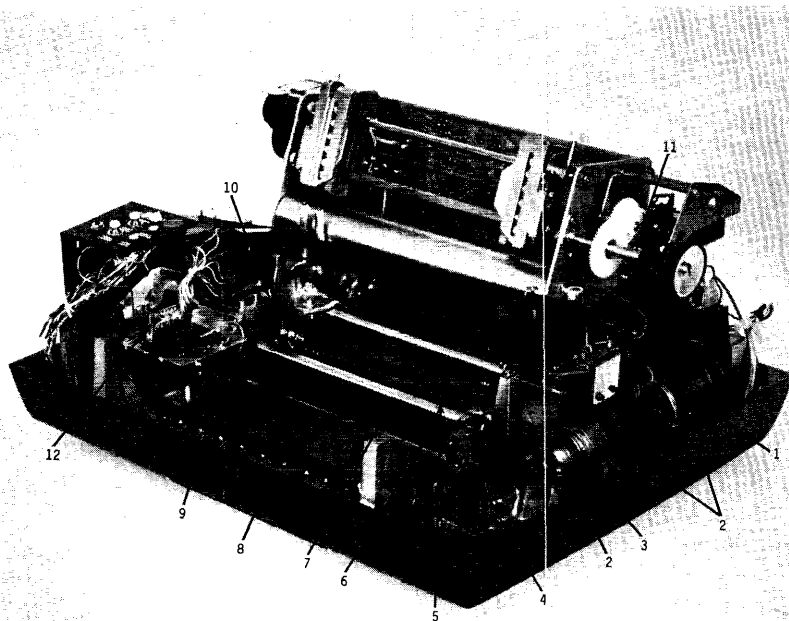
The printer is approximately 12-¾" (32.4 cm) high by 18-¾" (47.6 cm) deep by 23¼" (59 cm) wide, and weighs approximately 66 pounds (30 kg.). The complete printer is assembled on a base made of cast aluminum. Enclosing the printer are three removable plastic covers: the main cover, top cover and VFU cover. The top cover can be opened to give access to the print head by tilting the cover back and lifting it completely off the printer. The VFU cover can also be tilted back or removed for access to the optional Vertical Format Unit, if it is used.

Figures 1-6 to 1-9 are different photographic views of the printer taken with the covers removed. All major assemblies are identified, in addition to a few other important components, the locations of which should be noted.



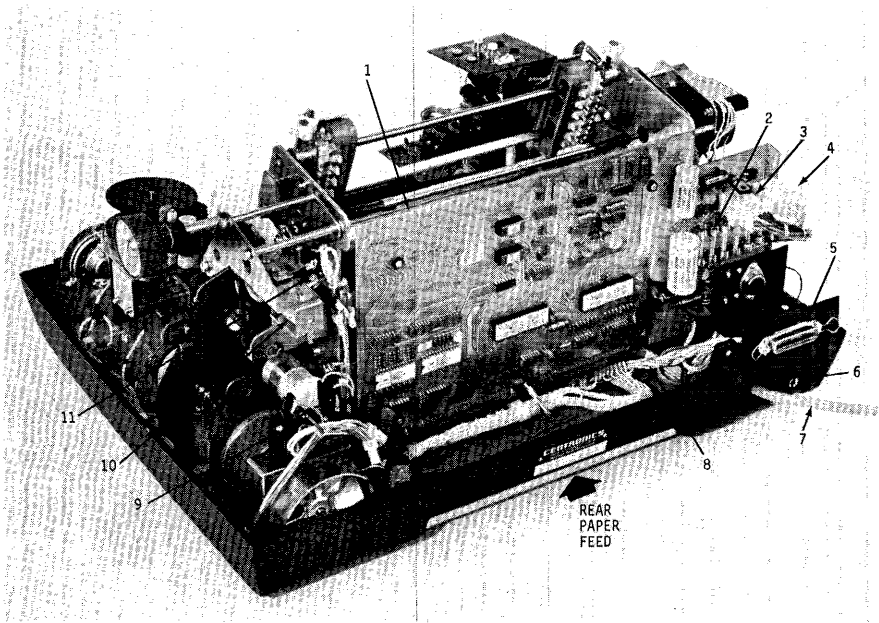
- |                                |                                |                         |
|--------------------------------|--------------------------------|-------------------------|
| 1. Print Head Assembly         | 5. Damper Piston               | 10. Pin Feed Mechanisms |
| 2. Video Ampl. and Cable Ass'y | 6. Operator Panel              | 11. Paper Feed Shaft    |
| 3. Carriage                    | 7. Damper Cylinder             | 12. Platen              |
| 4. Ribbon Cable                | 8. Left Ribbon Feed            | 13. Platen Knob         |
|                                | 9. Vertical Format Unit Option | 14. Right Ribbon Feed   |

Figure 1-6. LEFT FRONT VIEW OF 306



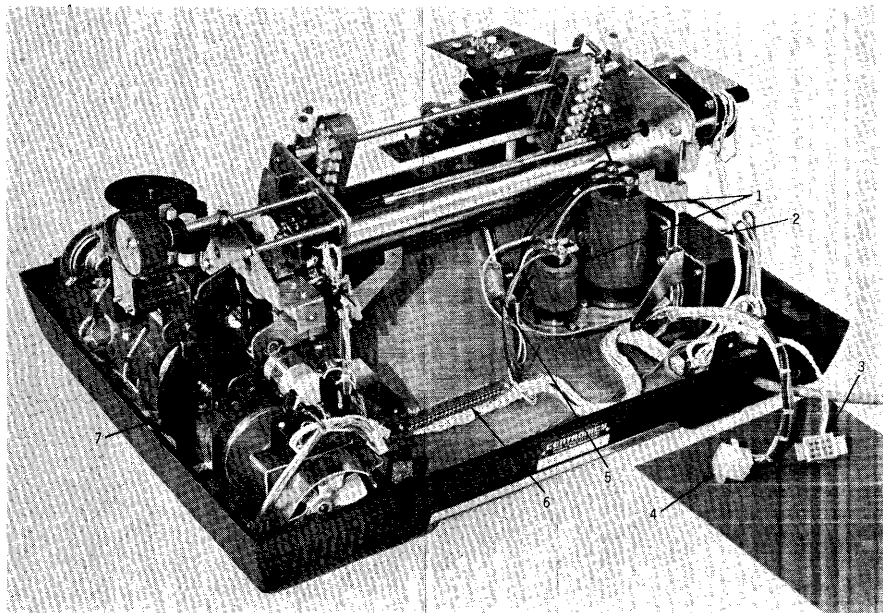
- |                      |                           |                              |
|----------------------|---------------------------|------------------------------|
| 1. Main Drive Motor  | 5. Main Drive Belt        | 9. Optical Block             |
| 2. Drive Mechanism   | 6. Timing Fence           | 10. Penetration Control Knob |
| 3. Forward Clutch    | 7. Carriage Return Spring | 11. Form Feed Mechanism      |
| 4. Reed Switch (EOP) | 8. Power Driver Board     | 12. Solenoid Finger Board    |

Figure 1-7. RIGHT FRONT VIEW OF 306



- |                                    |                         |
|------------------------------------|-------------------------|
| 1. Logic/Power Supply Board        | 7. AC Power Input       |
| 2. Logic/P.S. Fuses                | 8. Input Cable (W2)     |
| 3. AC and 35V Input Connector (J1) | 9. Motor Control Option |
| 4. DC Output Connector (J2)        | 10. Line Feed Solenoid  |
| 5. Input Connector                 | 11. Line Count Switch   |
| 6. In-Line Fuse                    |                         |

Figure 1-8. REAR VIEW OF 306



- |                                    |                             |
|------------------------------------|-----------------------------|
| 1. 35V Power Supply                | 5. Paper Out Switch         |
| 2. Power Transformer               | 6. Main Printer Harness     |
| 3. DC Output Connector (J2)        | 7. Motor Starting Capacitor |
| 4. AC and 35V Input Connector (J1) |                             |

Figure 1-9. REAR VIEW OF 306 (LOGIC/P.S. BOARD REMOVED)



**SECTIONS 2 AND 3**  
**INSTALLATION AND OPERATION**

A separate Series 300 Operators Manual contains most of the installation, set-up and operating procedures for the Model 306 printer. Reference should be made to this Operators Manual during normal printer installation and operation.

Included on the following pages is additional information not contained in the Operators Manual.

**2.1 SITE PREPARATION (Figure 2-1)**

A line drawing of the printer dimensions is shown in Figure 2-1.

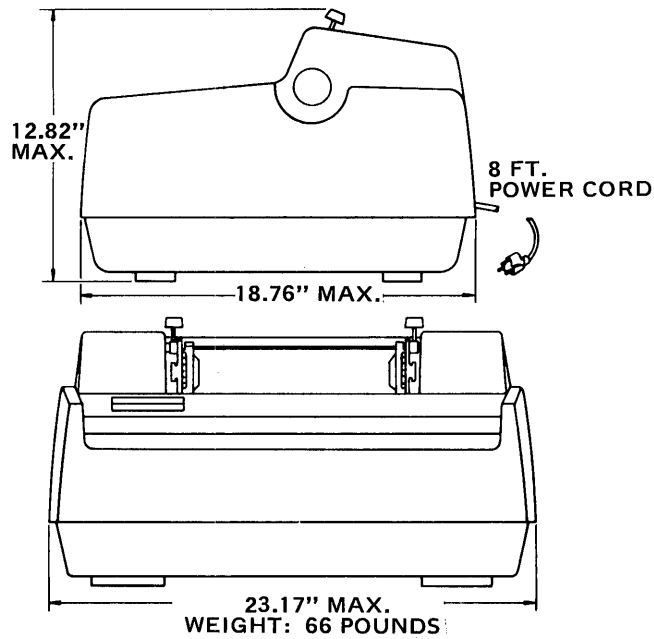


Figure 2-1. PRINTER DIMENSIONS

Environmental and electrical requirements at the installation site are as follows:

- |                        |  |
|------------------------|--|
| <u>Temperature:</u>    | 40° to 100°F (4° to 37.5°) (operating)<br>-40° to 160° F (-40° to 71° C) (storage) |
| <u>Humidity (%RH):</u> | 5% to 90% (no condensation) - operating<br>0% to 95% - storage                     |
| <u>Electrical:</u>     | 115 VAC ± 10%, 60 Hz<br>230 VAC ± 10%, 50 Hz                                       |



## 2.2 SHIPPING CRATE

The printer is shipped in a crate approximately 22 inches (55 cm) high, 27 inches (68 cm) deep and 28 inches (71 cm) wide. The crate is made of weatherized, triple-walled cardboard. When properly strapped, the packing crate and printer is capable of fork lift operation with a seven-high stacking capability.

Shipped with the printer are the following items:

- A. **Special Interface and Cable** - If a special interface is used, the interface card is included with the printer. For certain interfaces such as the RS232, a special cable is also shipped. Cabling requirements for the standard parallel interface are defined in Appendix B.
- B. **VFU Tape** - If optional Vertical Format Unit is installed, a standard vertical format paper tape providing six line feeds one inch for each vertical tab and 66 lines (11 inches) for each form feed code is provided. Refer to the Operators Manual for duplicating the existing tape, or if a different format is desired, generating a new tape.
- C. **Documentation** - All documentation describing that particular printer is included in a plastic bag under the printer. This documentation includes a technical manual for the printer and any optional interface, and a notice of all approved changes incorporated in the printer, but not documented in the manual. Please keep this documentation with the printer at all times so that accurate information will be available for troubleshooting purposes.
- D. **Pin Feed Knobs** - These knobs are contained in a small plastic bag stapled to the guide bar for the pin feed unit.
- E. **Print Sample** - A sample printout from that particular printer is included in the upper paper pan.
- F. **Unpacking/Repacking and Set-Up Instruction Sheet.**

## SECTION 4

### THEORY OF OPERATION

#### 4.1 INTRODUCTION

This section on the theory of operation contains a detailed description of each major function performed by the electronics in the Model 300/500 Series printers. Figure 4-1 shows a basic functional diagram of the printer electronics.

Throughout this section, reference is made to the schematic diagrams contained in Section 7. The section is organized as follows:

- Paragraph: 4.2 Basic Timing
- 4.3 Initializing the Printer (Prime, Select)
- 4.4 Data Input (Data, Strobe, Busy, Acknowledge)
- 4.5 Data Storage
- 4.6 Character Printing
- 4.7 Paper Movement (Line Feed, Vertical Tab, Form Feed)
- 4.8 Special Functions (Bell, Paper Empty, Delete, Motor Control)
- 4.9 Power Supplies
- 4.10 LSI Chips Inputs/Outputs

#### 4.2 BASIC TIMING

Timing for the printer electronics is provided by signal OSC, which is generated by Large Scale Integrated (LSI) circuit ME14. The OSC signal frequency ( $125 \text{ KHz} \pm 125 \text{ Hz}$ ) is determined by a crystal controlled oscillator (Y1, ME6, ME15).

The oscillator crystal (Y1) establishes a reference frequency of 4 MHz, which is divided by a 16-counter ME15 to provide a 250 - KHz signal at pin 26 of the 2010 LSI element (ME14). Element ME14 divides this signal by two, generating the OSC output signal of  $125 \text{ KHz} \pm 125 \text{ Hz}$ .

The OSC signal is used by LSI elements ME13, ME14 and ME28 for internal timing. It is also double inverted by ME37-2 and ME34-12 to generate signal OSCXT. Signal OSCXT is routed to printer interface connector for use by an optional interface card.

#### 4.3 INITIALIZING THE PRINTER

Before the printer can accept input data, a Prime and Select operation has to occur. The Prime operation initializes the printer logic to ready state. After causing a prime condition, the select operation resets the busy line to the interface connector and makes the printer ready to receive data. Prime on select can be disabled by jumper 3 to 14 on platform X1 (X1-3 to 14).

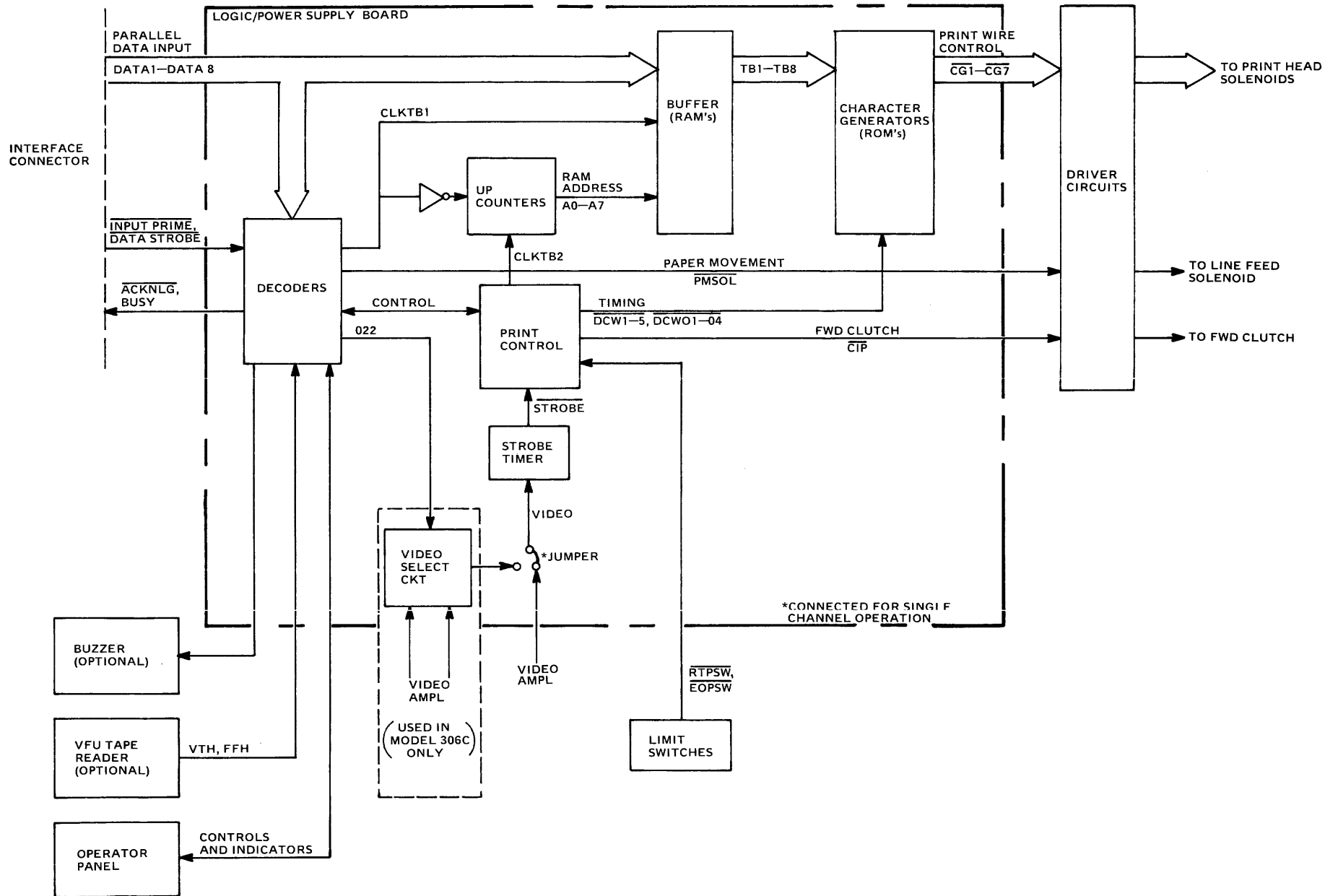


Figure 4-1. SERIES 300/500 BLOCK DIAGRAM

### 4.3.1 PRIME

The PRIME signal, generated by LSI ME14-37, is initiated by any of the following conditions:

- A. **Power Turn - on** - When the printer is powered - up, capacitor C7 is initially discharged causing a 100 to 500 - millisecond  $\overline{\text{PWR PRIME}}$  signal at ME14-32. This generates a high PRIME signal at ME14-37. As C7 charges to +5 Vdc,  $\overline{\text{PRW PRIME}}$  goes high, terminating the power prime operation.
- B. **Printer Selection** - If the Delete Inhibit option (DELINH) is not used (i.e., jumper X1-3 to 14 is connected), then a low  $\overline{\text{SLCT}}$  input to ME14-40 and a high DELINH to ME14-39 generates a 100 to 400 - microsecond PRIME pulse from ME14-37.
- C. **End of a Printed Line** - At the end of a line of print, CIPX from ME14-30 goes high, turning off the forward clutch and generating a 100 to 400 - microsecond PRIME pulse at LSI ME14-37.
- D. **Delete Code** - Receiving a delete code (octal 177)\* on input data lines  $\overline{\text{DS1}}$  through  $\overline{\text{DS7}}$  generates a low  $\overline{\text{DCPRM}}$  output from LSI ME13-8. Signal  $\overline{\text{DCPRM}}$  in turn initiates a 100 to 400-microsecond PRIME pulse from LSI ME14-37. Recognition of delete code can be inhibited with jumpers X4-15 to 1 and X4-9 to 7 (Delete Code Inhibit option).
- E. **Input Prime** - Reception of a low  $\overline{\text{INPUT PRIME}}$  signal via the interface connector generates a high IP signal into LSI ME13-36. This produces a  $\overline{\text{DCPRM}}$  output from LSI ME13-8 (same as the delete code), which in turn initiates a 100 to 400-microsecond PRIME pulse from LSI ME14-37.

In all the above cases, the high PRIME signal from LSI ME13-36 resets the printer logic and causes ME32-3 to generate a parallel enable signal for PE input of up-counters ME9 and ME10. This presets the outputs of the up-counters to conditions present on the jam inputs (pins 3, 4, 12 and 13 of ME9 and ME10). These inputs can be programmed for an 80 or 132 column printer via a jumper option (X2-4 to 13 for an 80-column printer).

### 4.3.2 SELECT/DESELECT

When the printer is selected, it is conditioned to receive and process data for printout. When deselected, only the Select (octal 021) or Delete (octal 177) code is recognized by the printer.

#### 4.3.2.1 Select

The printer is selected by either of the following conditions:

- A. Operation of the SELECT switch when the printer is deselected.
- B. Reception of an octal 021 code.

When the SELECT switch is depressed, a high SELSW signal appears at LSI input ME13-31. Approximately 2-8 milliseconds after SELSW goes low, a latch in LSI ME13 is set, causing the  $\overline{\text{SLCT}}$  output (LSI ME13-40) to go high.

The LSI select latch is also set when an octal 021 code, appearing on LSI ME13 inputs DS1-DS7, is added with ungated data strobe pulse DSTA.

\*Throughout this section, input codes are defined only by their first seven bits. However, bit 8 into the function decoder contained in LSI ME13 must be true ( $\pm$ OV).

### 4.3.2.2 Deselect

The printer is deselected (i.e., the internal select latch is reset in 2009 chip ME13) either by again pressing the SELECT switch or by an octal 023 appearing on data lines  $\overline{DS1-DS7}$  with a DSTA pulse. Alternately pressing the SELECT switch alternately selects and deselects the printer. Note that when power is turned on, PWRPRM resets the internal select latch so that the printer initially appears in a deselect state.

A high  $\overline{SCLT}$  signal at ME13-40 indicates that the printer is selected. This signal, inverted by ME16-12 ( $\overline{SLCT}$ ), lights the SELECT lamp on the operator panel.  $\overline{SLCT}$  is inverted by ME21-6, generating a SLCT signal to the interface connector.

If  $\overline{DELINH}$  jumper (X1-2 to 14) is connected, then selecting the printer will also cause a prime condition. If jumper X1-3 to 14 is connected, then selecting will not cause a prime condition.

## 4.4 DATA INPUT

Inputs to the printer consists of seven standard parallel data lines (DATA1 - DATA7), an active low DATA STROBE input, and an active low input prime (INPUT PRIME) line. The first seven data lines receive the 7 bit USASCII code shown in Figure 4-2.

b7 b6 b5 Bits					Column							
b4	b3	b2	b1	Row	000	001	010	011	100	101	110	111
					0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	\	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	\$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	
1	1	0	1	13	CR	GS	.	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	-	o	DEL

CONTROL CODES
STANDARD
OPTIONAL

NOTE: Underscore (octal 137) is replaced by a backarrow in the standard 9x7 matrix.

Figure 4-2. USASCII CODE

The optional eighth bit is used as a control bit to specify an elongated character or select an additional character set. The data strobe is used to synchronize input data with the printer electronics. The input prime line (INPUT PRIME) is used to prime the printer electronics.

The eight data inputs have a unity loading factor and are terminated by a 1K pull-up resistor to +5 volts. The DATA STROBE and INPUT PRIME inputs are terminated by a 470 ohm resistor to +5 volts. Note that with no input on DATA 8 line terminating resistor R15 holds the input at +5V and makes bit 8 appear as a ONE on the logic card.

In response to received data, the printer generates an  $\overline{ACKNLG}$  pulse to acknowledge reception of a character. If the received character caused the printer to perform some function such as paper movement, character printing, etc., the printer responds with a BUSY signal.

#### 4.4.1 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 pulse. 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.

Figure 4-3 provides the timing involved during a normal data input condition (not busy) or a busy condition in Centronics printers that use the 300/500 Logic/Power Supply Board (63060416).

##### 4.4.1.1 Normal Data Input - No Busy

As shown in Figure 4-3, each data line must be stable at least 1.0 microsecond before and after  $\overline{\text{DATA STROBE}}$ , and the  $\overline{\text{DATA STROBE}}$  pulse must be at least 1.0 microsecond long. In response to the received data, some 2.5 to 10 microseconds after the trailing edge of  $\overline{\text{DATA STROBE}}$ , the printer generates a 2.5 to 5.0 microsecond  $\overline{\text{ACKNOWLEDGE}}$  pulse, indicating that it is ready to receive additional data. As a standard feature, the printer will not recognize a data strobe pulse during the acknowledge delay interval. As an option, non-gated strobe is available.

##### 4.4.1.2 Data Input Causing Busy

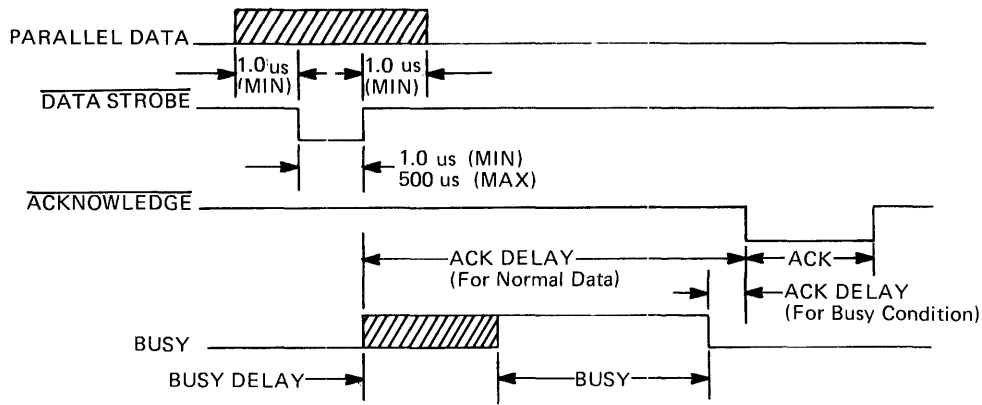
As shown in Figure 4-3, the printer responds to any of the functions listed in the table under Busy Duration by generating a  $\overline{\text{BUSY}}$  signal from 0 to 1.5 microseconds after the trailing edge of  $\overline{\text{DATA STROBE}}$ . As shown, the duration of  $\overline{\text{BUSY}}$  depends on the specific function being performed.

From 0 to 10 microseconds after  $\overline{\text{BUSY}}$  is terminated, the printer generates a 0.5 to 5.0-microsecond  $\overline{\text{ACKNOWLEDGE}}$  pulse to indicate that the specified function is completed.

#### 4.4.2 $\overline{\text{BUSY}}$

A busy indication is developed by LSI chip ME13 pin 11. This  $\overline{\text{BUSY}}$  output, normally high when the printer is not busy, goes low when any of the following conditions occur:

- A.  $\overline{\text{CSBSY}}$  goes low - This occurs during any one of the following conditions:
  - 1. During a bottom of form detection (VTH and FFH are high).
  - 2. When a paper motion command is received while the motor control circuit is timed out.  $\overline{\text{CSBSY}}$  goes low for approximately 300 milliseconds.
  - 3. When signal DMC goes high, indicating that a full line of data has been stored.
- B. PRIME goes high- This occurs during a prime operation as described in Section 4.3.1.
- C. LFF (internal to ME13) goes high - This occurs either when a form feed code (octal 014) is received or the optional TOP OF FORM switch on the operator panel is pressed. (Note: If the DSC option is used, the received FF code will first cause the line to be printed before activating LFF). LFF is normally reset by the trailing edge of DLYLF.
- D. LLF (internal to ME13) goes high - This occurs when a line feed code (octal 012) is received or the optional LINE FEED switch on the operator panel is pressed. LLF is reset by the trailing edge of DLYLF.



NORMAL DATA INPUT TIMING

	301	306	306C	500	501	588
ACK DELAY	2.5-10 usec	2.5-10 usec	2.5-10.0 usec	2.5-10 usec	2.5-10 usec	2.5-10.0 usec
ACK	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec

BUSY CONDITION TIMING

BUSY DELAY	0-1.5 usec	0-1.5 usec	0-1.5 usec	0-1.5 usec	0-1.5 usec	0-1.5 usec
ACK DELAY	0-10.0 usec	0-10.0 usec	0-10.0 usec	0-10.0 usec	0-10.0 usec	0-10.0 usec
ACK	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec	2.5-5.0 usec
<b>BUSY DURATION:</b>						
Line Feed	50 msec (single LF) 100 msec (double LF)	76 msec (single LF) 152 msec (double LF)	76 msec	76 msec (single LF) 152 msec (double LF)	50 msec (single LF) 100 msec (double LF)	76 msec
Vertical Tab (1-inch)	165-175 msec	310-320 msec	310 - 320 msec	310-320 msec	165-175 msec	310-320 msec
Form Feed (11-inches)	1.5-2.0 sec	2.8 - 3.3 sec	2.8 - 3.3 sec	2.8 - 3.3 sec	1.5-2.0 sec	2.8 - 3.3 sec
Delete	100-400 usec	100-400 usec	100-400 usec	100-400 usec	100-400 usec	100-400 usec
Bell	0	0	0	0	0	0
Select	100-400 usec	100-400 usec	100-400 usec	100-400 usec	100-400 usec	100-400 usec
Deselect	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected
Print Command	6 msec/char plus 50 msec LF	8.4 msec/char plus 76 msec LF	10 msec/char (10 cpi)* 8.4 msec/char (12 cpi) 6.6 msec/char (15 cpi) 6.0 msec/char (16.5 cpi) plus 76 msec (LF)	8.4 msec/char plus 76 msec LF	6 msec/char plus 50 msec LF	11.3 msec/char plus 76 msec LF
(Return time-no busy)	(270 msec max)	(270 msec max)	(270 msec max)	(400 msec max)	(400 msec max)	(400 msec max)

\*Cpi = Characters per inch

Figure 4-3. DATA INPUT TIMING

- E. LTF (internal to ME13) goes high - (Similar to the LFF signal) - LTF goes high when a vertical tab code (octal 013) is received and is reset by the trailing edge of DLYLF.
- F.  $\overline{\text{DCPRM}}$  goes low - This occurs under any of the following conditions:
  1. Reception of a delete code (octal 177).
  2. Reception of an  $\overline{\text{INPUT PRIME}}$  signal at the interface connector.
  3. During a power prime ( $\overline{\text{PWRPRM}}$ ) condition.
- G. REMCR (internal to ME13) goes high - This occurs when a control character is clocked into memory, indicating the start of a character printing operation. In the standard printer configuration, only the carriage return control code (octal 015) is stored into memory. However, if the DSC option is used (jumper X1-4 to 13), then a LF, VT, FF or CR code (octal 012, 013, 014 and 015, respectively) can be loaded into memory.
- H.  $\overline{\text{PMSOL}}$  goes low - This occurs while the paper movement solenoid is activated.
- I. FAULT goes high - This occurs under any of the following conditions:
  1. The printer is de-selected ( $\text{SCLT}'$  is low).
  2. The printer is out of paper ( $\overline{\text{PE}}$  is low).
  3. During a paper time-out condition.
  4. During a light detect (LD) error condition. Signal  $\overline{\text{LD}}$  goes low when there is not a video signal detected as the print head travels across the page.
- J. DLYLF goes high - This line feed delay occurs following a paper movement operation. The DLYLF signal is either approximately 40 or 60 milliseconds, depending on the printer configuration.

As shown in the timing diagram in Figure 4-3, BUSY can occur up to 1.5 microseconds after the trailing edge of  $\overline{\text{DATA STROBE}}$ . The worst case (1.5 usec) condition arises when CSBSY goes active. This occurs because of the accumulated delays in loading the last character in a line of data into memory, detecting a maximum count indication at  $\overline{\text{CO}}$  output ( $\overline{\text{CO}}$  low) of upcounter ME10, generating  $\overline{\text{CSBSY}}$  on LSI chip ME14 and finally generating  $\overline{\text{BUSY}}$  on LSI chip ME13.

#### 4.4.3 DECODERS

The buffered data inputs along with a data strobe input are applied to two decoder networks. One decoder network (First Decoder) is comprised of elements ME17 through ME20, ME26 and ME27. The other decoder network (Second Decoder) is contained in LSI chip ME13.

##### 4.4.3.1 First Decoder

The First Decoder (ME17 through ME20, ME26 and ME27) detects the following:

- A. Delete code (octal 177) for the delete code inhibit option.
- B. Character density select code (octal 022). This code is gated and is only used in the Model 306C printer.
- C. Special code (octal 034) for character elongation by line. This code is gated and is a special option.



#### 4.4.3.1.1 Delete Code Inhibit (option)

If the printer is configured with delete code inhibit (X4-16 to 1 and X4-10 to 7), detection of an octal code 177 on the data input lines causes a low output at ME26-3 (177). Signal 177 causes the following:

- A. Inhibits  $\overline{\text{CLKTB1}}$  pulses via ME32-11.
- B. Drives  $\overline{\text{DS6}}$  and  $\overline{\text{DS7}}$  high, converting octal 177 to octal 037. The Second Decoder (ME13) acknowledges (ACK) the code but does not initiate any function.

#### 4.4.3.1.2 Character Density Selection (Model 306C Only)

When jumper platform X4 pins 11 to 6 are connected and a hardwire connection is made between E1 and E2, this enables the Model 306C to select character density.

#### **CAUTION**

**E1 IS CONNECTED TO E2 ONLY  
FOR THE MODEL 306C, OTHERWISE  
DAMAGE WILL RESULT.**

Jumper X2-2 to 15 is also connected when the Model 306C printer is configured with an 80/132, 96/132, 80/120 or 96/120 dual-timing fence. This enables the Video Select Circuit to change the strobe delay time in the universal timing chip (ME28) from 660 to 370-microseconds when switching from 80 or 96 characters per full line to 132 or 120 characters per full line, respectively. See Appendix A for all timing programmed into ME28.

The detection of an octal 022 code sets latch output (ME20-11) high. This output is reset by PRIME. When ME20-11 goes high, it causes the following:

- A. Drives ME39-4 low. This output appears at jumper pin X2-2. When X2-2 to 15 is connected as described in the previous paragraph, the strobe delay time will change from 660 microseconds to 370 microseconds.

- B. Enables ME43-11 output to track CHAN2 video pulses. If the VIDEO CONT signal is high, set by a NORMAL/CONDENSED switch operation, reception of octal 022 code will cause ME43-11 output to track the video signal opposite to that selected by the switch and, depending on the printer configuration, changes the strobe delay timing.

#### 4.4.3.1.3 Character Elongation (Octal 034) - Special Option

When the printer is configured to recognize octal code 034 instead of 016 to elongate characters by line (X5-6 to 11 and X5-12 to 4), detection of octal code 034 and associated data strobe (DSTA) sets a latch (ME27), driving UCC SET low to ME14-21. The latch is reset by PRIME.

#### 4.4.3.2 Second Decoder

The Second Decoder is located in LSI chip ME13. The octal codes recognized by the Second Decoder are listed in Table 4-1. The table provides the following information:

- A. Code function
- B. Jumper (s) necessary to enable the code function.
- C. Signal mnemonic of the resultant output.
- D. Resulting printer action.

**Table 4-1. Second Decoder Code Recognition**

OCTAL CODE	FUNCTION	JUMPERS	ME13 OUTPUT MNEMONIC	PRINTER ACTION
007	Bell (Optional)	None	Bell	Generates an audible tone, 1 to 2 seconds in duration, via the speaker at the front of the printer.
012	Line Feed*	None	$\overline{\text{CSLF}}$ , $\overline{\text{PMSOL}}$	Advances paper one line.
013	Vertical Tab*	None	$\overline{\text{PMSOL}}$	Advances paper until the next hole is reached in channel 5 of the VFU paper tape.
014	Form Feed*	None	$\overline{\text{PMSOL}}$	Advances paper until the next hole is reached in channel 7 of the VFU tape.
015	Carriage Return	None	$\overline{\text{DSCR}}$	Prints line of stored data.
016	Elongated Characters	X5-1 to 15 X5-5 to 11 X5-12 to 4	$\overline{\text{UPSC}}$	Prints all characters in a line of data double the normal width.

OCTAL CODE	FUNCTION	JUMPERS	ME13 OUTPUT MNEMONIC	PRINTER ACTION
021	Select **	None	SLCT'	Can receive data. Jumper X1-3 to 14 inhibits a prime operation during select.
023	Deselect **	None	SLCT'	Will not recognize any input data except a Select (021) or Delete (177) code.
177	Delete **	None	<u>DCPRM</u>	Printer is primed. Note 1 If printer has the Delete Inhibit option, Delete code (177) will be acknowledged but not acted on. Note 2 In Model 306C only, the character density returns to that set by the NORMAL/CONDENSED switch.

\*If the DSC option is used (jumper X1-4 to 13), LF, VT, and FF also cause the stored line of data to be printed. If the printer does not have DSC option and the code is received in the middle of a line of data, paper is advanced immediately without loss of data.

\*\*This code will also be recognized during a busy condition.

In addition to functions listed in the Table 4-1, the Second Decoder monitors input data for the first printable character (i.e., a high on bit 6 or 7). Detection of the first printable character enables the printer to respond by printing the line of characters under either of the following conditions:

- A. Recognition of a carriage return code.
- B. If the DSC option is used, recognition of a Line Feed, Vertical Tab or Form Feed code.

#### 4.5 DATA STORAGE

The printer storage buffer consists of two Random Access Memory (RAM) elements. Up-counters are used to address the RAM elements and determine when there is a full line of characters in storage. Depending on a jumper option, 80 characters (X2-4 to 13) or 132 characters (X2-4 to 13 not connected) will be detected as a full line of data.

##### 4.5.1 TIMING OF UP COUNTERS AND RAM ELEMENTS

The actual timing involved depends on which one of the following printer operations is taking place:

- A. A prime condition.
- B. Data reception.
- C. Reception of a carriage return code (octal 015) prior to a full line of data (depending on mode of operation, the 80th or 132nd character in a line).
- D. Printing a line of characters.

#### 4.5.1.1 Priming the Up Counters

As shown in Figure 4-4, a prime condition will cause a positive pulse to appear at the preset enable (PE) input of up-counters ME9 and ME10. The leading edge of this signal presets the counters to the load conditions present on the jam inputs (pins 3, 4, 12 and 13) of each counter. These conditions are reflected on the RAM address bus lines A0 through A7. There are two load conditions:

- A. For an 80-column printer, where jumper X2-4 to 13 is connected to preset the counter to decimal count 175 (octal 257).
- B. For a 132-column printer, where jumper X2-4 to 13 is not connected and the counter is preset to decimal 123 (octal 173).

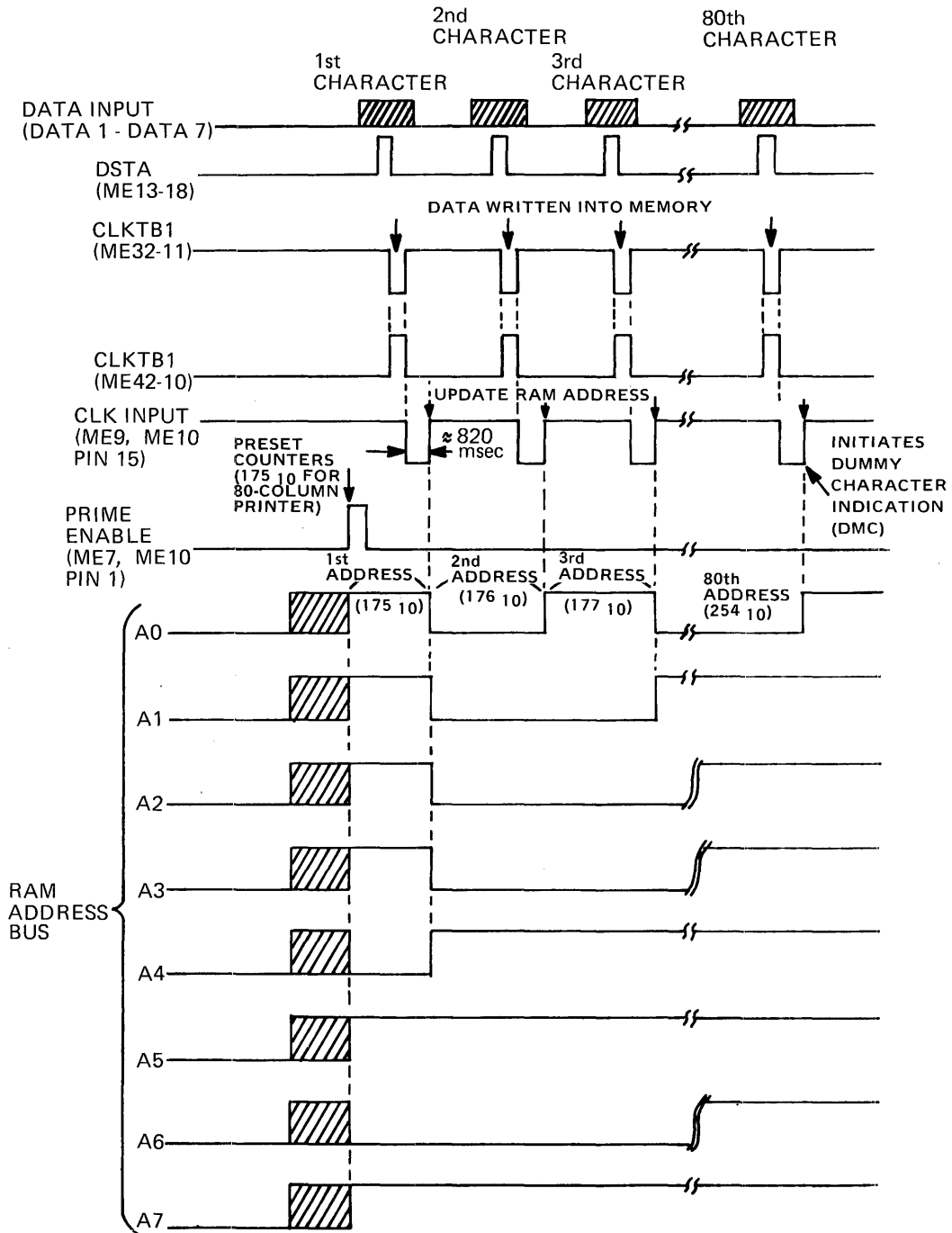


Figure 4-4. TIMING WHEN STORING DATA

#### 4.5.1.2 Normal Data Input

Each time a printable character or CR code (octal 015) is received during normal data input to the printer, LSI element ME13 causes the generation of  $\overline{\text{CLKTB1}}$  and CLKTB1, slightly delayed from data strobe.

Assume that a full line of data is being received and the board is configured for an 80-column/line printer (See Figure 4-4). The data strobe (DSTA) received with the first character in a line causes ME32-11 and ME42-10 to generate  $\overline{\text{CLKTB1}}$  and CLKTB1. During  $\overline{\text{CLKTB1}}$  the Random Access Memory (RAM) elements write the data for the first character into the preset RAM address (decimal 175 for an 80-column printer).

The trailing edge of CLKTB1 causes a clock signal (approximately 820 nanoseconds) to appear at CLK input of ME9 and ME10 pin 15. The trailing edge of this clock pulse increments ME9 to the next count, providing the next RAM address. The second character received by the printer is then written into this address. Approximately 820 nanoseconds later, the address for the third character appears on the RAM address bus. This sequence continues until the 80th character is received and written into RAM address decimal 254. On the trailing edge of this CLKTB1, the RAM address is updated to decimal 255. At this time, the carry out ( $\overline{\text{CO}}$ ) output (ME10 pin 7) goes low, indicating maximum count of ME10. The  $\overline{\text{CO}}$  output is gated and inverted via ME32-4, providing a dummy character indication (DMC) to the 2010 LSI input ME14-34. This causes the printer to go busy and activates the forward clutch.

#### 4.5.1.3 Following a Carriage Return

Following the reception of a carriage return code (octal 015), signal  $\overline{\text{DSCR}}$  goes low, providing a dummy character recognition (DMC) to LSI input ME14-34. This causes the printer to go busy and activates the forward clutch.

#### 4.5.1.4 During Character Printing

After a line of data has been stored and a start print condition is detected by LSI ME14, ME14-30 generates a  $\overline{\text{CIPX}}$  signal. This activates the forward clutch and causes the print head assembly to move along the timing fence.

The  $\overline{\text{CIPX}}$  signal remains low during the print cycle, providing a high at input ME31-9 and two signals ( $\overline{\text{CIPM}}$  and CIP) for the motor control logic.

As the print head assembly moves along the timing fence, the first window in the fence causes the logic to switch from DCWO time to DCW1 time and ME14-36 to generate a CLKTB2 pulse (Refer to Figure 4-5). Signals CLKTB2, CIPX and high output of ME31-12 are ANDed to generate a preset enable signal to up-counters ME9 and ME10 via ME32-3. This presets the counters to the first RAM address. Thus, the first character written into memory is the first character printed.

On the trailing edge of the first CLKTB2 pulse, ME31 is clocked, driving ME31-12 low. This enables ME27-11 to track each subsequent CLKTB2 pulse, updating the memory on the trailing edge of each DCWO interval.

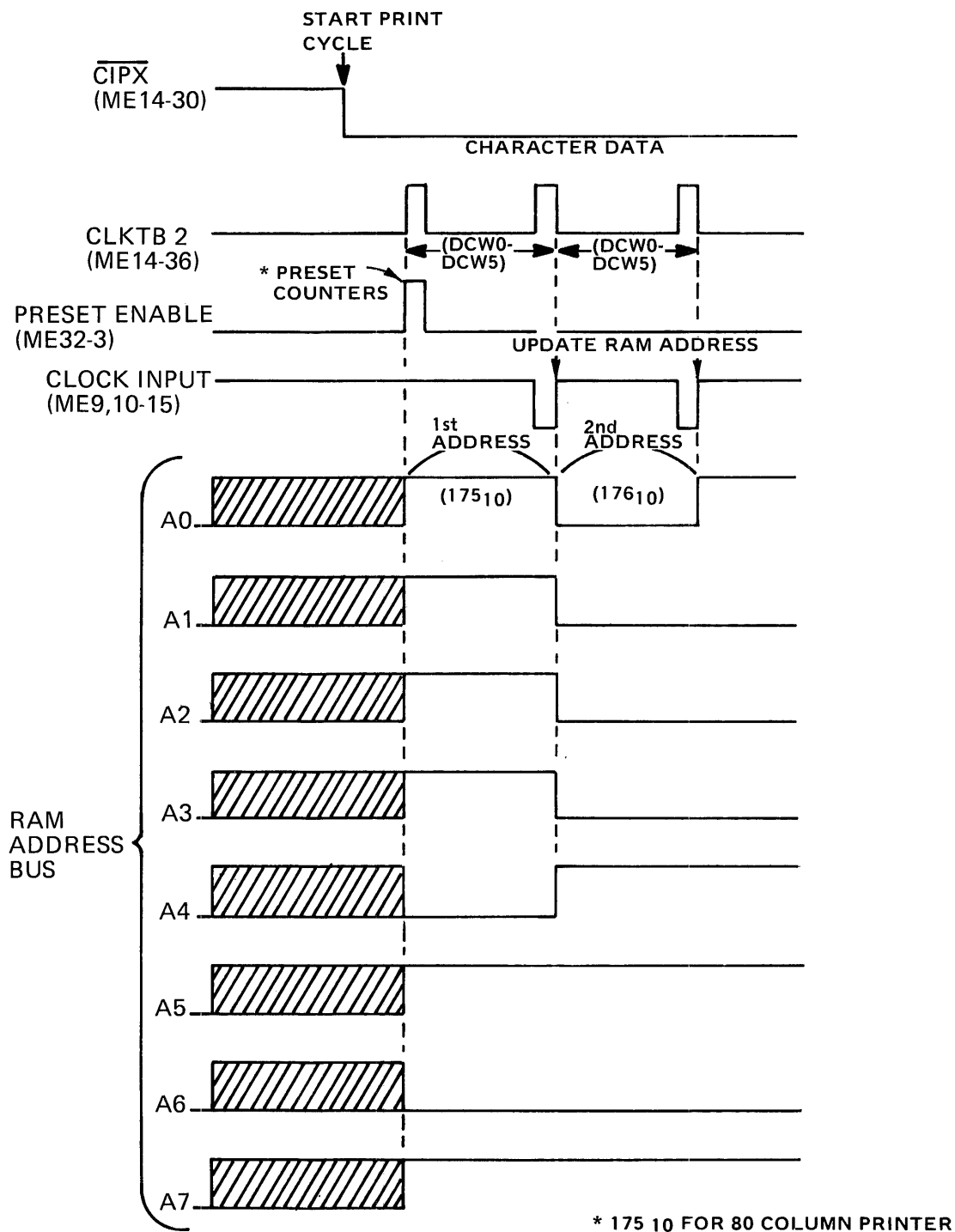


Figure 4-5. TIMING OF RAM ADDRESSING DURING PRINT CYCLE

## 4.6 CHARACTER PRINTING

Character printing is initiated when LSI chip ME14 detects a high on pin 14 (DMC) indicating a decoded Carriage Return or buffer full condition (up-counter ME10 reached maximum count). The DMC input to ME14 is recognized during any time except when ME14 generates  $\overline{CIPX}$  or PRIME. When DMC is recognized, the logic activates an electromechanical clutch that causes the print head to move from left to right across the page.

As the print head carriage moves across the page, the timing fence and optic pick-up assembly generates timing pulses to the video amplifier. These timing signals are used by the logic to register the five full-step columns of dots in the printed character.

Depending on whether a 5 x 7 or 9 x 7 character matrix is used for character generation, the logic uses either one or two Read-Only Memory (ROM) 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 four half-step columns in a 9 x 7 matrix.

This section describes the character printing operation in the following sequence.

### Paragraph 4.6.1 Initiating Print Operation

- 4.6.2 Character Registration and Timing
- 4.6.3 Character Generator (ROM)
- 4.6.4 Print Head Operation
- 4.6.5 Power Driver Circuits

### 4.6.1 INITIATING PRINT OPERATION

As data is received by the printer, the count is increased incrementally in the up-counters until the maximum count is reached (full line of data). This drives ME10-7 ( $\overline{CO}$ ) low, causing ME14-34 (DMC) to be driven high. This DMC input is also driven high when signal DSCR is driven low by the reception of a carriage return code (octal 015).

When LSI chip ME14 recognizes a high DMC signal, it generates a low carriage in print signal ( $\overline{CIPX}$ ).

As shown in Figure 4-6, the  $\overline{CIPX}$  signal is double inverted and routed to:

- A. Inverter ME34, where  $\overline{CIPM}$  is inverted by ME34-4 to generate CIP.
- B. The Motor Control circuit, where  $\overline{CIPM}$  resets a retriggerable 9-second one-shot. If a paper movement command (CSLF or PMSOLD) or another print command ( $\overline{CIPM}$ ) has not been received for nine seconds, a 300-millisecond Motor Delay (MTRDLY) signal is generated.

The MTRDLY signal causes a 300-millisecond busy condition while delaying the generation of CIP via ME29-8. The delay is effective when the printer has the Motor Control feature. The Motor Control feature is discussed in paragraph 4.8.4.

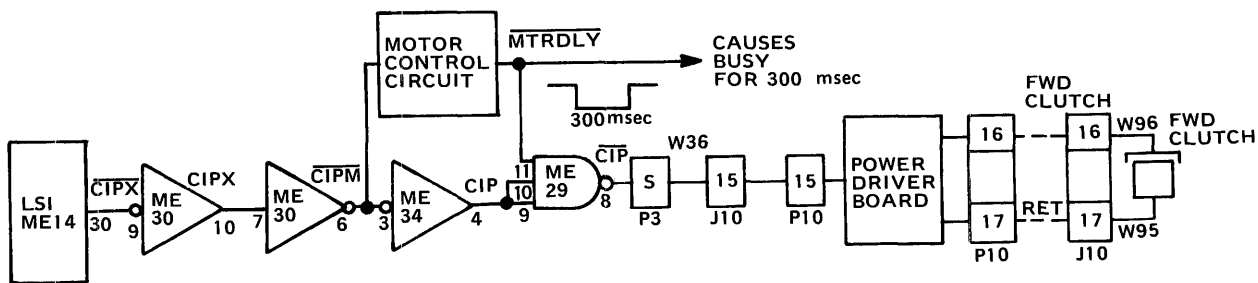


Figure 4-6. FORWARD CLUTCH INTERCONNECTION DIAGRAM

When signal  $\overline{CIP}$  goes low, it activates the forward clutch via the Power Driver Board, causing the carriage assembly to move from left to right.

A limit switch is located at the right (RTP switch) and left (EOP switch) end of print head travel. They are actuated by a magnet mounted on the underside of the carriage mechanism. Actuation of the RTP or EOP switch indicates that the carriage is at the extreme left or right position, respectively. Signals  $\overline{RTPSW}$  and  $\overline{EOPSW}$  generated by the switches are applied to LSI chip ME14 to control the forward clutch logic ( $\overline{CIPX}$ ) and to detect failure in the video signal from the timing fence (LD goes low).

When the  $\overline{EOP}$  switch is actuated or a control code is detected by LSI chip ME14 ( $\overline{TB6}$  and  $\overline{TB7}$  signal high),  $\overline{CIPX}$  goes high, turning off the forward clutch. This results in returning the print head to the left margin.

#### 4.6.2 CHARACTER REGISTRATION AND TIMING

As the carriage assembly moves from left to right, the optic pick-up assembly on the video amplifier board generates the video signal for controlling the print timing. As the print head moves across the page, the optic pick-up assembly scans the alternate transparent-opaque bar pattern on the timing fence, generating a video signal.

Depending on the timing fence and video amplifier used, single channel or dual channel (Model 306C Only), CHANNEL 1 or CHANNEL 1 and CHANNEL 2 signals will be generated and routed to the Logic/Power Supply Board (Logic Board) via the Power Driver board (See Figure 4-7).

If the single-channel timing fence and video amplifier are used, signal CHANNEL 1 is routed through a jumper (X4-5 to 11) to the VIDEO input of LSI chip ME28 on the logic board. If the dual-channel timing fence and video amplifier are used, signals CHANNEL 1 and CHANNEL 2 are routed to the Video Select circuit (ME39 and ME43) on the logic board. The signal selected by the Video Select circuit is routed through a jumper (X4-6 to 11) and appears at the universal timing chip ME28 as signal VIDEO.

#### NOTE

Signal CHANNEL 2 is routed via a hard-wire jumper (E1 to E2/Logic Board). This connection is made only when a dual-channel video amplifier is used (Model 306C).



The VIDEO signal causes ME28 to generate a  $\overline{\text{STROBE}}$  signal, initiating the print timing shown in Figure 4-8. (Timing shown for Model 306 and 500. For timing related to Model 301, 501, 588 and 306C printers, see Appendix A).

If a 9 x 7 dot matrix is used, the leading edge of  $\overline{\text{STROBE}}$  initiates a delay interval (internal to LSI chip ME28) between  $\overline{\text{STROBE}}$  and Delayed Strobe (DLYSTB). The duration of the  $\overline{\text{STROBE}}$  and DLYSTB pulses are the same. In normal character printing,  $\overline{\text{STROBE}}$  is used for full-step timing and DLYSTB for the half-step timing.

#### 4.6.2.1 Video Amplifier

The single-channel (63060330-4001) or dual-channel (63060374-4002) video amplifier assembly is mounted on the carriage assembly. Each video amplifier channel consists of a photo transistor in the optic pick-up assembly and a comparator circuit. The phototransistor converts the light monitored through the timing fence into an analog video signal. This signal causes the comparator to generate a pulsing output (VIDEO) that is routed to the logic board via the power driver board (See Figure 4-7). The duty cycle of VIDEO is set by the potentiometer connected to the other comparator input.

When the dual-channel video amplifier is used (Model 306C Only), the VIDEO 1 output reflects the top bar pattern on the timing fence, while VIDEO 2 reflects the lower bar pattern.

#### 4.6.2.2 Video Select Circuit (Model 306C Only)

The Video Select Circuit is located on the logic board and consists of elements ME39 and ME43. This circuit selects either CHANNEL 1 or CHANNEL 2 signal as a VIDEO input to the universal timing chip ME28 and, depending to the timing fence used, can change the strobe delay time via the MODE input of ME28.

The Video Select circuit has four inputs:

- A. Two control lines - VIDEO CONT and input from First Decoder (022).
  - 1. VIDEO CONT - This input is low when the NORMAL/CONDENSED switch is set to NORMAL position and goes high when the switch is set to the CONDENSED position.
  - 2. Input from First Decoder (022) - This is a gated input and goes high when a octal 022 is monitored on the printer input data lines.
- B. The video signal inputs - CHANNEL 1 and CHANNEL 2. These signals are generated by the dual-channel video amplifier during carriage movement.

During a prime condition, PRIME resets the 022 input from the First Decoder, driving ME39-11 high. When the NORMAL/CONDENSED switch is set to NORMAL position, VIDEO CONT is low and sets exclusive OR gate output ME39-11 low. This drives the MODE output (ME39-4) high and enables the VIDEO output (ME43-11) to track the CHANNEL 1 signal. If the switch is set to the CONDENSED position, the MODE output goes low and the VIDEO output tracks the CHANNEL 2 signal.

When an octal 022 code is detected, ME39-13 input is driven high. This input is OR'ed with the VIDEO CONT signal, causing the VIDEO output to track the signal opposite to the signal selected by the NORMAL/CONDENSED switch setting. The state of the MODE output is changed accordingly.

#### 4.6.2.3 Strobe and Delay Strobe Timing

The universal timing chip (ME28) generates the  $\overline{\text{STROBE}}$  and DLYSTB signals. The timing of these signals, along with a delay between STROBE and DLYSTB (internal to ME28), are determined by the conditions set by the X2 jumper platform configuration. See Appendix A, it provides all the timing set by the X2 jumper platform according to the printer model and timing fence used in the printer.

In the Model 306C, the strobe delay time is selected by the Video Select Circuit via jumper X2-2 to 15 whenever the printer is configured with an 80/132, 96/132, 80/120 or 96/120 dual-timing fence. The strobe delay time is changed from 660 to 370 microseconds when the printer switches from 80 or 96 characters per full line to 132 or 120 characters per full line, respectively.

#### 4.6.2.4 Matrix Column Timing

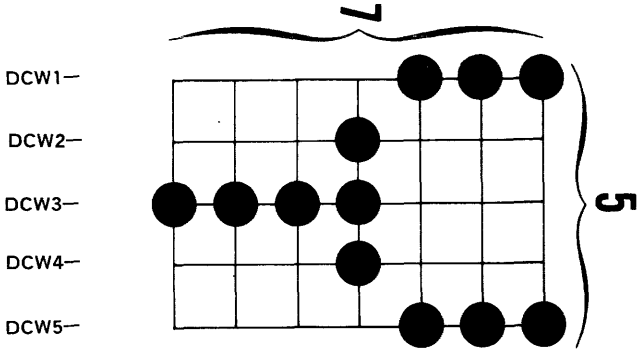
The LSI element ME14 has two strobe counters. They establish the timing involved to print each column in the 5 x 7 or 9 x 7 dot matrix of a character (See Figure 4-9). One strobe counter (full-step) is clocked by the trailing edge of  $\overline{\text{STROBE}}$ . The other counter (half-step) is clocked by the trailing edge of DLYSTB.

The full-step counter establishes times DCW0 through DCW5. Time DCW0 corresponds to the space between characters.

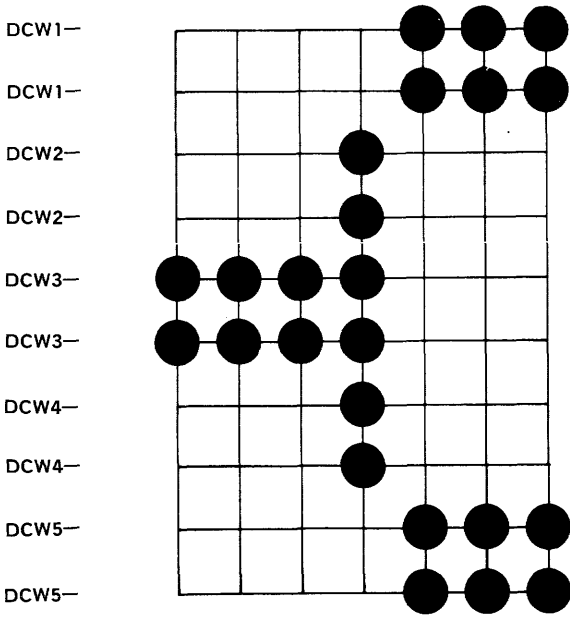
During time DCW1 through DCW5, ME14 generates signal  $\overline{\text{DCW1}}$  through  $\overline{\text{DCW5}}$ . These signals correspond to the full step columns in the 5 x 7 or 9 x 7 dot matrix.

The half-step counter establishes times DCW01 through DCW04 and causes ME14 to generate signals  $\overline{\text{DCW01}}$  through  $\overline{\text{DCW04}}$ . These signals correspond to the half-step columns in a 9 x 7 matrix.

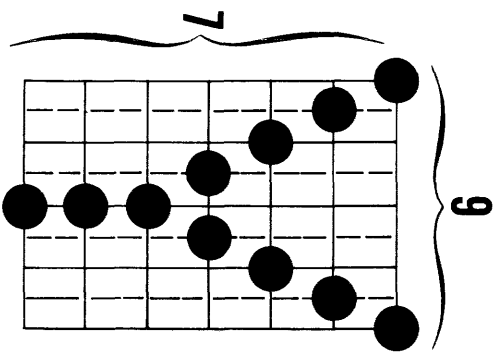
During elongated character printing, the UCC latch (internal to ME14) allows alternate  $\overline{\text{STROBE}}$  and DLYSTB pulses to clock the full-step and half-step counters, respectively. This results in all full and half-step DCW times being twice as long during elongated character printing than during normal printing.



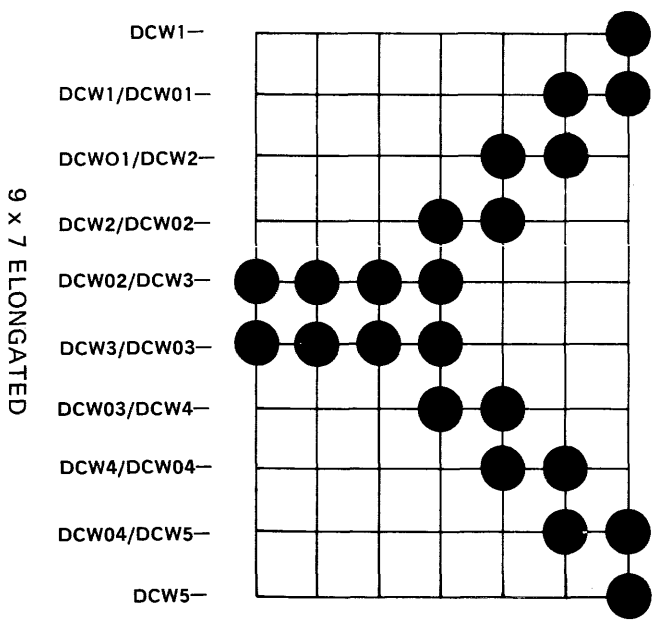
5 x 7 NORMAL



5 x 7 ELONGATED



9 x 7 NORMAL



9 x 7 ELONGATED

Figure 4.9. DCW TIMING, NORMAL AND ELONGATED CHARACTERS

### 4.6.3 CHARACTER GENERATOR (ROM)

The character generator network is located on the logic board and provides the character formation data used to determine which print-head solenoid to drive.

In the network, up to four Read Only Memory (ROM) elements can be used, depending on the selected character generating capabilities of the printer:

- A. 5 x 7, 64-character set - ME3 or ME4.
- B. 9 x 7, 64 character set - ME3 and ME1, or ME4 and ME2.
- C. 9 x 7, 64-character set and 5 x 7, 64-character set - ME3, ME4 and ME2.
- D. 9 x 7, 96-character set - ME3, ME1, ME4, ME2.

Each ROM element has three types of inputs (in addition to the input voltages) that consist of the modified character code ( $\overline{TB1}$ - $\overline{TB5}$ ), column address ( $\overline{DCW1}$ - $\overline{DCW5}$ ,  $\overline{DCW01}$ - $\overline{DCW04}$ ) and a timing input (pin 28).

- A. **The modified character code** - Outputs  $\overline{TB1}$ - $\overline{TB5}$  from the RAM elements (ME11 and ME12) are buffered and applied to five of the six character inputs of all ROM's. For the ROM's in element locations ME4 and ME2, the sixth character code input is controlled by  $\overline{TB6}$ . For the ROM's in locations ME3 and ME1, the sixth character code input is controlled by  $\overline{TB6}$  or TB7, depending on a jumper option (X3-2 to 14 for  $\overline{TB6}$ , X3-3 to 14 for TB7).
- B. **Column Address** - Timing outputs  $\overline{DCW1}$  through  $\overline{DCW5}$  from LSI chip ME14, specify the five full-step columns in each 5 x 7 or 9 x 7 character matrix in ROM's ME3 and ME4. Timing outputs  $\overline{DCW01}$  through  $\overline{DCW04}$  specify the four half-step columns in each 9 x 7 matrix in ROM's ME1 and ME2.
- C. **Timing** - A low input to pin 28 of each ROM gates the 7-bit dot configuration of the addressed character and column to the output of that ROM. For the full-step ROM's (ME3 and ME4), this timing input is  $\overline{STROBE}$  ANDed with  $\overline{ROMTB8}$  or  $\overline{ROMTB8}$ . By jumper option,  $\overline{ROMTB8}$  can be  $\pm 0V$ , +5V, EN7, TB8 or  $\overline{TB8}$ , allowing the selected one of these inputs to enable the ROM. The STROBE pulse provides the timing input for gating the 7-bit dot pattern to the print head solenoids.

For the half-step ROM's (ME1 and ME2), the timing input is ROME2 ANDed with  $\overline{ROMTB8}$  or  $\overline{ROMTB8}$ . For normal character printing, ROME2 generated by LSI chip ME14, is coincident with Delayed Strobe signal DLYSTB. This effectively interleaves the dot pattern from the half-step ROM's with the dot pattern from the full-step ROM's.

For elongated character printing, ROME2 is coincident with the STROBE signal. This, combined with the fact that the DCW timing signals from LSI chip ME14 are twice as long during elongated character mode, causes the printed character to be twice as wide as normal characters. An example of the character (Y), both in normal and elongated style, is shown in Figure 4-9.

The seven outputs from all four ROM's are wire ORed together and gated out to the Power Driver board as signal CG1 through CG7. In normal operation, the STROBE or DLYSTB signal gates the addressed dot column to the Power Driver board. On the logic board, the input to ME8 pins 9 and 10 is normally low, holding the output constantly high and enabling the CG output gates. If, however, there is a failure in the -12V supply, then ME8-9 and 10 go high, forcing ME8-8 low and disabling the CG gates.

#### 4.6.4 PRINT HEAD OPERATION

The print head is the device used to do the impact printing of the characters. The head contains seven solenoids that move the print wires against the ribbon to form the column of dots on the paper. The position of these solenoids and the location of the print wires in the head are shown in Section 1.

Solenoid #1 controls the top dot and solenoid #7 controls the bottom dot in a column. The wires come from each solenoid and are positioned at a jewel located at the end of the head. The length of these wires is approximately 3.5 inches and each wire requires about one ounce of force to begin its movement. The amount of force needed to move the wires 0.015 inch (i.e., the distance necessary to make a dot on the paper) is about 12 ounces.

The total distance travelled by the wires is approximately 0.015-inch, but under normal operation, the end of the head is about 0.006 inch from the ribbon and paper. The reason for locating the wires closer than 0.015 inch from the paper, is to account for the amount of force absorbed by the ribbon and paper upon impact.

The electrical timing and mechanical movement of the wires is shown in Figure 4-10. As shown, a 475 to 525-microsecond pulse is used to complete the impact. The voltage used to drive the solenoids is +35 Vdc unregulated. This voltage is about +35 to +38 Vdc when the pins are in an idle state, but drops to about +30 Vdc when all pins are engaged at the same time. From the beginning of the 475 to 525-microsecond drive pulse, about 200 microseconds is required before the wire starts to move in each solenoid. Once the wire starts moving, an additional 300 microseconds is required before the wire makes an impact on the paper. Approximately 500 microseconds more are required for the wire to retract to its normal position.

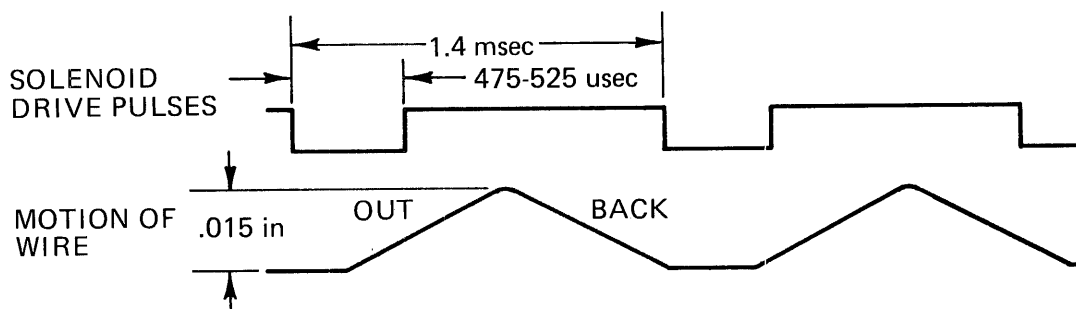


Figure 4-10. PRINT HEAD TIMING

#### 4.6.5 POWER DRIVER CIRCUIT

The power driver circuits are located on the Power Driver Board and are used to drive the print-head solenoids and activate the forward clutch.

##### 4.6.5.1 Solenoid Drivers

Signals  $\overline{CG1}$  through  $\overline{CG7}$  from the character generator on the logic board are applied to the solenoid power driver circuits on the Power Driver Board. The driver circuits invert and amplify the signals to generate current pulses for driving solenoids in the print head.

Since all solenoid driver circuits operate in the same manner, only the first one, which consists of inverter ME2 (pins 5 and 6) and transistor Q2, will be discussed.

During a quiescent condition, signal  $\overline{CG1}$  is high, inverter output ME2-6 is low ( $\pm 0V$ ) and transistor Q2 is off. When  $\overline{CG1}$  goes low, ME2-6 goes high, forward biasing the base of transistor Q2. This turns Q2 on and causes current to flow through 1.5 ohms resistor R4, transistor Q2 and solenoid L1 to the +35 volt supply. Resistor R4 limits the current to approximately 2.5 amperes, which is required to drive the solenoid.

When signal  $\overline{CG1}$  returns high, transistor Q2 turns off, de-energizing solenoid L1. The de-energizing of the solenoid tends to cause ringing. Any ringing voltage above +35 volts forward biases diode CR2 and is absorbed by capacitor C1 and resistor R5.

##### 4.6.5.2 Forward Clutch Driver

The main drive motor moves the print head from left to right via an electromechanical clutch (forward clutch) mechanism. The forward clutch is controlled by signal  $\overline{CIP}$  from the logic board. This signal is applied to a driver circuit on the Power Driver Board, which activates the clutch.

The forward clutch driver circuit is similar to the solenoid driver circuit discussed in paragraph 4.6.5.1. When signal  $\overline{CIP}$  goes low, inverter output ME1-8 goes high driving transistor Q15 on. The collector current flows through the clutch and current-limiting resistor R38 to the +35 volt supply. When  $\overline{CIP}$  goes high, Q15 turns off and deactivates the clutch. Diode CR16 and Resistor R37 are provided to eliminate ringing when the clutch is deactivated.

##### 4.6.5.3 Clamp Circuit

The clamp circuit is connected to the input of all driver circuits and prevents any of them from activating during power turn off.

While the printer is energized, zener diode CR21 reverse biases emitter of transistor Q18, thus holding Q19 off. This enables zener diode CR22 to provide a clamp voltage of +4.7 volts. This reverse biases the clamp diodes connected to the base of each transistor in the driver circuits.

When the printer is de-energized, the +5 volt supply output goes to zero volts before the +35 volt supply. This forward biases transistor Q18, turning on Q19 and clamping the base of each transistor in the driver circuits to ground. This prevents the transistors from turning on and driving the solenoid.

## 4.7 PAPER MOVEMENT

Three printer functions can cause a paper movement operation: line feed, form feed, and vertical tab. Each of these functions cause the paper to move by activating the paper movement solenoid, which in turn activates a clutch that mechanically links the main drive motor to the paper-feed tractors.

For each line feed operation, the solenoid is energized for 10 or 16 milliseconds, depending on the printer model (see Appendix A). At the end of this interval and again depending on the printer model, a 40 or 60-millisecond line feed delay is initiated to allow the clutch pawl and clutch mechanism to return home before another paper movement operation is allowed.

In response to a form feed or vertical tab command, the solenoid is energized, enabling continuous paper movement. The paper movement is terminated by the reception of a delete code (octal 177), an INPUT PRIME signal appearing at the interface connector, or a paper time-out condition.

If the optional Vertical Format Unit (VFU) is used, paper movement is terminated by the detection of a hole in the appropriate channel of the vertical format paper tape. Operation of the VFU is described in Section 4.7.4.

To prevent the printer from slewing paper continually, the LSI chip ME13 on the logic board has a time-out circuit. This circuit is activated by any paper movement command. The paper time-out interval is approximately 6-9 seconds. If, at the end of this time, paper is still advancing, the line feed solenoid command (PMSOL) is deactivated, terminating the paper movement operation and causing a fault condition.

As paper moves in the printer, each line advance causes a line count switch located in the form feed mechanism to open and close. The two wires from this switch go to the interface connector via the logic card. As a result, a line count level from the input device is switched on and off by the printer for each line advance. If the printer does not have the optional VFU, the user's software controls vertical formatting by counting these line count pulses and terminates the paper movement operation when appropriate.

### 4.7.1 LINE FEED

The line feed operation can be initiated by any of the following conditions:

- A. At the end of a printed line when the printer has automatic line feed (X1-11 to 5 connected) - The trailing edge of signal  $\overline{CIPX}$  causes LSI chip ME28 to generate an LF signal.
- B. Reception of a line feed code (octal 012) - LSI chip ME13 decodes a line feed character and generates a 5 to 10-microsecond  $\overline{CSLF}$  pulse. The trailing edge of  $\overline{CSLF}$  causes LSI chip ME28 to generate an LF signal.
- C. Depressing the optional LINE FEED switch on the operator panel- Depressing this switch causes  $\overline{REMLF}$  to go low. This low input to LSI chip ME13 generates a 5 to 10-microsecond  $\overline{CSLF}$  pulse. The trailing edge of  $\overline{CSLF}$  causes LSI chip ME28 to generate an LF signal.

The LSI element (ME28) generates the Line Feed (LF) and Delay Line Feed (DLYLF) signals. Depending on the X2 platform configuration on the logic board, the LF signal can be 10 or 16 milliseconds and the DLYLF signal can be 40 or 60 milliseconds. Refer to Appendix A for the timing jumper connections, according to the printer model.

The double line feed option is enabled by platform X5, jumper 7 to 10, and controlled by the optional switch on the control panel. When the switch is in the double line feed position, it enables DBLF to be driven high. This causes ME28 to generate two Line Feed (LF) pulses for every line feed command (ALF or CSLF'). When the switch is in the single line feed position, DBLF is kept low, causing ME28 to generate only one LF pulse for every line feed command.

As shown in Figures 4-11 and 4-12, when LF is high, LSI element ME13 generates PMSOL. Signal PMSOL is inverted to clock ME31-3 and double inverted (PMSOLD) to activate the line feed solenoid via the Power Driver board. The trailing edge of PMSOL triggers the delay line feed signal (DLYLF). During both LF and DLYLF signals, the printer remains busy. As shown in Figure 4-5, the busy condition is also maintained through the second line feed of a double line feed operation.

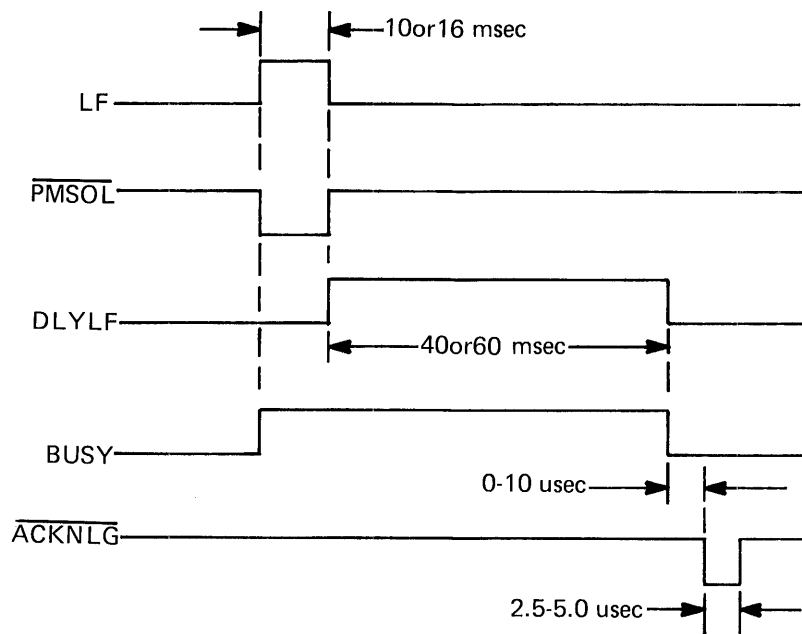


Figure 4-11. SINGLE LINE FEED TIMING



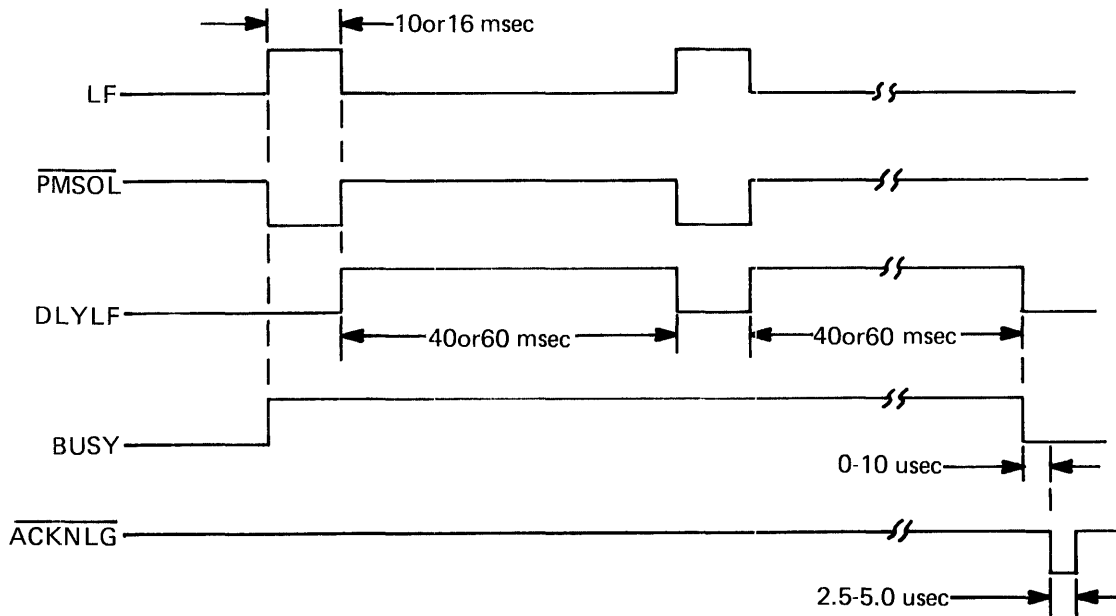


Figure 4-12. DOUBLE LINE FEED TIMING

#### 4.7.2 FORM FEED

A form feed operation can be initiated by either of the following two conditions:

- A. Reception of a form feed code (octal 014) - LSI chip ME13 decodes the form feed character and generates a low  $\overline{\text{PMSOL}}$  signal to activate the line feed solenoid. If the DSC option is used (X1-4 to 13), the line is printed before  $\overline{\text{PMSOL}}$  is activated.
- B. Depressing of the optional TOP OF FORM switch on the operator panel - This generates a low  $\overline{\text{TOFSW}}$  signal, causing LSI chip ME13 to generate a low  $\overline{\text{PMSOL}}$  signal.

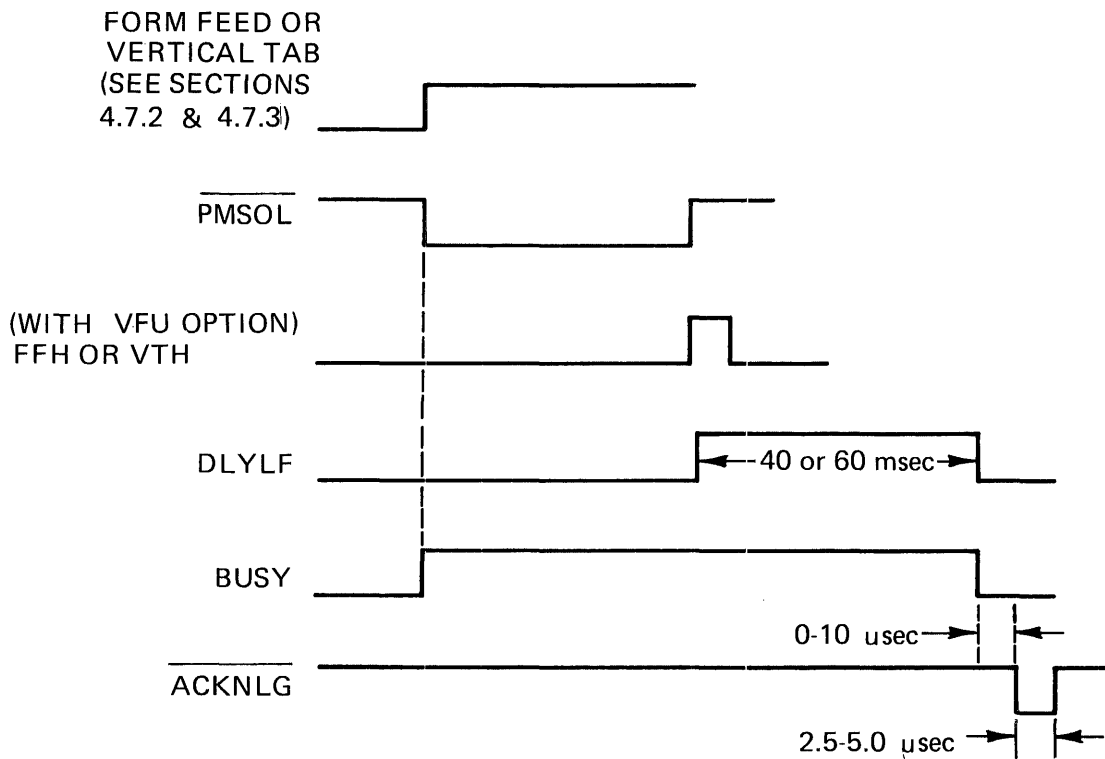


Figure 4-13. FORM FEED AND VERTICAL TAB TIMING

The low  $\overline{\text{PMSOL}}$  signal activates the line feed solenoid and generates a busy condition. This continues until one of the following conditions occurs:

- A. The input device terminates the operation by sending a delete code (octal 177) or an  $\overline{\text{INPUT PRIME}}$  signal, deactivating  $\overline{\text{PMSOL}}$ .
- B. A paper time-out condition is detected, at which time  $\overline{\text{PMSOL}}$  is deactivated and the FAULT line is activated.
- C. If the VFU is used, a hole is detected in channel 7 of the paper tape. This generates a high FFH input to LSI chip ME13, which deactivates  $\overline{\text{PMSOL}}$ .

The printer remains in a busy condition during  $\overline{\text{PMSOL}}$  and  $\overline{\text{DLYLF}}$ .

#### 4.7.3 VERTICAL TAB

A vertical tab operation is initiated by receiving a vertical tab code (octal 013). LSI chip ME13 decodes the vertical tab character and generates a low  $\overline{\text{PMSOL}}$  signal. If the DSC option is used (X1-4 to 13), the line is printed before  $\overline{\text{PMSOL}}$  is activated.

The low  $\overline{\text{PMSOL}}$  signal initiates the paper movement and generates a busy condition. This continues until one of the following conditions occurs:

- A. The input device terminates the operation by sending a delete code (octal 177) or an  $\overline{\text{INPUT PRIME}}$  signal, deactivating  $\overline{\text{PMSOL}}$ .
- B. A paper time-out condition is detected, at which time  $\overline{\text{PMSOL}}$  is deactivated and the FAULT line is activated.
- C. If the VFU is used, a hole is detected in channel 5 of the paper tape. This generates a high FFH input to LSI chip ME13, which deactivates  $\overline{\text{PMSOL}}$ .

The printer remains in a busy condition during  $\overline{\text{PMSOL}}$  and  $\overline{\text{DLYLF}}$ .

#### 4.7.4 VERTICAL FORMAT UNIT (OPTIONAL)

The vertical format unit (VFU) consists of a standard 8-channel paper tape reader, located on the upper left side of the printer. Movement of the paper tape in the VFU is caused by direct mechanical linkage to the gear train that drives the paper feed tractors. As a result, each line feed advances the paper by one line and the tape by one sprocket hole.

As shown in Figure 4-14, holes detected in Channel 5 or 7 of the tape generate signals that are amplified by a VFU amplifier contained in the tape reader unit. Each channel in the vertical format control tape reader contains an input photo transistor, driving an emitter follower amplifier. When the photo transistor receives light, current flows through it and into the base of the emitter follower, generating a +5V output.

The two amplifier outputs CHANNEL 5 and CHANNEL 7 are then applied to the logic board and ME13 as VTH and FFH. A 2-4 millisecond delay is designed into ME13 for noise immunity.

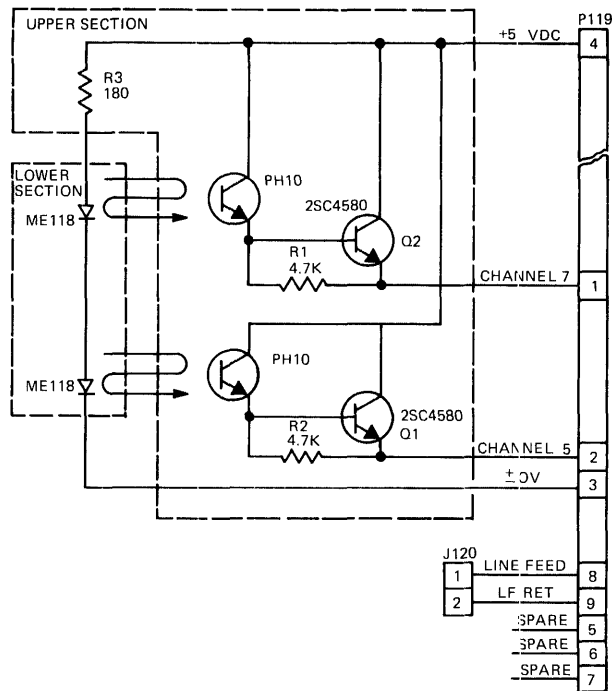


Figure 4-14. SCHEMATIC – VERTICAL FORMAT UNIT

#### 4.7.5 BOTTOM OF FORM DETECTION (OPTIONAL)

This option involves a bottom of form circuit and can only be used in conjunction with the optional Vertical Format Unit (VFU). The bottom of form circuit (ME32, 33, 38, 42 and 43) is located on the logic board. This circuit, when enabled by jumper X4-4 to 3, detects bottom of form indications on the VFU tape.

As shown in Figure 4-15, if during a paper movement operation holes appear in coincidence in channel 5 and 7, the following occurs:

- A. ME38-3 is clocked, driving ME38-1 high.
- B. LSI ME13 outputs  $\overline{\text{PMSOL}}$  and  $\overline{\text{DLYLF}}$  are driven high. This temporarily terminates paper movement.

The trailing edge of this  $\overline{\text{DLYLF}}$  clocks ME38-11. This causes the following:

- A. Drives  $\overline{\text{CSBSY}}$  low, keeping the printer busy (BUSY).
- B. Resets output ME38-1.
- C. Generates signal  $\overline{\text{TOF}}$ .

When  $\overline{\text{TOF}}$  goes low,  $\overline{\text{PMSOL}}$  is driven low. This restarts the paper movement operation and continues the operation until a top of form indication is detected (hole in channel 7). This drives signal FFH high, causing the termination of paper movement and generation of DLYLF by ME28. On the trailing edge of DLYLF,  $\overline{\text{TOF}}$  signal is driven high and busy condition is terminated. An acknowledge is sent 0-10 microseconds later.

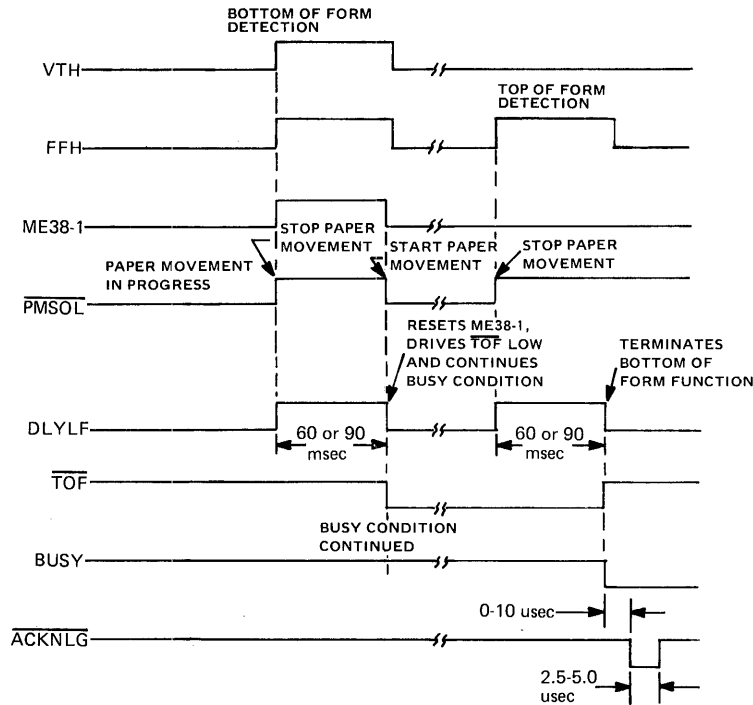


Figure 4-15. TIMING DURING BOTTOM OF FORM FUNCTION

#### 4.7.6 LINE FEED SOLENOID DRIVER

Logic signal  $\overline{\text{PMSOL}}$  from LSI chip ME13 is double-buffered on the logic board by ME42 and ME16 to generate  $\overline{\text{PMSOLD}}$  to the Power Driver board. When  $\overline{\text{PMSOLD}}$  goes low, ME1-10 on the Power Driver board goes high turning on Q16. This allows current to flow through R40, the line feed solenoid and into the collector of Q16, activating the solenoid. R51 limits the current flow.

When  $\overline{\text{PMSOLD}}$  goes high (inactive), the output of ME1-10 goes low, turning off Q16. The solenoid current then decays through R40 and CR9.

The CLAMP input to the solenoid driver circuit is described in Section 4.6.5.3.

## 4.8 SPECIAL FUNCTIONS

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

### 4.8.1 BELL (OPTIONAL)

The following description applies only if the optional speaker (526825001) and speaker amplifier is included in the printer. Reception of a bell code (007) or detection of a paper empty condition ( $\overline{PE}$  goes low), causes a BELL signal to be generated on LSI chip ME13 pin 39. This BELL signal is a 0.8 to 1.6 KHz output approximately one to two seconds in duration. BELL is amplified by Q1 and Q2 then routed through P3-5 and 7 to drive the speaker.

A BELL code does not create a busy condition. A paper empty condition, however, still generates a BUSY.

### 4.8.2 DELETE

The delete code resets the printer logic by generating a prime condition. Reception of a delete code (octal 177) on the input data lines ANDed with the ungated data strobe  $\overline{DSTA}$ , sets a latch in LSI chip ME13, causing a low  $\overline{DCPRM}$  output at pin 8 of that chip. The low  $\overline{DCPRM}$  into LSI chip ME14 generates a high PRIME signal at ME14-37, resulting in a prime operation as described in Section 4.3.1.

Note that since the delete code is gated with  $\overline{DSTA}$ , the delete code is recognized by the printer even when the printer is busy.

### 4.8.3 PAPER EMPTY

A paper empty condition in the printer is detected by the Paper Out switch (S6) located in the path of the paper. With paper in the printer, signal  $\overline{PE}$  is high. After the last page passes over the Paper Out switch, signal  $\overline{PE}$  goes low. The low  $\overline{PE}$  into LSI chip ME13 on the logic board causes the following:

- A. Sets a latch internal to ME13, generating a 1-2 second BELL output.
- B. A high FAULT output (ME13-9).
- C. Lights the PAPER OUT lamp on the operator panel.

If the speaker option is used, the BELL output causes an audible alarm, warning the operator of the paper empty condition. The high FAULT output, in addition to causing a busy condition, also goes to the interface connector to indicate a fault status to the input device.

To allow the printer to print the last form, the operator can press the OVERRIDE switch on the operator panel. This causes  $\overline{PE}$  to go high for as long as the switch is pressed.

### 4.8.4 MOTOR CONTROL (OPTIONAL)

The motor control logic is contained on the logic board. The motor control switch (39072001) is attached to a bracket located on the main drive motor.

The motor control feature initiates a 9-second delay, following each print or paper movement command. If another print or paper movement command is not received during this time, a solid state switch deactivates and removes 115 Vac from the main drive motor. The dc voltage to the printer electronics are not affected.

If a paper movement command, which generates a cause line feed signal ( $\overline{CSLF}$ ), is received while the motor control circuit is timed out, the line feed operation is delayed for 120 milliseconds. This ensures that both line feeds will occur when the printer is operating in double line feed mode.

If a print command is received, the clutch signal ( $\overline{CIP}$ ) is delayed for approximately 300 milliseconds to allow the motor to get up to speed. This prevents the possibility of any distortion in the first few printed characters when the 9 x 7 character option is used.

Figure 4-16 illustrates the timing involved when the motor is turned on by  $\overline{CIPM}$  or PMSOL and turned off at the end of the 9-second interval.

When  $\overline{CIPM}$  goes low, ME34-2 goes low, forward biasing diode CR5. This discharges capacitor C14 to approximately one volt, driving ME40-3 high. The high output (ME40-3) drives ME16-2 (MOTOR CONTROL) and ME34-10 low. Signal MOTOR CONTROL activates the solid state switch, applying 115 Vac to the main drive motor. The ME34-10 output triggers 300-millisecond one-shot ME22, which generates a 300-millisecond motor delay signal  $\overline{MTRDLY}$ .

The  $\overline{MTRDLY}$  signal performs two functions:

- A. Delays the activation of the forward clutch ( $\overline{CIP}$ ) for 300-milliseconds. This allows the main drive motor to reach operating speed.
- B. Appears at ME35-8, generating a  $\overline{CSBSY}$  signal that keeps the printer busy for 300-milliseconds.

As shown in Figure 4-16, on the trailing edge of  $\overline{MTRDLY}$ , the forward clutch is activated and paper movement initiated.

On the trailing edge of  $\overline{CIPM}$ , ME34-2 goes high. This reverse biases diode CR5 and enables capacitor C10 to charge through resistor R58, initiating the 9-second interval.

As shown in Figure 4-16, if signal PMSOL goes high less than 9-seconds after the trailing edge of  $\overline{CIPM}$ . This resets the 9-second one-shot (ME40). When C14 charges to approximately two-thirds of +5 volts (approximately 9-seconds), ME31-2 goes high. This drives MOTOR CONTROL high, turning off the main drive motor.

If CSLF goes high while the motor is off, the motor is turned on, a 300-millisecond busy condition is initiated and  $\overline{CSLF'}$  goes low for 120 milliseconds. On the trailing edge of CSLF, the 9-second one shot is again triggered to start another 9-second interval.

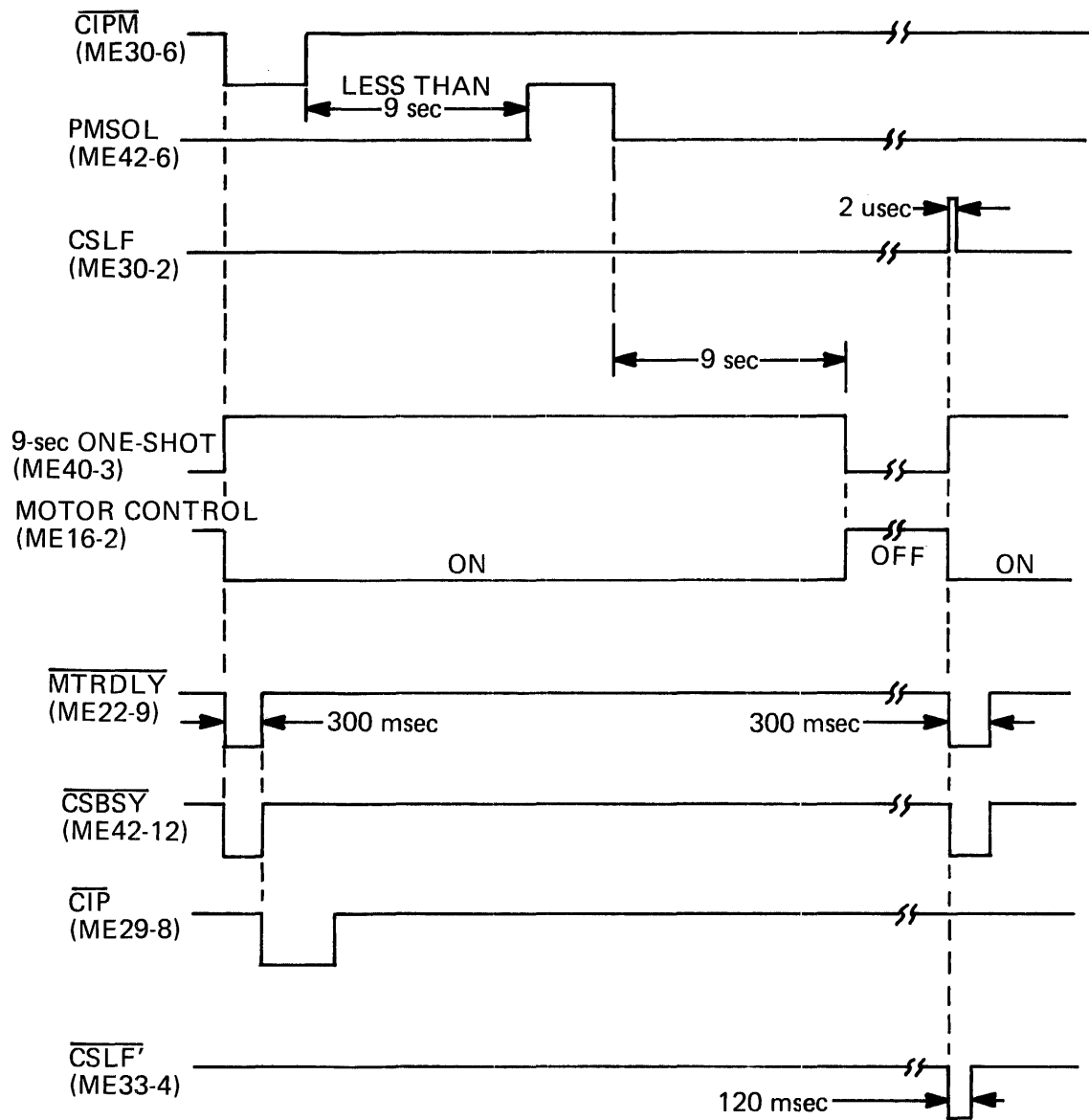


Figure 4-16. MOTOR CONTROL TIMING

## 4.9 POWER SUPPLIES

The standard power input to the printer is 115 Vac, 60 Hz. This input is fused through a 5 amp S.B. fuse (F1) and applied via a line filter and ON/OFF switch (S1) to the transformer (T1), the main motor (M1) and motor control switch.

The secondary of the multitap transformer develops the following voltages:

27.5 Vac (S1-S3)  
35 Vac center - tapped (S4-S6-S8)  
11 Vac center - tapped (S5-S6-S7)

The 35 Vac and 11 Vac voltages are used as inputs to the +5V, +12V and -12V power supplies on the logic board where they are rectified, filtered and regulated. The unregulated dc outputs from these three power supplies are also regulated on the optional connector board to provide dc voltages for the optional interface board. The 27.5 Vac is used to generate +35V unregulated.

Connector P1-J1 is used for bringing the ac inputs to the logic card and connecting the filter capacitors and resistors to the +5V and +35V supplies. Connector P2-J2 is used for connecting the power supply outputs to the rest of the printer and for connecting +35V to the power drivers.

### 4.9.1 +5V REGULATOR (Figure 4-17)

The 11 Vac output from the secondary winding of the transformer is rectified by diodes CR6 and CR7 and filtered by C1 and R1, which are located in the cavity. This filtered output is fused through F1 and regulated by regulator element Q8, which maintains the +5 Volt output. Capacitors C15 and C16 provide additional filtering for high frequency transients that might appear at the output. Resistor R61 is a bleeder resistor that allows some current flow through the regulator, keeping it in the active region.

Overvoltage protection is provided by components CR14, R60 and Q5. With the output at a normal +5V, Zener diode CR14 inhibits current flow through R60, holding the gate of SCR Q5 at ground. When the output voltage exceeds +6.8V, the Zener Diode CR14 conducts, developing a voltage across R60 and turning on SCR Q5. This shorts the input and blows fuse F1.

To simplify troubleshooting procedures for the +5V regulator, the load may be removed from this supply by unplugging connector J2.

### 4.9.2 +12V and -12V REGULATORS (Figure 4-18)

The voltage generated by 35 Vac center-tapped secondary winding of T1 is used as inputs to the +12V and -12V regulators. The operation of both circuits is identical to that of the +5V regulator described in Section 4.9.1.

As in the +5V regulator, the load may be removed from these supplies by unplugging connector J2.

### 4.9.3 +35V POWER SUPPLY (UNREGULATED) - Figure 4-19

The 27.5 Vac output from the transformer is rectified by diode bridge CR10, 11, 12 and 13 and filtered by R2-C2 to generate the +35V unregulated voltage for the power driver circuits. Four outputs from the logic board (35V-1, -2, -3, -4), fused by F2, are used to power the nine driver circuits.





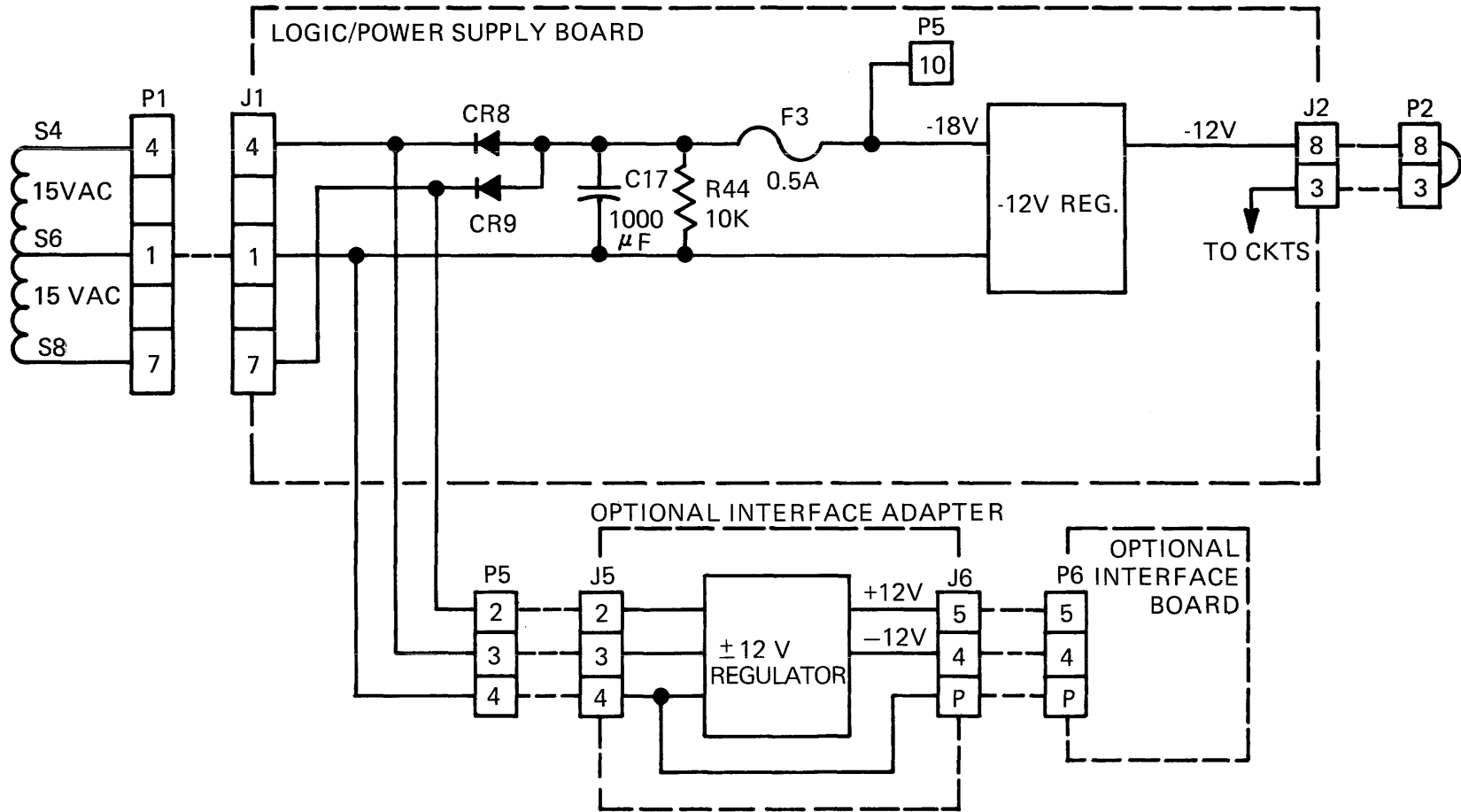


Figure 4-18.  $\pm 12$ V and -12V REGULATOR INTERCONNECTION DIAGRAM

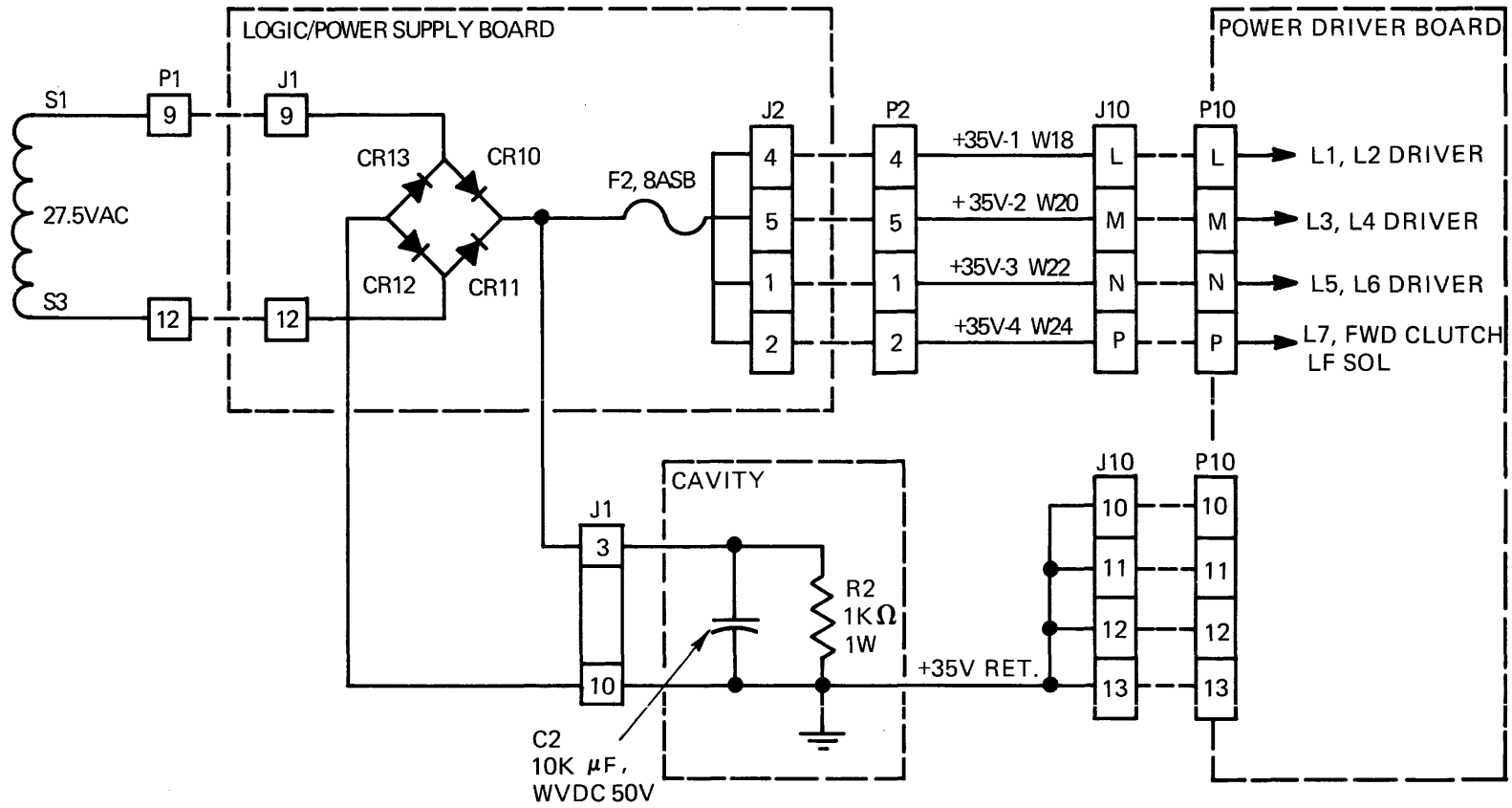


Figure 4-19. +35V UNREGULATED SUPPLY INTERCONNECTION DIAGRAM

#### **4.10 LSI ELEMENTS INPUTS/OUTPUTS**

Table 4-2 describes the inputs and outputs of LSI chip ME28 (3011). Tables 4-3 and 4-4 describe the outputs of LSI chips ME13 (2009) and ME14 (2010), respectively.

Table 4-2. INPUTS/OUTPUTS OF LSI CHIP ME28 (3011)

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
1		+5V	
32		±0V	
3		-12V	
4	OSC	125 kHz square wave	Basic clock input for the 3011.
13	PWR PRIME	Power Prime	Input to reset internal circuitry.
14,15,16	SWDW1-SWDW3	Strobe/Delayed Strobe Width Control	Parallel inputs that can program length of STROBE and DLYSTB from 300 usec to 500 usec in eight steps, where SWDW1 is the most significant bit and SWDW3 the least significant.
23,22,21	SDPW1-SDPW3	Strobe Delay Pulse Width Control	Parallel inputs that program length of delay between leading edge of STROBE and DLYSTB pulses, where SDPW1 is the most significant bit and SDPW3 the least significant.
36,37,38	LFPW1-LFPW3	Line Feed Pulse Width Control	Parallel inputs that can program LF pulse widths from 2 msec to 20 msec in eight steps, where LFPW1 is the most significant bit and LFPW3 the least significant.
39,40	DLFW1-DLFW2	Delayed Line Feed Pulse Width	Parallel inputs that can program Delayed Line Feed from 10 msec to 60 msec in four steps, where DLFW1 is the most significant bit and DLFW2 the least significant.
24,25	MODE	Machine Type	Parallel inputs that program the mode in which the chip will operate, low or high speed.
12	VIDEO	Video Pulses	Input used in conjunction with programmed timing to generate STROBE and DLYSTB signals. This input is normally low, and goes high whenever the optic pick-up assembly travels across the translucent portions of the timing fence.

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
34	ALF	Automatic Line Feed	Determines whether or not line feed is automatic. If tied high (X1, 5 to 11), a line feed will occur (LF output pin 28) automatically at the end of each print cycle. If tied low (X1, 6 to 11), no automatic line feed occurs.
35	CSLF <sup>1</sup>	Cause Line Feed	Input that is normally high and is pulsed low to initiate a line feed. Trailing edge of the pulse causes an LF output (pin 28).
33	CIPX	Carriage in Print Cycle	Input that goes low during print mode. The trailing edge of this input causes an LF output (pin 28) when ALF (pin 34) is tied high (X1, 11 to 5).
31	PMSOL	Paper Motion Solenoid	Input that is normally high and is driven low during paper motion. Also used to initiate delayed line feed.
6	DBLF	Double Line Feed	When this input is high, all line feed commands (ALF or CSLF <sup>1</sup> ) cause generation of two Line Feed (LF) pulses. When low, the line feed commands generate one LF pulse.
28	LF	Line Feed	Output used to initiate a line feed function. It is dependent on ALF, CSLF <sup>1</sup> and DBLF inputs.
27	DLYLF	Delayed Line Feed	Output that goes high on trailing edge (low to high) of PMSOL.
11	STROBE	Strobe	Output initiated by VIDEO signals. Length of STROBE is dependent on strobe width control inputs (SWDW1, SWDW2 and SWDW3).

Table 4-3. OUTPUTS OF LSI ME13 (2009)

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
11	BUSY	Busy	This output goes low during any of the following conditions: A. LSI input ME13-10 goes low. B. LSI input ME13-5 ( <u>PWRPRM I</u> ) goes low or ME13-38 (PRIME) goes high. C. Paper movement operation ( <u>PMSOL</u> ). D. LSI output ME13-8 ( <u>DCPRM</u> ) goes low. E. LSI output ME13-9 (FAULT) goes high. F. LSI input ME13-37 (DLYLF) goes high.
13	ACK	Acknowledge	A 2.5 to 5.0 usec output pulse that is generated: A. 2.5 to 10 usec after the trailing edge of data strobe (DSTA) input when the printer is not busy, or B. 2.5 to 10 usec after the trailing edge of a BUSY signal (ME13-11).
9	FAULT	Fault Indication	This output goes high under any of the following conditions: A. Printer is deselected when a de-select code octal 023 is received on data line inputs (ME13-21 through ME13-27). B. Printer is deselected by operation of SELECT switch on the control panel. This action generates signal SELSW. The trailing edge of SELSW generates a fault indication. C. LSI input ME13-34 ( <u>PE</u> ) goes low, indicating printer is out of paper. D. A paper time-out condition exists (internal to ME13). E. <u>LD</u> input ME13-35 goes low, indicating no video signal during print cycle.

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
40	SELECT'	Select	If the printer is deselected, SELECT output goes high when a select code (octal 021) is detected on the data line inputs (ME13-21 through ME13-27), or LSI input ME13-31 is driven high by operation of the SELECT switch on the control panel. If the printer is selected, detection of a deselect code (023) or operation of the SELECT switch drives SELECT output low. Select and deselect codes are effective even when the printer is busy.
39	BELL	Bell	A 0.8 to 1.6 kHz signal with a duration of one to two seconds. It is generated upon reception of a bell code (octal 007) on the data line inputs (ME13-21 through ME13-27), or a low on input ME13-34 ( <u>PE</u> ), indicating a paper empty condition.
6	<u>CSLF</u>	Cause Line Feed	Output that goes low under any of the following conditions: A. Line feed code (octal 012) detected on LSI data inputs (ME13-21 through ME13-27). If the DSC option is used (jumper X1, 4 to 13), the complete line of data will be printed before this output goes low. B. LSI input ME13-33 ( <u>REMLF</u> ) goes low. Operation of MAN LF switch on the control panel drives the input low.
7	<u>PMSOL</u>	Paper Movement Solenoid	This output is driven low when any paper movement command (i.e., line feed, form feed or vertical tab) is detected at the LSI data inputs (ME13-21 through ME13-27). <u>PMSOL</u> remain low until: A. A paper time-out condition is detected (internal to ME13). B. Power prime ( <u>PWRPRM</u> ) input (ME13-5) goes low.

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Table 4-3 (cont'd)

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
7 (cont'd)	<u>PMSOL</u>	Paper Movement Solenoid	<p>C. FFH input (ME13-29) goes high, indicating a hole in channel 7 of Vertical Format Unit (VFU) paper tape has been reached during form feed operation.</p> <p>D. VTH input (ME13-28) goes high, indicating a hole in channel 5 of the paper tape has been reached during vertical tab operation.</p>
12	<u>DSCR</u>	Decoded Carriage Return	<p>Output that goes low on the trailing edge of a data strobe associated with a control code (zeroes in bits 6 and 7) detected on the LSI data inputs (ME13-21 through ME13-22), causing that code to be loaded into memory. DSCR remains low until the printer is primed following the carriage return and paper movement operation.</p> <p>Normally, only the CR code (octal 015) is loaded into memory. If the printer has the DSC option (X1, 4 to 13), control codes LF (octal 012), FF (octal 014), and VT (octal 013) can also be loaded into memory.</p>
8	<u>DCPRM</u>	Decoded Prime	<p>Output that goes low under any of the following conditions:</p> <p>A. A delete code appears at the LSI data inputs (ME13-21 through ME13-27).</p> <p>B. The Input Prime (IP) input (ME13-36) goes active.</p> <p>C. The Power Prime (PWRPRM) input (ME13-5) goes active.</p>
14	CLKTB1	Clock Shift Register Pulse	<p>Output pulse that triggers a one-shot used to advance up-counters ME9 and ME10 to the next count and RAM address. The following character received by the printer is written into RAM (ME11 and ME12) memory at that address. The CLKTB1 pulse is generated when data strobe (DSTA), LSI input (ME13-18) goes active while both inhibit levels INH1 and INH2 (internal to the chip) are active.</p>

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
14 (cont'd)	CLKTB1	Clock Shift Register Pulse	<p>If the Gated Strobe (GDSTB) option is used (X1, 1 to 15), INH1 is active when the printer is selected and the last input character has been acknowledged by the printer. If GDSTB option is not used (X1, 1 to 16), INH1 is always active. INH2 is inactive when the character on the input data lines can be stored in the shift register. This occurs when the input data lines contain a printable character (a ONE in bit 6 or 7) or, after the first printable character is received, a carriage return code (octal 015) appears on the data lines.</p> <p>If the DSC option is used (X1, 4 to 13), an LF (octal 012), VT (octal 013) or FF (octal 014) code, can be stored in memory after the first printable character is received.</p>
15	<u>UPSC</u>	Upper Case	<p>Output that goes low when an elongated character code (octal 016) appears on the LSI data inputs (ME13-21 through ME13-27).</p>

Table 4-4. OUTPUTS OF LSI ME14 (2010)

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
12-16	DCW1-DCW5	Strobe Counter Outputs	<p>These are timing outputs used to establish when each full-step column of dots will be printed in the dot matrix of a character.</p> <p>The LSI has an internal strobe counter that is reset by an internal DCW0 signal. During normal character printing, each STROBE signal appearing at ME14-23 input increments the counter. During elongated character printing, every other STROBE signal increments the counter, making each DCW time interval twice the normal width.</p>
7-10	DCW01-DCW04	Delayed Strobe Outputs	<p>These are timing outputs used to establish when each half-step column of dots will be printed in the dot matrix of a character.</p> <p>The LSI has an internal delayed strobe counter that is reset by an internal DCW0 signal. During normal printing of 9 x 7 characters, each DLYSTB signal appearing at ME14-22 input increments the counter. During elongated character printing, alternate STROBE signals increment the counter, making each DCW0 time interval twice the normal width.</p>
24	ROME2	ROM Timing	<p>This output is used as the timing input for the half-step character generators (ROM ME1 and ME2).</p> <p>During normal printing of 9 x 7 characters, each DLYSTB signal, appearing at ME14-22 input, generates a ROME2 pulse. When printing elongated 9 x 7 characters, each STROBE signal generates a ROME2 pulse.</p>
30	CIPX	Forward Clutch	<p>This is an active low output signal used to initiate the print cycle. Signal CIPX goes low when all of the following conditions exist:</p> <ul style="list-style-type: none"> <li>A. Printer not being primed (PRIME output ME14-37 low).</li> <li>B. Right limit switch not actuated (EOPSW input ME14-19 high).</li> </ul>

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PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
30 (cont'd)	CIPX	Forward Clutch	<ul style="list-style-type: none"> <li>C. No control character detection at the memory output (TB6 or TB7 input ME14-3 or 4 high).</li> <li>D. Left limit switch actuated (RTPSW input ME14-28 low).</li> <li>E. Detection of a full line of data or carriage return code. DMC input (ME14-34) goes high.</li> </ul> <p>The CIPX signal remains low until the right limit switch is actuated (EOPSW signal low), or a control character is detected at the Character Buffer output (TB6 and TB7 signals high). Normally, the control character is a carriage return code (octal 015). If the DSC option is used (X1, 4 to 13), the control character can also be a line feed (octal 012), vertical tab (octal 013) or form feed (octal 014) code.</p>
25	OSC	Oscillator Output	<p>This is a 125 kHz signal used as the system clock. It provides a clock input to both LSI elements ME13 and ME28. It is buffered then appears as OSCXT signal at the interface connector.</p>
36	CLKTB2	Clock Shift Register Pulse	<p>An active high pulse generated under any of the following conditions:</p> <ul style="list-style-type: none"> <li>A. During a prime condition, to preset up-counters ME9 and ME10. On the trailing edge of the PRIME signal (ME14-37), a single CLKTB2 is generated. This causes ME32-3 to generate preset enable signal PE, presetting up-counters ME9 and ME10.</li> <li>B. During character printing, to clock the up-counters ME9 and ME10, updating the RAM address for the next character. Each STROBE pulse occurring during Strobe Counter interval DCW0 (internal to LSI ME14) generates a CLKTB2 pulse. This causes the up-counters to update the RAM address for the next character.</li> </ul>
38	SRCL	Shift Register Recirculate Input	Not Used.

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Table 4-4 (cont'd)

PIN NO.	MNEMONIC	SIGNAL	DESCRIPTION
17	LD	Light Detect	<p>This output indicates that there were no video signals generated while print head travelled from left to right limit switches. Signal LD goes low when input RTPSW (ME14-28) goes high and no STROBE signals (ME14-23) are monitored before input EOPSW (ME14-23) goes low.</p> <p>The LD signal is reset by any prime condition and, if printer has prime on select option (X1, 14 to 2), LD is reset when printer is re-selected.</p>
37	PRIME	Prime	<p>This signal sets the printer logic to an initial condition and enables presetting of the up-counters. PRIME goes high for 100-500 msec during a power prime condition (capacitor C7 on ME14-32 input (PWRPRM) charges to a positive threshold level) or for approximately 100-400 usec during any of the following conditions.</p> <ol style="list-style-type: none"> <li>DCPRM input (ME14-31) goes low.</li> <li>SLCT input (ME16-40) goes high and the Delete Inhibit (DELINH) option is used (X1, 14 to 2).</li> <li>CIPX output (ME14-30) goes high.</li> </ol>
35	CSBSY'	Cause Busy	<p>This output indicates that the 132nd character has been loaded into the Character Buffer without a carriage return code.</p> <p>CSBSY' goes low when DMC input (ME14-34) goes high and PRIME output (ME14-37) is low.</p>

## SECTION 5

### REMOVAL, REPLACEMENT AND ADJUSTMENT PROCEDURES\*

#### 5.1 INTRODUCTION

This section describes the operation, removal/replacement and adjustments (if required) for each major mechanical assembly in the Model 306 printer.

#### 5.2 MECHANICAL ASSEMBLIES

The mechanical assemblies and their referenced figures are covered in the order listed below. Mechanical drawings and parts lists are contained in Section 8 of this manual.

Section	Title	Figure and Reference Parts Symbol
5.2.1	Carriage Mechanism	AA
5.2.2	Platen	AB
5.2.3	Paper Pan	AC
5.2.4	Driving Mechanism (1)	AD
5.2.5	Driving Mechanism (2)	AE
5.2.6	Idler Pulley	AF
5.2.7	Reed Switch	AG
5.2.8	Base	AH
5.2.9	Frame	AI
5.2.10	Paper Feed	AJ
5.2.11	Pin Feed	AK
5.2.12	Ribbon Feed	AL
5.2.13	Cover	AM
5.2.14	Operator Panel	AN
5.2.15	Electrical Components (1)	AO
5.2.16	Electrical Components (2)	AP
5.2.17	Electrical Components (3)	AQ
5.2.18	Print Head and Associated Assemblies	8-19
5.2.19	Motor Control, Option	5-18
5.2.20	Vertical Format Unit (VFU), Option	8-20
5.2.21	Printer Drive Mechanism, Model 306	5-29

\*Procedures in Section 5 have been updated for Rev. H manual.

#### 5.2.1 CARRIAGE MECHANISM (Figure AA)

##### 5.2.1.1 Operation

The function of the carriage mechanism is to hold the print head under the best condition to print characters against the platen and to guide the head smoothly from left to right, and return it to the starting position after printing the last character.

At the back left and right edge of the carriage (AA-51) there are six identical guide rollers (AA-52) that function to hold and slide the carriage along the rear guide bar (AB-7). Mounted on the bottom front of the carriage are two retainers (AA-100) that also serve to hold the carriage unit, and at the same time, guide the moving head along the front guide bar AB-12.

## CARRIAGE MECHANISM

The print head bracket (AA-66) mounts on the carriage (AA-51) and slides forward and backward between a head bracket guide plate (AA-75) on the left, and the carriage on the right. The plate is adjustable using two screws (AA-78). Front and back movement of the carriage and head is accomplished by the use of a fork (AA-67) that rotates when the head adjusting knob (AA-58) is turned. As the calibrated head adjusting knob rotates, its eccentric cam and shaft with mounted fork contacts the under side of the moving head bracket (AA-66) and causes it to move forward or backward to a maximum of 0.060-inch travel. The mechanical adjustment is determined by the thickness of the copies to be run. The head lock knob (AA-59) is mounted in the same plane as the head adjusting knob (AA-58), but to the left of the head bracket, and locks the common eccentric shaft to fix the position of the print head in relation to platen (AB-1) prior to printing.

The print head mounts to the head bracket unit (AA-66) by four allen-head screws, two on each side of the head.

When the carriage is positioned over the left or right switch (AG-1) a magnet underneath the carriage unit closes either the left or right reed switch, sending a signal to indicate the carriage position to electronic logic.

The carriage and head drive forward by an adjustable driving belt (AE-9) attached to the underside of the carriage between the forward clutch drive pulley (AE-18) and idler pulley (AF-23). A spring (AG-20) attached to the underside of the carriage returns the carriage with the head to the home or starting position (left margin).

A damper cylinder (AA-85), mounted on the extreme left side of the base (AH-1), effectively cushions the returning head and carriage mechanism. The damper action is also aided by an air regulating screw (AA-86) mounted on the left side of the carriage and is center aligned to that of the damper cylinder.

Mounted at the front of the carriage unit (AA-51) is the video amplifier bracket (Fig. 8-19/27) supporting the video amplifier (See Figure 7-13) and cabling to the power driver board (Fig. 7-12/8).

Mounted at the back of the carriage unit (to right of the center line) are two ribbon guide rollers (AA-62) which maintain proper ribbon operating tension as the head moves out to the right while printing.

### 5.2.1.2 Removal/Replacement

#### A. Print Head

(With Platen Knob (AJ-17), Plate (AJ-18) and Screw (AJ-19) removed)

1. Remove outside covers prior to disassembly, and loosen head locking knob (AA-59).
2. Turn head adjusting knob (AA-58) for maximum gap between platen (See Figure 1-6/12) and front of head (Figure 1-6/1).
3. Unplug solenoid fingerboard (Figure 8-19/31) from video amplifier connector below print head.
4. Using a 3-32-in. diameter allen-wrench, remove at the top on each side of head bracket unit (AA-66), two allen-head screws (4-40 x .50 lg) and two No. 4 internal lockwashers (Fig. 8-19/39, 40).
5. Remove from the bottom, on each side of head bracket, two remaining screws (4-40 x .62 lg) and two No. 4 internal lockwashers (Fig. 8-19/40, 41).

#### B. Carriage Unit

1. Remove print head (Refer Para. 5.2.1.2A, steps 1-5).
2. Remove video amplifier board (See Figure 8-19/16 by removing screws, lockwashers, flatwashers (See Figure AA-96, 97, 98) from bracket attached to carriage unit (AA-51).
3. Remove left and right ribbon spool from printer.
4. Remove left ribbon holder bracket (AL-191) by removing screws, lockwashers, flatwashers (AL-52, 53, 54).

5. Remove right ribbon holder bracket (AL-55) by removing screws, lockwashers, flatwashers (AL-93, 94, 95).
  6. Remove nuts (AL-103) from ribbon feed bar (AL-101).
  7. Remove screws (AD-38) and washers (AD-39, 40). Rotate bracket (AD-34) out of the way.
  8. Slide the rear carriage bar (AB-7) out from carriage rollers (AA-52) by removing screws and lockwashers (AB-27, 28).
  9. Remove main driving belt (AE-9) by removing two nuts (AA-105) from belt tension axle (AA-106).
  10. Remove carriage spring (AG-20) from D.B. guide plate (AA-107) located on underside of carriage.
  11. Lower retainer bracket (AA-101) by removing one inside screw, lockwasher, flatwashers (AA-104, 103, 102). Loosen the other side.
- C. Damper Cylinder
1. Remove left ribbon spool (AL-113).
  2. Remove three screws, lockwashers, flatwashers (AA-93, 95, 94) from damper cylinder (AA-85) and remove.
- D. Head Bracket Unit
1. To release head bracket unit (AA-66) from carriage unit (AA-51), remove head bracket guide (AA-75) by removing two screws and lockwashers (AA-76, 77). Remove center screw and fork (AA-68, 69, 67).
  2. Reassemble in reverse order.

### 5.2.1.3 Adjustments

- A. Damper Unit
1. Piston unit AA-80, mounted to the left side of carriage unit (AA-51) must be aligned on center line with that of the damper unit (AA-85). Loosen three screws (AA-93) on damper, and adjust piston (AA-80) to align with damper when bottomed. Tighten screws on damper when aligned.
  2. A critical adjustment of dampening effect for return carriage is the air adjusting screw (AA-86) located on the top of the damper cylinder. Check for the following:

Condition A

Carriage should run out for a full line of characters (80) and return to damper for repeat of 80 character/line readout.

Condition B

Make sure printer is capable of one character-per-line printout.

3. If either condition A or B is not met, adjust release of compressed air by turning screw (AA-86) on damper. Air should eject properly from release hole on damper to meet above conditions, A and B; adjust accordingly.

**Note**

**Avoid bottoming of piston to inside of damper cylinder on final adjustments.**

- B. Carriage Movement and Retainers (AA-100) (Fig. 5-1 and Fig. 8-1).  
To adjust for proper movement of carriage, perform the following steps:
1. Remove return spring (AG-20) from carriage unit (AA-51).
  2. Remove two nuts (AA-105) from belt tension axle (AA-106) and remove main driving belt (AE-9).
  3. Loosen two screws (AA-104) at front of carriage holding upper and lower retainers (AA-100). Slightly pivot right-hand side of retainer holder (AA-101) downward to loosen retainers on front guide bar (AB-12).

## CARRIAGE MECHANISM PLATEN

4. Carriage should now move with hand pressure of about 60 to 80 grams (2-3 oz.).
5. Adjust retainer holder (AA-101) so that retainers (AA-100) are compressed against front guide bar so that a hand pressure of 100-150 grams (3.5-5oz.) will move carriage along the carriage bars.
6. Re-install main belt removed in step 2., including two nuts (AA-105) on the belt tension axle (AA-106).
7. Carriage should move along carriage bars with a hand pressure of approximately 700 gms. (24.5 oz.).
8. Re-install return spring removed in step 1.
9. Loosen locknuts (BA-56) on left and right eccentric axles (BA-55). (See Figure 5-1).
10. Turn slotted axles to loosen (or tighten) carriage bearing rollers (surface of roller is lightly touching carriage bar). Retighten axle nuts.
11. Move carriage by hand and observe that rollers are moving smoothly and that carriage is not binding. Hand pressure should be approximately 1.4-1.8 kg. (3 to 4 lbs.).
12. If roller bearings are too tight (binding against carriage bar), repeat steps A.9. through A.11.

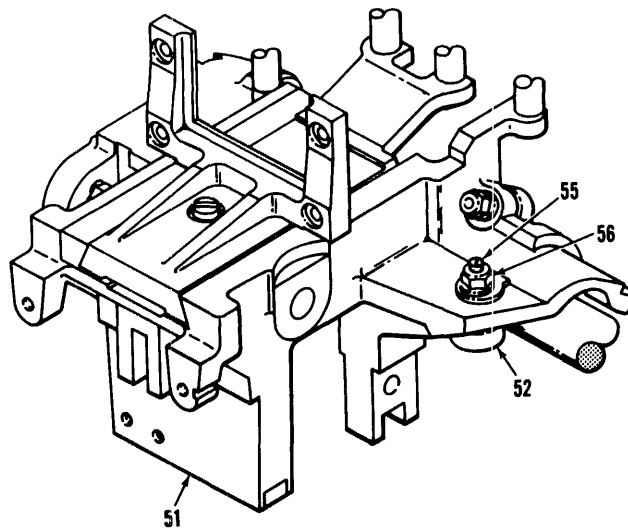


Figure 5-1. CARRIAGE MOVEMENT ADJUSTMENTS

### C. Head Bracket Guide

1. The head bracket guide (AA-75) is adjusted to ensure proper operation between the head bracket guide and the head bracket. Adjust two screws and washers (AA-76, 77) on the top of the guide and two adjusting screws and nuts (AA-78, 79) at the side of the guide so that the two surfaces (guide and head bracket) contact, but do not bind when the adjusting knob (AA-58) is rotated.

## 5.2.2 PLATEN (Figure AB)

### 5.2.2.1 Operation

As the print head moves to the right, supported by two removable front and rear guide bars (AB-12, 7), round metallic wires from the print head strike through the print ribbon leaving a dot configuration on the paper. Behind the paper, is a mounted platen (AB-1) providing the hard surface against which the solenoid wires impact.

### 5.2.2.2 Removal/Replacement

#### A. Platen

Prior to removing platen (AB-1) perform the following steps (to allow clearance for removal):

1. Remove two screws (AI-19) (on right side of frame, AI-46), and remove retainer holder (B), retainer bearing (D), and retainer holder (A) (AI-18, 17, 16). (These are support pieces for paper feed shaft, AI-15).
2. Slide paper feed shaft to right and remove.
3. Remove screws (AD-2) on larger capacitor (AP-3), and set capacitor aside.
4. Loosen check nuts (AB-6) on screws (AB-5) and remove screws at top and behind platen (AB-7).
5. Remove screws, washers (AB-2, 4, 3) at the back of and underneath the platen, and remove platen from the front of the printer.
6. To re-install platen, reverse disassembly steps A.1. through A.5. above.

#### Note

**When re-installing platen, adjust screws (AB-5) so that there is a gap of 0.15 mm (0.006-in.) between platen and print head. Tighten nuts (AB-6) making sure adjustment is maintained.**

#### B. Rear Guide Bar (Fig. AB)

1. To remove rear guide bar (7), perform steps B.1 through B.8 at para. 5.2.1.2.
2. To install rear guide bar, reverse order of removal at para. B.1 above.

#### C. Front Guide Bar (Fig. AB)

1. Remove video amplifier board by performing steps found at para. 5.2.18. 2.D.
2. Loosen screws (104) and allow retainer holder (101) to pivot and drop slightly downward from guide bar (12).
3. Remove front guide bar by loosening screws (30) holding left and right set plates (31, 32). Slide bar to right.
4. To install front guide bar (12), reverse order of removal at para. C1 through C3.

### 5.2.3 PAPER PAN (Figure AC)

#### 5.2.3.1 Operation

There are two methods used to feed paper to the printer. In the bottom method, the paper is hand fed into a center slot on the underneath portion of the base. A paper pan unit (front) (AC-1) is used to continue the path that guides the paper over the platen (AB-1) where it can be positioned on the pin feed holding units (AK) for print use.

The second method of paper feed is somewhat like the bottom method, except paper is fed from the back of the printer between the paper pan unit (rear) (AC-7) and the paper pan unit (center, AC-4).

An adjustable micro-switch (AC-20) is mounted on the back wall of the rear paper pan with the actuator arm (part of switch) extending through a slot directly over the path of the paper. When paper runs out, the PAPER OUT lamp is lighted on the operator panel. For those models with the optional use of a speaker assembly 526825001, (Fig. AH) an audible buzzer signal is tripped by the switch.

5.2.3.2 Removal/Replacement

A. Paper Pan Unit (Rear)

The following procedure must be made prior to removing the paper pan, rear (AC-7).

1. Remove capacitor bracket and capacitor (AI-23) by removing screw and washer (AI-7, 25) from right chassis frame (AI-46) (main motor side).
2. Remove main motor guard (AD-4) by removing two screws and washers (AD-5, 6).
3. Unplug the two cables (Fig. 7-9/J8, J9) attached to component board assembly logic/power supply board (Fig. 7-9) and remove screws and washers from two support brackets (top) (AI-8, 10) and two support brackets (bottom) (AI-4, 6).
4. Release bracket (part of logic/power board 63060416) holding the input connector of the printer by removing screws and washers from base (AH-1) of printer. (Note that ground wire must be removed at same time).
5. Remove input cable connector 630060119 (Fig. 7-9), from logic/power supply board, and set board to the side.
6. Remove printer harness 526783001 with connector (J8) from logic/power supply board (Fig. 7-12).

**Note**

To protect PAPER OUT switch actuator (AC-20) mounted on the wall of paper pan the following steps should be followed:

7. Remove capacitor (AP-3) by removing three screws (AP-2).
8. Remove bracket (AP-1) supporting capacitors (AP-3) and (AP-4) by removing four screws (AP-2) from left frame (AI-12).
9. Remove bracket (AI-4) by removing screws (AI-5).
10. Remove paper pan unit (AC-7) from rear position of printer by removing one screw and washer (AC-13, 14) from each side of pan. Remove pan with mounted switch (AC-20) but avoid bending actuator arm (part of switch) on switch when removing or installing.
11. For installation of paper pan unit (rear) (AC-7), reverse disassembly procedure, para. 5.2.3.2A, steps 1 through 11. (Adjust Paper Out micro-switch (AC-20) for smooth flow of paper, if required).

B. Paper Pan Unit (Center) (AC-4)

**Note**

To remove this middle unit of the three paper pan assemblies, para. 5.2.3.2.A., steps 1 through 7 must first be performed prior to removal.

1. Remove three screws and washers (AC-5, 6) from underneath printer. Move pan into center slot of base of printer.
2. Pull paper pan outward from flanged position at rear of printer.
3. To re-assembled, reverse order of disassembly procedure.

C. Paper Pan Unit (Front) (AC-1)

1. Perform the steps indicated at para. 5.2.1.2.A., steps 1 and 2.
2. Remove perforated bottom plate (AH-4) underneath the base (AH-1) of printer by removing four screws and washers (AH-5, 6).

3. Remove bottom screws and washers (AC-5 and 6) from center pan (AC-4).
4. Remove screws and washers (AC-2, 3) from each side, top of paper pan (AC-1).
5. Slip paper pan tabs free of base holes, and pull paper pan upward from the top side of printer.
6. To re-assemble, reverse order of disassembly.

#### 5.2.4 DRIVING MECHANISM (Figure AD, part 1) \*

##### 5.2.4.1 Operation

For this portion of the driving mechanism (part 1 of 2) continuous drive power from the main motor (AD-49) is transmitted to the clutch units (Refer Fig. AE, part 2, which includes air gap or preload clutches) in the following manner:

Motor- Motor pulley (AD-13/13-1) - belt (AD-15) - Center pulley (AD-24) - Center shaft (AD-23) - Motor pulley (AD-30) - Timing belt (AD-41) - Driving pulley (AE-1) - to clutch unit (AE).

The center pulley (AD-24) is supported on both ends of a center shaft (AD-23) by brackets (AD-34) which contain bronze bearing retainers (B) (AD-35). Located at the back end of the center shaft is a drive pulley (AD-27) which transfers drive torque by means of an O-ring (AJ-29) to the paper feed mechanism. The center shaft also functions to rotate pulley (AD-30) via belt (AD-15) which continues drive power to the pulley (AE-1) for the clutch units (AE, part 2).

The main motor is air cooled by a fan (AD-51) mounted on the shaft of the motor. Air is vented directly through a grid outlet on the base of the printer to the outside. A safety guard (AD-4) covers the fan. To minimize vibration, the motor is cushioned on the base of the printer with the use of a small rubber mat (AD-49). Two holder brackets (AD-49) fix the motor in place on the base. A capacitor (AI-23) is used to start the motor which is grounded with a ground wire strap (AD-45).

This portion of the driving mechanism (Figure AD, Part 1) uses two pulley belts: (1) timing belt (AD-15) used between center pulley (AD-24) and motor pulley (AD-13) and (2) timing belt (AD-41) used between driving pulley (AE-1) and motor pulley (AD-30).

##### 5.2.4.2 Replacement/Removal

###### A. Main Motor

1. Remove motor capacitor (AI-23) located just above main motor (AD-49) by removing screw (AI-7) and washer (AI-25) from right frame (AI-1).
2. Remove motor fan safety guard (AD-4) by removing two screws (AD-5) and lockwashers, (AD-6) from printer base (AH-1).
3. Loosen nut (AD-22) located at back of bracket (AD-16) using open-end wrench, 5.5mm (0.22-in.). Remove belt (AD-15) from main motor pulley (AD-13).
4. Remove two main motor holders (upper) (AD-49) by removing screws, washers, and grommets (AD-11, 12, 8) from motor holder (lower) (AD-49) and printer base. Note, that between the lower motor holder and motor there is a rubber cushion (AD-49).
5. Remove ground wire (AD-45) from motor by removing screw (AD-47) and washer (AD-46).
6. To remove fan (AD-51), loosen screw (AD-51) on motor shaft.
7. To re-assemble, reverse order of disassembly (Refer para. 5.2.4.3.A. for correct belt tension adjustment).

\* The overall drive mechanism of the Model 306 is shown in Table 5-1. The name of the part or assembly is keyed to the parts list along with the reference symbol number that can be used for a cross reference to any figure number in Section 8 for that part.



TABLE 5-1. LOCATION OF SUBASSEMBLIES/PARTS BY FIGURE OR SYMBOL REFERENCE

1. RACK GUIDE PLATE (FIG. 8-13/2) (AL)	24. DRIVING PULLEY (FIG. 8-4/27) (AD)
2. RIBBON FEED RACK (AL) (FIG. 8-13/1) (AL)	25. TIMING BELT (FIG. 8-4/15) (AD)
3. SOLENOID, PRINT HEAD (FIG. 8-19/32)	26. MOTOR PULLEY (FIG. 8-4/30) (AD)
4. PRINT HEAD ASSEMBLY (FIG. 8-19)	27. TIMING BELT (FIG. 8-4/15) (AD)
5. HEAD ADJUSTING KNOB (FIG. 8-1/58) (AA)	28. DRIVING PULLEY (FIG. 8-5/1) (AE)
6. CARRIAGE ROLLER (FIG. 8-1/52) (AA)	29. TENSIONER (L) (FIG. 8-4/17) (AD)
7. CARRIAGE (FIG. 8-1/55) (AA)	30. CENTER PULLEY (FIG. 8-4/24) (AD)
8. CARRIAGE GUIDE BAR, REAR (FIG. 8-2/7) (AB)	31. MOTOR FAN (FIG. 8-4/51) (AD)
9. RETURN IDLER PULLEY AND BRACKET (FIG. 8-7/21) (AG)	32. MOTOR (FIG. 8-4/50) (AD)
10. MULTI-FORM PAPER	33. MOTOR PULLEY (FIG. 8-4/13 OR FIG. 8-4/13-1 50 HZ) (AD)
11. PIN FEED ASSEMBLY (LEFT AND RIGHT) (FIG. 8-11) (AK)	34. PRELOAD CLUTCH UNIT ASSEMBLY (FIG. 8-5) (AE)
12. LOCKING KNOB (FIG. 8-11/16) (AK)	35. CLUTCH ARMATURE (FIG. 8-5/39) (AE)
13. PAPER FEED GUIDE SHAFT (FIG. 8-9/20) (SEE ALSO FIG. 8-11) (AI)	36. DRIVING PULLEY (C) (FIG. 8-5/18) (AE)
14. PAPER FEED SHAFT (FIG. 8-9/15) (SEE ALSO FIG. 8-11) (AI)	37. MAIN DRIVE BELT UNIT (FIG. 8-5/9) (AE)
15. PAPER FEED IDLER GEAR (FIG. 8-10) (AJ)	38. REED SWITCH AND BRACKET (AG)
16. PAPER FEED CAM (FIG. 8-10/49) (AJ)	39. FRONT CARRIAGE BAR (AA)
17. CLUTCH, INNER CAM, RELEASER, AND PAWL (FIG. 8-10/40, 41, 102) (AJ)	40. OPTICAL BLOCK-SINGLE CHANNEL (FIG. 8-19/28)
18. CLUTCH PULLEY (FIG. 8-10/44) (AJ)	41. TIMING FENCE (FIG. 8-19/6)
19. CLUTCH SHAFT (FIG. 8-10/37) (AJ)	43. VIDEO AMPLIFIER ASS'Y (FIG. 8-19/16)
20. O-RING (AJ) (FIG. 8-10/29) (AJ)	44. CARRIAGE SPRING (FIG. 8-7/20) (AG)
21. PLATEN KNOB (FIG. 8-10/17) (AJ)	45. RETURN PULLEY (FIG. 8-6/33) (AF)
22. PAPER FEED GEAR (FIG. 8-10/72) (AJ)	46. IDLER PULLEY AND SAFETY ADJUST (FIG. 8-6/23) (AF)
23. CENTER SHAFT (FIG. 8-4/23) (AD)	47. IDLER PULLEY SHAFT (PINION) (FIG. 8-6/22) (AF)

5.2.4.3 Adjustments

A. Timing Belt (AD-15) (Refer to Figure 5-2)

This belt is located between motor pulley (AD-13) and center pulley (AD-24). Proper tension is applied as follows:

1. Loosen nut (AD-22), located at back of bracket (AD-16), with a 5.5 millimeter (0.22-in) open-end wrench.
2. Adjust position of tensioner (AD-17) so that movement of belt (side away from tensioner) when hand depressed with a pressure of 500 grams (17.6 oz.) travels inward to a maximum distance of 3-6 mm (0.1-0.2-in.).

B. Preventive Maintenance, Tensioner (AD-17)

1. Apply oil to felt washers (AD-18), located on each side of right tensioner (AD-17) on a normally semi-annual preventive maintenance (PM) basis.

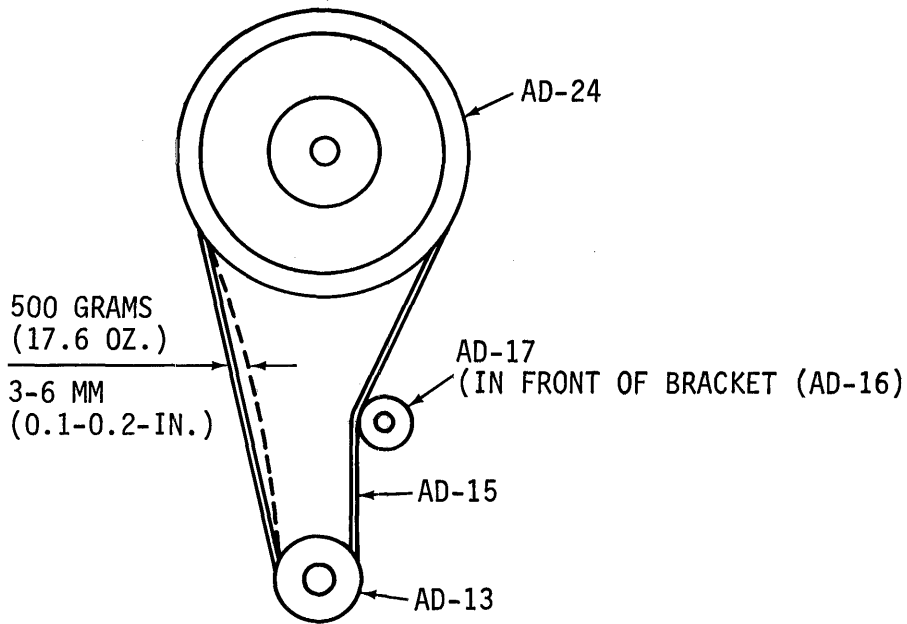


Figure 5-2. ADJUSTMENT OF TIMING BELT (AD-15)  
(View from back of printer, forward)

C. Timing Belt (AD-41) (Refer to Figure 5-3)

This belt is located between the drive pulley (AE-1) on the electromagnetic clutch unit (AE) and the motor pulley (AD-30) of the center shaft (AD-23). Adjustment of proper tension is as follows:

1. Loosen nut (AD-22), located at front of bracket (AD-16), with a 0.22-in. (5.5 mm) open-end wrench.
2. Adjust position of tensioner (AD-17) so that movement of belt (AD-41) (side away from tensioner) when hand depressed with a pressure of 500 grams (17.6 oz.) travels inward to a maximum distance of 3-6 mm (0.1-0.2 in.).
3. Belt should not wobble when forward clutch is turned on. Motor should not be under strain (no noise).

## DRIVING MECHANISM (PART 2)

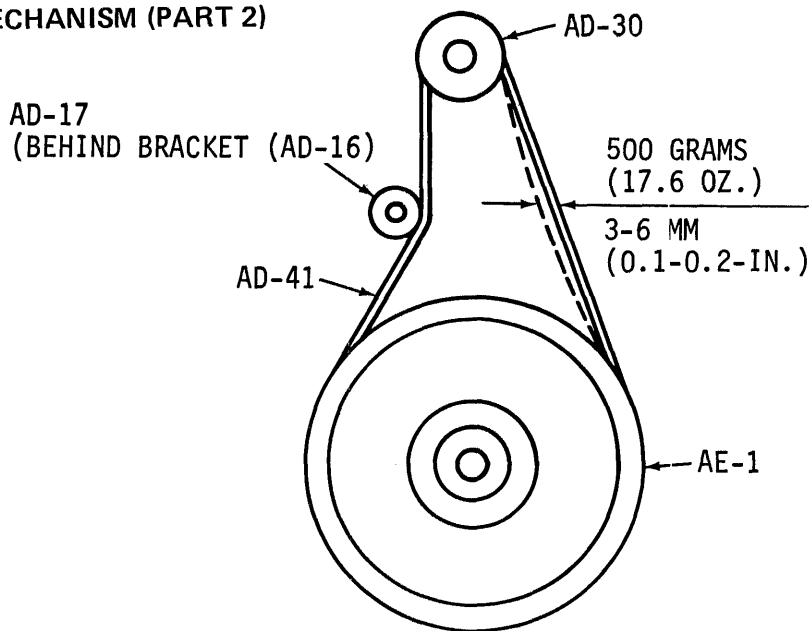


Figure 5-3. ADJUSTMENT OF TIMING BELT (AD-41)  
(VIEW FROM BACK OF PRINTER, FORWARD)

### 5.2.5 DRIVING MECHANISM (Figure AE, Part 2)

#### 5.2.5.1 Operation

This portion of the driving mechanism (AE-part 2) uses a constant surface to surface contact between armature (AE-39) and grooved rotor (AE-40) (pre-load condition) to continue drive torque from the main motor (Figure AD/49), part 1 for carriage movement.

#### A. Driving Mechanism, Preload Clutch (Figure AE, Part 2)

##### Note

When using a **PRELOAD CLUTCH 529841001-6001** (Kit) (with splined armature) in Model 306, USE **POWER DRIVER BOARD ASSEMBLY 63060105-4005** configured especially for preloaded clutch operation and four or eight inches per second (IPS) paper slew speed.

Power transmitted from the driving pulley (AE-1) through a preload clutch assembly is indicated as follows:

Drive pulley (AE-1)- clutch shaft (AE-40) - rotor (AE-40)- splined armature (AE-39) - hub (AE-28) - spring (AE-29) - drive pulley (AE-18).

The clutch shaft, with fixed drive pulley (AE-1), rotates continuously in a clockwise direction through slip clutch mechanism (AJ-40, 41, 46) in the paper feed mechanism (AJ). This rotation is maintained through a clutch field (AE-30) assembly, and when activated, the splined armature (AE-39) is pulled against the rotor, and friction torque is continued, causing the head and carriage to move in the forward direction (to the right). Drive is disconnected between splined armature and rotor when signals to the clutch field assembly (AE-30) are discontinued; the head and carriage are then under spring (AG-20) return to left margin.

Because of a preload condition (surface to surface contact) between armature and rotor, there is no required gap adjustment. The tension against the rotor is maintained by a clutch spring (AE-29) pressing between the fixed, forward driving pulley (AE-18) and the splined armature.

The hub (AE-28) inserts into the splined armature maintaining torque drive for the mounted forward drive pulley (AE-18) at the front end of the clutch shaft (AE-40).

The clutch field unit (AE-30) is prevented from rotating about its shaft (part of pinned rotor) by means of a clutch anti-turning stopper (AE-12) mounted directly to the base of the printer.

### 5.2.5.2 Removal/Replacement

- A. Main Driving Belt Unit (AE-9)
1. To loosen or tighten main driving belt, (AE-9), adjust two nuts (AA-105) located on underside of carriage (AA-51).
  2. To remove driving belt (AE-9) from carriage, perform the following:
    - a. Remove two nuts (AA-105) from belt tension axle (AA-106).
    - b. Disengage belt by unhooking T-end of belt from left side under carriage. Slide belt over and under idle pulley (AF-23) on the left. Pull belt to the right under driving pulley (C) (AE-18) and out.
    - c. To replace belt, reverse disassembly procedure. Check adjustments at para. 5.2.5.3.A.
- B. Driving Mechanism Assembly (AE) Part 2 (Forward Drive and Preload Clutch Ass'y.
1. To remove complete driving mechanism as shown in Figure AE, perform the following steps:
    - a. Perform para. 5.2.5.2.A. to remove main belt (AE-9).
    - b. Loosen tensioner (AD-17) against belt (AD-41).
    - c. Remove screw and washer (AE-13, 14) releasing anti-rotation stopper (L) (AE-12).
    - d. Loosen two allen-head screws (AE-19) on driving pulley (C) (AE-18).
    - e. Remove screws and washers (AE-22, 23) on both left and right bushing brackets (AE-21).
    - f. Slide loosened belt off driving pulley (C) (AE-18).
    - g. Remove driving pulley (AE-1) and clutch field ass'y (AE-30) from shaft.
    - h. Remove pinned rotor (AE-40) (with shaft) splined armature (AE-39) hub (AE-28) spring (AE-29) and driving pulley (AE-18).
    - i. To replace preload clutch unit (AE-40), reverse disassembly procedure.
    - j. Check para. 5.2.5.3.C. for clutch bracket (AE-21) adjustments.

### 5.2.5.3 Adjustments

- A. Drive Belt (AE-9) Main Motor ( See Figure 5-4)
- The main drive belt is located between the drive pulley (C) (AE-18) and the idler pulley (AF-23) on the idler pulley shaft (AF-22). With belt in normal operating position, perform the following steps:
1. Adjust main drive belt tension, by turning adjusting nuts (AA-105) on belt tension axle (AA-106).
  2. For correct operating tension, adjust belt so that movement (at midway point) corresponds to a hand depression of 500 grams (17.6 oz.) for a maximum downward distance of 6 to 8 mm (0.2-0.3-in.).

## DRIVING MECHANISM (PART 2)

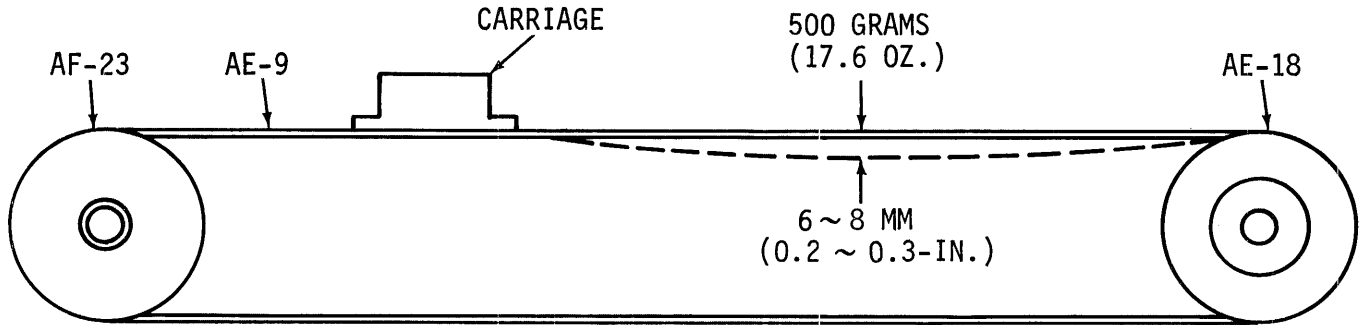


Figure 5-4. MAIN MOTOR BELT ADJUSTMENT (AE-9)

### B. Bushing End-Play Adjustment, Preload Clutch (Refer to Fig. 5-5)

To ensure smooth rotation of clutch shaft (AE-40), perform the following adjustments:

1. Tighten screws (AE-22) on rear bushing bracket (AE-21).
2. Loosen screws (AE-22) on front bushing bracket (AE-21).
3. Insert flat guage between spacer (AE-17) and hub of drive pulley (AE-18). Maintain a gap of 0.002-0.004-in. max. (0.05-0.10mm) and tighten bracket to this dimension.

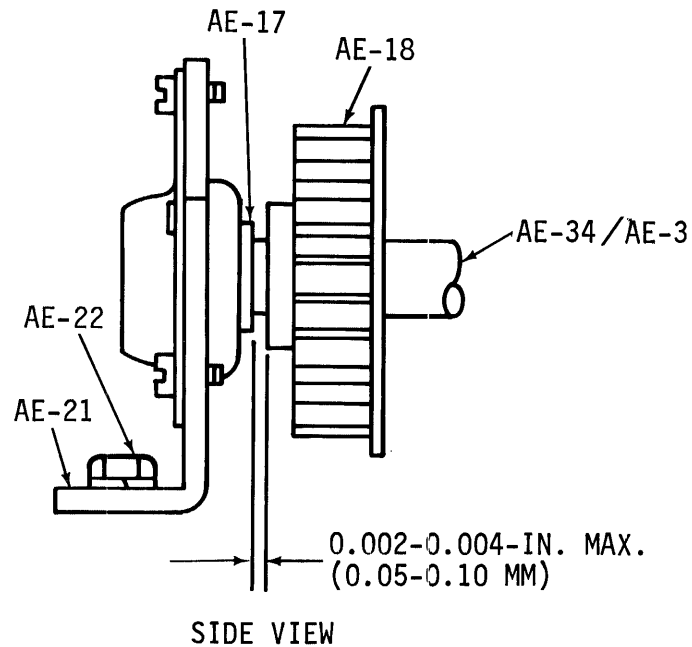


Figure 5-5 BUSHING END-PLAY ADJUSTMENT FOR FORWARD CLUTCH SHAFT, (PRELOAD CLUTCH)

### C. Driving Mechanism (Fig. AE, Part 2)

1. Bracket (AE-21) (Fig. 5-6)
  - a. Maintain one back bracket (AE-21) supporting the drive mechanism as far left as possible prior to tightening screws, washers (22), (23). (See Fig. 5-6).

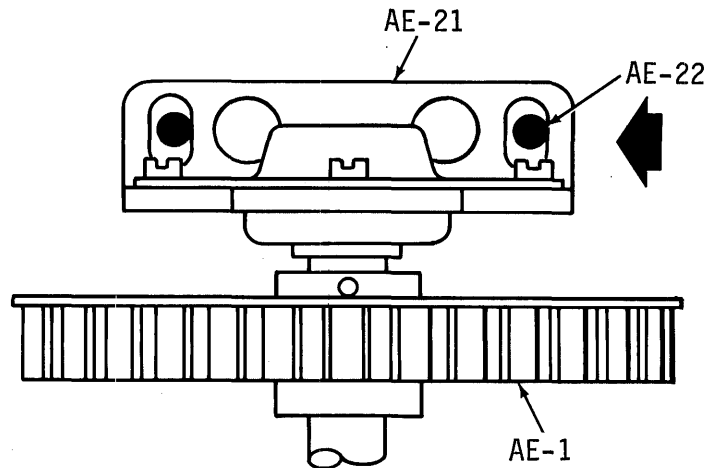


Figure 5-6. LOCATION OF DRIVE PULLEY BRACKET (AE-21)

## 5.2.6 IDLER PULLEY ASSEMBLY (Figure AF)

### 5.2.6.1 Operation

The idler pulley assembly, located on the left side of the printer, is used to transmit power from the main belt (AE-9) directly to the ribbon assembly mechanism (AL) for both forward and reverse drive.

The unit consists of an idler drive pulley (AF-23) and torque limiter (brake) (AF-31) (part of idler drive pulley), spring return pulley (AF-33) and a pinion shaft (AF-22).

For forward drive of both carriage and ribbon mechanism, power is transmitted from the drive pulley (AE-18) and main belt through the idler pulley (AF-23) to the drive pinion shaft (AE-22).

A rack (AL-1), geared to the rotating pinion shaft maintains the drive for both the left and right ribbon movement (See Figure AL). The rack and pinion notion is continuous with the movement of the ribbon drive mechanism and carriage for forward and reverse direction.

On reverse direction the carriage return spring, under tension, is guided over the return pulley (AF-33). The fixed idler pulley (AF-23), now rotating counterclockwise, transmits reverse torque directly to the rack and pinion, setting up the condition for the next ribbon feed drive and carriage movement when the print head returns under spring tension to the left margin.

The idler pulley and brake, spring return pulley, and pinion shaft are supported by an idler pulley holder (AF-40) which in turn mounts directly to the base of the printer. Should carriage or ribbon drive malfunction, a torque limiter device (brake) (part of idler pulley) permits slippage of pinion shaft protecting forward or reverse ribbon drive linkages.

When the malfunctions is eliminated, the brake is reset by moving carriage, by hand, to start position on the printer (See para. 5.2.6.3.A. for adjustments).

### 5.2.6.2 Removal/Replacement

#### A. Idler Pulley Unit (AF)

To remove entire idler pulley unit 527730001, perform the following steps:

1. Remove two nuts (AA-105) on belt tension axle (AA-106) and remove main driving belt (AE-9).

## IDLER PULLEY ASSEMBLY

2. Remove carriage return spring (AG-20) between bottom of head/carriage at DB guide plate (AA-107) and return spring bracket (AG-17). Move carriage to right out of the way.
3. Remove nut, screw, washer (AL-121, 96, 120) holding left ribbon releaser (AL-33 and left rod link - AL-98).
4. Remove screws, washers (AL-52, 53, 54) and remove left ribbon holder plate (AL-191).
5. Remove three screws (AA-93) and washers (AA-94, 95) and remove damper cylinder (AA-85).
6. Remove four screws, washers (AF-41, 42) from printer base (AH-1) and remove entire idler pulley unit (See Fig. AF).
7. When replacing idler pulley unit, reverse removal steps 1 through 6. (Note, in step 1, when replacing main belt, that the ribbon feed rack (AL-1 should be in left-most position, and the idler pulley support bracket (AF-40) is in extreme right position and parallel to center line of printer.

### B. Idler Pulley Shaft (AF-22)

1. To remove shaft and parts from idler pulley bracket support (AF-40) perform the following:
  - a. Apply removal procedures from para. 5.2.6.2.A.1 through 5.2.6.2.A.6.
  - b. Remove snap ring (AF-34) from shaft (opposite end of pinion).

Before removing nut (AF-30) in next step (c), bend nut holder (AF-29) so that nut can rotate.

- c. Using a 5.5 mm (7/32-in.) wrench, remove nut (AF-30) and nut holder securing the two ends of brake shoe holders (AF-43).
- d. Spread brake shoe holders (AF-43) (with attached brake shoes) and remove small threaded shaft (AF-28) and attached spring (AF-27).
- e. Using a 2 mm (0.078-in.) allen wrench, loosen two set-screws on friction sleeve (AF-31), (note that when re-installing sleeve, keep idler pulley in side contact with sleeve and maintain one set-screw on flat of shaft).
- f. Grasp pinion end of shaft and slide shaft from the following parts.
  1. Retainer (AF-35) (left).
  2. Spacer (AF-39) (use needle nose pliers to replace).
  3. Return pulley (AF-33).
  4. Idler Pulley (AF-23) (with holders, AF-43).
  5. Friction sleeve (AF-31).
  6. Retainer (AF-35) (right).
- g. To re-assemble idler pulley shaft parts, reverse steps at para. B.1.(a) through B.1.(f), (1) - (6).

### C. Idler Pulley (AF-23) (Part of Brake Mechanism)

1. To install brake shoe holders (AF-43) (with attached brake shoes) on idler pulley, perform the following steps:
  - a. Remove complete idler pulley assembly (AF). Refer to para. 5.2.6.2.A.1. through 6.
  - b. Remove idler pulley shaft (AF-22) (and parts). Refer to para. B.1.(a). through B.1.(f) 4.
  - c. Remove snap rings (AF-26), and remove brake shoe holders (AF-43) (with attached brake shoes).

- d. Replace brake shoe holders, and secure with snap rings (AF-26).
- e. To re-assemble idler pulley unit and shaft, reverse steps B.1.(a) through B.1.(f).
- f. To install complete idler pulley (AF), reverse steps in para. 5.2.6.2.A.1. through 5.2.6.2.A.7.

### 5.2.6.3 Adjustment

- A. Idler Pulley (AF-23) (Part of Torque Limiter (Brake Mechanism) (Fig. 5-7).
  1. Perform removal steps at para. 5.2.6.2.A.1. through 5.
  2. Using a 5.5 mm (7/32-in.) wrench, turn nut (AF-30) on small threaded shaft (AF-28) (holding spring (AF-27) until tension is off the spring.
  3. Finger tighten nut until it comes to rest on top surface of nut holder (AF-29) (with brake shoe holder (AF-43) underneath).

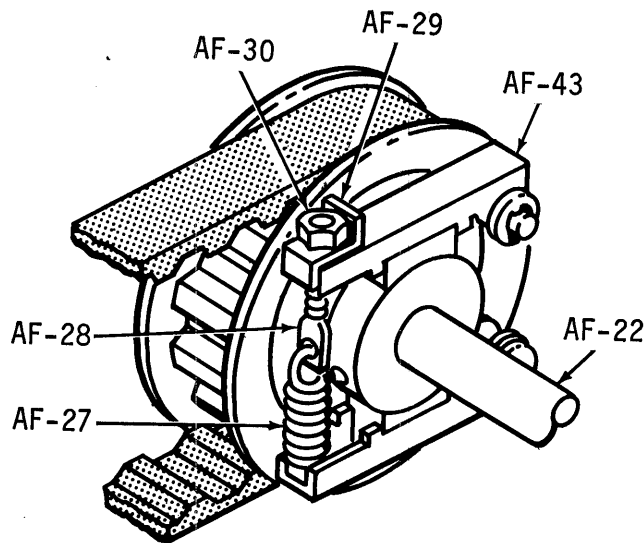


Figure 5-7. TORQUE LIMITING DEVICE (BRAKE)

## 5.2.7 REED SWITCH (AG)

### 5.2.7.1 Operation

Two reed switches (AG-1) that control end of print (EOP) (right) and ready to print (RTP) (left) are located above the back of the power driver heat shield at the front of the printer. The bottom of the reed switch holders (AG-9, 12) are mounted to the base of the printer; and at the top of the holders, the non-conductive holder (AG-2) and the reed switch (AG-1) are fastened to the adjustable reed switch bracket (AG-7) by two more separate screws and nuts.



## REED SWITCH

The spring (AG-20) for the carriage return is fastened to a return spring bracket (AG-17) on the left side of the printer, coils around the return pulley located on return pulley holder (AG-21) and is then looped under and over second return pulley (AF-33) of shaft (AF-22). It is then attached to the underside of the carriage, slightly to the left of the main drive belt tension axle (AA-106) on the D.B. guide plate (AA-107).

### 5.2.7.2 Removal/Replacement

#### A. Reed Switch ( Left and Right) (See Fig. 5-8)

1. Remove screw, washers (AG-3, 4, 5) and nut (AG-6) from both reed switches (AG-1).
2. Remove insulating adjusting holders (AG-2) by removing screws (AG-15) mounted to reed switch holders (AG-7).
3. To remove adjusting holders (AG-7) remove screws (AG-8) and washers (AG-25).
4. To remove reed switch bracket holders (AG-9, 12) from base of printer, remove screws (AG-13, 10) and lockwashers (AG-11, 14).
5. To re-assemble reed switch assembly, reverse steps 1 through 4 above.

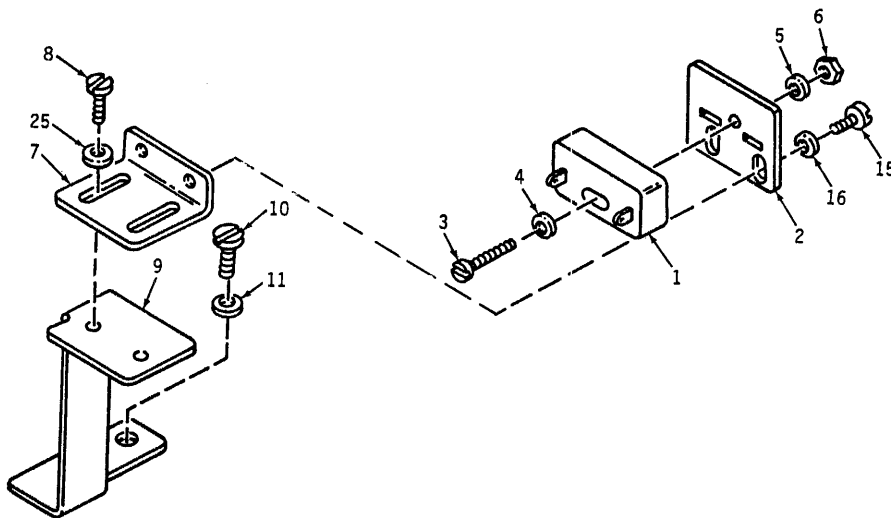


Figure 5-8. REED SWITCH ASSEMBLY, LEFT (AG)

### 5.2.7.3 Adjustments

#### A. Left Reed Switch - Static Adjustment (See Figure 5-9).

1. Adjust left reed switch (AG-1) by loosening screws (AG-8) and washers (AG-25) on bracket (AG-7).
2. Slide left reed switch so that the distance between outside, right edge of adjusting holder (AG-2) and the back portion of the left post that holds the front carriage bar (AB-12) is 33 millimeters (1.3 inches).

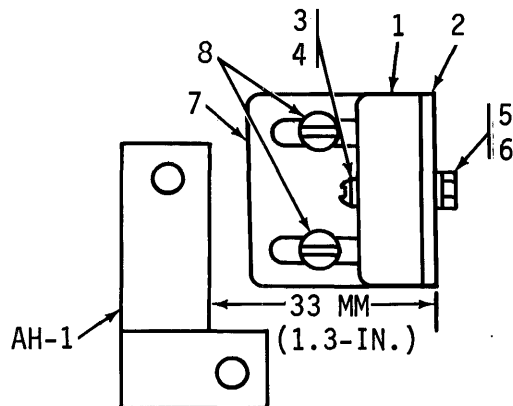


Figure 5-9. LEFT REED SWITCH (AG-1) STATIC - ADJUSTMENT

B. Right Reed Switch - Dynamic Adjustment.

1. The test for the right-hand limit switch (AG-1) is to ensure 80 characters printed. Lines should be transmitted without a carriage return (CR) signal, or exactly 80 characters, to ensure that right limit switch (reed) turns off forward clutch and returns print head to home or left starting position.

**Note**

**Ensure that the 80th character printed is a whole one (5 or 9 column).**

5.2.8 PRINTER BASE (Figure AH)

5.2.8.1 Operation

The all aluminum metal base is a self-contained, single unit structured from cast aluminum, oxide protected, which supports the complete electronic and mechanical assemblies in the printer.

A perforated guard plate (AH-4) is located directly under the power driver assembly.

Four 2 x 5-inch removable rubber feet (AH-2) support the base.

An optional speaker (AH-3) is shown mounted in the front, right-hand corner of the base (AH-1) using two mounting screws (AH-16) and bracket (AH-15).

5.2.8.2 Adjustment

1. Speaker Option

For electrical installation of speaker option, two wires located at the front, right-hand side of the base are connected to the speaker. The wires are identified as: W91-white / red (coming from connector J8 at pin 7) and the return wire, W104-white/orange (coming from connector J8, pin 5). (Refer to Wiring Diagram (Fig. 7-7) for Model 306 Printer Mechanism).

## FRAME

### 5.2.9. FRAME (FIG. AI)

#### 5.2.9.1 Operation

Two chassis frames right and left (AI-46, 12) support (1) the paper feed guide shaft (AI-20) (upon which are mounted two pin feed tractor units (Refer to Figure AK) and (2) the paper feed shaft (AI-15) which is geared (Refer to Figure AJ) for line feeding of the printer paper. The paper feed shaft rotates on bronze bearings (retainers - AI-17) which are held by retainer holders (AI-16, 18) to the chassis by screws (AI-19).

Located on the left end of the shaft (AI-20) (inside the left frame, AI-12), is a small pin feed stopper (AI-34) which is adjustable when establishing the left print-out margin using perforated multi-form paper (See para. 5.2.9.3).

Four brackets (AI-4, 6, 8, 10) attached to the chassis frames (AI-1, 12) support the logic/power supply printed circuit board, which stands in a vertical position at the back of the printer.

Capacitor (AI-23) for main motor is mounted by bracket at the bottom right of the right-hand frame (AI-46).

#### 5.2.9.2 Replacement/Removal

##### A. Paper Feed Shaft (AI-15)

1. Refer to para. 5.2.10.2.A.1 to remove paper feed knob (AJ-17).
2. Refer to para. 5.2.10.2.B.1 through B.3 to remove pf gear (Fig. 8-10/72).
3. Loosen lock-knobs (Fig. 8-11/16) (left and right) at top of pin feed holders (Fig. 11/11,38).
4. Using a small slotted-head screwdriver, loosen two small screws, lockwashers (Fig. 8-11/22, 23) on the set plate (Fig. 8-11/21) of left and right pin feed units.
5. Using a medium sized screwdriver, remove screws (AI-19) holding the retainer holder (AI-45) retainer holder (AI-16), and retainer (bearing) (AI-17) supporting the paper feed shaft on the left and right side of printer.
6. Remove shaft out to the right from the suspended pin feed units (left and right) (Fig. 8-11).
7. To reassemble, reverse order of disassembly.

##### B. Paper Feed Guide Shaft (AI-20)

1. Loosen both locking knobs (AK-16) at top of pin feed holders (Fig. 8-11/11, 38).
2. Remove nut (AI-22) at right end of guide shaft.
3. Loosen allen-head screw (AI-35) on pin feed stopper (AI-34).
4. Remove slotted head screw (AI-21) from left end of shaft.
5. Slide shaft (AI-20) from the two pin feed units (Fig. 8-11).
6. To reassemble, reverse order of disassembly.

#### 5.2.9.3 Adjustments

##### A. Pin Feed Stopper (Fig. 8-11/5) (Maintaining 5/8-In. Nominal Paper Margin)

1. Loosen set-screw (Fig. 8-11/6) on pin feed stopper and maintain 0.3-in. (9mm) dimension between stopper and left chassis (AI-12). Tighten screw.
2. Check para. 5.2.18.3.C timing fence adjustment, if required.
3. Set left pin feed assembly flush to stopper and lock knob (AK-16).
4. Check for 5/8-in. nominal margin for print out on paper.
5. Recheck fence dimension adjustment (step 2) if margin is not 5/8-in. nominal.

## 5.2.10 PAPER FEED (Figure AJ)

## 5.2.10.1 Operation

A. Standard Operation

Paper can be moved manually by pulling out and rotating the platen knob (AJ-17). For the standard Model 306 printer the vertical formatting is controlled by the user's software and a line count switch (4). Each line generates a line pulse to the interface connector on the printer. By keeping count of these pulses, the user's software can terminate the paper movement. Drive torque to operate the form feed clutch is supplied by the center shaft (AJ-37) through an O-ring (AJ-29). Any paper command will energize the solenoid magnet (AJ-65). The armature will then retract from rest position toward the magnet pole piece pulling the clutch slide pawl (81) with it. This releases the clutch unit (AJ-40, 41). As the clutch release pawl (AJ-102) is released, three internal bearings (AJ-46) in the clutch assembly grip the clutch shaft (AJ-37) and rotate it 180 degrees. This half revolution is equal to paper movement of 1/6 of an inch, or one line. At the end of line feed, the solenoid slide will engage both the release pawl (AJ-102) and clutch tab on the inner cam (AJ-40) disengaging the clutch (the three bearings retract from the shaft).

At the conclusion of a line feed, a back stopper pawl (AJ-31) which rides on the back stop cam and gear (AJ-49), will drop in behind the notched lobe of the cam and prevent counter rotation of the clutch shaft (i.e., downward movement of multi-part paper).

## 5.2.10.2 Removal/Replacement

A. Paper Feed Knob (AJ-17)

1. Remove screw (AJ-19), ornamental plate (AJ-18), and paper feed knob (AJ-17).

B. Paper Feed Gear (Fig. 8-10/72)

1. Perform step A.1. (When performing next step, be careful of spring tension on washers).
2. Remove snap ring (AJ-16) on paper feed shaft (AI-15).
3. Remove parts in the following order from paper feed shaft (AI-15) when loosening set-screws (AJ-74) on paper feed gear (AJ-72) with a 1.5 millimeter allen-wrench.
  - a. Washer (AJ-15), Spring (AJ-14).
  - b. Paper feed knob coupler (AJ-12) (with set-screws, AJ-13 loosened), and paper feed coupler (AJ-73). (This will be in one piece, unless set-screws (AJ-13) are loosened).
  - c. Remove paper feed gear (AJ-72) from shaft.
4. Reverse steps B.1. through B.3. to reassembled.
5. For removal of remaining paper shaft, see Figure AI-15, Section 8 and refer to para. 5.2.9.2.A.

C. Clutch Pulley (AJ-44), Clutch Releaser (AJ-41), Clutch, Inner Cam (AJ-40), Cam With Gear (AJ-49), Counter (AJ-51) and Clutch Shaft (AJ-37)

The above parts are removed from shaft (AJ-37) in the following manner:

1. Remove snap ring (AJ-39) just inside right PF chassis (AJ-30) on shaft (AJ-37).
2. Remove snap ring (AJ-47) from cam (AJ-40).
3. Loosen allen screws (AJ-50) on inner cam (AJ-40).
4. Loosen all screws (AJ-62) on cam and gear (AJ-49).
5. Loosen allen screws (AJ-52) on counter (AJ-51).
6. Remove snap-ring (AJ-39) on shaft (AJ-37) (just inside PF chassis, AJ-53).
7. Remove O-ring (AJ-29) from pulley (AJ-44).
8. Pull shaft (AJ-37) from left chassis (AJ-53), but keep inner cam and pulley together as there are three internal bearings (AJ-46) contained on the inside of part AJ-41, releaser, which may scatter.

9. To assemble, reverse disassembly procedure placing O-ring(AJ-29) over pulley (AJ-44) as shaft is threaded through parts. When parts are assembled, place O-ring over the driving pulley (AD-27).

### 5.2.10.3 Adjustments

#### A. Clutch, Inner Cam (AJ-40) Clutch Slide Pawl (81) (Fig. 5-10)

To adjust proper distance of clutch slide pawl (81) with respect to holding the raised tab on paper feed clutch, inner cam (AJ-40) (prior to line feed release), perform the following steps: (Refer to Fig. 5-10 below and mechanical drawing Fig. AJ, Section 8).

1. Loosen bolts (AJ-75) and washers (AJ-68, 69) on clutch magnet frame (AJ-63) mounted to right-hand paper feed chassis 529862001-5001 (AJ- Part List).
2. Slide magnet on paper feed chassis slots so that the gap between clutch slide pawl (81) and raised tab on inner cam (AJ-40) is from 0.005-0.015 in. max. (0.1-0.3 mm). Tighten screws and washers.

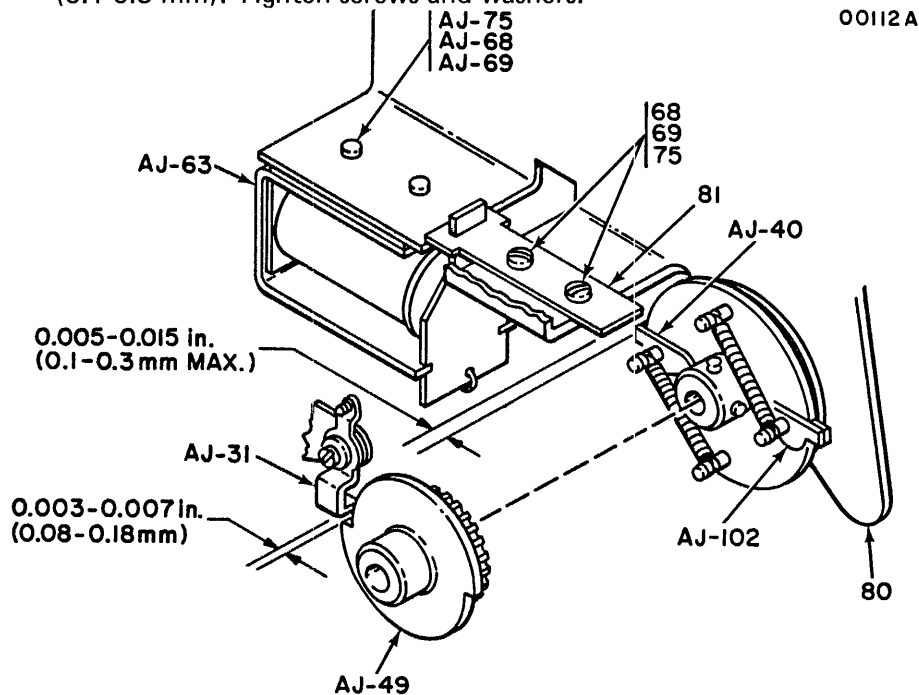


Figure 5-10 TWO ADJUSTMENTS, PAPER FEED MECHANISM (AJ)

#### B. Paper Feed Cam and Gear (AJ-49) / Back Stopper (AJ-31) (Fig. 5-10)

As the raised tab on inner cam (AJ-40) and clutch release pawl (AJ-102) strike the the clutch slide pawl (81) (completing a line feed ), it is at this point that the back stopper pawl (AJ-31) drops off the notched end of the cam (AJ-49) and must be adjusted in this position (preventing counter rotation or downward movement of paper).

1. Loosen allen screws (AJ-62) on stop cam (AJ-49) and maintain a gap of 0.003-0.007-in. max. (0.08-0.18 mm) between back stopper pawl and notch on cam. Tighten allen screws on stop cam when gap is attained.

#### C. Line Feed Counter (Fig. 8-10)

The line feed counter (AJ-51) must be adjusted so that both magnets clear the reed switch housing (AJ-4) when activating the internal switch.

1. Loosen two allen-head screws (AJ-52) on line counter (AJ-51).
2. With the clutch slide pawl (81) holding both the tab on the inner cam (AJ-40) and clutch release pawl (AJ-102) (clutch off), set the counter so that within a 90 degree rotation the switch is activated, and then comes to a stop beyond the reed switch housing at each line feed.

## 5.2.11 PIN FEED UNIT (FIGURE 8-11)

### 5.2.11.1 Operation

Pin feed belt units left and right (fig. 8-11/32) provide pin guides for paper to travel vertically up or down. To move paper down, pull paper feed knob (AJ-17) outward and rotate counterclockwise; to move paper up, rotate clockwise. Pin feed units are adjustable and are locked in position by fixing knobs (AK-16). Paper holders (AK-12, 37) are used to keep paper on pin feed tractors when printer is in use.

Direct coupling of paper feed knob and paper feed shaft (See Figure AI-15) is accomplished by serrated portion of spring activated knob inserting into opposing serrated coupler (AJ-12).

### 5.2.11.2 Replacement/Removal

- A. Pin Feed Units (Fig. 8-11)
  1. Perform step A of para. 5.2.9.2 to remove paper feed shaft (AI-15).
  2. Perform step B of para. 5.2.9.2 to remove paper feed guide shaft (AI-20)

### 5.2.11.3 Adjustment

- A. Paper Holder Gate (Left and Right) (12, 37) (Fig. 5-11)  
(Adjustment can be done with assembly mounted on printer).
  1. Clearance between idler slide (28) and the paper holder gate, when closed, should be  $0.065 \pm 0.015$ -inch ( $1.6 \pm 0.4$  mm) to hold paper in place when printer is operating.
  2. Adjust for clearance by bending right angle metal stopper at bottom of pin feed holder (11, 38).

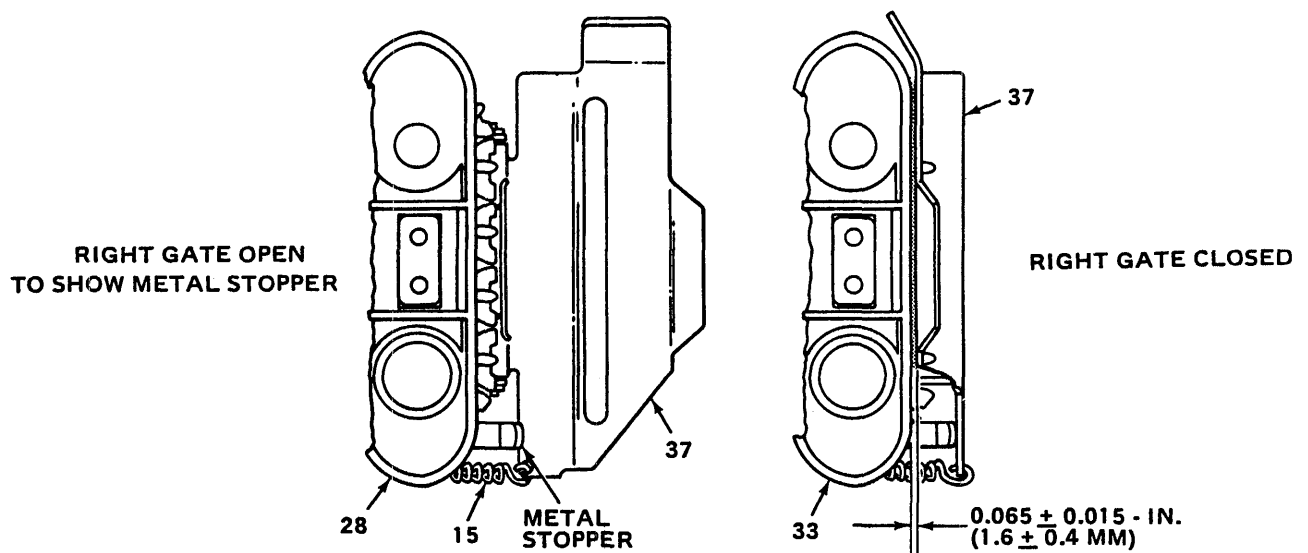


Figure 5-11. ADJUSTMENT FOR PAPER HOLDER GATE

## PIN FEED UNIT

- B. Pin Attachment Guide (17) (Left and Right) (Fig. 8-11)  
(Adjustment is required only if part becomes misaligned or replaced)
1. With left paper gate closed (12), loosen lock knob (16) at top of left pin feed holder (11) of left pin feed unit.
  2. Slide left pin feed unit out of the way, as required, and loosen two screws, washers (18, 19, 20) holding the pin attachment guide (17) on the pin feed holder.
  3. Open left paper feed gate and move pin attachment guide so that it is completely inserted under mounting screws and parallel with idler slide (28). Tighten screws, lockwashers.
  4. Repeat steps indicated at B.1. through B.3. for right paper gate (37) and right pin feed holder (38) for right pin feed unit.
- C. Set Plate (21) For Paper Drive Slide Shaft (10) (Fig. 8-11)
1. Ensure that both halves of the set plate (21) contact the paper drive slide shaft to avoid backlash for positive drive of shaft.
    - a. Using a small slotted head screwdriver, loosen two screws, lockwashers (22, 23) on one-half of the set plate (21) located on sleeve (24) of the pin feed unit (left).
    - b. Push set-plate against the shaft (10) and tighten screws, lockwashers.
    - c. Repeat steps in para. C.1.a and C.1.b., and adjust the other half of the set plate in the same manner.
    - d. Repeat steps in para. C.1.a. through C.1.c., and adjust the other set plate (11) for the right hand pin feed unit.
- D. Pin Feed Unit (Left and Right) (Fig. 8-11)
1. To remove pin feed units from printer, perform steps indicated in para. 5.2.11.2.A.

### NOTE

**The following removal/replacement procedure applies to either a left or right pin feed unit. But where there is a part difference, key numbers will be indicated in the text so that the operation being applied will cover both units.**

2. Orient pin feed unit so that spring (15) is at bottom of unit while being held in hand. Paper holder gate (13, 37) is closed.
3. Turn belt (32) and locate two set-screws (27) between pins on drive pulley (26) for drive sleeve (24) at bottom of unit.
4. Loosen two screws, washers (18, 19, 20) holding the pin attachment guide (17) on the pin feed holder (11, 38).
  - a. Open gate (12, 37) and slide pin attachment guide (17) outward so that when belt is compressed each side, the clearance between belt and guide is approximately ¼-in. (6.3 mm). (Not critical).
5. Using a medium sized slotted head screwdriver, remove two screws, lockwashers (34, 35) and plate nut (36) holding pin feed holder (11, 38) and belt guide (33) together.
6. Separate and remove belt guide (33) from remaining portion of pin feed unit. Keep sleeve (24) in position.
7. Remove two screws, lockwashers (29, 19, 30) and recessed nut (31) holding the idler slide (28) to the pin feed holder unit (11, 38). Keep sleeve (24) in position.
8. Lay unit on bench with gate (12, 37) open. The set plate (21) (Fig. 8-11) is facing downward, the sleeve (24) is projecting upward, (See Fig. 5-12). (Set plate is not shown).

9. Remove the following three assembled parts together as one unit from sleeve (24): (1) belt (32), (2) idler slide (28) and (3) drive pulley (26). Note, that the drive pulley slides up over the sleeve (24) with the other two parts.
10. Remove spacer (25) from sleeve (24).
11. Lift up remaining pin feed holder unit (11), (38) from bench and remove sleeve (24) from pin feed holder (11, 38).
12. To re-assemble pin feed unit (left and right), reverse steps indicated at para. 5.2.11.3.D.1. through D.11.

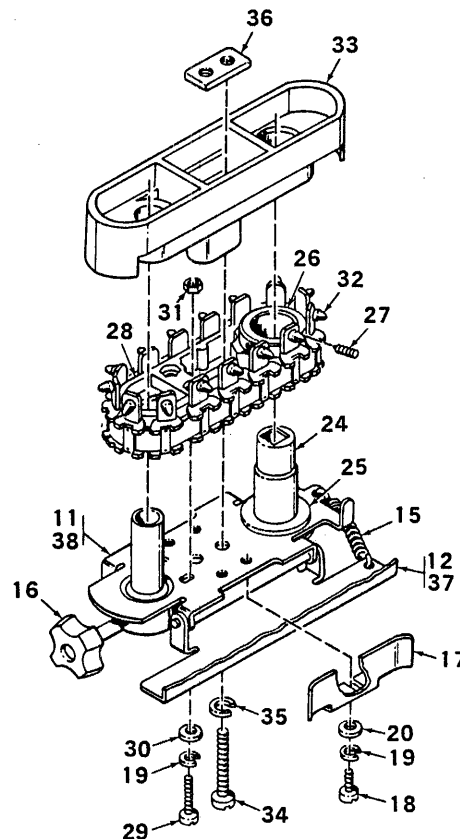


Figure 5-12. REMOVAL OF BELT (32) IDLER SLIDE (28), AND DRIVE PULLEY (26)

E. Paper Holder Gate (Left and Right) (12, 37).Fig. 8-11.

1. Remove paper holder gate, if required, with both assemblies in position on the printer.
  - a. Using spring removal tool, remove spring (15) located at bottom of paper holder gate when gate is closed.
  - b. Remove snap ring (14) at bottom of pin (13) on gate. Remove pin.
  - c. To replace gate, reverse order of disassembly E.1.a through E.1.b.



## 5.2.12 RIBBON FEED (FIGURE AL)

### 5.2.12.1 Operation

As the printer operates, a left and right ribbon feed mechanism, mechanically linked so as to function when the print head moves, feeds the print ribbon obliquely across the face of the platen (AB-1). The slightly upward angle is maintained by right ribbon spool being located 1½ inches higher with respect to the left lower ribbon spool allowing use of the entire ribbon surface. Two rollers (AA-62), mounted in advance of the moving print head on the same carriage, guide the ribbon across the jewel of the print head. A safety device protects the ribbon mechanism from being damaged allowing slippage in main drive (Refer to para. 5.2.6.3.A.).

#### A. Ribbon Feed Mechanism - Left

Torque transmission route is as follows:

Idler pulley (AF- 23) - Idler pulley shaft (pinion) (AF-22) - Ribbon feed rack (AL-1) - Ribbon pawl operator link (L) (AL-20) - Ribbon pawl operator (L) (AL-197) - Ribbon feed pawl (L) (AL-11) - Ribbon feed ratchet (L) (AL-189) Ribbon with spool (AL-113)

#### B. Ribbon Feed Mechanism - Right

Torque transmission route is as follows:

Idler pulley, (AF-23) - Idler pulley shaft (pinion) (AF-22) - Ribbon feed rack (AL-1) - Ribbon feed bar (AL-101) - Ribbon pawl operator link (R) (AL-112) - Ribbon pawl operator (R) (AL-199) - Ribbon feed pawl (R) (AL-58) - Ribbon feed ratchet (R) (AL-190) - Ribbon with spool (AL-113).

#### C. Connecting Rod Link, Left and Right Spool

Torque transmission route for ribbon feed mechanism depends upon position of left ribbon releaser (AL-33) or right ribbon releaser (AL-82). The two operate in tandem by a connecting rod link (L) (AL-98) and connecting rod link (R) (AL-97) which is adjustable on the right side of the left rod link. The position of the two connecting rod links is controlled by ribbon release holder (AL-46) located to the left of the ribbon releaser (L) (AL-33). The holder consists of a spring arm and roller upon which the ribbon releaser (AL-33) will ride under tension, but remains positioned when set for either right or left movement of the ribbon.

#### D. Forward and Reverse Control Ribbon Movement

Tension of ribbon is held by ribbon holder (L) (AL-27) and (R) (AL-76) in conjunction with ribbon releasers (R) (AL-82), (L) (AL-33), guide rollers (L) (AL-42), (R) (AL-89), and ribbon tension rollers (L), (AL-37), (R) (AL-86).

If the ribbon, rotating on the ribbon spool (AL-113), approaches the end, two eyelets or stop plate on the ribbon pull the releaser rods (AL-82, 33) and the direction of the ribbon is reversed.

#### E. Ribbon Movement - Right

For the transfer of ribbon movement to the right, right rod links (AL-97) must be in position to the right, the gear teeth of the spool feed ratchet (R) (AL-190) engages with drive ribbon feed pawl (AL-58) rotating ribbon spool (AL-113) clockwise. A ribbon stop pawl (R) (AL-79) prohibits reverse motion of feed.

F. Ribbon Movement— Left

For the transfer of ribbon movement to the left, left rod link (AL-98) must be in position to the left, gear teeth on spool feed ratchet (L) (AL-189) engages with drive ribbon feed pawl (L) (AL-11) rotating left ribbon spool (AL-113) counterclockwise. A ribbon stop pawl (L) (AL-30) prohibits reverse motion of feed ratchet when ribbon feeds to the left.

G. Stoppers – Left and Right (AL-115, 49)

For proper movement of the ribbon pawl operators (AL-197, 199) two stoppers (AL-115, 49) are adjusted to maintain optimum movement of the ratchets (AL-189, 190) (ribbon rotation) with respect to the transference of drive from the rack and pinion (AL-1, AF-22) through the left ribbon pawl operator link (AL-20).

H. Summary of Ribbon Movement Function

In summary, if motion of ribbon is set for right movement the right feed pawl drives the right feed ratchet, while left feed ratchet and left stop pawl is disengaged and inactive. On the other hand, if motion is set for left movement of ribbon, the left feed pawl drives the left feed ratchet, while the right feed ratchet and right stop pawl is disengaged and inactive.

### 5.2.12.2 Removal/Replacement

A. Ribbon Holder Plate (AL-191), (Left)

1. Disconnect ribbon releaser (L) (AL-33) from ribbon rod link (L) (AL-98) by removing screw (L) (AL-96).
2. Remove entire ribbon holder plate (AL-191) by removing four screws (AL-52) and washers (AL-53, 54) from left chassis frame (AI-12).

B. Ribbon Holder Plate (AL-55), (Right)

1. Disconnect ribbon releaser (R) (AL-82) from ribbon rod link (R) (AL-97) by removing screw (R) (AL-96).
2. To remove entire ribbon holder plate (AL-55) perform the following:
  - a. Remove two nuts (AL-103) and washer (AL-102) from right-hand side of ribbon feed bar (AL-101).
  - b. Remove four screws (AL-93) and washers (AL-94, 95) from right chassis frame (AI-46).
  - c. Remove screws (AD-38), washers (AD-39, 40) from bracket (AD-34) and remove entire ribbon holder plate (AL-55).
3. To replace, reverse order of disassembly.

C. Ribbon Feed Rack (AL-1)

1. Prior to removing ribbon feed rack (AL-1), perform para. 5.2.12.2.A. and swing left ribbon holder plate out of the way.
2. Move carriage and head to the right, and fasten temporarily. Remove two nuts (AL-103) and washer (AL-102) from left side of ribbon feed bar (AL-101).

## RIBBON FEED

3. Remove two screws (AL-6) and washers (AL-7) from printer base post (below left end of platen (AB-1) on side).
4. Remove two screws (AL-6) and washers (AL-7) from printer base post (at left end of rear guide bar, AB-7) and remove ribbon rack feed.
5. To re-assemble, reverse steps 1 through 4.

### 5.2.12.3 Adjustments

#### A. Rack and Idler Pulley Shaft (Pinion) (AL-1, AF-22)

(Perform steps from para. A.1 through A.2 to adjust rack and pinion.)

1. Idler Pulley Assembly Positioning (AF-21).
  - a. Remove damper (AA-85).
  - b. Remove left ribbon holder plate (AL-191).
  - c. Loosen four screws, washers (AF-41, 42) holding idler pulley ass'y (AF-21) to base of printer.
  - d. Move idler pulley assembly (AF-21) so that unit is located to the extreme right position of mounting holes. Unit must be parallel to center line of printer (Refer to Fig. 5-13).

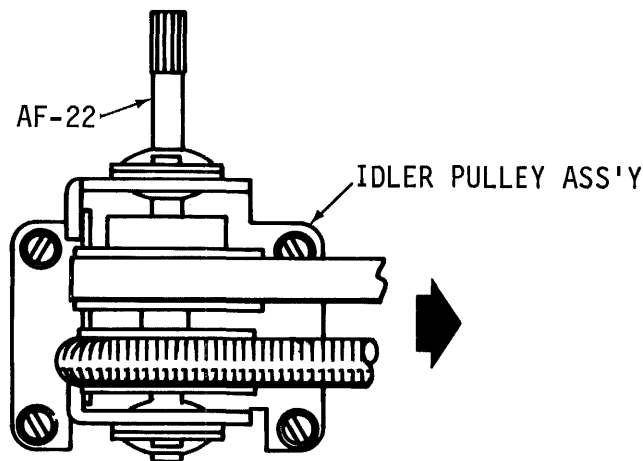


Figure 5-13 LOCATING IDLER PULLEY ASSEMBLY

- e. Replace damper
  - f. Proceed to next step, 2.
2. Ribbon Feed Rack (AL-1)
    - a. Starting Position Adjustment
      - 1) Push carriage (Fig. 8-1/51) containing piston (AA-80) to left margin until piston bottoms in damper cylinder (AA-85).
      - 2) Loosen four screws (AL-6) holding rack guide plate (AL-2) to printer.
      - 3) Raise rack guide plate (AL-2) upwards away from pinion (AF-22).
    - b. Rack and Pinion Adjustment
      - 1) Move ribbon feed bar (AL-101) by hand so that rack (AL-1) can be adjusted in next step (2).
      - 2) Maintain 7 mm (0.27-inch) between ribbon feed rack (AL-1) and guide rack (AL-2). (See Figure 5-14).

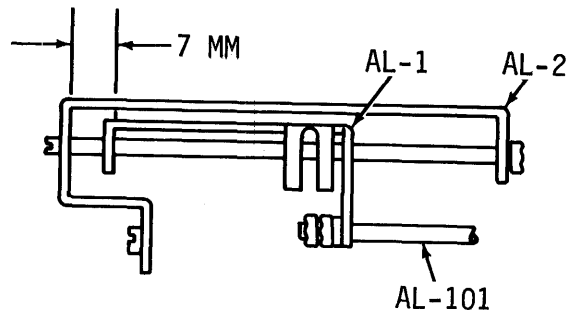


Figure 5-14. LOCATING DIMENSION FOR RIBBON FEED RACK

- 3). When performing next step (4), adjust guide plate so that rack is in a horizontal plane and meshes evenly with pinion gear when head is run out to extreme right by hand.
  - 4). Maintain allowable standard backlash of 0.1 mm (0.004-in.) between rack and pinion teeth. (Move rack guide plate up or down into spline of shaft (AF-22) to establish backlash adjustment, (See Fig. 5-15).
  - 5). When those steps in paras. 2.b.1. through 2.b.3 have been performed correctly, tighten four rack guide screws (AL-6).
3. Torque Limiting Device (Brake) (AF-23)
    - a. Perform steps found at para. 5.2.6.3.A.2 through A.4.
    - b. Replace ribbon holder plate (AL-191).

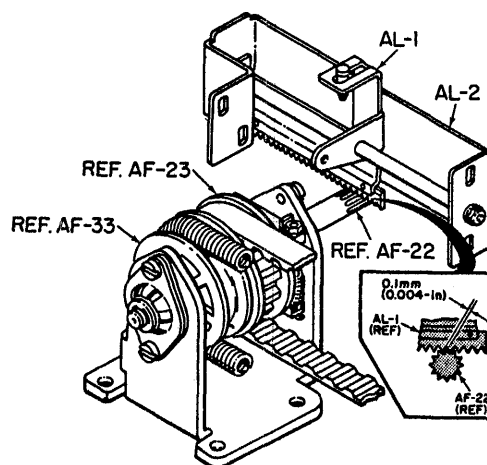


Figure 5-15. RACK AND PINION ADJUSTMENT, RIBBON MECHANISM

## RIBBON FEED

### B. Ribbon Reverse Mechanism

(Perform steps from B.1 through B.5 for adjustment of Ribbon Reverse Mechanism)

#### 1. Dimensioning of Left and Right Ribbon Holder Plates (AL-191, 55)

(Perform steps from B.1 through B.5 for adjustment of Ribbon Reverse Mechanism)

##### a. Left Ribbon Holder Plate (AL-191) (Fig. 5-16)

- 1) Maintain parallelism of plate with respect to printer base and apply distance of 16-17 mm (0.6-0.67 - in.) between top of plate and top of rear guide bar (AB-7).
- 2) Tighten mounting screws, washers (AL-52, 53, 51) of bracket when parallelism and correct distance has been attained.

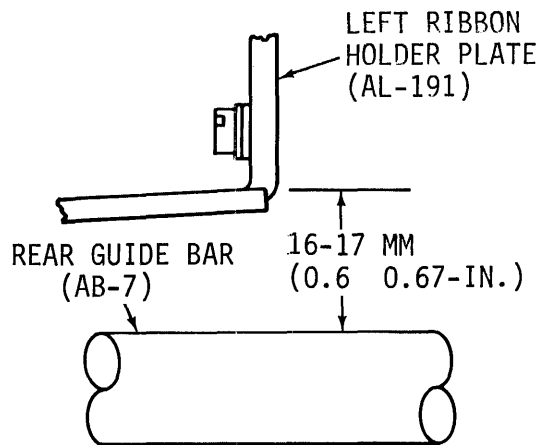


Figure 5-16. LOCATING DIMENSION FOR LEFT RIBBON HOLDER PLATE WITH RESPECT TO REAR GUIDE BAR

##### b. Right Ribbon Holder Plate (AL-55) (Fig. 5-17)

- 1) Maintain parallelism of bracket (AL-55) with respect to printer base and apply a distance of 41-42 mm (1.6-in.) between top of bracket and top of rear guide bar (AB-7).
- 2) Tighten mounting screws, washers (AL-93, 94, 95) of bracket when parallelism and correct distance has been attained.

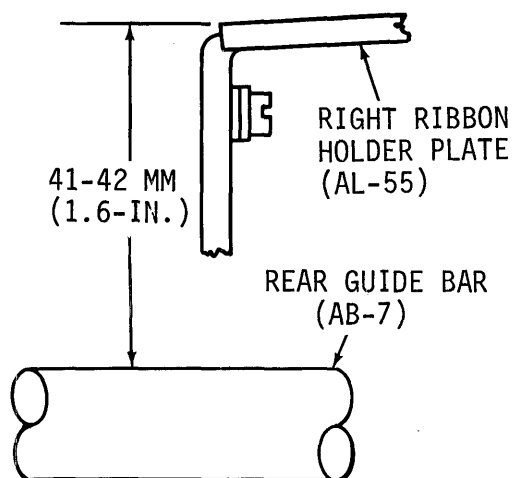


Figure 5-17. LOCATING DIMENSION FOR RIGHT RIBBON HOLDER PLATE WITH RESPECT TO REAR GUIDE BAR

2. Left Pawl Operator Adjustment (AL-197) (Fig. 5-18)

- a. Set carriage (containing mounted piston, AA-80) at extreme left margin until piston bottoms into damper cylinder (AA-85).
- b. Set left releaser (AL-33) to the left.
- c. Loosen screw (AL-50) on left pawl operator stopper (AL-49) and reset stopper with high side touching the right side of the left pawl operator. Tighten Screw.

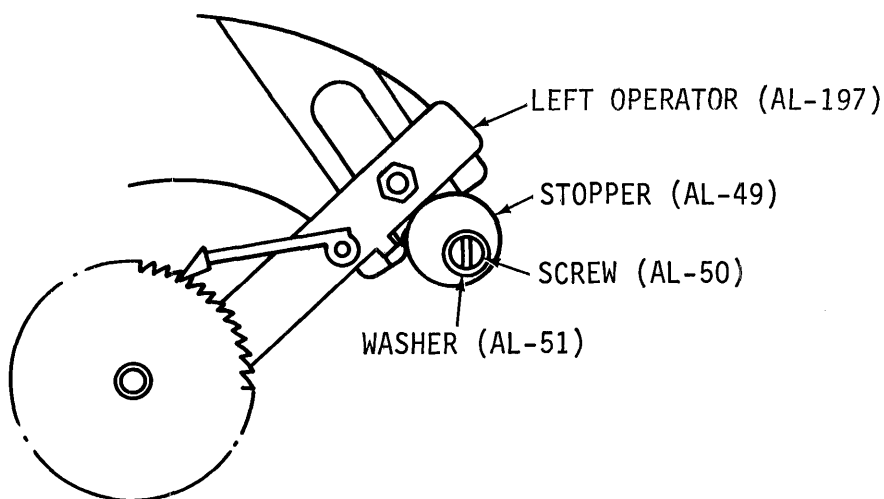


Figure 5-18. LEFT OPERATOR AND STOPPER ADJUSTMENT

3. Ribbon Feed Bar (AL-101) (Adjustment for Left and Right Operator) (AL-197,199)

a. Ribbon Feed Bar - Left Side (Fig. 5-19)

- 1) Loosen both nuts (AL-103) on left side of ribbon feed bar.
- 2) Establish a gap of 0.2 mm (0.008-in.) between washer (AL-102) and ribbon feed rack (AL-1).
- 3) Tighten nuts (AL-103) up to washer while holding gap at the same time.

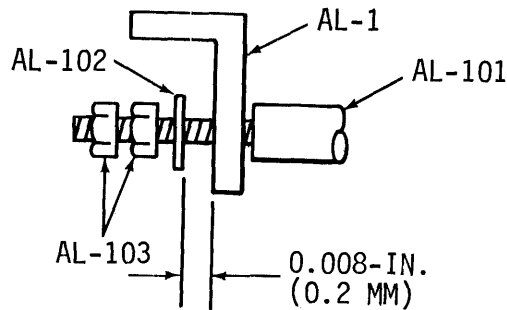


Figure 5-19. RIBBON FEED PLATE AND GUIDE BAR (LEFT SIDE)

b. Ribbon Feed Bar - Right Side (Fig. 5-20)

- 1) Loosen left nut (AL-103) on left side of ribbon pawl operator link (AL-112).
- 2) Maintain 0.1 mm (0.004-in) gap between nut and right ribbon pawl operator link (AL-112).
- 3) Do not tighten nuts until step 4.b. has been performed.

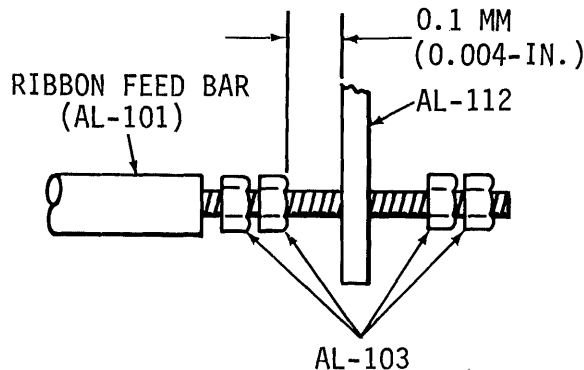


Figure 5-20. ADJUSTING NUTS FOR RIGHT PAWL OPERATOR MOVEMENT

4. Right Pawl Operator (AL-199) Starting Position (Fig. 5-21)

- a. Set left side of right pawl operator (AL-199) at a distance of 0.5-1.5 mm (0.02-0.06-in.) from right plate (AL-55).
- b. To adjust and maintain 0.5-1.5 mm (0.02-0.06-in.) between plate and operator, as shown in Fig. 5-21, adjust and tighten nuts (AL-103) referred to in Figure 5-20 (Note that right stop pawl (AL-79) and right feed pawl (AL-58) are fully engaged, Fig. 5-21).

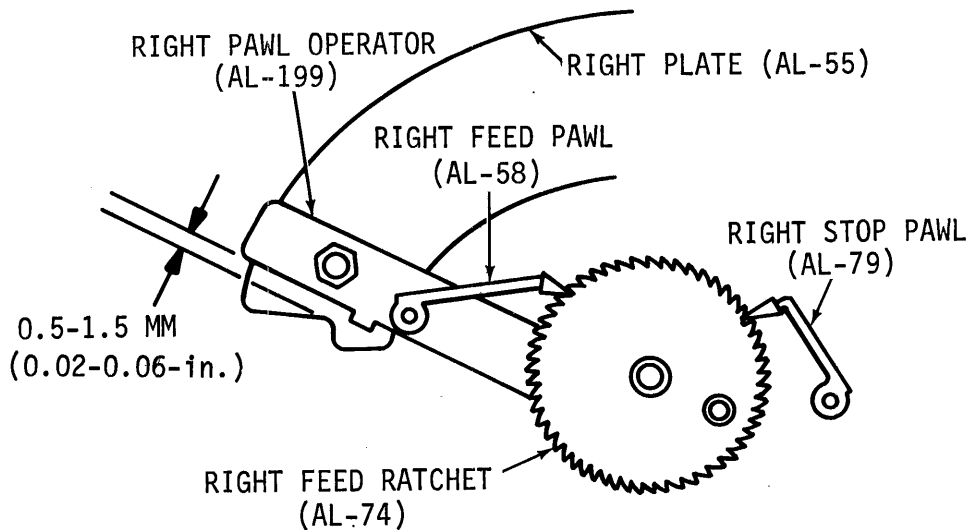


Figure 5-21. RIGHT PAWL OPERATOR STARTING POSITION

5. Ribbon Reverse Adjustment (Left and Right)

- a. Remove left and right ribbon spools.
- b. On left support plate (AL-191) of ribbon feed mechanism, loosen screw, washer (AL-47, 48), and pivot control spring (AL-46) upward and towards the front of the printer (to avoid contact with ribbon releaser (AL-33) (Fig. 5-23).
- c. Loosen two screws, washers (AL-99, 100) just enough so that the ribbon rod links (AL-98, 97) can slide independently from each other.
- d. Adjust the ribbon rod links (AL-98, 97) so that the cam (part of left and right ribbon releasers (AL-33, 82) is just contacting the left and right pawls (AL-11, 58) at that point where the ribbon feed pawls are fully engaged with their respective left and right ribbon feed ratchets (AL-189, 190) (See Fig. 5-22).
- e. When the conditions in step 5.d. are met, tighten two screws (AL-99) in rod links (AL-97, 98).
- f. Replace the control spring (AL-46); adjust the control spring so that the pointer or spur on the ribbon releaser left (AL-33) is just before top dead center on the control spring roller, and then tighten the screw, washer (AL-47, 48) (Refer to Fig. 5-23).

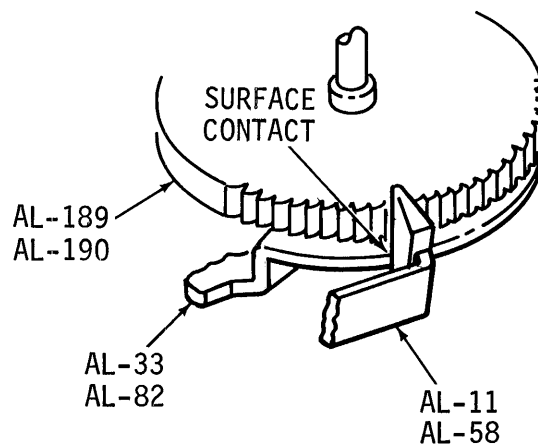


Figure 5-22. PAWL, RATCHET AND CAM MOVEMENT



**RIBBON FEED  
COVER  
OPERATOR PANEL**

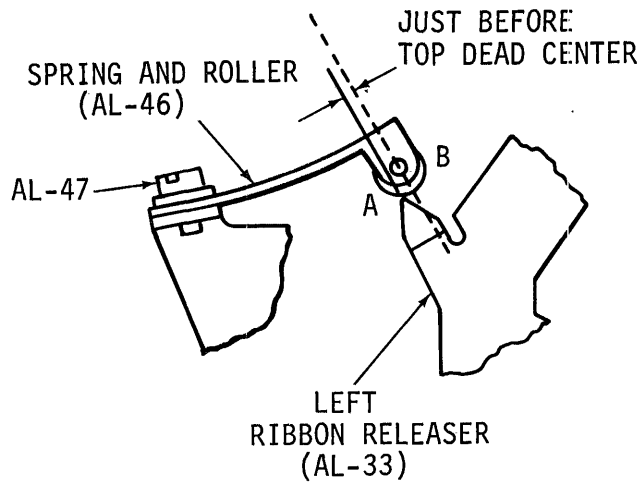


Figure 5-23. SPUR ON LEFT RELEASER (AL-174) AND ROLLER (AL-46)

**5.2.13 COVER (FIGURE AM)**

**5.2.13.1 Operation**

The covers to the Model 306 printer consist of three structural foam parts: The main cover, top cover and form feed cover.

The main cover is the largest of the three and mounts over the printer, fastening to two posts in the front, and two posts at the back.

The top cover dovetails into the back of the main cover that contains two hinged tabs. If the top cover is closed, it will normally come to rest into two opposing clips (on the main cover) acting as a locking device. An aperture exposing the operator panel is located on the left side.

The form feed cover is the smallest in size and functions as an access to the optional vertical format unit (VFU), when installed. This cover has hinged tabs and a clip into which it normally rests. A recessed well allows hand removal when required.

**5.2.13.2 Removal/Replacement**

**A. Main Cover Removal**

1. Remove screw, ornamental plate and platen knob (AJ-19, 18, 17).
2. To remove cover (AM-14) remove two screws and washers (AM-11, 12) from two front posts (part of base, AH-1) and two screws (AM-13) from rear posts.
3. When replacing cover (AM-14), reverse procedure of para. A.1 through A.2.

**5.2.14 OPERATOR PANEL (FIGURE AN)**

**5.2.14.1 Operation**

The operator panel is located on the left front of the printer where it mounts by bracket to two posts. An additional angular bracket provides support to the panel.

Refer to Operator Manual for control functions indicated on the operator panel.

#### 5.2.14.2 Replacement/Removal

- A. Operator Panel
1. Remove main top cover (AM-1).
  2. To remove operator panel (AN-6) remove four screws (AN-7) and washers (AN-8, 9) from base posts on left side, front of printer.

#### 5.2.15 ELECTRICAL COMPONENTS (FIGURE AO)

##### 5.2.15.1 Operation (Fig. 8-16)

- A. Multitap Transformer (AO-21)  
Model 306 operates with the use of a 115/230 volt, 50/60 Hz multitap transformer. However, other input applications include voltages for 100, 110, 115 and 120; 200, 220, 230 and 240 wiring. Refer to schematic 63508152 in Section 7 for detailed wiring of specific input voltages. Note, that the application of 60 Hz requires use of a 60 Hz motor pulley, and that the 50 Hz requires a 50 Hz motor pulley. (Refer to Figure 8-4, items 13 and 13-1).
- B. AC Power Cord, Fuse (F1), Line Filter (AO-34, 42, 27)  
The AC power cord (AO-34) is supplied with the printer, and the input circuit requires a 3-amp, slo-blo fuse (AO-42). The fuse cartridge (AO-37) is accessible at the back, right hand side of the printer. A filter for the ac line input is included in the circuit (AO-27).

##### 5.2.15.2 Removal/Replacement

- A. Power Transformer, Multitap (Fig. AO-21)
1. Remove transformer in the following manner:
    - a. Remove six solderless terminals from two capacitors (AP-8,9).
    - b. Unplug transformer output cable from connector (J1) on logic/pwr. supply board 63060416 (See Section 7, item 80).
    - c. Remove screws, washers (AO-22/23) from bracket (AO-24).
    - d. Remove transformer
    - e. To replace transformer, reverse removal/replacement procedure.
- B. Bracket, Transformer (Fig. AO-24)
1. Perform steps in para. 5.2.15.2.A.1 to remove transformer.
  2. Remove screws, washers (AO-22, 23) from transformer bracket, and remove bracket from printer base.
- C. Line Filter (Fig. AO-27)
1. To remove line filter (AO-27) from printer base, remove two screws (AO-29).
  2. To replace line filter, reverse steps C.1.

#### 5.2.16 ELECTRICAL COMPONENTS (AP)

##### 5.2.16.1 Operation

- A. Capacitors (AP-8 and AP-9) (+5 Pwr. Supply, 35-Volt Pwr. Supply (Unregulated) (Fig. 8-17)
1. The two capacitors shown (See Fig. 8-17) are placed together on a single mounting bracket (AP-10) and held in place by one metal strap (AP-12) on left side of printer (behind paper pan (AC-1) (Ref. Fig. 4-17, 4-19, Section 7 for theory of operation.)
- B. Bracket Mounting Screw
1. The mounting screw and associated hardware for the bracket (AP-10) can be found in Fig. AD (58) as well as in Fig. (AP).

ELECTRICAL COMPONENTS (AP)  
ELECTRICAL COMPONENTS (AQ)  
PRINT HEAD AND ASSOC. ASS'YS

5.2.16.2 Removal/Replacement

1. Remove capacitor mounting bracket (AP-10) by removing nut and washer (AP-13,14) from screw (Fig. AD-58). (This screw is threaded into tapped hole and supports one side of the tensioner bracket (AD-16), as well as the capacitor bracket).
2. To release capacitors (AP-8,9) from bracket, remove screw (AP-12) and unhook clamp strap (AP-11).

5.2.17 ELECTRICAL COMPONENTS (FIGURE AQ)

5.2.17.1 Operation

Main harness unit is supplied with three connectos (See Fig. 8-18 and wiring diagram Fig. 7-7).

5.2.18 PRINT HEAD AND ASSOCIATED ASSEMBLIES (FIG. 8-19)

5.2.18.1 Operation

1. The intent of this section is to show the mechanical relationship of the mounted print head ass'y 63002437-4001 (38) to that of the video amplifier board ass'y (single optic channel) 6306030-4001 (16) including the power driver board ass'y 63060105-4005 (8) and standard timing fence ass'y 63060179-5001 (6) (80 char.). Refer to Section 7 for schematic board assemblies and to Section 4 for electronic theory of operation for each assembly.
2. Timing Fence (Standard) (Fig. 8-19/6)  
At the front of the printer, mounted on two vertical posts (part of the printer base) is located the flexible timing fence assembly (0.007-in. thick) containing 480 windows total for an 80-character run-out, and must be mounted at a prescribed distance from the left post. (Refer to para. 5.2.18.3.E.).

5.2.18.2 Removal/Replacement

A. Print Head (38) (Fig. 8-19)

1. Perform operation indicated in para. 5.2.1.2.A.
2. To install print head, reverse removal/replacement procedure of step 1 and refer to Operator Manual for Forms Thickness Control prior to printing.

B. Carriage (See Figure 8-1, 8-19)

1. Refer to removal/replacement procedure of print head carriage in para. 5.2.1.2.B.

C. Power Driver Board (8) (Fig. 8-19)

1. Detach top printer cover (Fig. 8-14/14).
2. Unplug ribbon cable connector board (20) from holding clips of power driver board (8) connector (9). Refer to Section 7 for electrical component board assembly, power driver bd. 63060105-4005 (for preload clutch).
3. Release ribbon cable ass'y (20) coming from video amplifier board (16) to the power driver board (8) by removing screw, washer (14,15) from cable clamp (13) of cable tray located on the front of the power driver heat sink (10).
4. Remove entire heatsink bracket (10), which includes attached power driver board (8), by removing three countersunk metric screws (12) at front of printer attached to printer base unit.

5. To re-install power driver unit, reverse above disassembly procedure.
- D. Video Amplifier and Cable Assembly (16) (Fig. 8-19)
1. Perform steps 1, 2, and 3 of para. 5.2.18.2.C.
  2. Unplug print head fingerboard (31) from holding clips (22) on connector (21) of the video amplifier board (16).
  3. Remove entire video amplifier board (16) and attached cables (20) by removing screws, washers (17, 18, 19) from bracket support (27) attached to front of print head carriage (Ref. Fig. 8-1 (51)). **CAUTION: AVOID CONTACT WITH TIMING FENCE.**
  4. To install video amplifier and cable ass'y reverse order of disassembly procedure of para. 5.2.18.2. D.1 through D.3.
- E. Timing Fence Kit Assembly 63060194-6001 (Fig. 8-19)

**CAUTION**

**IN ANY OPERATION INVOLVING TIMING FENCE,  
AVOID SURFACE CONTACT OR ABRASION TO  
EMULSION SIDE OF FENCE (SIDE MARKED,  
"RIGHT").**

1. Carefully remove video amplifier board, single channel 63060330-4001 (16) including optical pick-up head (single track) 63002634-5001 (28) from timing fence (6) when removing screws and washers (17, 18, 19) from video bracket (part of video amp. board 16).
2. Loosen screws, washers (3,4) holding clamp (7) on right side of printer base.
3. Unhook left side of flexible timing fence (6) from projection at back of clasp (1) and remove fence.
4. To remove clasp (1), remove two screws, washers (3,4,5) from left post on left side of printer base.
5. To install timing fence and video amplifier with optical pick-up head assembly, reverse order of disassembly in para. 5.2.18.2. E.1. through E.4.

### 5.2.18.3 Adjustments

- A. Print Head (Fig. 8-19/38)  
Once the print head (38) is bracket mounted to the carriage (Ref. 8-1/51) with attaching hardware (Ref. para. 5.2.1.2.A.), there are no more installation adjustments except for operator procedure. Refer Operators Manual, Forms Thickness Control. See also Print Head PM, Section 6 of this manual.
- B. Carriage (Fig. 8-1/5)  
1. Refer to para. 5.2.1.3.B. for complete carriage adjustments.
- C. Timing Fence Location and Fixed Parallelism (Fig. 5-24)

**CAUTION**

**WHEN INSTALLING AND ADJUSTING MOUNTED  
OPTICAL HOUSING ASSEMBLY 63002634-5001  
(FIG. 5-24) WITH RESPECT TO TIMING FENCE,  
AVOID SCRATCHING OF EMULSION ON TIMING  
FENCE (SIDE MARKED "RIGHT").**

1. Location  
Loosen screws, washers (3,4) on right side clamp (7), and pull right-end of tab of fence to the right so that the first window of fence is located 4.5 inches (114 mm) from right edge of printer casting (timing fence support, left). Note, that this dimension allows for for a 5/8 inch nominal printout margin on the print form, as well. See next step.

2. Parallelism

When timing fence location is applied (step 1), parallelism should be within 0.002-in. (0.05 mm) along entire length of fence. Use shim/s (2), if required. When location of fence and parallelism has been established, tighten hardware (3,4) on clamp (7).

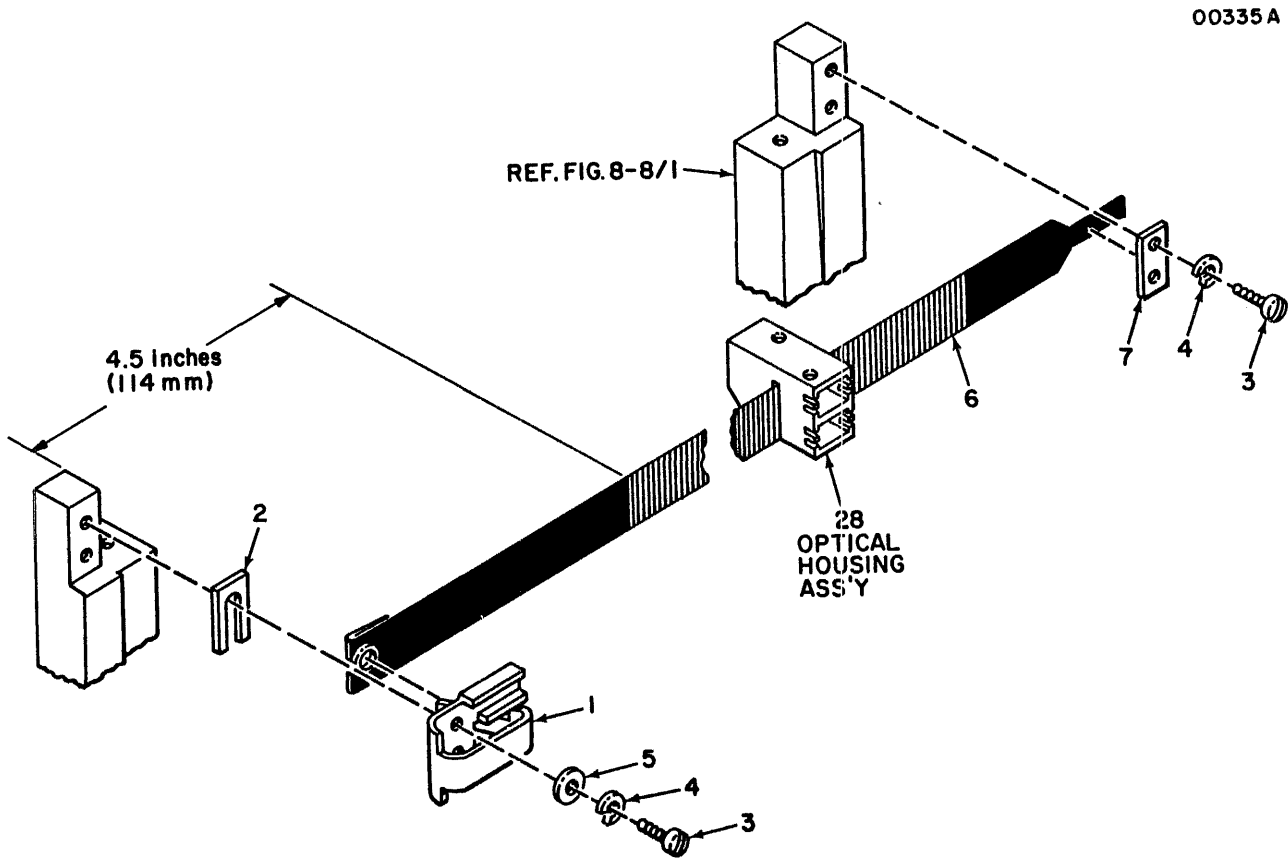


Figure 5-24. ESTABLISHING TIMING FENCE LOCATION AND PARALLELISM

D. Single Track, Optical Pickup Assembly Alignment

1. Centering Timing Fence in Slot of Single Track Optical Pickup (Figure 5-25)

With the optical housing mounted to the video amplifier board (16) (Fig. 8-19) (with bracket attached), guide mounted fence into slot of optics housing, but before tightening screws, washers (Fig. 8-19/17, 18, 19) on the bracket (part of video amplifier) and carriage (Fig. 8-1/51), check the following:

- a. Make sure fence is positioned in center of optic housing slot.
- b. If required, loosen mounting screws on video amplifier board (Fig. 8-19/29) and adjust optical housing so that fence is positioned in the center line of the housing slot (Fig. 5-30). Tighten screws.
- c. Make sure that when the fence is positioned in the middle of the slot that the bottom of the fence is in the same plane with the bottom surface of the optical pickup housing (Fig. 5-25).

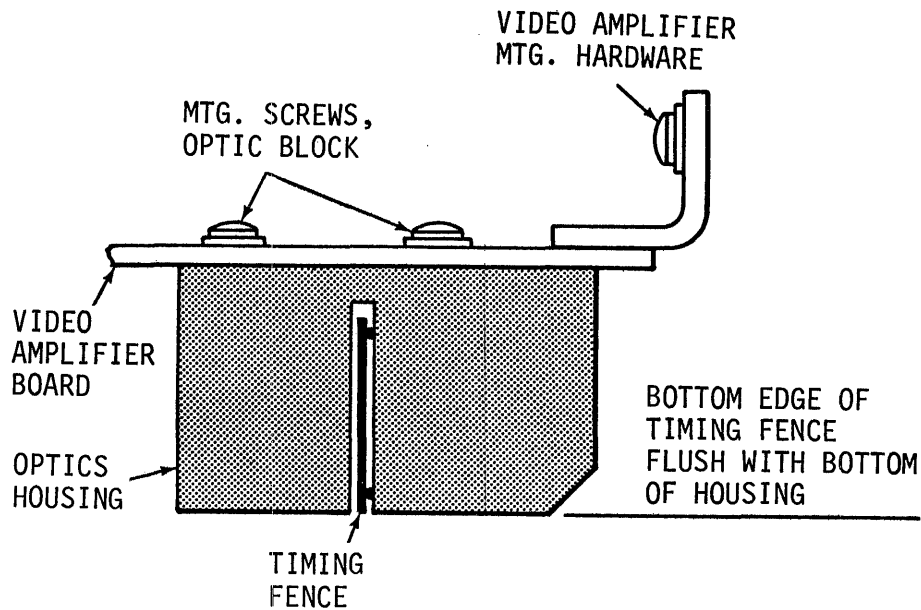


Figure 5-25. FENCE ADJUSTMENT AND OPTICS HOUSING

d. When conditions have been met at para. D.1. (a) through D.1. (c), tighten mounting screws and washers on video amplifier bracket.

2. Vertical and Horizontal Alignment of Single Track Optic Housing (Fig. 5-26)

a. Vertical

Sight right side of housing and make sure of parallel alignment with respect to vertical timing fence slots. If necessary, loosen video amplifier mounting screws, washers (Fig. 8-19/17, 18, 19) and adjust bracket (Fig. 8-19/27) (with optic housing attached).

b. Horizontal

If required, make sure screws, washers (Fig. 8-19/17, 18, 19) holding bracket (Fig. 8-12/27) are tight; bend bracket slightly up or down so that the bottom of the optic housing is parallel with power driver shield (Fig. 8-19/11).

c. Recheck step 2(a).

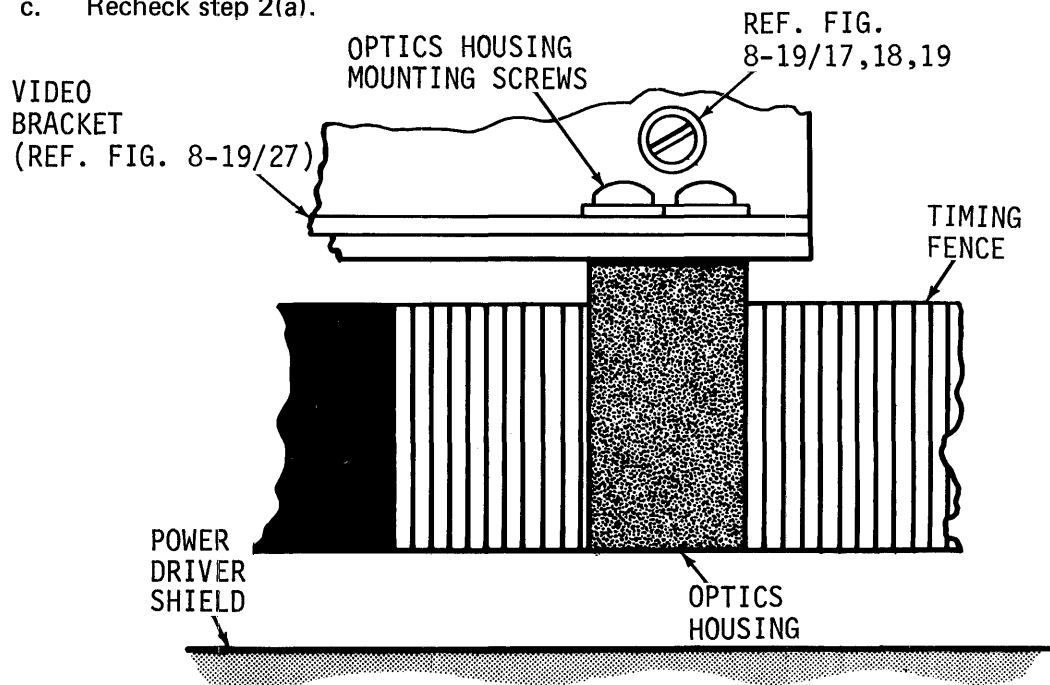


Figure 5-26. VERTICAL AND HORIZONTAL ALIGNMENT OF SINGLE TRACK OPTICS HOUSING

PRINT HEAD AND ASSOC. ASS'YS  
MOTOR CONTROL ASS'Y (OPTION)

3. Carriage to Timing Fence Alignment Checkout

- a. Timing fence should be in the center line of the housing slot throughout full carriage movement (forward, and back to starting margin). If optic pickup travel is not uniformly parallel to centered timing fence, recheck paras. 5.2.18.3.C. through D.

G. Maintenance of Flexible Mylar Timing Fence

Timing fence can be wiped clean using a material that is lint free, no abrasives. For more extensive cleaning use mild soap and water. **CAUTION: DO NOT USE ANY ORGANIC SOLVENTS.**

5.2.19 MOTOR CONTROL ASSEMBLY OPTION

5.2.19.1 Operation

The motor control operates to turn the main motor on and off when the printer is not receiving data.

5.2.19.2 Removal/Replacement

A. Motor Control (Fig. 8-4/52) (Option)

1. Disconnect white/blk wire from terminal marked No. 4 on the motor control (Fig. 5-27).
2. Disconnect white/brn wire from terminal marked No. 3 on the motor control.
3. Disconnect red wire from terminal marked No. 2 on the motor control (115V).
4. Disconnect blue wire from terminal marked No. 1 on the motor control (this wire comes directly from the motor AD-49).
5. Remove two screws, washers (Fig. 8-4/53, 54) to remove motor control from the top of motor fan cover (Fig. 8-4/4).
6. To install motor control, reverse removal procedure and refer to schematic diagram 63060123, Section 7.

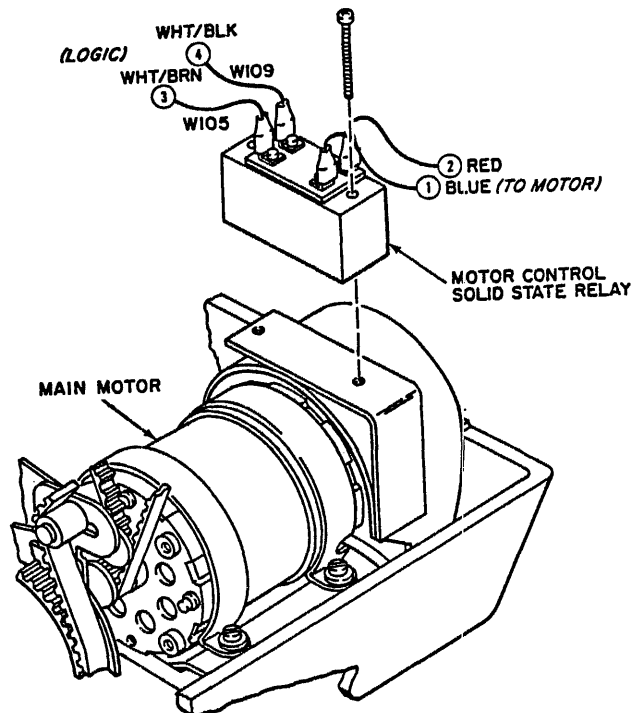


Figure 5-27. MOTOR CONTROL LOCATION AND INSTALLATION

## 5.2.20 VERTICAL FORMAT UNIT (VFU) 63060125-5003 (OPTION) (FIGURE 8-20)

## 5.2.20.1 Operation

The optional Vertical Format Unit (VFU) is mounted to the left frame (AI-12) and consists of two major assemblies (1) upper tape reader assembly and (2) lower tape reader assembly.

The upper tape reader assembly pivots on a shaft allowing the assembly to be lifted for inserting the VFU paper tape on the sprocket of the lower tape reader assembly.

Tape movement is electro-mechanically controlled by a shaft coupled to the paper feed mechanism. Refer to Section 4.7.4 in the THEORY OF OPERATION for detailed electrical operation.

5.2.20.2 Removal/ReplacementA. Vertical Format Unit (Fig. 8-20)

1. Disconnect twelve pin harness connector (4) of upper tape reader assembly from connector of main wire harness.
2. Remove three nuts, lockwashers and flatwashers (37, 38, 39) from left frame (AI-12).
3. Remove upper and lower tape reader assembly from drive shaft (32) by pulling assembly out from left hand coupling (31) (Fig. 20, View A).
4. Remove drive shaft (32) by pulling it out from right-hand coupling (31).

5.2.20.3 Adjustments

- A. The following procedures details the adjustment and maintenance for the aligning of the paper tape holes with respect to the lower tape reader holes (Refer to Fig. 5-28).
  1. Raise upper tape reader assembly to expose paper tape containing channel holes and sprocket drive holes.
  2. Loosen set-screw (14) on sprocket (13) of lower tape reader (Fig. 8-20).
  3. Manually rotate paper tape in a clockwise direction and observe Top Of Form (TOF) (Channel 7) and Vertical Tab (VT) (Channel 5) as they move toward the rectangular holes on the lower tape reader.
  4. At the point where the leading edges of both the VT and TOF holes align with the front edges of the slits of the lower tape reader, stop rotating the paper tape.
  5. Tighten set-screw (14) on sprocket when adjusted.
  6. When testing Top of Form (TOF), alignment in relation to the print out on the paper form, make sure that the form does not stop one line before, or one line beyond TOF position. Repeat steps A.1. through A.5 to re-align if required.

**NOTE**

**Pressing Top of Form switch on operator panel allows hole on paper tape to move over the light source. Sensing the light source through the paper tape hole by the upper tape reader holes immediately stops tape motion.**



VERTICAL FORMAT UNIT (VFU)

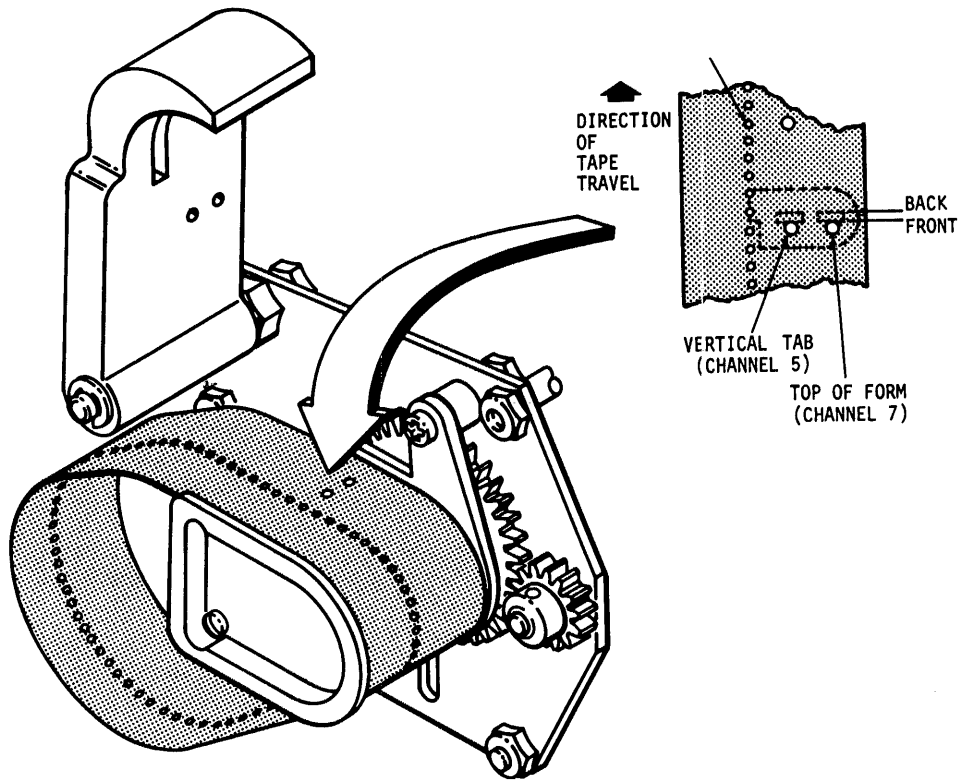


Figure 5-28. PAPER TAPE READER ADJUSTMENT

## HANDLING LSI CHIPS

1. **REMOVING A CHIP FROM THE SHIPPING CONTAINER**
  - a. Before touching the chip, reference yourself to the container by touching and holding the metalized rubber containing the chip pins.
  - b. While holding the rubber, lift out chip and hold lightly by the pins.
  - c. You can now safely carry the chip, by holding the pins.
2. **REPLACING THE CHIP IN ITS CONTAINER**
  - a. While holding pins touch and hold rubber and replace.
3. **GIVING CHIP TO ANOTHER PERSON**
  - a. While holding pins of chip in one hand, make contact with the other person until he is holding the chip by its pins.
4. **REMOVE AND REPLACE CHIP IN PRINTER**
  - a. Before removing or replacing chip, touch signal ground (large ground plane on LSI Component Board) and hold.
  - b. While holding signal ground, remove or replace chip.
  - c. In general, something other than the chip (e.g., your hand) should make the first contact with the circuit.

### CAUTION

WHEN OPERATING PRINTER WITH COVERS OFF, KEEP PAPER AWAY FROM LOGIC TO PREVENT PAPER STATIC DISCHARGE FROM DAMAGING LSI CHIPS.



## SECTION 6 MAINTENANCE

This section contains the following maintenance information:

Paragraph	Description
6.1	Electrical Adjustments
6.2	Preventive Maintenance
6.3	Recommended Tools
6.4	Troubleshooting Guide

In addition, detailed removal, replacement and adjustment procedures for all mechanical assemblies are contained in Section 5. Associated mechanical drawings and list of materials are in Section 8. Detailed theory of operation on the electronics portion is contained in Section 4 and associated drawings and lists of materials are in Section 7.

### **6.1 ELECTRICAL ADJUSTMENT**

The following text provides the procedure to adjust the VIDEO output signal of the single channel video amplifier (63060330). Referring to the schematic diagram (Figure 7-4) and assembly drawing (Figure 7-13) in Section 7, proceed as follows:

- a. Monitor the voltage level at ME1 pin 2 with an oscilloscope while moving carriage slowly to the right.
- b. Voltage varies as optic block passes by the transparent opaque sections of the timing fence. Record highest voltage level observed.
- c. Monitor level at ME1 pin 3 and adjust R2 to set voltage level to one-half level recorded at ME1 pin 2. This sets up reference voltage for proper VIDEO output duty cycle.

### **6.2 SERIES 300 PREVENTIVE MAINTENANCE**

The following Preventive Maintenance (PM) procedures apply to the Series 300 printers.

FREQUENCY OF P.M.	-	6 MONTHS
TIME REQUIRED	-	1 HOUR (APPROXIMATELY)
CLEANING MATERIAL	-	TWO SOFT CLEAN CLOTHS MEDIUM BRISTLE CLEANING BRUSH.

### **RECOMMENDED TOOLS**

Refer to Section 6.3 of the Maintenance Section.

### **LUBRICANTS RECOMMENDED:**

Kit, LUBE 62000187-6001

Note: This kit contains item  
1 through 4.

- |    |                                     |               |                      |
|----|-------------------------------------|---------------|----------------------|
| 1. | Lubricant, DTE OIL, Light           | 30050005-0001 | 2 oz. Plastic Bottle |
| 2. | Lubricant, SAE 10-30W               | 30050002-0001 | 2 oz. Plastic Bottle |
| 3. | Lubricant, Degreaser (LPS-1)        | 30050009-0001 | 2 oz. can            |
| 4. | Lubricant, grease<br>(Rheolube 723) | 30050004-0001 | 11 oz.               |

## PREPARATION

1. Obtain print sample prior to beginning of P.M.
2. Clean printer with vacuum, cleaner, if available.

1. Carriage Assembly and Timing Fence

- a. Using a soft clean cloth, wipe both sides of timing fence. If necessary, use a mild detergent. (See Figure 6-1).

**CAUTION: NEVER USE AN ORGANIC SOLVENT, AS THIS WILL DAMAGE TIMING FENCE.**

- b. Wipe the carriage guide bars, all rollers and platen.
- c. Lightly lubricate guide bars using lightweight oil (See Figure 6-1).
- d. Using an eye loupe, verify that print wires align flush with face of print head jewel. (Make sure that print wires are not recessed in the jewel.) (See Figure 6-1).
- e. Re-mount print head on carriage assembly.

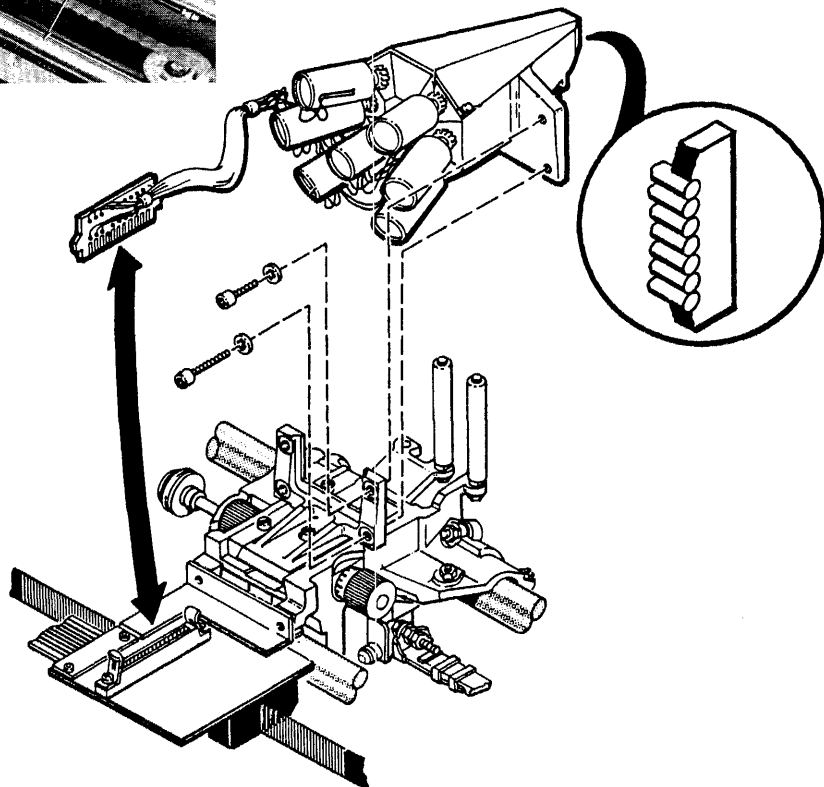
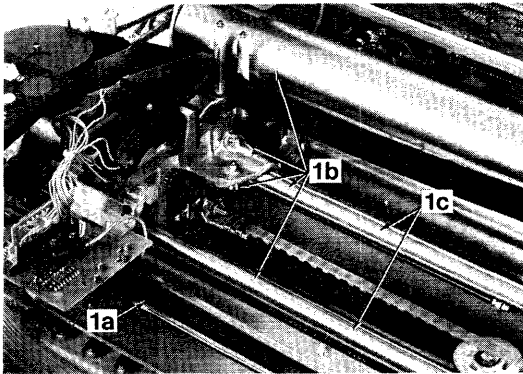


Figure 6-1. CARRIAGE ASSEMBLY AND TIMING FENCE

2. Paper Feed Assembly

- a. Apply a drop of lightweight oil on the paper feed clutch gear and clutch slide pawl attached to the solenoid armature. (Oil is intended for clutch bearing lubrication). (See Figure 6-2).

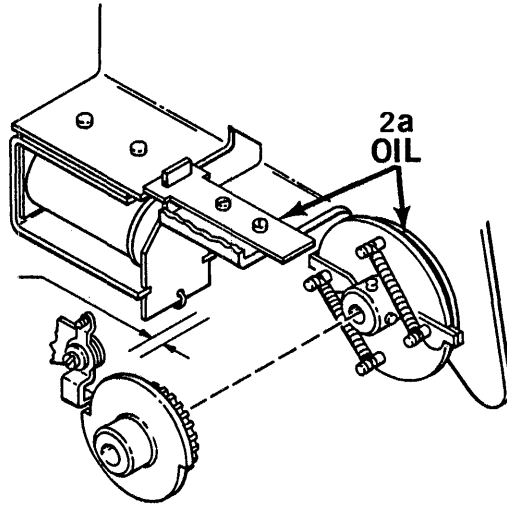


Figure 6-2.. PAPER FEED ASSEMBLY

3. Ribbon Feed Assembly

- a. Inspect ratchets, pawls, and springs for wear and mesh (left and right).
- b. Clean and lubricate all gears and springs with grease oil as indicated. (See Figures 6-3 and 6-4).
- c. Verify that both ribbon spools rotate freely when both ribbon releasers are in neutral position (neither spool engaged).

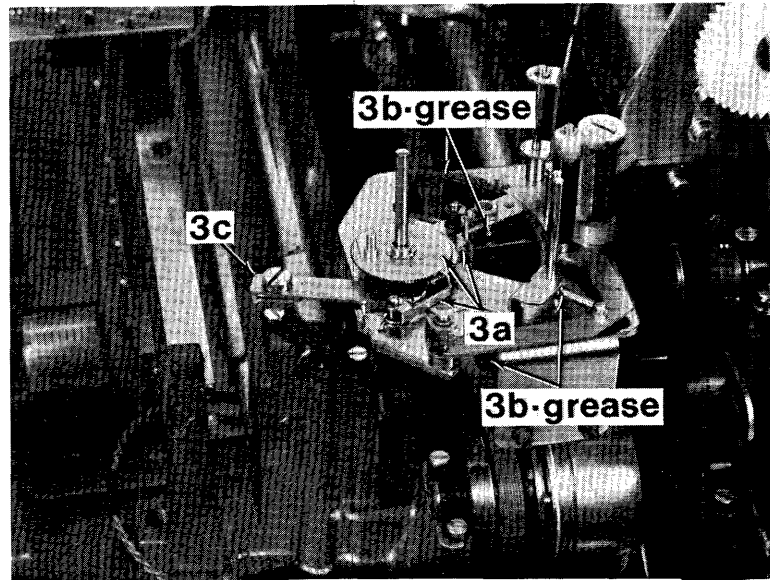


Figure 6-3. RIBBON FEED ASSEMBLY

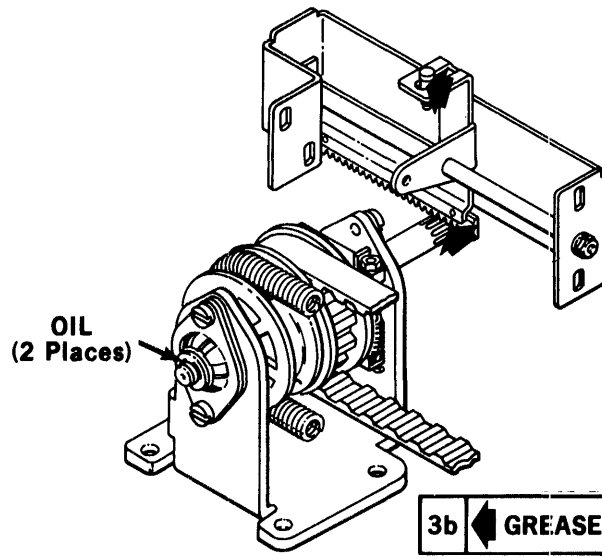


Figure 6-4. IDLER AND RIBBON FEED DRIVE

4. Drive Assembly
  - a. Inspect gears for proper mesh and wear.
  - b. Oil felt tensioner washers. (See Figure 6-5).

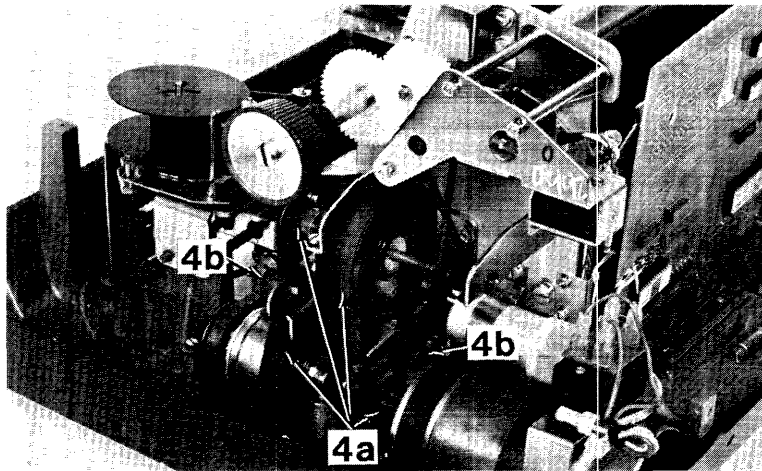
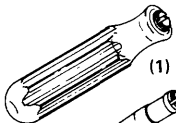
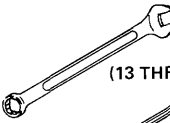
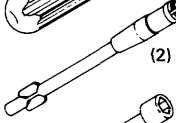
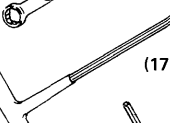
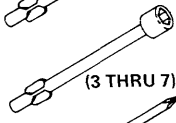
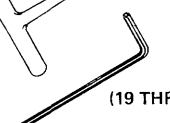
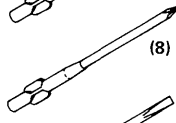
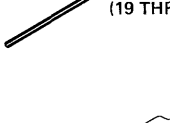
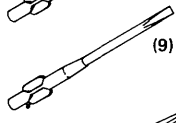

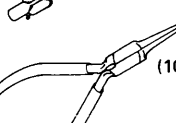
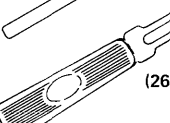
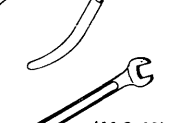
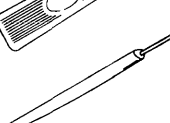
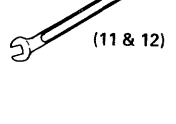



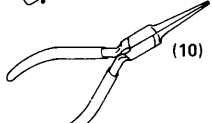

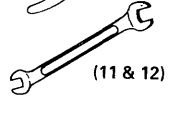
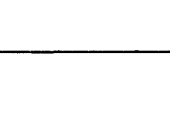


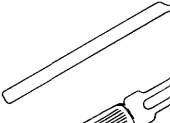
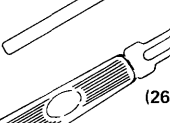
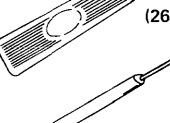
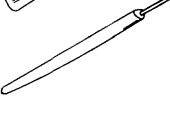
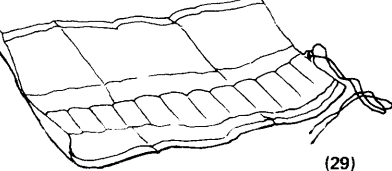


Figure 6-5. DRIVE ASSEMBLY

6.4 RECOMMENDED TOOLS

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

**CENTRONICS TOOL KIT**  
(63002399-6001)

ITEM	DESCRIPTION	PART NUMBER	ITEM	DESCRIPTION	PART NUMBER
	1. Universal Handle	30600002 - 3001		13. 8 mm Combination Open End, Box Wrench	30600002 - 3012
	2. Extension 4-Inch	30600002 - 3002		14. 10 mm Combination Open End, Box Wrench	30600002 - 3013
	3. 4 mm Nut Driver	30600002 - 3003		15. 17 mm Combination Open End, Box Wrench	30600002 - 3014
	4. 5.5 mm Nut Driver	30600002 - 3004		16. 19 mm Combination Open End, Box Wrench	30600002 - 3015
	5. 7 mm Nut Driver	30600002 - 3005		17. 3/32-Inch "T" Handle Hex Key	30600002 - 3016
	6. 8 mm Nut Driver	30600002 - 3006		18. 5/32-Inch "T" Handle Hex Key	30600002 - 3017
	7. 10 mm Nut Driver	30600002 - 3007		19. 1/16-Inch Hex Key	30600002 - 3025
	8. Philips Head Screwdriver	30600002 - 3009		20. .050-Inch Hex Key	30600002 - 3024
	9. Slotted Head Screwdriver	30600002 - 3008		21. 1.5 mm Hex Key	30600002 - 3020
	10. Needle Nose Plier	30600002 - 3010		22. 2.0 mm Hex Key	30600002 - 3019
	11. 5 x 5.5 mm Open End Wrench	30600002 - 3023		23. 2.5 mm Hex Key	30600002 - 3021
	12. 6 x 7 mm Open End Wrench	30600002 - 3011		24. 3.0 mm Hex Key	30600002 - 3022
				25. Spanner Wrench	63003105 - 3001
				26. 4 mm Snap Ring Holder	63002399 - 3018
				27. 5 mm Snap Ring Holder	63002399 - 3019
				28. Spring Hook	63002399 - 3020
				29. Tool Pouch	30600002 - 3018



# SERIES 306 TROUBLESHOOTING GUIDE

## MODEL 306 PRINTER SERVICE GUIDE

The following information is intended to aid service personnel to develop good service procedures and troubleshooting techniques in servicing Centronics Model 306 printer.

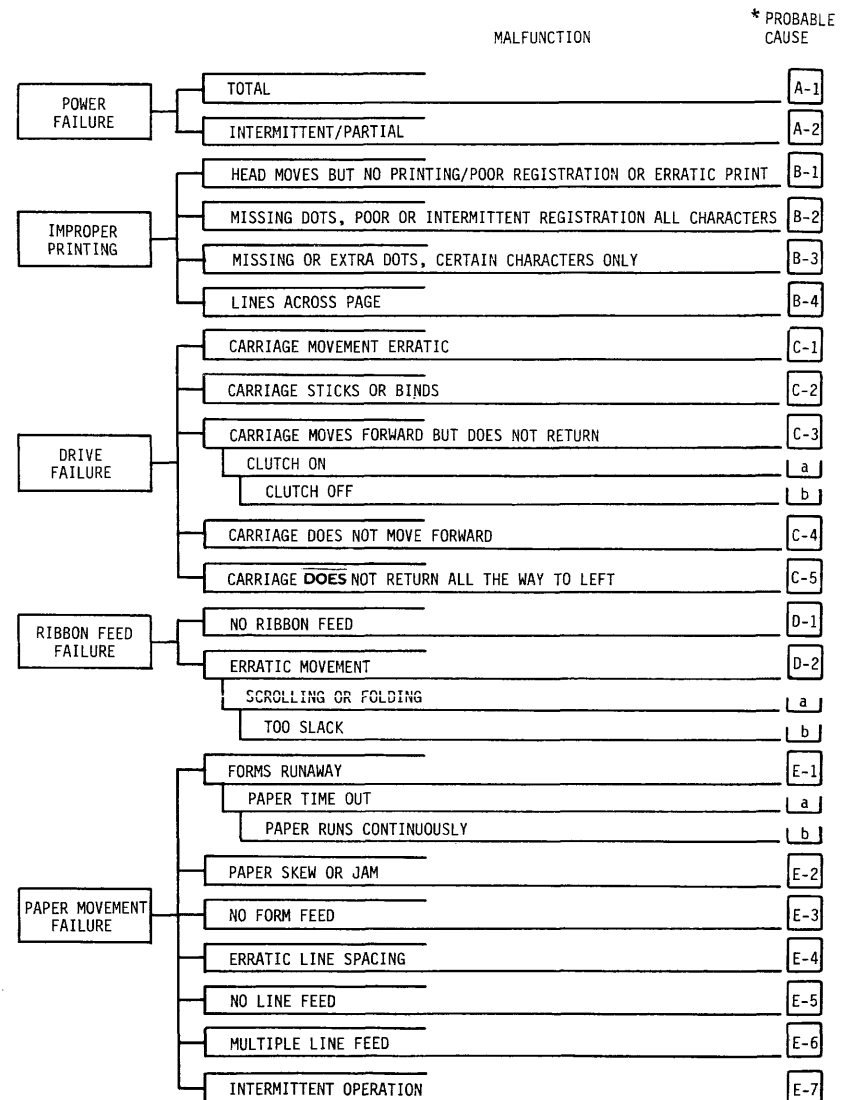
When servicing the printer for any reason, a brief inspection and verification of the printer areas described below may well prevent potential failures in the future.

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

1. Verify that the timing fence is centered in slit of optic block.
2. Verify that the carriage guide bar is clean and free of caked-on dirt.
3. Verify proper main drive belt tension.
4. Verify smooth, free carriage motion.
5. Check damper operation. Verify that there is no binding and that the piston O-ring is intact and lightly greased.
6. Check that the RTP and EOP switches are not loose.
7. Check that the line feed O-ring and pulleys are clean and do not slip.
8. Verify uniform clutch gap.
9. Verify proper pin alignment on pin-feed tractor units.
10. Verify proper pin feed belt tension.
11. Verify proper backstop pawl spring tension.
12. Verify smooth line feed clutch operation.

Turn power on:

If optional Vertical Format Unit is used, check VFU paper tape position over the LED light holes to insure proper detection of vertical tab and form feed signals.



\*All statements apply to 300/500 Series except where indicated.

**A. POWER****A-1 TOTAL**

1. Damaged power card.
2. Open AC line fuse.
3. Open 5V supply fuse, F1.

**A-2 INTERMITTENT/PARTIAL**

1. Defective Logic board.
2. Improper AC line voltage.

**B. PRINTING****B-1 HEAD MOVES BUT NO PRINT/POOR REGISTRATION OR ERRATIC PRINT**

1. Improper print head position.
2. Dirty fingerboards or circuit board connectors.
3. Dirty or defective timing fence.
4. Improper adjustment of optic block.
5. Defective light emitting diodes (LED).
6. Improper alignment of timing fence to optic slit.
7. Defective Video amplifier.
8. Defective ribbon cable.
9. Defective Logic board.
10. Defective Driver board.

**B-2 MISSING DOTS, POOR OR INTERMITTENT PIN REGISTRATION, ALL CHARACTERS**

1. Improper print head position.
2. Dirty fingerboards or circuit board connectors.
3. Dirty or defective timing fence.
4. Improper damper piston and cylinder alignment.
5. Defective RTP or EOP switch.
6. Defective logic board fuses.
7. Improper optical system alignment.
8. Defective Video amplifier.
9. Defective ribbon cable.
10. Defective Driver board.
11. Improperly adjusted or defective print wire solenoids.

**B-3 MISSING OR EXTRA DOTS, CERTAIN CHARACTERS ONLY**

1. Defective ROM.
2. Defective P.C. runs in character generator.

**B-4 LINES ACROSS PAGE**

1. Improperly installed print head cover.
2. Improper penetration adjustment.
3. Defective print wires.
4. Defective ribbon cable.
5. Poor Logic board to Driver board connection.

6. Defective Driver board.
7. Defective Logic board.

**C. DRIVE****C-1 CARRIAGE MOVEMENT ERRATIC**

1. Improper main drive belt tension.
2. Dirty carriage guide bar.
3. Improper penetration adjustment.
4. Improper ribbon drive rack and pinion adjustment.
5. Improper cylinder and damper piston alignment.
6. Defective or improperly adjusted drive pulleys, gears or belts.

**C-2 CARRIAGE STICKS OR BINDS**

1. Optic block touching timing fence.
2. Improper drive belt tension.
3. Improper damper piston and cylinder alignment.
4. Improper ribbon drive rack and pinion adjustment.
5. Right hand ribbon drive assembly driving pawl may have dropped behind ribbon releaser.

**C-3 CARRIAGE MOVES FORWARD BUT DOES NOT RETURN****C-3a Clutch On**

1. Defective EOP switch.
2. Defective Driver board.
3. Defective Logic board.

**C-3b Clutch Off**

1. Defective return spring.
2. Improper ribbon drive rack and pinion adjustment.
3. Defective ribbon drive assembly drive pawl.

**C-4 CARRIAGE DOES NOT MOVE FORWARD**

1. Improper damper piston and cylinder alignment.
2. Improper clutch gap.
3. Defective -12V supply fuse, F3 (Logic Bd.).
4. Dirty board contacts.
5. Defective Driver board.
6. Defective RTP switch.
7. Defective clutch.
8. Defective Logic board.
9. Defective drive motor.
10. Defective motor control circuitry (if provided).
11. Inappropriate input data.

**C-5 CARRIAGE DOES NOT RETURN ALL THE WAY TO LEFT**

1. Improper damper piston and cylinder alignment.
2. Improper ribbon drive rack and pinion adjustment.

3. Dirty board contacts.
4. Defective driver board.
5. Defective RTP switch.
6. Defective clutch.
7. Defective logic boards.
8. Defective drive motor.
9. Defective motor control circuitry (if provided).
10. Inappropriate input data.

**D. RIBBON FEED****D-1 NO RIBBON FEED**

1. Improperly seated ribbon spool.
2. Improperly adjusted ribbon reversing rod.
3. Rack and pinion assembly teeth missing.
4. Broken or missing ribbon drive pawl (See C-2 item 5).

**D-2 ERRATIC MOVEMENT****D-2a Scrolling or Folding**

1. Improperly mounted ribbon holding bracket.
2. Bent reversing arm or tensioner.

**D-2b Too Slack**

1. Missing or weak ribbon holding plate springs.
2. Broken or missing ribbon stop pawl

**E. PAPER MOVEMENT****E-1 FORMS RUNAWAY****E-1a Paper Timeout**

1. Defective VFU LED or sensor.
2. Defective paper tape.
3. Defective Logic board.
4. Improper alignment of tape reader LED's to tape holes.
5. Improper gap between upper and lower VFU reader housings.
6. Printer receiving form feed or vertical tab commands with no VFU installed.

**E-1b Paper Runs Continuously**

1. Defective armature return spring.
2. Solenoid clutch slide pawl movement restricted.
3. Excessive solenoid slide gap.
4. Restricted armature movement.

5. Defective Driver board.
6. Defective Logic board.

**E-2 PAPER SKEW OR JAM**

1. Print head too close to paper.
2. Incorrect paper feed.
3. Improper pin feed sprocket alignment.
4. Improper pin feed belt tension.
5. Paper pan friction against forms.
6. Pin feed holder paper thickness setting too small.

**E-3 NO FORM FEED**

1. Improper gear train adjustment.
2. Paper feed 0-ring slipping.
3. Defective TOP OF FORM switch or contacts.
4. Defective Driver board.
5. Defective fuse, F2 (Logic Bd.).
6. Defective Logic board.
7. Improperly adjusted platen knob.

**E-4 ERRATIC LINE SPACING**

1. Excessive back stop pawl and cam mechanism play.
2. Backlash in platen knob.
3. Improper gear mesh.
4. Paper feed 0-ring slipping.

**E-5 NO LINE FEED**

1. Defective or missing platen knob.
2. Improper solenoid clutch slide pawl gap.
3. Paper feed 0-ring broken or slipping.
4. Defective Driver board.
5. Defective fuse, F2 (Logic Bd.).
6. Defective Logic board.
7. Solenoid clutch slide pawl binding.
8. Armature binding.
9. Excessive solenoid armature spring tension.
10. Defective solenoid.
11. Defective LINE FEED switch or contacts.
12. Improperly adjusted drive train.

**E-6 MULTIPLE LINE FEED**

1. Excessive solenoid clutch slide pawl gap.
2. Defective armature return spring.
3. Solenoid clutch slide pawl binding.
4. Excessive line feed pulse width.
5. Excessive lubricant or dirty clutch slide pawl.

**E-7 INTERMITTENT OPERATION**

1. See E-3 and E-5.



## SECTION 7

### ELECTRICAL DRAWINGS AND LISTS OF MATERIALS

This section contains the schematic, wiring and assembly diagrams, and lists of materials for all the electronic assemblies in the Model 306.

The following is a list of the drawings appearing in this section.

Figure No.	Description	Drawing No.
7-1	Schematic Diagram, Logic/Power Supply Board, 300/500 Series	63060417
7-2	Schematic Diagram, Power Driver Board (Sheet 1 of 2)	63060106
7-3	Schematic Diagram, Power Driver Board (Sheet 2 of 2)	63060106
7-4	Schematic Diagram, Video Amplifier	63060331
7-5	Schematic Diagram, Interconnection Diagram, Connector Card	63060110
7-6	Schematic Diagram, Mutitap 50/60 Hz Transformer	63508152
7-7	Wiring Diagram, Printer Mechanism	63060123
7-8	Schematic Diagram, Elapsed Time Indicator (Option)	63002641
7-9	Logic/Power Supply Board Connections	—
7-10	PC Board Assembly, Logic/Power Supply Board, 300/500 Series (Sheet 1 of 2)	63060416
7-11	PC Board Assembly, Logic/Power Supply Board, 300/500 Series (Sheet 2 of 2)	63060416
7-12	PC Board Assembly, Power Driver Board	63060105
7-13	PC Board Assembly, Video Amplifier	63060330
7-14	PC Board Assembly, Connector Card (Option)	63060109
7-15	PC Board Assembly, Elapsed Time Indicator (Option)	63002640
7-16	Cable Assembly, Data Input	63060119
7-17	Cable Assembly, Computer Input Cable - W2 (Option)	63002258

#### NOTE

Refer to the Engineering Change Notice (ECN) sheets shipped with the printer for changes made to the printer which have not yet been incorporated into the drawings in this technical manual. Always keep these Engineering Change Notice Sheets with the manual.



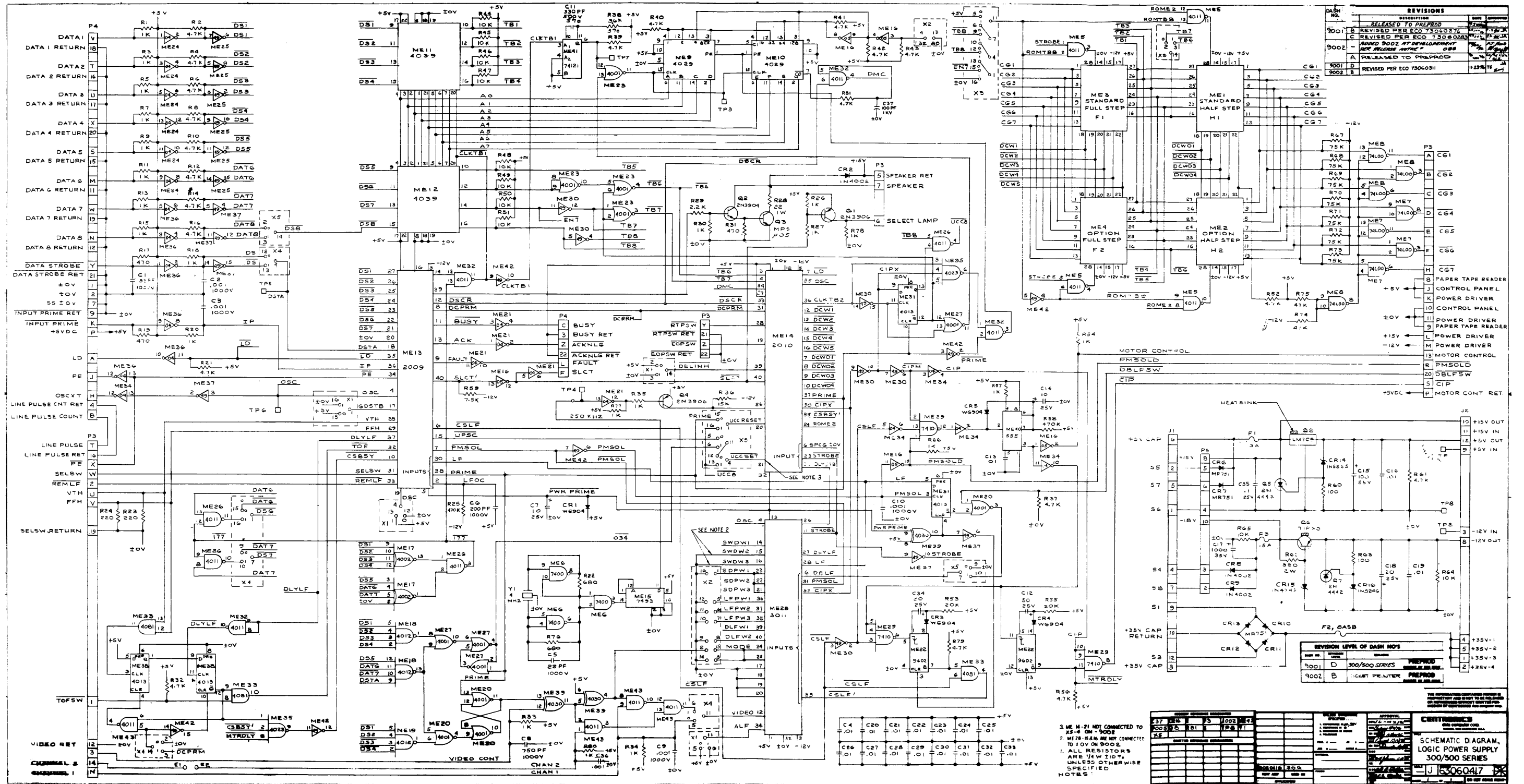


Figure 7-1. SCHEMATIC DIAGRAM, LOGIC/POWER SUPPLY BOARD, 300/500 SERIES



THE INFORMATION CONTAINED HEREIN IS PROPRIETARY AND IS NOT TO BE RELEASED OR REPRODUCED WITHOUT WRITTEN PERMISSION OF CENTRONICS data computer corp.

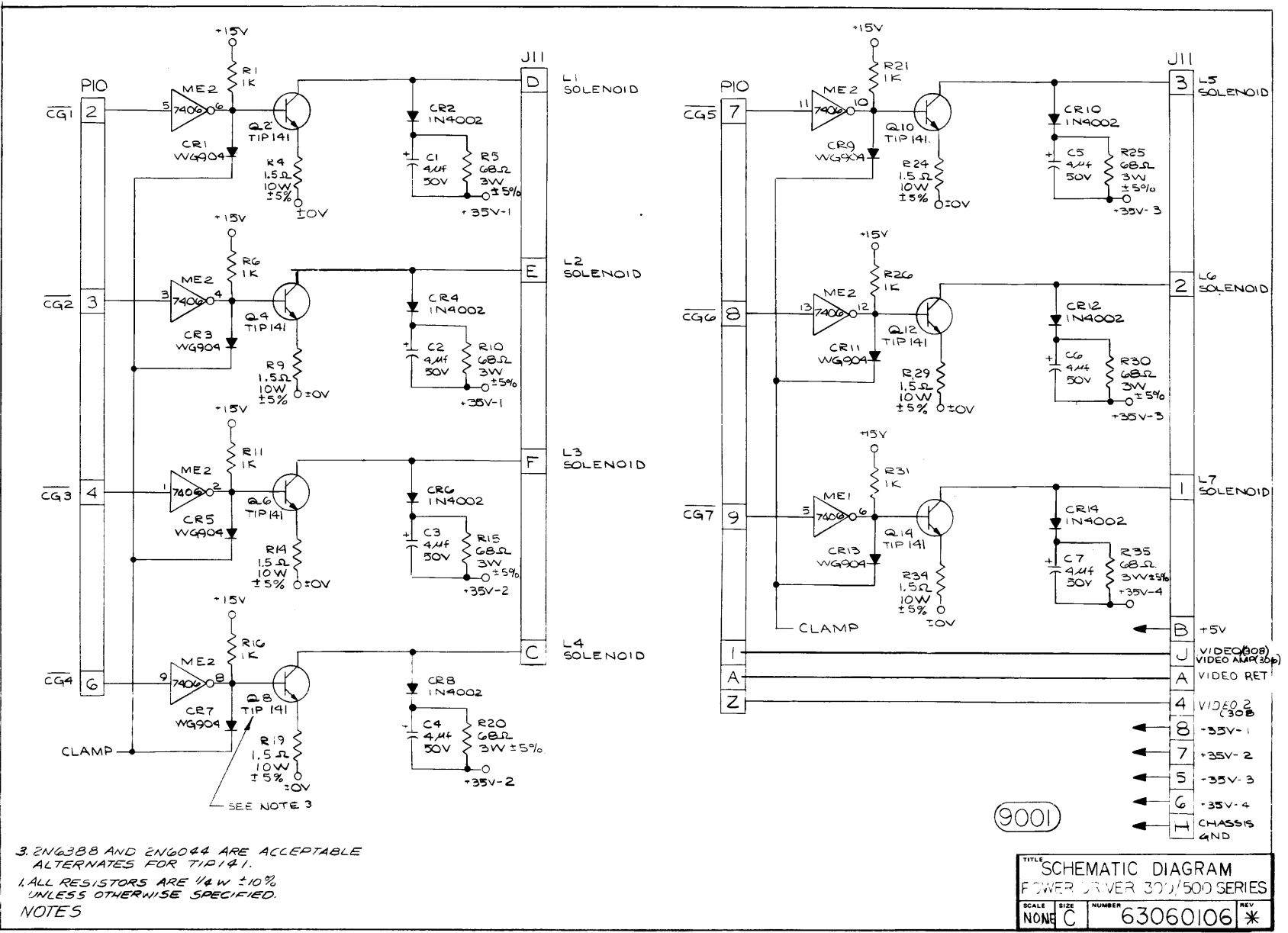


Figure 7-2. SCHEMATIC DIAGRAM, POWER DRIVER BOARD (SHEET 1 OF 2)

7-5

REV. H



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REV. H

7-6

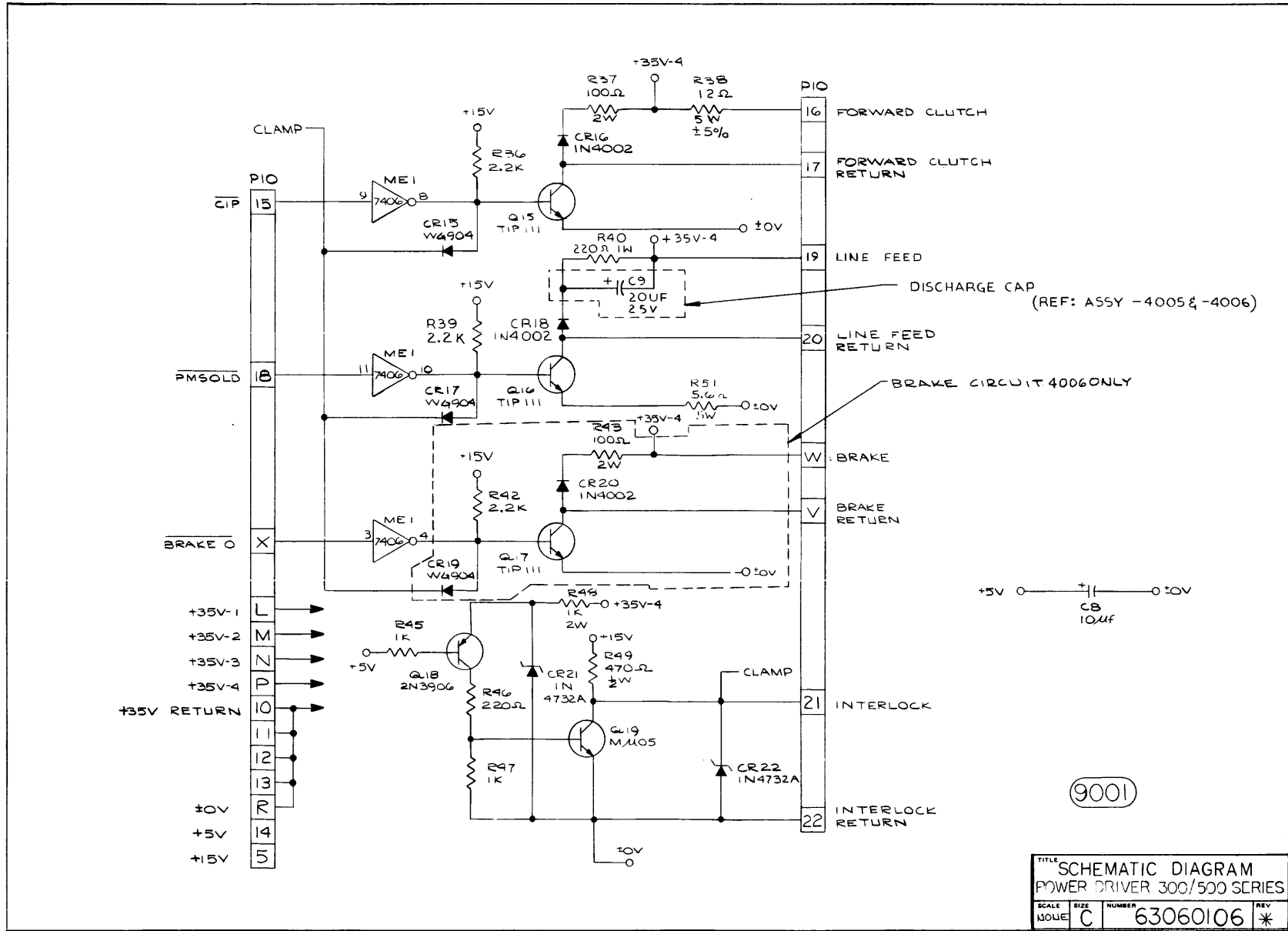


Figure 7-3. SCHEMATIC DIAGRAM, POWER DRIVER BOARD (SHEET 2 OF 2)

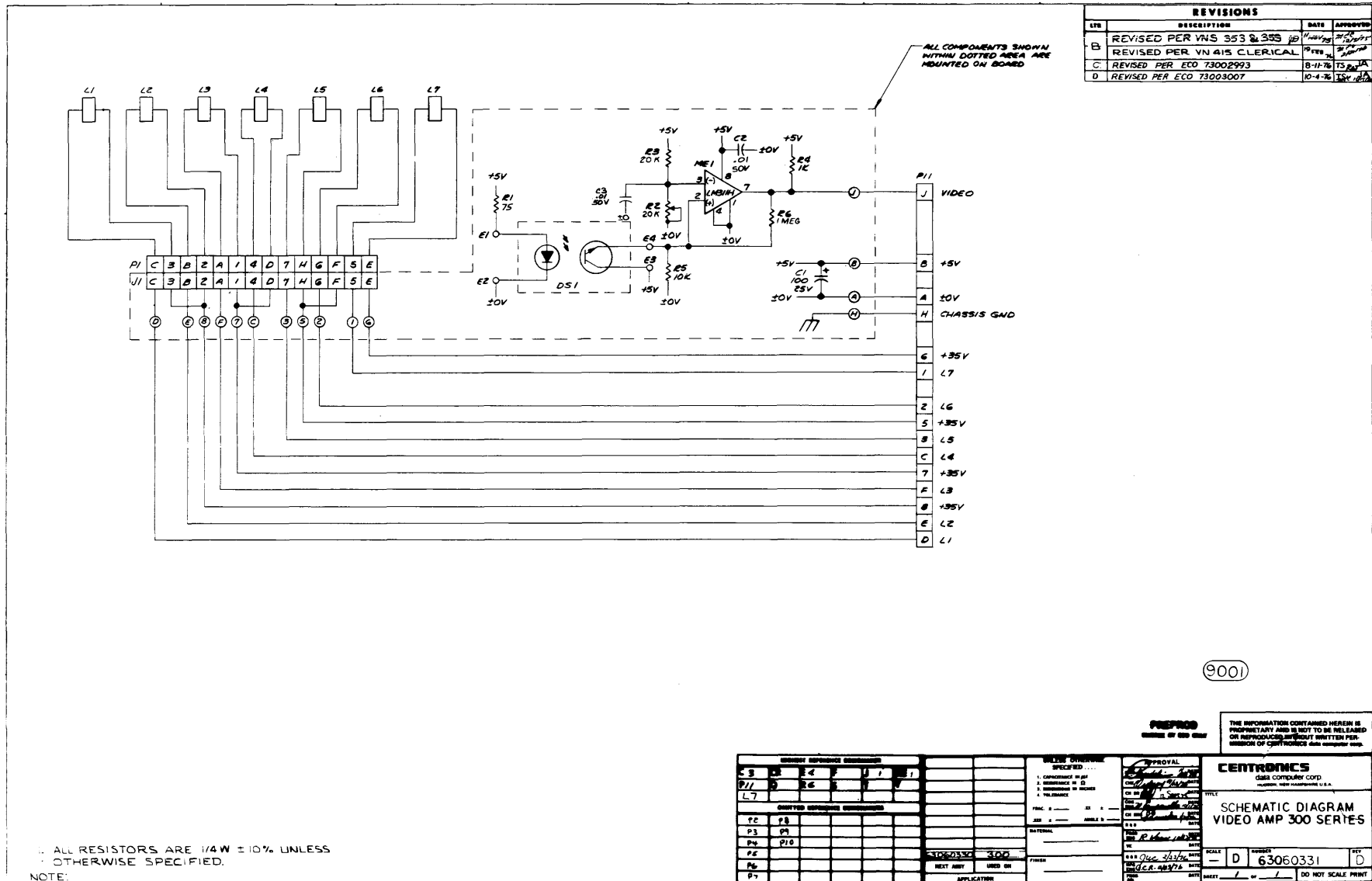


Figure 7-4. SCHEMATIC DIAGRAM, VIDEO AMPLIFIER

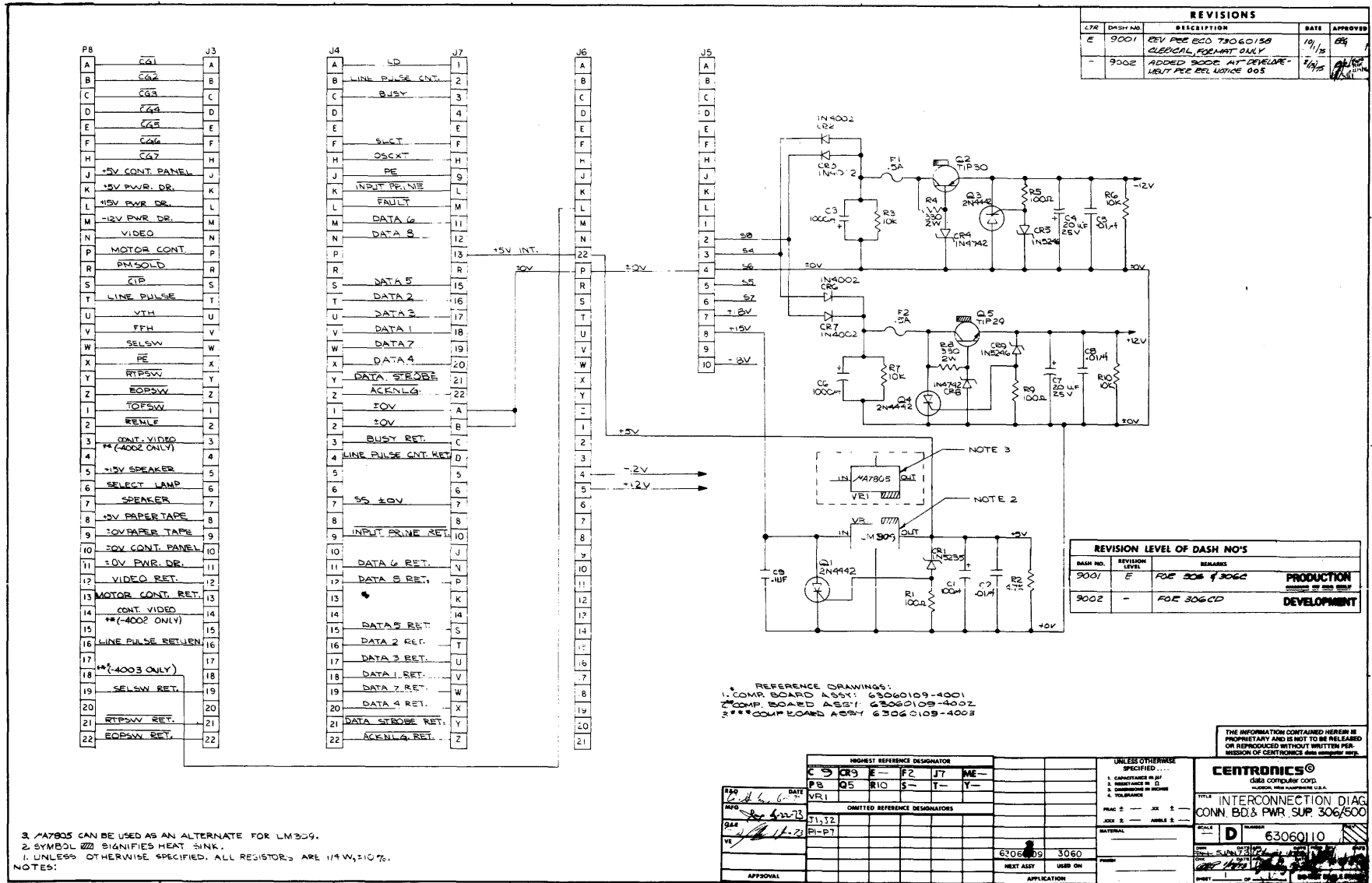
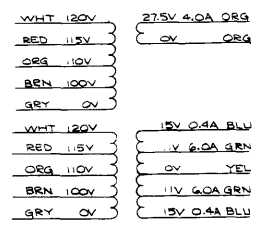
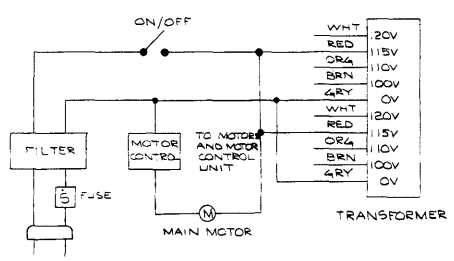
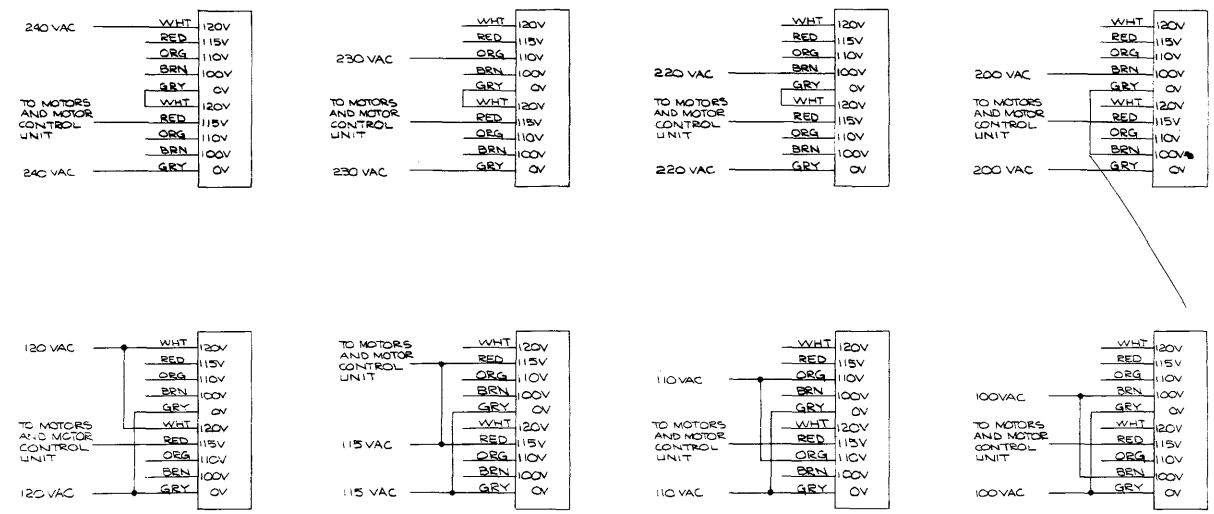


Figure 7-5. SCHEMATIC DIAGRAM, INTERCONNECTION DIAGRAM, CONNECTOR CARD

REVISIONS

ITER	DESCRIPTION	DATE	APPROVED
A	REVISED PER VMB99 CLERICAL CHANGE, FORMAT ONLY	17 MAR 75	CT JA
B	REVISED PER ECO 7350B017	7-23-75	MF JA



9001

PRODUCTION CHANGE BY EDD DMKT THE INFORMATION CONTAINED HEREIN IS PROPRIETARY AND IS NOT TO BE RELEASED OR REPRODUCED WITHOUT WRITTEN PERMISSION OF CENTRONICS data computer corp.

UNLESS OTHERWISE SPECIFIED		APPROVAL	
1. CAPACITANCE IN $\mu$ F	OR	CONTROL ACCEPTED	DATE
2. RESISTANCE IN $\Omega$	OR	DATE	DATE
3. TOLERANCE IN PERCENT	OR	DATE	DATE
FRAC 2	BY 2	DATE	DATE
VAL 8	SCALE 2	DATE	DATE
6350B017	508	DATE	DATE
6350B010	308	DATE	DATE
NEXT ASSY	USED ON	DATE	DATE
APPLICATION		DATE	DATE

**CENTRONICS**  
data computer corp  
HUBBARD, MASSACHUSETTS U.S.A.

TITLE: SCHEMATIC DIAGRAM  
MULTITAP 50/60 HZ TRANSFORMER (300/500 SERIES)

SCALE: **D** 63508152 **B**

DO NOT SCALE PRINT

Figure 7-6. SCHEMATIC DIAGRAM, MULTITAP 50/60 HZ TRANSFORMER

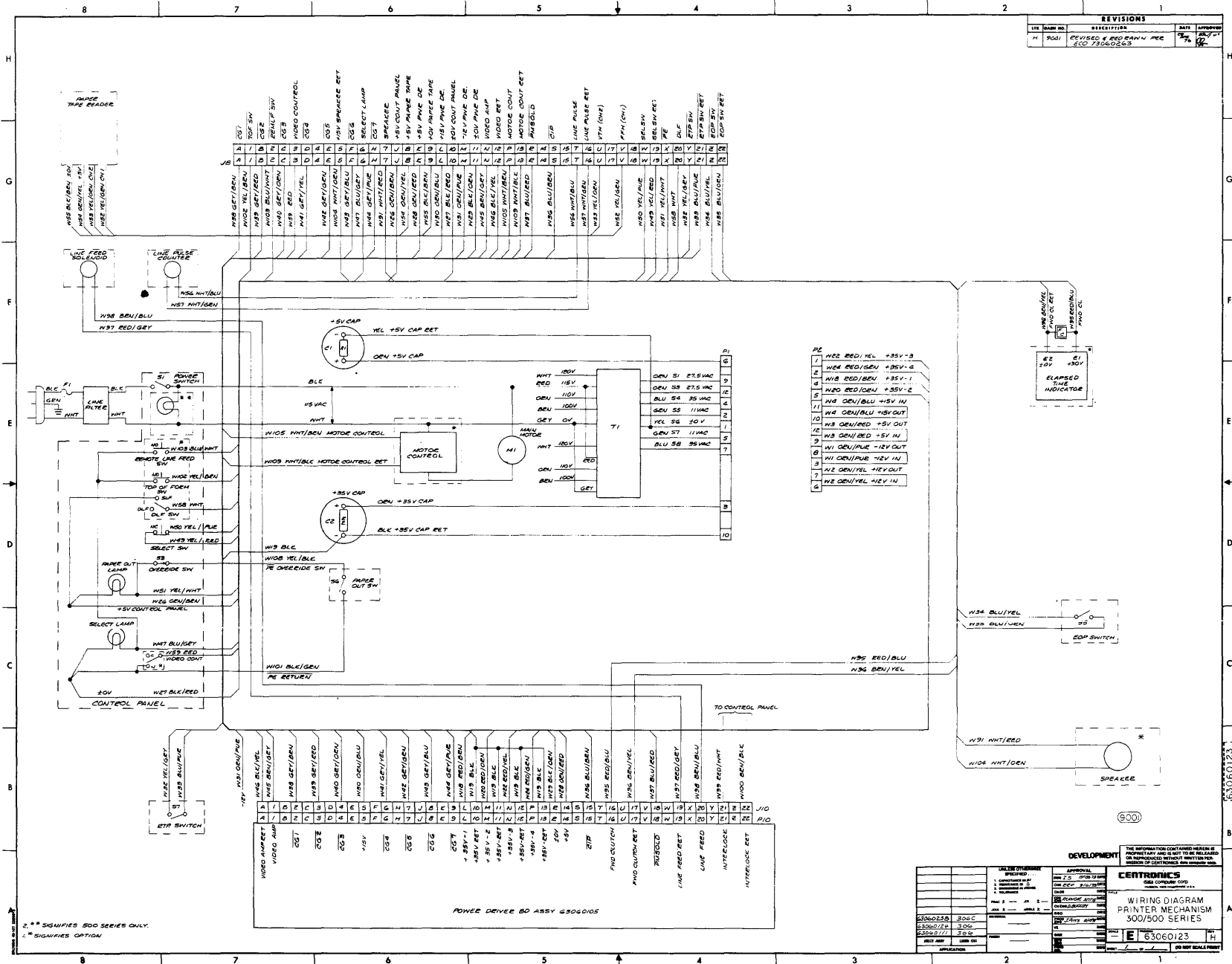


Figure 7-7. WIRING DIAGRAM, PRINTER MECHANISM

7-11

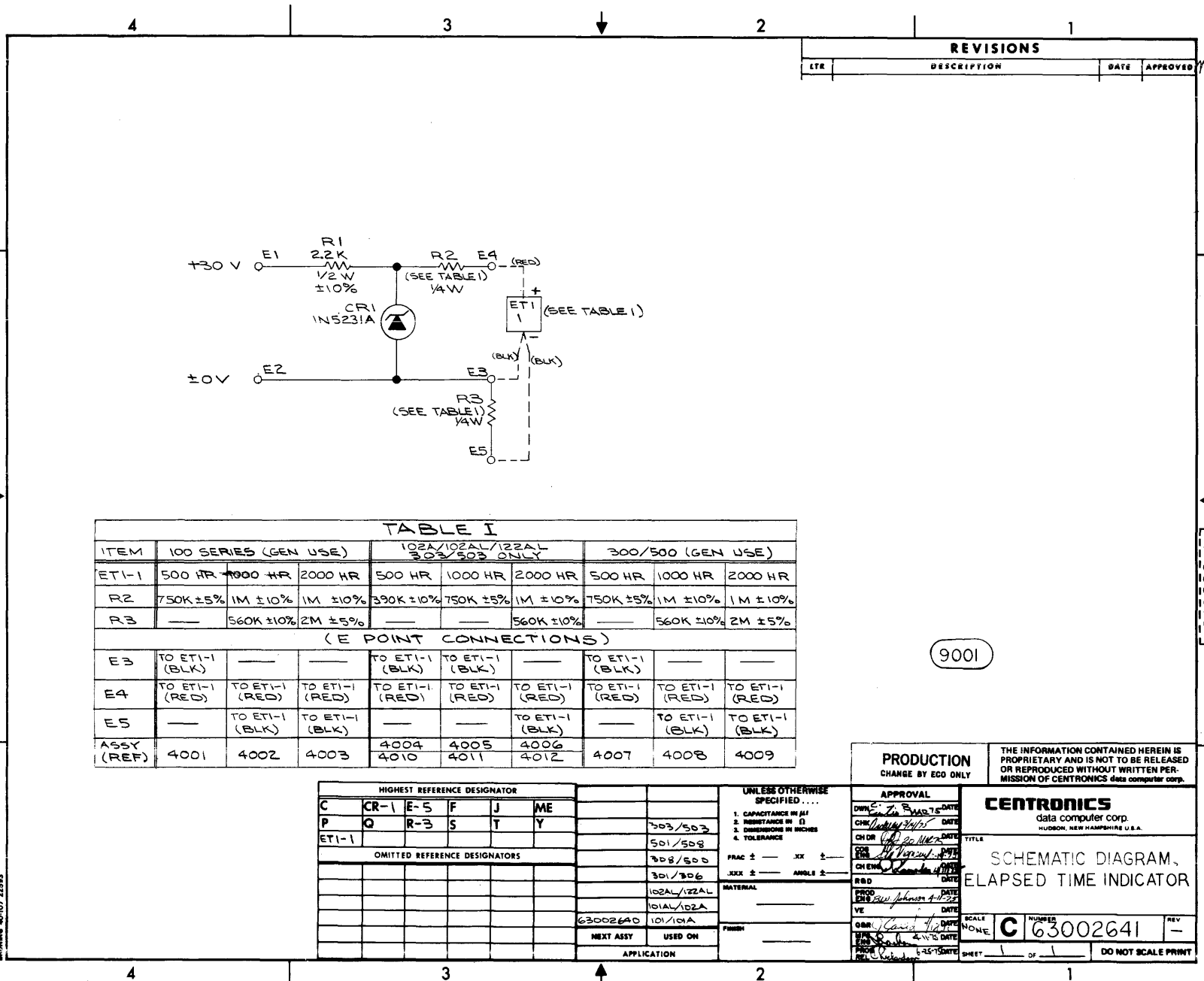


Figure 7-8. SCHEMATIC DIAGRAM, ELAPSED TIME INDICATOR (OPTION)

REV. E

This illustration is intended to aid the reader in following the 306/500 wiring diagram. (#63060123)

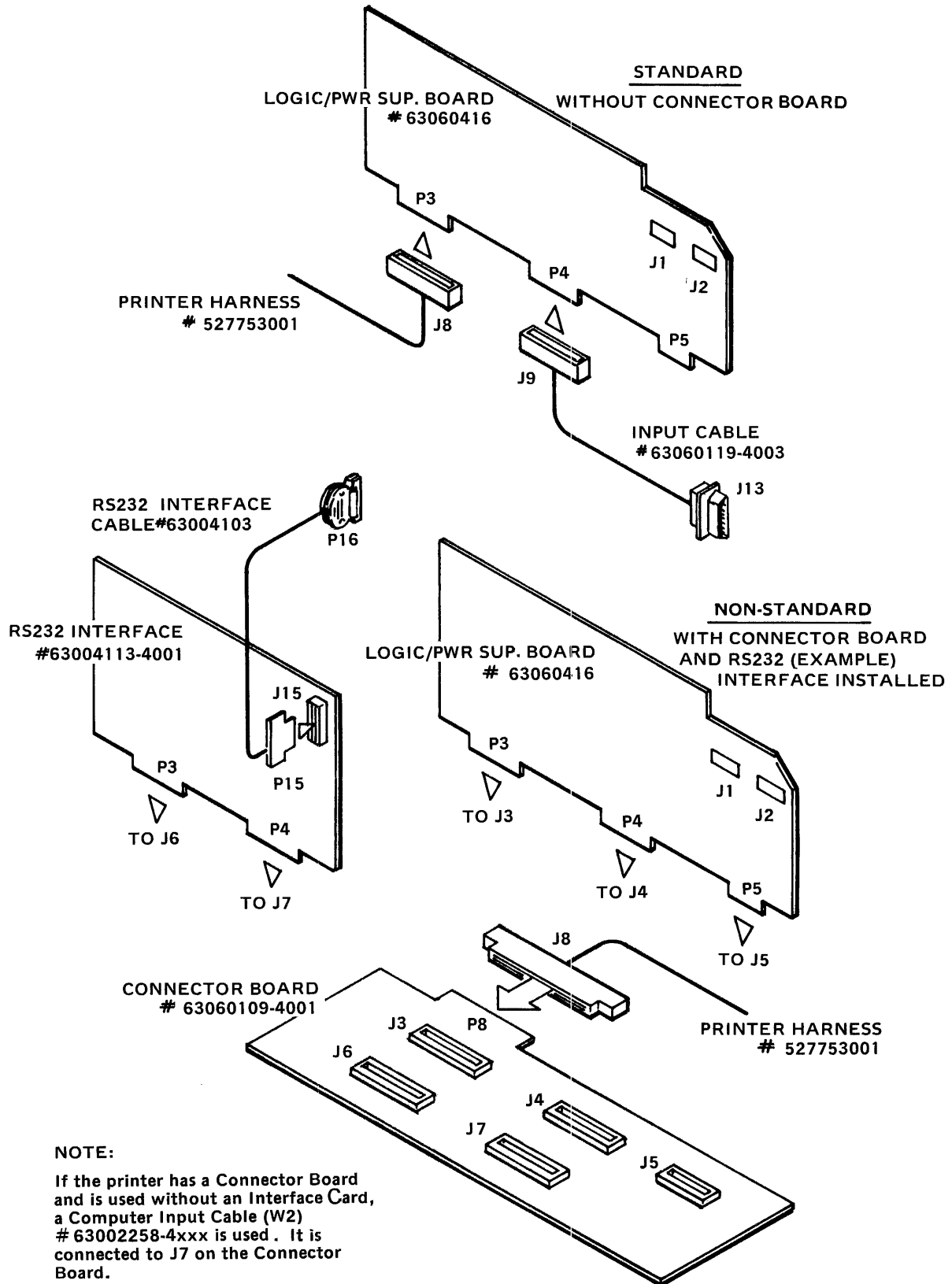


Figure 7-9. LOGIC/POWER SUPPLY BOARD CONNECTIONS

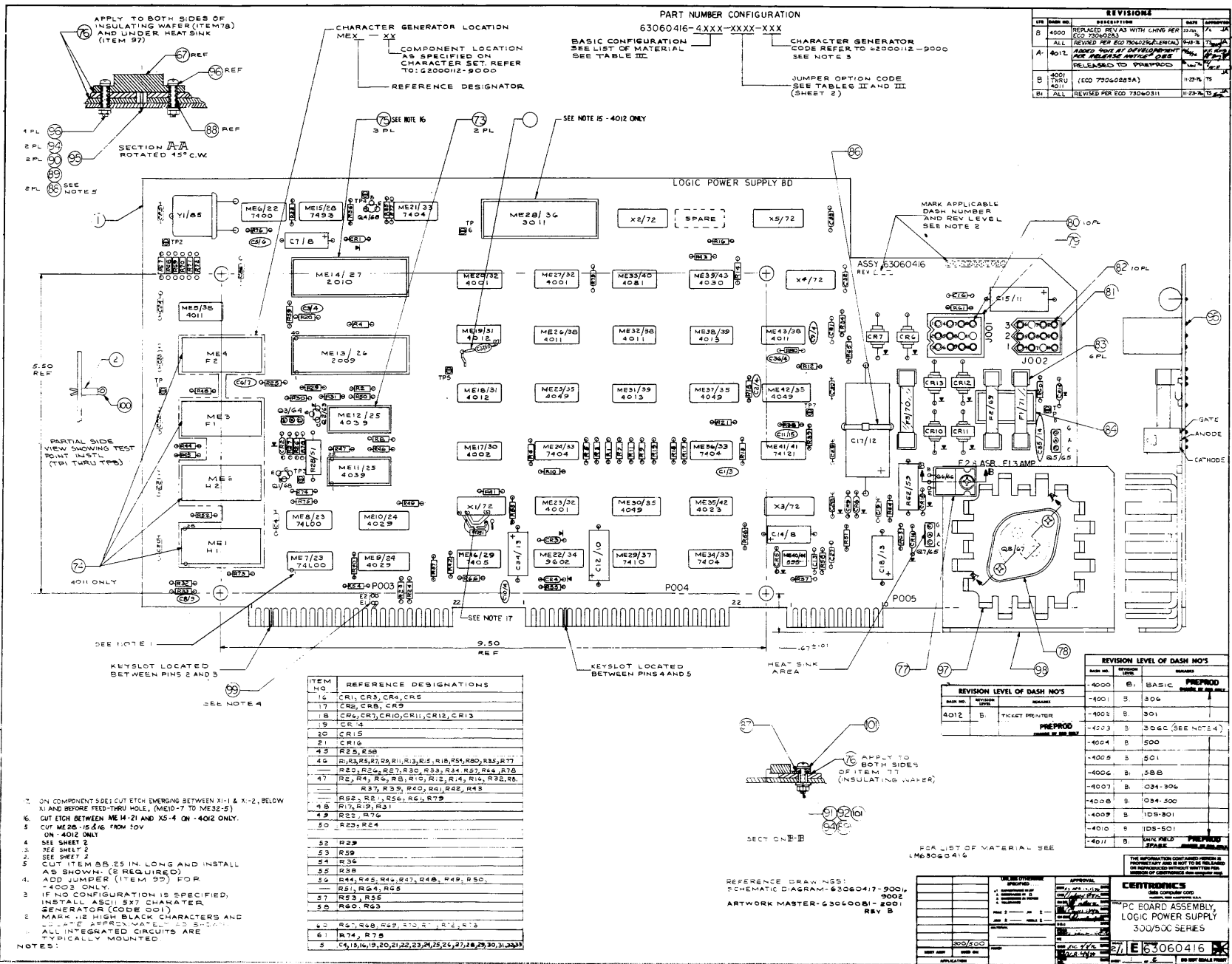


Figure 7-10. PC BOARD ASSEMBLY, LOGIC/POWER SUPPLY BOARD, 300/500 SERIES (SHEET 1 OF 2)

REV	DATE	DESCRIPTION	BY	CHKD
B	4/20	REPLACED REV. 4 WITH CHNG PER 75060311 (ECO 75060311)	1024	75-24
A	4/12	ALL REVISED PER ECO 75060285A (ECO 75060285A) RELEASING TO PRODUCTION	1024	75-24
B	4/01	THRU 4/01 (ECO 75060285A)	1024	75-24
B-1	ALL	REVISED PER ECO 75060311	1024	75-24

REV	DATE	DESCRIPTION	BY	CHKD
4000	B	BASIC		
4001	B	306		
4002	B	301		
4003	B	306C (SEE NOTE 4)		
4004	B	500		
4005	B	501		
4006	B	508		
4007	B	031-306		
4008	B	034-500		
4009	B	1DS-301		
4010	B	1DS-501		
4011	B	1DS-501		

ITEM NO	REFERENCE DESIGNATIONS
16	CR1, CR3, CR4, CR5
17	CR6, CR8, CR9
18	CR7, CR10, CR11, CR12, CR13
19	CR14
20	CR15
21	CR16
43	RS5, RS9
46	R1, R3, R5, R7, R9, R11, R13, R15, R18, R51, R80, R83, R77
47	R2, R6, R7, R30, R33, R44, R21, R54, R78
48	R4, R8, R9, R10, R12, R14, R16, R19, R22, R8
49	R37, R39, R40, R41, R42, R43
48	RS2, RS1, RS9, RG1, R72
48	R7, R9, R31
49	R33, R76
50	R23, R24
52	R23
53	R39
54	R36
55	R28
56	R44, R45, R46, R47, R48, R49, R50
57	R51, R64, R65
57	R23, R55
58	R60, R63
60	R67, R68, R69, R70, R71, R72, R73
61	R74, R78
5	C4, 15, 16, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33

- NOTES:
- ON COMPONENT SIDE CUT ETCH EXTERIOR BETWEEN X-1 & X-2, BELOW X1 AND BEFORE FEED-THRU HOLE, (ME10-7 TO ME32-5)
  - CUT ETCH BETWEEN ME14-21 AND X5-4 ON -4012 ONLY.
  - CUT ME26-15 & 16 FROM 10V ON -4012 ONLY
  - SEE SHEET 2
  - SEE SHEET 2
  - CUT ITEM BB 25 IN. LONG AND INSTALL AS SHOWN. (2 REQUIREDS)
  - ADD JUMPER (ITEM 93) FOR -4003 ONLY.
  - IF NO CONFIGURATION IS SPECIFIED, INSTALL ASCII SX7 CHARACTER GENERATOR (CODE 001)
  - MARK IS HIGH BLACK CHARACTERS AND LOCATE APPROXIMATELY AS SHOWN.
  - ALL INTEGRATED CIRCUITS ARE TYPICALLY MOUNTED

FOR LIST OF MATERIAL SEE L46900416

REFERENCE DRAWINGS:  
SCHEMATIC DIAGRAM-63060417-9001  
ARTWORK MASTER-63060081-9001  
REV. B

DATE	BY	CHKD	APPV
3/20/50			
3/20/50			
3/20/50			

37 | **E** 63060416



PLATFORM LOCATION	GROUP	OCTAL CODE	PLATFORM PIN		SIGNAL FUNCTION	RESTRICTIONS
			FROM	TO		
X1	I	20	1	16	NON GATED STROBE	NONE
		0	1	15	GATED STROBE	NONE
	II	10	14	3	SELECT DOES NOT CAUSE PRIME	NONE
		0	14	2	SELECT CAUSES PRIME	NONE
	III	04	4	13	AUTO CR ON PAPER MOTION	NONE
		0	4	12	LINE FEED, VERT TAB, FORM FEED NORMAL	NONE
	IV	02	11	6	AUTO LINE FEED DISABLE	NONE
		0	11	5	AUTO LINE FEED ENABLE	NONE
	V	01	7	10	NOT USED	NONE
		0	7	9	NOT USED	NONE
X2		0	1	16	STROBE DELAY PULSE WIDTH	NONE
		2	15		MODE CONTROL	NONE
		3	14		MODE CONTROL	NONE
		4	13		80/132	NONE
		5	12		LINE FEED PULSE WIDTH 1	NONE
		6	11		LINE FEED PULSE WIDTH 2	NONE
		7	10		LINE FEED PULSE WIDTH 3	NONE
		8	9		DELAY LINE FEED PULSE WIDTH	NONE
X3	I	20	1	16	±OV TO CHARACTER GENERATOR	NONE
		0	1	15	96 CHARACTER SET	NONE
	II	10	14	3	LOWER CASE PRINTS AS UPPER CASE DISABLE	NONE
		0	14	2	LOWER CASE PRINTS AS UPPER CASE	NONE
	III	04	4	13	EN7/±OV ENABLE	NONE
		0	4	12	TB8 TO CHARACTER GENERATOR	NONE
	IV	02	11	6	TB8/TB8/EN7/±OV ENABLE	NONE
		0	11	5	STANDARD CHAR. GEN. ENABLE +5V	NONE
	V	01	7	10	TB8/EN7/±OV ENABLE	NONE
		0	7	9	TB8 TO CHARACTER GENERATOR	NONE
X4	I	20	1	16	DELETE/DELETE ENABLE	MUST USE X4-V(7-10)
		0	1	15	DELETE/DELETE DISABLE	MUST USE X4-V(7-9)
	II	10	14	3	BOTTOM OF FORM ENABLE	NONE
		0	14	2	BOTTOM OF FORM DISABLE	NONE
	III	04	4	13	INVERTED DATA STROBE	NONE
		0	4	12	DATA STROBE NORMAL	NONE
	IV	02	11	6	VIDEO SWITCHING	NONE
		0	11	5	VIDEO NORMAL	NONE
	V	01	7	10	DELETE/DELETE ENABLE	MUST USE X4-I(1-16)
		0	7	9	DELETE/DELETE DISABLE	MUST USE X4-I(1-15)
X5	I	20	1	16	UCC RESET = UCC8	MUST USE X5-III(4-13)
		0	1	15	UCC RESET = PRIME	NONE
	II	10	14	3	DS8 = DAT 8	NONE
		0	14	2	DS8 = DAT 8	NONE
	III	04	4	13	UCC SET = UCC8	MUST USE X5-I(1-16)
		0	4	12	UPSC/034 = ENABLE	NONE
	IV	02	11	6	UCC SET = 034	NONE
		0	11	5	UCC SET = UPSC	NONE
	V	01	7	10	DOUBLE LINE FEED ENABLE	NONE
		0	7	9	DOUBLE LINE FEED DISABLE	NONE

- Number selected equals X2 platform. Refer to 63080163/9000.
- If no operation are selected from table II, then J7, J8, J9, and J10 must equal zero. For X1, X3, X4, and X5 values refer to table III as called out by the assembly dash Number.
- When /4007, /4008 or /4012 are selected, single character elongation, option J10 - 08 or J10 - 09 must not be used.

NOTES:

SEE NOTE 13

TABLE II

J7	J8	J9	J10	FUNCTION	JUMPERS				RESTRICTIONS
					X1	X3	X4	X5	
01	-	-	-	CUT LINE FEED	02	-	-	-	
02	-	-	-	NON-GATED STROBE	20	-	-	-	
04	-	-	-	DELETE/DELETE	-	-	21	-	
08	-	-	-	BOTTOM OF FORM	-	-	10	-	NOT AVAILABLE ON -4009
01	-	-	-	AUTO CR ON PM	04	-	-	-	
02	-	-	-	INHIBIT PRIME	10	-	-	-	
04	-	-	-	DOUBLE LINE FEED	-	-	-	01	NOT AVAILABLE ON -4006
-	-	-	02	96 CHAR SET	-	07	-	-	
-	-	-	04	128 CHAR SET BIT 8 LO	-	03	-	-	
-	-	-	05	128 CHAR SET BIT 8 HI	-	02	-	-	
-	-	-	08	SINGLE CHAR ELONG BIT 8 LO	-	-	-	34	SEE NOTE 12
-	-	-	09	SINGLE CHAR ELONG. BIT 8 HI	-	-	-	24	SEE NOTE 12

SUM OF BINARY NUMBERS SELECTED EQUALS JUMPER OPTION CODE (REFER TO CONFIGURATION BOOK 63212060-9001)

SUM OF NUMBERS SELECTED EQUALS X, X3, X4 & X5 PLATFORM REFER TO 6308024-9000.

J9 MUST ALWAYS EQUAL ZERO

J10 CAN ONLY EQUAL: 0, 2, 4, 5, 8, 9, 10 & 11

TABLE III

DASH NO.	DESCR	PLATFORM CODE				
		X1	X2	X3	X4	X5
-4001	306	00	224	00	00	00
-4002	301	00	271	00	00	00
-4003	306C	00	304	00	02	00
-4004	500	00	204	00	00	00
-4005	501	00	251	00	00	00
-4006	588	00	004	00	00	00
-4007	034-306	00	224	00	00	02
-4008	034-500	00	204	00	00	02
-4009	IDS-301	00	271	00	04	00
-4010	IDS-501	00	251	00	04	00
-4011	UNIVERSAL FIELD SPARE	-	-	-	-	-
-4012		00	030	00	00	00

SEE TABLE II - J8-04

SEE TABLE II - J7-08

SEE NOTE 12

SEE NOTE 14

TABLE IV

SETTINGS OBTAINED WITH X2						
DASH NO.	X2	L.F.(MS)	DLYLF (MS)	STROBE (us)	STBDLY (us)	80/132
4001&4007	224	16	60	450	660	80
4002&4009	271	10	40	450	370	80
4003	304	16	60	450	N-660 C-370	132
4004&4008	204	16	60	450	660	132
4005&4010	251	10	40	450	370	132
4006	004	16	60	450	776	132
4012	030	10	60	500	776	80

Figure 7-11. PC BOARD ASSEMBLY LOGIC/POWER SUPPLY BOARD 300/500 SERIES (SHEET 2 OF 2)

**LIST OF MATERIALS  
PC BOARD ASSEMBLY, LOGIC/POWER  
SUPPLY BOARD, 300/500 SERIES  
(Ref: Ass'y No. 63060416)**

**NO. 63060416-4000 (300/500) CONFIGURATION, REV. B1**

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	63060081-2001	PC BD AW 306 LOGIC BOARD	1
2	36612103-2040	SPACER .12DIA #0 CLR .18L NYL	8
3	21330001-1001	CAP CER DISC 33PF 1KV 20%	1
4	21102000-1001	CAP CER DISC 1000PF 1KV 20%	5
5	21103004-1001	CAP TBAX GLASS .01UF 50V 20%	18
6	21220001-1001	CAP CER DISC 22PF 1KV 20%	1
7	21201000-1001	CAP CER DISC 200PF 1KV 20%	1
8	22106002-1001	CAP ELCTLT 10UF 25V -10+75%	2
9	21751001-1001	CAP CER DISC 750PF 1KV 20%	1
10	22506002-1001	CAP ELCTLT 50UF 25V -10+75%	1
11	22107002-1001	CAP ELCTLT 100UF 25V -10+75%	1
12	22108001-1001	CAP ELCTLT 1000UF 35V -10+150%	1
13	22206002-1001	CAP ELCTLT 20UF 25V -10+75%	2
14	21104000-1001	CAP CER DISC .1UF 25V 20%	1
15	25331000-1001	CAP MICA RDL 330PF 500V 5%	1
16	38100904-1001	SEMICOND DIODE TBAX 1N4148	4
17	38040020-1001	SEMICOND DIODE TBAX 1N4002	3
18	38000002-1001	SEMICOND DIODE SILICON TBAX	6
19	38052350-1001	SEMICOND DIODE TBAX 1N5235	1
20	38047420-1001	SEMICOND DIODE TBAX 1N4742	1
21	38052460-1001	SEMICOND DIODE TBAX 1N5246	1
22	35474000-1001	IC QUADR NAND 2-INPUT 7400	1
23	35574000-1001	IC QUADR NAND 2-INPUT 74L00	2
24	35740290-1001	IC UP/DOWN COUNTER 4029	2
25	35514039-1003	IC RNDM ACCESS MEM 256X4 4039	2
26	35512011-1002	IC LSI SMC REV H & ABOVE 2009	1
27	35512010-1001	IC LSI 2010	1
28	35474930-1001	IC 4-BIT BINARY COUNTER 7493	1
29	35474050-1001	IC HEX INVERTER 7405	1
30	35740020-1001	IC DUAL NOR 4-INPUT 4002	1
31	35740120-1001	IC DUAL NAND 4-INPUT 4012	2
32	35740010-1001	IC QUADR NOR 2-INPUT 4001	3
33	35474040-1001	IC HEX INVERTER 7404	4
34	35496020-1001	IC DUAL MONOSTABLE MV 9602	1
35	35740490-1001	IC HEX INVERTING BUFFER 4049	4
36	35530111-1001	IC LSI 3011	1
37	35474100-1001	IC TRIPLE NAND 3-INPUT 7410	1
38	35740110-1001	IC QUADR NAND 2-INPUT 4011	4
39	35740130-1001	IC DUAL D-TYPE FLIP-FLOP 4013	2
40	35740810-1001	IC QUADR AND 2-INPUT 4081	1
41	35474121-1001	IC SGL MONOSTABLE MV 74121	1
42	35740230-1001	IC TRIPLE NAND 3-INPUT 4023	1
43	35740300-1001	IC QUADR EXCL-OR 2-INP 4030	1
44	35205550-1001	IC LINEAR TIMER 555	1
45	41474926-1001	RES CARBON 470K OHM 1/4W 10%	2
46	41102926-1001	RES CARBON 1K OHM 1/4W 10%	22
47	41472926-1001	RES CARBON 4.7K OHM 1/4W 10%	21

NO. 63060416-4000 (300/500) CONFIGURATION, REV. B1 (CONT'D)

ITEM	PART NO.	NOMENCLATURE	QTY PER
48	41471926-1001	RES CARBON 470 OHM 1/4W 10%	3
49	41681926-1001	RES CARBON 680 OHM 1/4W 10%	2
50	41221926-1001	RES CARBON 220 OHM 1/4W 10%	2
51	41220016-1001	RES CARBON 22 OHM 1W 10%	1
52	41222926-1001	RES CARBON 2.2K OHM 1/4W 10%	1
53	41752926-1001	RES CARBON 7.5K OHM 1/4W 10%	1
54	41153926-1001	RES CARBON 15K OHM 1/4W 10%	1
55	41362925-1001	RES CARBON 3.6K OHM 1/4W 5%	1
56	41103926-1001	RES CARBON 10K OHM 1/4W 10%	10
57	41203926-1001	RES CARBON 20K OHM 1/4W 10%	2
58	41101926-1001	RES CARBON 100 OHM 1/4W 10%	2
59	41331026-1001	RES CARBON 330 OHM 2W 10%	1
60	41753926-1001	RES CARBON 75K OHM 1/4W 10%	7
61	41473926-1001	RES CARBON 47K OHM 1/4W 10%	2
63	38239040-1001	SEMICOND XSTR GP 2N3904	1
64	38300050-1001	SEMICOND XSTR NPN HV AMPL	1
65	38244420-1001	SEMICOND THYR PWR 2N4442	2
66	38200300-1001	SEMICOND XSTR PNP W/MICA TIP30	1
67	35203090-1001	IC VOLTAGE REGULATOR 309	1
68	38239060-1001	SEMICOND XSTR PNP GP 2N3906	2
69	39030012-1001	FUSE GL .25DIA 8A SLOW 1.25L	1
70	39030018-1001	FUSE GL .25DIA .5A 250V 1.25L	1
71	39030011-1001	FUSE GL .25DIA 3A 250V 1.25L	1
72	31410247-2003	SOCKET IC 16PIN SLDR DIP .300W	5
73	31410248-2004	SOCKET IC 22PIN SLDR DIP .400W	2
75	31410246-2003	SOCKET IC 40PIN SLDR DIP .600W	3
76	30050000-0001	COMPOUND THRM CONDCT SILICONE	A/R
77	35070003-2002	PAD XSTR MTG TIP .002THK RECT	1
78	35070002-2004	PAD XSTR MTG TO-3 .002THK	1
79	31300008-1002	CONN PLUG 12POSN .093	1
80	31240021-2002	CONTACT CONN PC MTG PIN .093	10
81	31340008-1002	CONN RCPT 12POSN .093	1
82	31240021-2001	CONTACT CONN PC MTG SKT .093	10
83	31350003-2001	CLIP FUSE W/EAR PC MTG .25DIA	6
84	62000111-3001	WARNING DECAL FUSE RATING	1
85	37816544-1006	XTAL 4 MHZ STD CAN 3 LEAD	1
86	39695231-2001	STRAP CABLE ADJ LKG .625BDL	1
87	35000004-2001	WSHR SHOULDER #4X.031L NYL	1
88	39690200-0009	TUBING PLSTC 9AWG ID NAT	A/R
89	30000000-0001	VARNISH INSULATING RED	A/R
90	34517207-2001	SCR PNH REC 4-40X.62L	2
91	34517167-2001	SCR PNH REC 4-40X.50L	1
92	34818007-2001	WSHR LOCK SPLIT #4	1
94	34712007-2001	NUT HEX 4-40 X MDM THK	3
95	30070000-0001	SOLDER 60/40 .0320 WIRE	A/R
96	34815007-2001	WSHR LOCK INTL TOOTH #4	4
97	32860004-2001	HEAT SINK TO-3 .90H FINGERS	1
98	63060385-2001	BRACKET HEAT SINK	1
100	33250003-2003	PIN COTTER .0460 X.50L BRS	8
101	34900001-2001	WSHR FLAT #4X.25 OD	2
111	21101001-1001	CAP CER DISC 100PF 1KV 20%	1
REF	63060082-9001	PC BD DD 306 LOGIC BOARD	

NO. 63060416-4004 (500) CONFIGURATION, REV. B1

ITEM	PART NO.	NOMENCLATURE	QTY PER
102	63060416-4000	PC BD ASSY, LOGIC PWR 300/500	1
107	63080163-2204	JUMPER BAUD RATE PLATFORM 204	1
REF	63060417-9001	SCHEM DIA 306 LOGIC BOARD	
REF	63080164-9000	OPTION SUMMARY JUMP PLAT STD	

NO. 63060416-4008 (SPECIAL OPTION, 034 FOR CHARACTER ELONGATION)  
CONFIGURATION, REV. B1

ITEM	PART NO.	NOMENCLATURE	QTY PER
102	63060416-4000	PC BD ASSY, LOGIC PWR 300/500	1
107	63080163-2004	JUMPER BAUD RATE PLATFORM 004	1
REF	63060417-9001	SCHEM DIA 306 LOGIC BOARD	
REF	63080164-9000	OPTION SUMMARY JUMP PLAT STD	



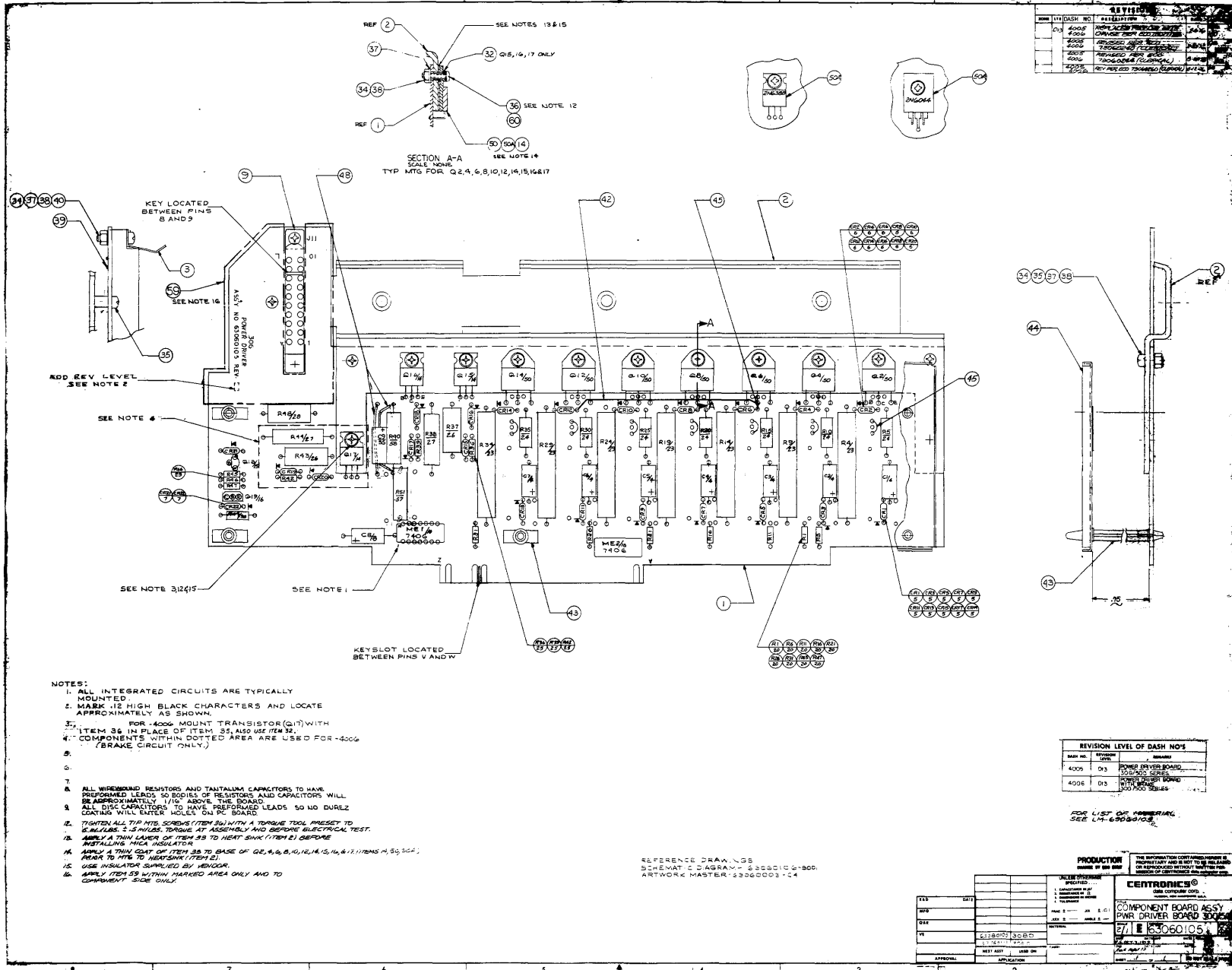


Figure 7-12. PC BOARD ASSEMBLY, POWER DRIVER BOARD

LIST OF MATERIALS  
PC BOARD ASSEMBLY  
POWER DRIVER BOARD W/O BRAKE  
(Ref: Ass'y No. 63060105-4005, Rev. D13)

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	63060003-2001	PC BD AW 306 DRIVER	1
2	63060113-5001	H/S MTG BKT ASSY PWR DR BD 306	1
3	63002300-2001	CLIP, P.C. BOARD	2
4	22405003-1001	CAP ELCTLT 4UF 50V -10+75%	7
5	38100904-1001	SEMICON D DIODE TBAX 1N4148	9
6	38040020-1001	SEMICON D DIODE TBAX 1N4002	9
7	38047321-1001	SEMICON D DIODE TBAX 1N4732A	2
8	22106002-1001	CAP ELCTLT 10UF 25V -10+75%	1
9	31230011-1001	CONN EDGE 10POSN 2-ROW MDM	1
10	35474060-1001	IC HEX INVERTER BFR/DRVR 7406	2
14	38201110-1001	SEMICON D XSTR W/MICA TIP111	2
15	38239060-1001	SEMICON D XSTR PNP GP 2N3906	1
16	38300050-1001	SEMICON D XSTR NPN HV AMPL	1
20	41102926-1001	RES CARBON 1K OHM 1/4W 10%	9
23	43158105-1001	RES WW 1.5 OHM 10W 5%	7
24	40680325-1001	RES WW 68 OHM 3.25W 5%	7
25	41222926-1001	RES CARBON 2.2K OHM 1/4W 10%	2
26	41101026-1001	RES CARBON 100 OHM 2W 10%	1
28	41102026-1001	RES CARBON 1K OHM 2W 10%	1
29	41221926-1001	RES CARBON 220 OHM 1/4W 10%	1
30	41471946-1001	RES CARBON 470 OHM 1/2W 10%	1
32	35000004-2005	WSHR SHOULDER #4X.187L NYL	2
33	30050000-0001	COMPOUND THRM CONDCT SILICONE	A/R
34	30000000-0001	VARNISH INSULATING RED	A/R
35	34517105-2001	SCR PNH REC 4-40X.31L SST	5
37	34815005-2001	WSHR LOCK INTL TOOTH #4 SST	15
38	34712005-2001	NUT HEX 4-40 X MDM THK SST	15
39	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
40	34517165-2001	SCR PNH REC 4-40X.50L SST	11
43	36600004-2006	SPACER PCB LKG .75L NYL	5
44	63060114-2001	SHIELD POWER DRIVER	1
45	39610000-0005	WIRE UN-INSUL SOLID 22AWG	A/R
48	39690200-0020	TUBING PLSTC 20AWG ID NAT	A/R
50	63060346-6001	KIT TRANS TIP 141 & INSULATOR	1
50A	63060347-6001	KIT TRANS 2N6388 & INSULATOR	A/R
55	22206002-1001	CAP ELCTLT 20UF 25V -10+75%	1
56	43120055-1001	RES WW 12 OHM 5W 5%	1
57	43568056-1001	RES WW 5.6 OHM 5W 10%	1
58	41221016-1001	RES CARBON 220 OHM 1W 10%	1
59	30040002-0001	CONFORMAL COATING SPRAY-ON	A/R
60	34900001-2001	WSHR FLAT #4X.25 OD	9
REF	63060004-9001	PC BD DD 306 DRIVER	A/R
REF	63060106-9001	SCHEM DIAG PWR DRVR 300/500 SR	A/R

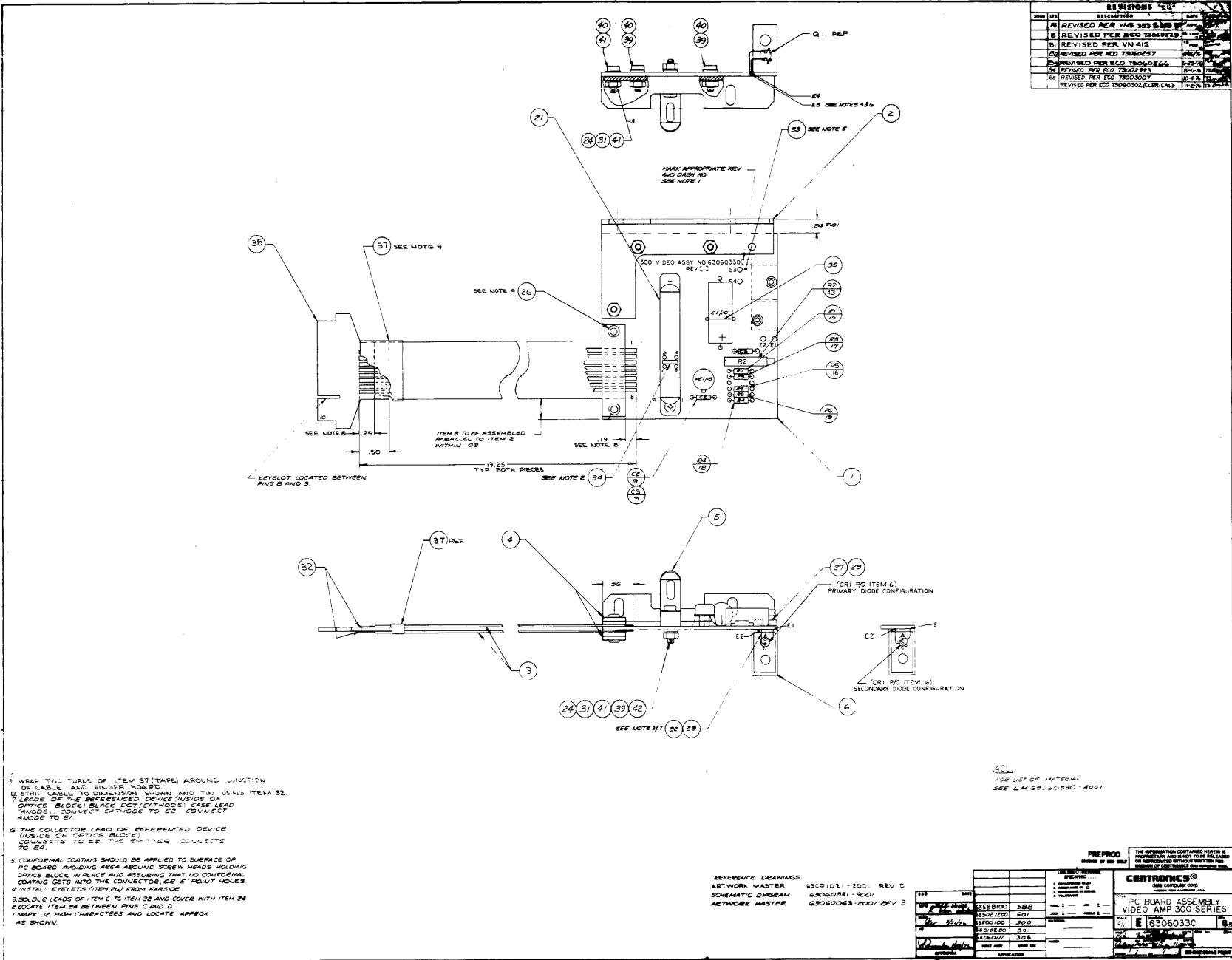
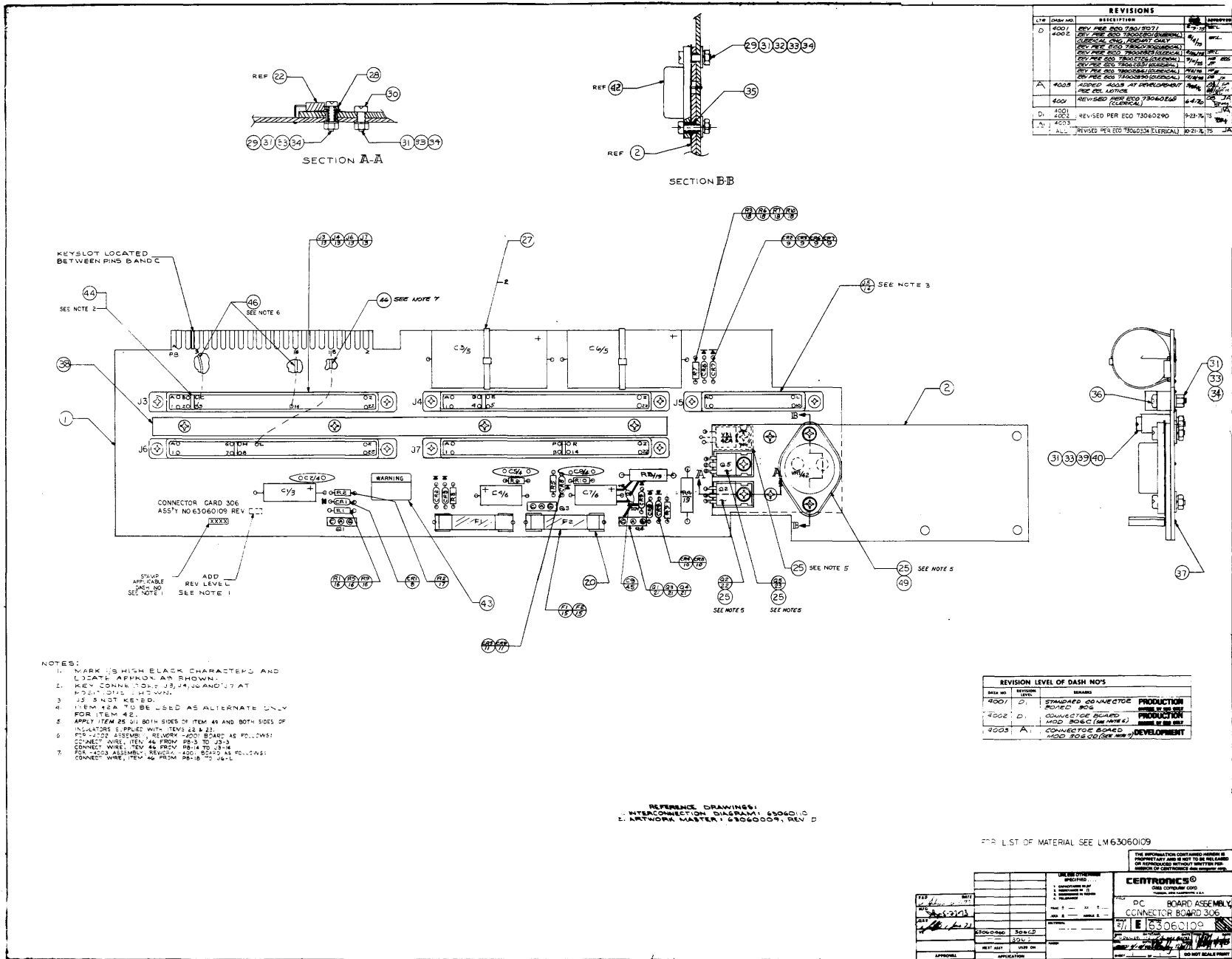


Figure 7-13. PC BOARD ASSEMBLY, VIDEO AMPLIFIER



**LIST OF MATERIALS  
PC BOARD ASSEMBLY  
VIDEO AMPLIFIER BOARD  
(Ref: Ass'y No. 63060330-4001, Rev. B5)**

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	63060063-2001	PC BD AW VIDEO AMP 300	1
2	63508104-2001	BRACKET MTG VIDEO AMP BOARD	1
3	39660029-0001	CABLE FLEXIBLE 8/C	3.2
4	63060116-5001	CLAMP ASSY	2
5	63002300-2001	CLIP, P.C. BOARD	2
6	63002634-5001	OPT PICKUP SINGLE TRK PHOTRANS	1
9	21103004-1001	CAP TBAX GLASS .01UF 50V 20%	2
10	22107002-1001	CAP ELCTLT 100UF 25V -10+75%	1
13	35203110-1003	IC VOLTAGE COMPARATOR 311	1
15	41750926-1001	RES CARBON 75 OHM 1/4W 10%	1
16	41103926-1001	RES CARBON 10K OHM 1/4W 10%	1
17	41203926-1001	RES CARBON 20K OHM 1/4W 10%	1
18	41102926-1001	RES CARBON 1K OHM 1/4W 10%	1
19	41105926-1001	RES CARBON 1MEG OHM 1/4W 10%	1
21	31230011-1001	CONN EDGE 10POSN 2-ROW MDM	1
22	39610000-0003	WIRE UN-INSUL SOLID 26AWG	A/R
23	39690200-0018	TUBING PLSTC 1,AWG ID NAT	A/R
24	30000000-0001	VARNISH INSULATING RED	A/R
26	33490001-2022	EYELET FLANGE .121D X.250L BRS	2
27	34104087-2001	SCR CAP HEX SOC 2-56X.25L	2
29	34902007-2001	WSHR FLAT #2X.00 OD	2
31	34712005-2001	NUT HEX 4-40 X MDM THK SST	5
32	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
33	30040000-0001	CONFORMAL COATING	A/R
34	31240456-2002	KEY PLZ BETW CONTACT	1
35	39695231-2001	STRAP CABLE ADJ LKG .625BDL	1
37	35060005-0001	TAPE TRANS REINF .75W X.006THK	A/R
38	63001021-2001	PC BD AW RIBBON CAB FINGER BD	1
39	34912005-2001	WSHR FLAT #4X.00 OD SST	4
40	34517125-2001	SCR PNH REC 4-40X.38L SST	3
41	34815005-2001	WSHR LOCK INTL TOOTH #4 SST	6
42	34517185-2001	SCR PNH REC 4-40X.56L SST	2
43	46203381-1001	POT PC MTG 20K OHM 1W 10%	1
REF	63001022-9001	PC BD DD RIBBON CAB FINGER BD	
REF	63060064-9001	PC BD DD VIDEO AMP 300	
REF	63060331-9001	SCHEM DIAG VIDEO AMP 300	



REVISIONS				
REV	DATE	DESCRIPTION	BY	CHKD
D	4001	REV PER ECO 73060290	WJL	WJL
	4002	REV PER ECO 73060290 (CLERICAL)	WJL	WJL
		REV PER ECO 73060290 (CLERICAL)	WJL	WJL
		REV PER ECO 73060290 (CLERICAL)	WJL	WJL
		REV PER ECO 73060290 (CLERICAL)	WJL	WJL
		REV PER ECO 73060290 (CLERICAL)	WJL	WJL
A	4003	ADDED ADDS AT DEVELOPMENT PER EOL NOTICE	WJL	WJL
	4004	REVISED PER ECO 73060290 (CLERICAL)	WJL	WJL
D	4001	REVISED PER ECO 73060290	WJL	WJL
A	4003	REVISED PER ECO 73060290 (CLERICAL)	WJL	WJL
		REVISED PER ECO 73060290 (CLERICAL)	WJL	WJL

- NOTES:
- MARK 'S' HIGH BLACK CHARACTER AND LOCATE APPEAR AS SHOWN.
  - KEY CONNECT J3, J4 AND J7 AT POSITION SHOWN.
  - J3 SHOT KEYS.
  - ITEM 42A TO BE USED AS ALTERNATE ONLY FOR ITEM 42.
  - APPLY ITEM 25 ON BOTH SIDES OF ITEM 49 AND BOTH SIDES OF INSULATORS 5. APPLY WITH ITEMS 22 & 23.
  - FOR J22 ASSEMBLY, NETWORK BOARD AS FOLLOWS: CONNECT WIRE, ITEM 46 FROM P8-3 TO J3-3. CONNECT WIRE, ITEM 46 FROM P8-4 TO J3-4.
  - FOR J203 ASSEMBLY, REVISED, ADD BOARD AS FOLLOWS: CONNECT WIRE, ITEM 46 FROM P8-2 TO J4-1.

REFERENCE DRAWINGS:  
 INTERCONNECTION DIAGRAM: 6306010  
 NETWORK MASTER: 6306009, REV D

REVISION LEVEL OF DASH NOS			
DATE	REVISION LEVEL	DESCRIPTION	STATUS
73001	D	STANDARD CONNECTOR BOARD 306	PRODUCTION
73002	D	CONNECTOR BOARD MOD. 306C (SEE NOTE 4)	PRODUCTION
73003	A	CONNECTOR BOARD MOD. 306C (SEE NOTE 4)	DEVELOPMENT

FOR LIST OF MATERIAL SEE LM63060109

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**CENTRONICS**  
 1000 CENTRONS DRIVE  
 SCOTTSDALE, ARIZONA 85260

PC BOARD ASSEMBLY  
 CONNECTOR BOARD 306  
 63060109

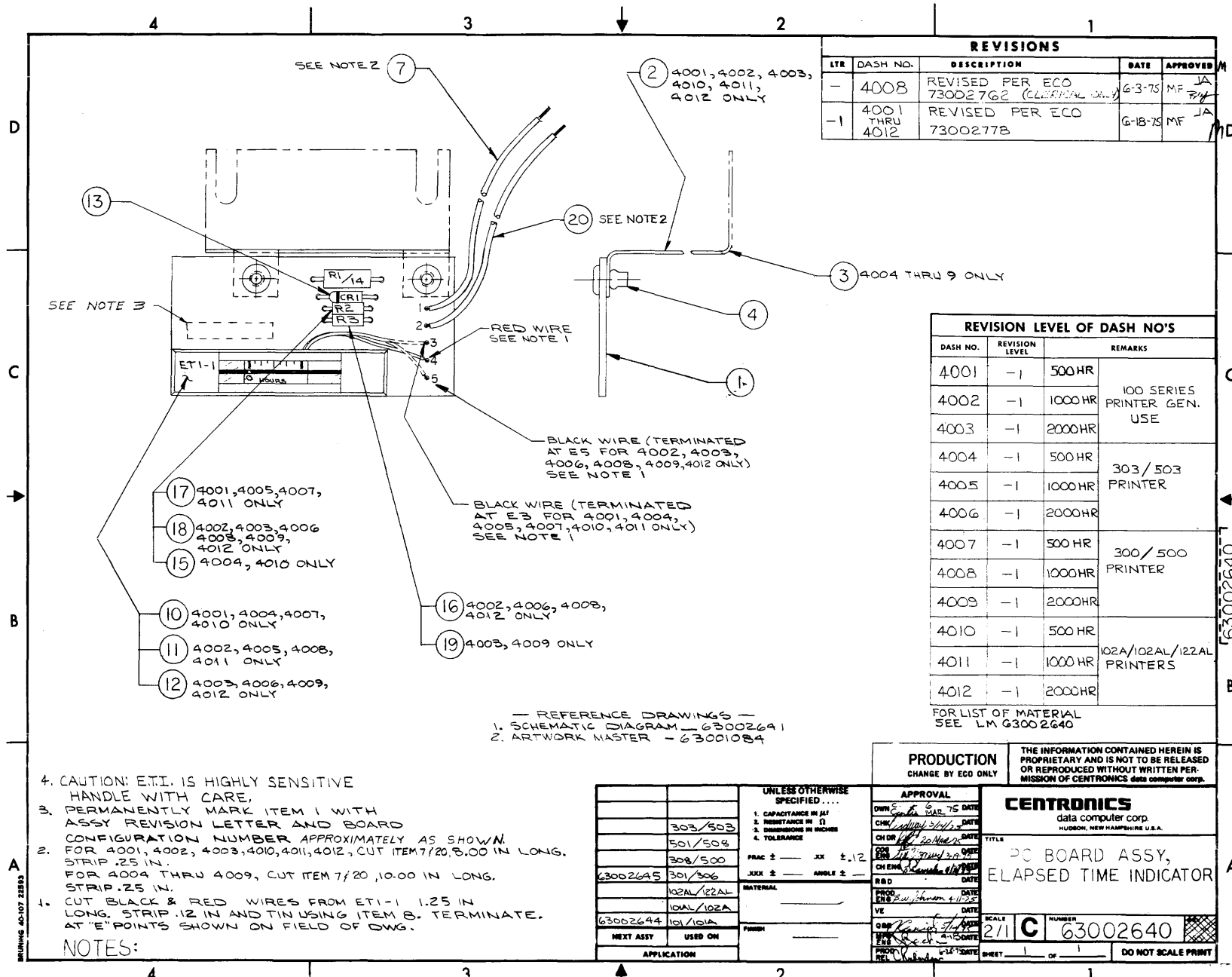
DATE: 12/21/73  
 BY: WJL  
 CHECKED: WJL  
 APPROVED: WJL

DO NOT SCALE PRINT

Figure 7-14. PC BOARD ASSEMBLY, CONNECTOR CARD

**LIST OF MATERIALS  
PC BOARD ASSEMBLY  
CONNECTOR CARD**  
(Ref: Ass'y No. 63060109-4001, Rev. D1)

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	63060009-2001	PC BD AW CONN BD 306	1
2	63060118-2001	HEAT SINK	1
3	22107002-1001	CAP ELCTLT 100UF 25V -10+75%	1
4	21103003-1001	CAP CER DISC .01UF 1KV 20%	3
5	22108001-1001	CAP ELCTLT 1000UF 35V -10+150%	2
6	22206002-1001	CAP ELCTLT 20UF 25V -10+75%	2
8	38052350-1001	SEMICOND DIODE TBAX 1N5235	1
8A	38052351-1001	SEMICOND DIODE TBAX 1N5235A	A/R
8B	38052352-1001	SEMICOND DIODE TBAX 1N5235B	A/R
9	38040020-1001	SEMICOND DIODE TBAX 1N4002	4
10	38047420-1001	SEMICOND DIODE TBAX 1N4742	2
11	38052460-1001	SEMICOND DIODE TBAX 1N5246	2
11A	38052461-1001	SEMICOND DIODE TBAX 1N5246A	A/R
11B	38052462-1001	SEMICOND DIODE TBAX 1N5246B	A/R
13	31230037-1001	CONN EDGE 22POSN 2-ROW MDM	4
14	31230011-1001	CONN EDGE 10POSN 2-ROW MDM	1
15	39030018-1001	FUSE GL .25DIA .5A 250V 1.25L	2
16	41101926-1001	RES CARBON 100 OHM 1/4W 10%	3
17	41472926-1001	RES CARBON 4.7K OHM 1/4W 10%	1
18	41103926-1001	RES CARBON 10K OHM 1/4W 10%	4
19	41331026-1001	RES CARBON 330 OHM 2W 10%	2
20	31350003-2001	CLIP FUSE W/EAR PC MTG .25DIA	4
21	38244420-1001	SEMICOND THYR PWR 2N4442	3
22	38200300-1001	SEMICOND XSTR PNP W/MICA TIP30	1
23	38200290-1001	SEMICOND XSTR NPN TIP29	1
25	30050000-0001	COMPOUND THRM CONDCT SILICONE	A/R
27	39690010-2005	STRAP CABLE ADJ LKG 2.0BDL	2
28	35000004-2005	WSHR SHOULDER #4X.187L NYL	2
29	34517145-2001	SCR PNH REC 4-40X.44L SST	4
30	34517105-2001	SCR PNH REC 4-40X.31L SST	2
31	34815005-2001	WSHR LOCK INTL TOOTH #4 SST	20
32	34912005-2001	WSHR FLAT #4X.00 OD SST	2
33	34712005-2001	NUT HEX 4-40 X MDM THK SST	20
34	30000000-0001	VARNISH INSULATING RED	A/R
35	39690200-0009	TUBING PLSTC 9AWG ID NAT	A/R
36	34517165-2001	SCR PNH REC 4-40X.50L SST	10
37	30070000-0001	SOLDER 60/40 .0320 WIRE	A/R
38	63060121-2001	BAR STIFFENER	1
39	34517285-2001	SCR PNH REC 4-40X.87L SST	4
40	34000019-2001	WSHR FLAT #6X.375 OD FIBRE	4
42	35203090-1001	IC VOLTAGE REGULATOR 309	1
42A	35207800-1001	IC VOLTAGE REGULATOR 7805	A/R
43	62000111-3001	WARNING DECAL FUSE RATING	1
44	31240456-2002	KEY PLZ BETW CONTACT	4
45	21104000-1001	CAP CER DISC .1UF 25V 20%	1
49	35070002-2004	PAD XSTR MTG TO-3 .002THK	1
REF	63060010-9001	PC BD DD CONN BD 306	A/R



REVISIONS				
LTR	DASH NO.	DESCRIPTION	DATE	APPROVED
-	4008	REVISED PER ECO 73002762 (CLEARANCE ONLY)	6-3-75	MF JA
-1	4001 THRU 4012	REVISED PER ECO 73002778	6-18-75	MF JA

REVISION LEVEL OF DASH NO'S			
DASH NO.	REVISION LEVEL	REMARKS	
4001	-1	500HR	100 SERIES PRINTER GEN. USE
4002	-1	1000HR	
4003	-1	2000HR	
4004	-1	500HR	303/503 PRINTER
4005	-1	1000HR	
4006	-1	2000HR	300/500 PRINTER
4007	-1	500HR	
4008	-1	1000HR	
4009	-1	2000HR	102A/102AL/122AL PRINTERS
4010	-1	500HR	
4011	-1	1000HR	
4012	-1	2000HR	

— REFERENCE DRAWINGS —  
 1. SCHEMATIC DIAGRAM — 63002641  
 2. ARTWORK MASTER — 63001084

- CUT BLACK & RED WIRES FROM ETI-1 1.25 IN LONG. STRIP .12 IN AND TIN USING ITEM 8. TERMINATE AT "E" POINTS SHOWN ON FIELD OF DWG.
- FOR 4004 THRU 4009, CUT ITEM 7/20, 10.00 IN LONG. STRIP .25 IN.
- FOR 4001, 4002, 4003, 4010, 4011, 4012, CUT ITEM 7/20, 8.00 IN LONG. STRIP .25 IN.
- CAUTION: ETI. IS HIGHLY SENSITIVE HANDLE WITH CARE, PERMANENTLY MARK ITEM 1 WITH ASSY REVISION LETTER AND BOARD CONFIGURATION NUMBER APPROXIMATELY AS SHOWN.

NOTES:

UNLESS OTHERWISE SPECIFIED ....	APPLICATION	USED ON
303/503		
501/504		
308/500		
63002645	301/306	
	102AL/122AL	
	101AL/102A	
63002644	101/101A	

<b>PRODUCTION</b> CHANGE BY ECO ONLY	THE INFORMATION CONTAINED HEREIN IS PROPRIETARY AND IS NOT TO BE RELEASED OR REPRODUCED WITHOUT WRITTEN PERMISSION OF CENTRONICS data computer corp.
<b>APPROVAL</b>	<b>CENTRONICS</b> data computer corp. HUDSON, NEW HAMPSHIRE U.S.A.
OWN: <i>[Signature]</i> DATE: <i>[Date]</i>	TITLE: PC BOARD ASSY, ELAPSED TIME INDICATOR
CHK: <i>[Signature]</i> DATE: <i>[Date]</i>	SCALE: 2/1
CH DR: <i>[Signature]</i> DATE: <i>[Date]</i>	NUMBER: 63002640
DES: <i>[Signature]</i> DATE: <i>[Date]</i>	SHEET: 1 OF 1
APP: <i>[Signature]</i> DATE: <i>[Date]</i>	DO NOT SCALE PRINT
PROJ: <i>[Signature]</i> DATE: <i>[Date]</i>	

Figure 7-15. PC BOARD ASSEMBLY, ELAPSED TIME INDICATOR (OPTION)

LIST OF MATERIALS  
PC BOARD ASSEMBLY  
ELAPSED TIME INDICATOR  
(Ref: Ass'y No. 63002640)

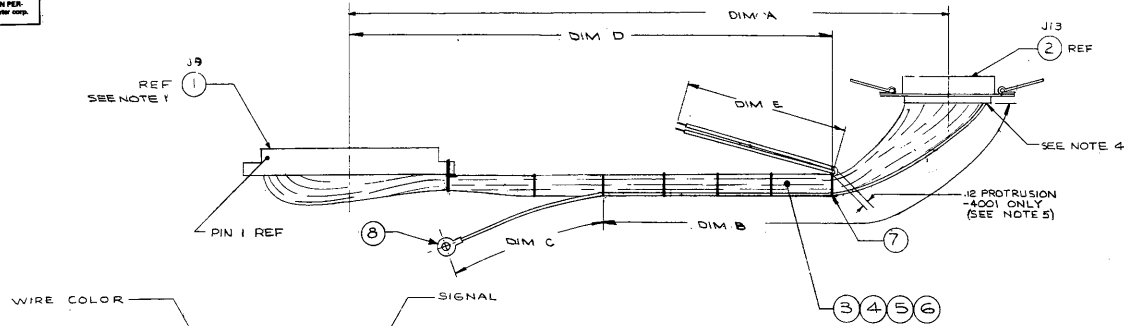
NO. 63002640-4007 (500 HR) CONFIGURATION, REV. -1

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	63001084-2001	PC BD AW ETI GEN USE	1
3	63002642-2001	BRKT ETI BD 300/500 SERIES	1
4	33453421-2001	RIVET DOME HD MDRL .12D X.232L	2
7	39648505-0004-2	WIRE TYPE B 26AWG RED	A/R
8	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
10	35811200-1001	INDICATOR ET 500HR ADH MTG	1
13	38052311-1001	SEMICON D DIODE TBAX 1N5231A	1
14	41222946-1001	RES CARBON 2.2K OHM 1/2W 10%	1
17	41754925-1001	RES CARBON 750K OHM 1/4W 5%	1
20	39648505-0004-0	WIRE TYPE B 26AWG BLACK	A/R
REF	63001085-9001	PC BD DD ETI GEN USE	A/R
REF	63002641-9001	SCHEM DIAG ETI GEN USE	A/R

NO. 63002640-4008 (1000 HR) CONFIGURATION, REV. -1.

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	63001084-2001	PC BD AW ETI GEN USE	1
3	63002642-2001	BRKT ETI BD 300/500 SERIES	1
4	33453421-2001	RIVET DOME HD MDRL .12D X.232L	2
7	39648505-0004-2	WIRE TYPE B 26AWG RED	A/R
8	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
11	35811200-1002	INDICATOR ET 1000HR ADH MTG	1
13	38052311-1001	SEMICON D DIODE TBAX 1N5231A	1
14	41222946-1001	RES CARBON 2.2K OHM 1/2W 10%	1
16	41564926-1001	RES CARBON 560K OHM 1/4W 10%	1
18	41105926-1001	RES CARBON 1MEG OHM 1/4W 10%	1
20	39648505-0004-0	WIRE TYPE B 26AWG BLACK	A/R
REF	63001085-9001	PC BD DD ETI GEN USE	A/R
REF	63002641-9001	SCHEM DIAG ETI GEN USE	A/R

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REVISIONS			
LTR	DASH NO.	DESCRIPTION	DATE APPROVED
E	4001	REPLACED REV D WITH CHANGE PER ECO 73060170	6-17-75 MF
E	4002	REVISED PER ECO 73500017	7-14-76 MS
F	4003	ADDED PER ECO 73500017	MS
E	4003	REVISED PER ECO 73060239	7-27-76 MS
A	4004		MS

WIRE COLOR	SIGNAL
YEL	LD
BLK	±0V
RED	LINE PULSE CNT (1-2 ONLY)
BLK	LOW FREQ OSC (-2 AND 4 ONLY)
RED	BUSY
WHT	BUSY RETURN
WHT	SPEAKER (-2 ONLY)
WHT	LINE PULSE CNT RETN (3 ONLY)
BLK	SPEAKER RET (-2 AND 4 ONLY)
YEL	SLCT
YEL	OSCXT
BLK	SS±0V
YEL	PE
RED	INPUT PRIME
WHT	INPUT PRIME RET
YEL	FAULT
RED	DATA 6
WHT	DATA 6 RET

RED	DATA 8
WHT	DATA 8 RETURN
YEL	±5V
BLK	CHASSIS GRD
RED	DATA 5
WHT	DATA 5 RETURN
RED	DATA 2
WHT	DATA 2 RETURN
RED	DATA 3
WHT	DATA 3 RETURN
RED	DATA 1
WHT	DATA 1 RETURN
RED	DATA 7
WHT	DATA 7 RETURN
RED	DATA 4
WHT	DATA 4 RETURN
RED	DATA STROBE
WHT	DATA STROBE RET.
RED	ACKNLG
WHT	ACKNLG RETURN

DASH NO.	DIM A	DIM B	DIM C	DIM D	DIM E	USAGE
-4001	9.00	3.00	4.00	—	—	306
-4002	9.00	3.00	4.00	7.00	4.00	101AL
-4003	13.50	3.00	5.00	—	—	500
-4004	24.00	3.00	6.00	—	—	500D

DASH NO.	REVISION LEVEL	REMARKS
4001	E	MODEL 306
4002	F	MODEL 101AL
4003	E	MODEL 500
4004	A	MODEL 500D

- CUT BOTH WIRES, SO THAT APPROXIMATELY .12 (REF) LENGTH IS PROTRUDING BEYOND THE TIE.
- INSTALL ITEM 10 ON EVERY OTHER PIN AND STAGGER BETWEEN ROWS ON ITEM 2.
- STRIP ALL LEADS .25 INCH ON BOTH ENDS AND TIN BEFORE ASSEMBLY.
- LEADS SHOWN WITH SYMBOL  $\frac{1}{2}$  SIGNIFY TWISTED PAIR.
- LOCATE KEY BETWEEN PINS 4 & 5

NOTES:

FOR LIST OF MATERIAL SEE LH 63060119

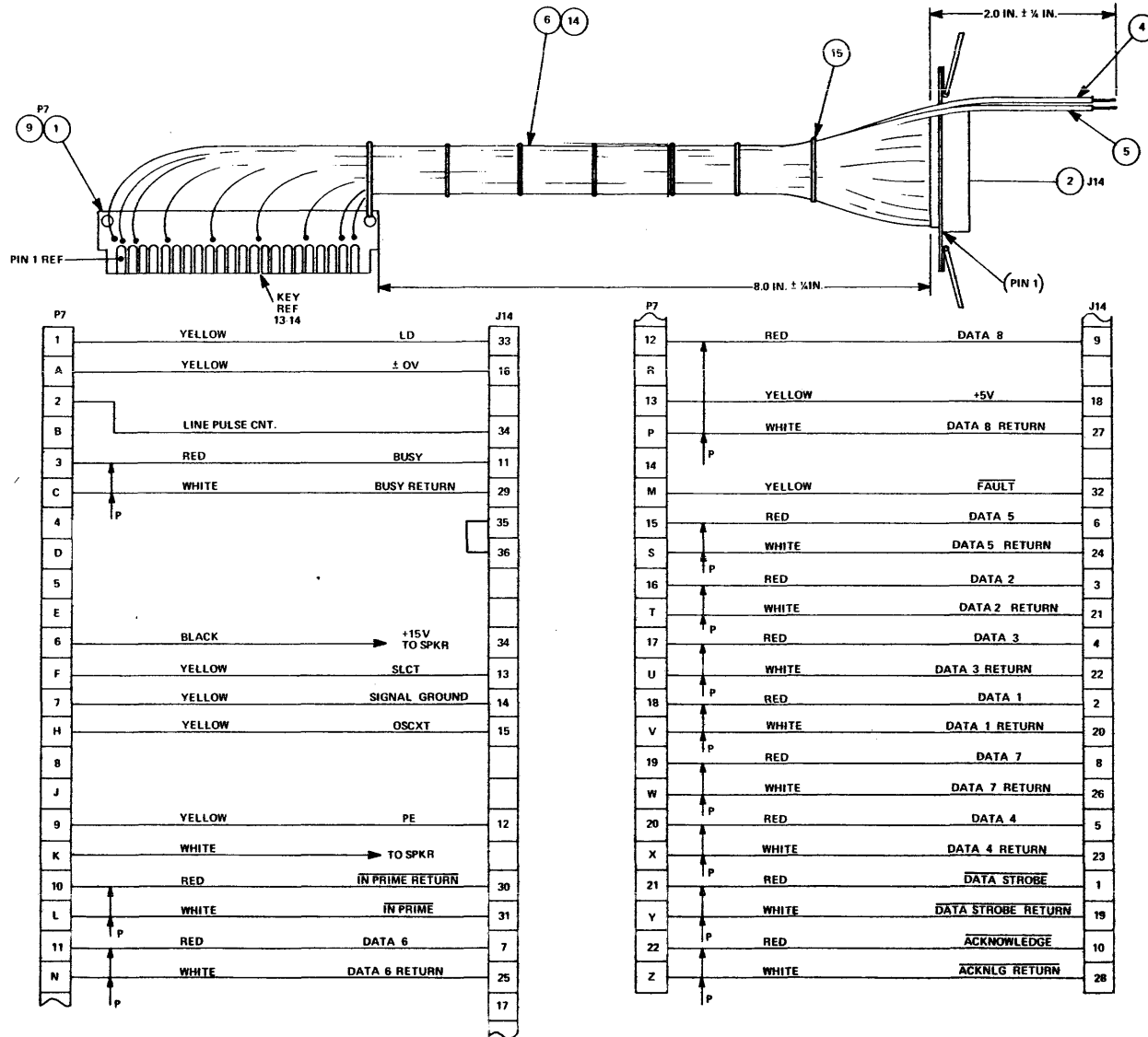
PRODUCT A  
DESIGNED BY 300 001

REV	DATE	UNLESS OTHERWISE SPECIFIED...	CENTRONICS data computer corp. HOLDEN VILLAGE, MASSACHUSETTS U.S.A.
1	3-14-75	1. DIMENSIONS IN INCH 2. DIMENSIONS IN MILLIMETERS 3. TOLERANCES UNLESS OTHERWISE SPECIFIED 4. FINISHES UNLESS OTHERWISE SPECIFIED	
2	3-15-75	MATERIAL	
3		APPROVAL	DATE

Figure 7-16. CABLE ASSEMBLY, DATA INPUT

LIST OF MATERIALS  
 CABLE ASSEMBLY, DATA INPUT CABLE  
 (Ref: Ass'y No. 63060119-4001, Rev. E)

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	31230038-1001	CONN EDGE 22POSN 2-ROW EYELET	1
2	31310019-1016	CONN RCPT PNL 36POSN NON-PLZ	1
3	39648505-0004-2	WIRE TYPE B 26AWG RED	9.8
4	39648505-0004-9	WIRE TYPE B 26AWG WHITE	10.3
5	39648505-0004-4	WIRE TYPE B 26AWG YELLOW	4.5
6	39648505-0004-0	WIRE TYPE B 26AWG BLACK	2.8
7	39690000-0001	TAPE LACING .06W X.01THK WHT	A/R
8	31460015-2003	TERM RING INSUL #8 26-22AWG	1
9	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
10	39690001-0004	SLEEVING SHRINK 50% .125ID BLK	A/R



CABLE ASSEMBLY (W2),  
COMPUTER INPUT (63002258-4003 REV. K)

1. LEADS SHOWN WITH SYMBOL  
SIGNIFY TWISTED PAIR.

NOTES:

Figure 7-17. CABLE ASSEMBLY, COMPUTER INPUT CABLE (W2)



**LIST OF MATERIALS**  
**CABLE ASSEMBLY, COMPUTER INPUT CABLE (W2)**  
(Ref.: Ass'y No. 63002258-4003, Rev. K)

ITEM	PART NO.	NOMENCLATURE	QTY PER
1	63001024-2001	PC BD AW PARALLEL TIMER FIN BD	1
2	31310019-1016	CONN RCPT PNL 36POSN NON-PLZ	1
4	39648505-0004-0	WIRE TYPE B 26AWG BLACK	2.1
5	39648505-0004-9	WIRE TYPE B 26AWG WHITE	2
6	39648505-0004-4	WIRE TYPE B 26AWG YELLOW	7.7
9	30070000-0001	SOLDER 60/40 .032D WIRE	A/R
14	39660015-0001	CABLE ITW PR 26AWG	10.1
15	39695231-2001	STRAP CABLE ADJ LKG .625BDL	6
REF	63001025-9001	PC BD DD PARALLEL TIMER FIN BD	

## SECTION 8

### DRAWINGS AND PARTS LISTS, MECHANICAL

This section contains drawings and parts lists for the major mechanical assemblies in the Model 306 printer. Two revision levels are shown on each mechanical drawing and parts list page:

1. The page revision level, located in the lower outside corner of any page, indicates at what revision of the manual that particular page was changed.
2. The revision level of the drawing and the parts list is located in the upper right-hand corner of the artwork. This revision method will start at AA and be updated on both the drawing and parts list whenever there is a change affected.

The reference number attached to each mechanical drawing and parts list is shown in the following example:

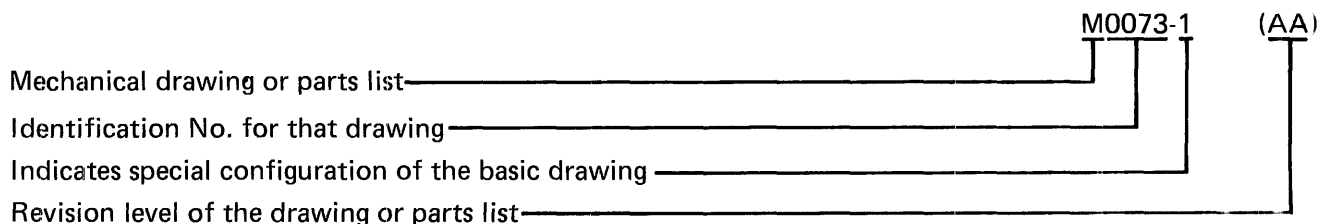


Figure	Reference Designation	Description
8-i	---	Location of Model 306 Subassemblies
8-1	AA	Carriage
8-2	AB	Platen
8-3	AC	Paper Pan
8-4	AD	Driving Mechanism (1)
8-5	AE	Driving Mechanism (2) (Preload Clutch)
8-6	AF	Idler Pulley
8-7	AG	Reed Switch
8-8	AH	Base
8-9	AI	Frame
8-10	AJ	Paper Feed
8-11	AK	Pin Feed
8-12	AL	Ribbon Feed (Part 1 of 2)
8-13	AL	Ribbon Feed (Part 2 of 2)
8-14	AM	Cover
8-15	AN	Operator Panel
8-16	AO	Electrical Components (1)
8-17	AP	Electrical Components (2)
8-18	AQ	Electrical Components (3)
8-19	---	Print Head and Associated Assemblies
8-20	---	Tape Reader Assembly (Option)



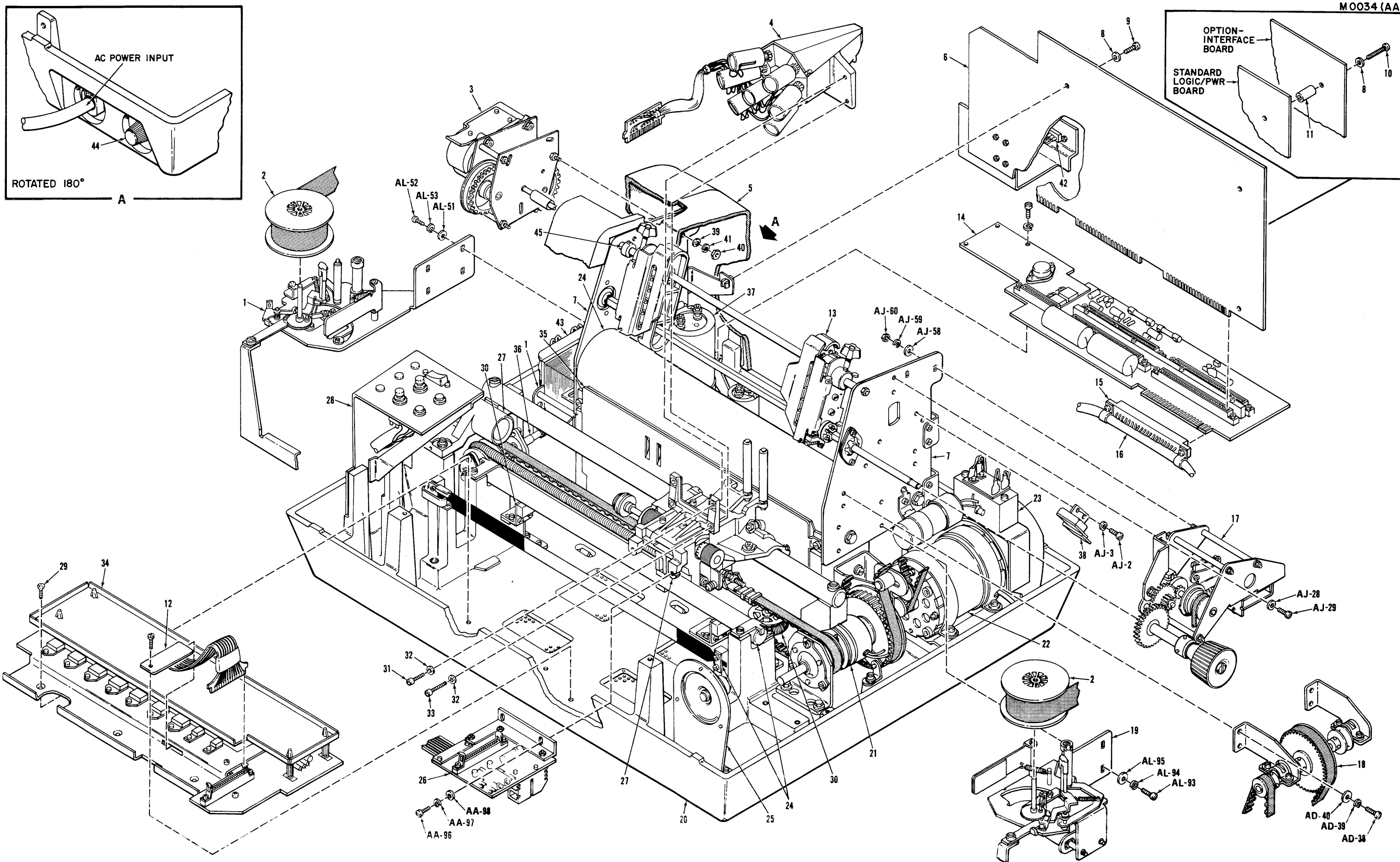


Figure 8-i. MODEL 306 SUBASSEMBLIES

Figure 8-i. MODEL 306 SUBASSEMBLIES

Key No.	FIGURE	DESCRIPTION
1	8-12	Ribbon Feed - AL (Part 1 of 2)
2	8-12	Twin Spool with Ribbon - AL-113 (See warranty note affecting non-qualified ribbons)
3	8-20	Vertical Format Unit (Option)
4	8-19	Head Ass'y
5	8-14	Cover - AM
6	7-10	Logic/Power Supply Ass'y 63060416-4001
7	8-9	Frame -AI
8	8-9	Frame -(AI-39)
9	8-9	Frame - (AI-38)
10	8-9	Frame - (AI-41)
11	8-9	Frame - (AI-40)
12	8-19	See Item 13
13	8-11	Pin Feed - AK
14	7-14	Connector Board 63060109
15	7-9	Main Harness Connector, (J8) - See also Fig. 8-18
16	8-18	Main Harness 526783001 (AQ-1)
17	8-10	Paper Feed - AJ
18	8-4	Driving Mechanism (Part 1 of 2) - AD
19	8-12	Ribbon Feed (Part 1 of 2) -AL
20	8-8	Base - AH
21	8-5	Driving Mechanism - AE (part 2)
22	8-4	Driving Mechanism (Part 1 of 2) - AD
23	5-25	Motor Control Unit (Option)
24	8-2	Platen -AB
25	8-8	Speaker (Option) - AH
26	7-13	Video Amplifier Ass'y 63060330 (See also Fig. 8-19, item 16)
27	8-1	Carriage - AA
28	8-15	Operator Panel - AN
29	8-8	Base - (AH-12)
30	8-7	Reed Switch - AG
31	8-19	Print Head and Associated Assemblies, item 16
32	8-19	Print Head and Associated Assemblies, Item 17
33	8-19	Print Head and Associated Assemblies, item 18
34	7-12	Power Driver Board Assembly 63060105 (See also Fig. 8-19)
35	8-3	Paper Pan - AC
36	8-6	Idler Pulley - AF
37	8-17	Electrical Components - (AP)
38	8-10	Paper Feed (AJ-1)
39	8-20	Vertical Format Unit (VFU - Option) (Kit Item 5)
40	8-20	Vertical Format Unit (VFU - Option) (Kit Item 8)
41	8-20	Vertical Format Unit (VFU - Option) (Kit Item 6)
42	7-16	Cable Ass'y Data Input
43	8-16	Multitap Transformer Unit (AD)
44	8-16	In-Line Fuse, 3-Amp, Slo-Blo (AO), See item 42
45	8-20	Refer to Kit, Drive Shaft, VFU of Parts List

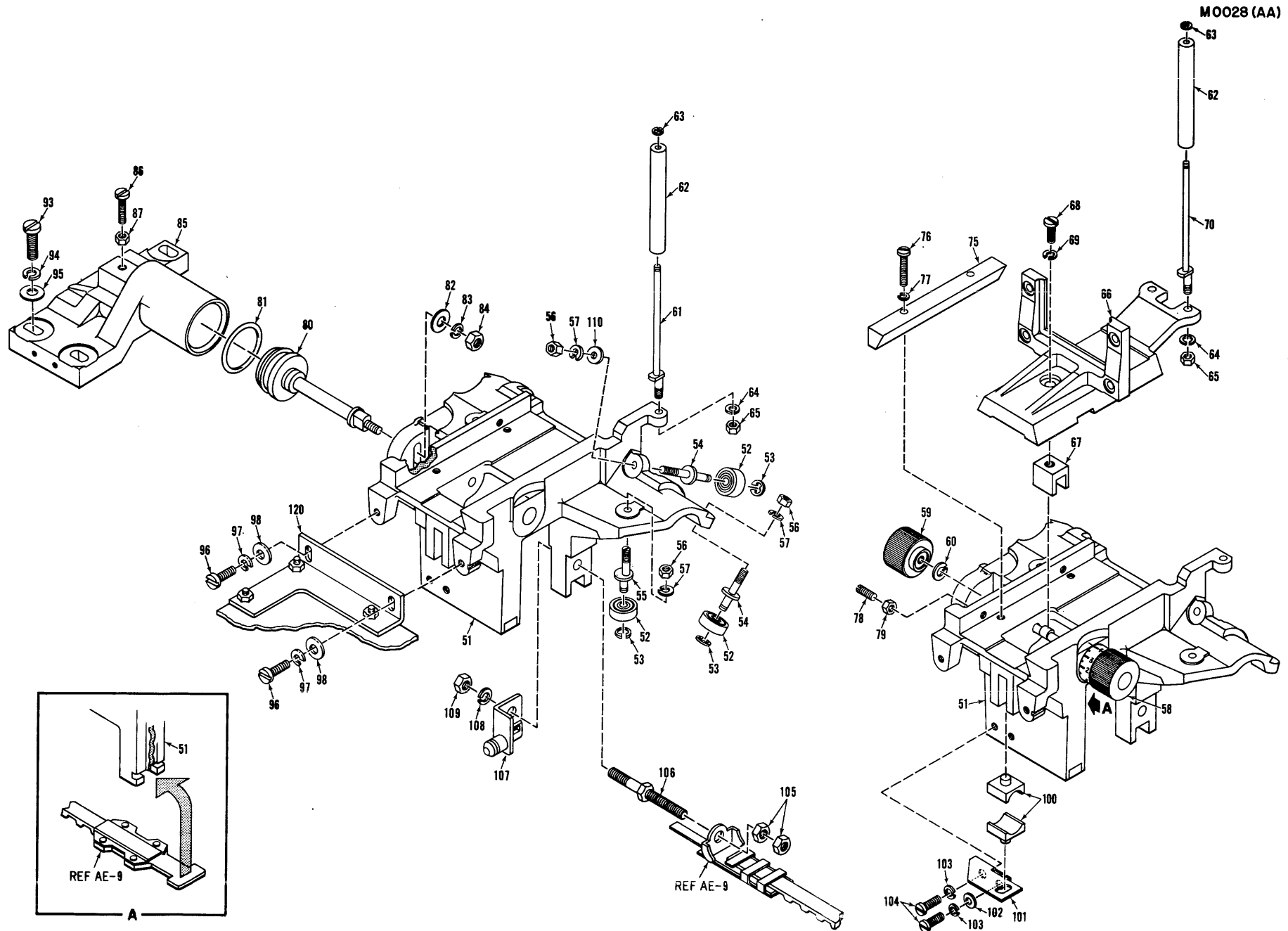


Figure 8-1. CARRIAGE - AA

## Figure AA CARRIAGE

Reference Number	Part Number	Part Name	Quantity	Reference Number	Part Number	Part Name	Quantity
AA-0	526872001	Carriage Unit	1	AA-78	011401015	Screw for AA-75	2
		Note: This unit is assembled with Parts covering from reference number AA-51 through AA-65.		AA-79	021400105	Nut for AA-78	2
				AA-80	527575001	Piston unit	1
AA-00	526871001	Carriage, complete unit	1	AA-81	527747001	O-ring for AA-80	1
		Note: This unit is assembled with parts covering from reference number AA-0 through AA-79 and AA-101 through AA-109, except AA-105.		AA-82	025050235	Washer for AA-80	1
				AA-83	028050247	Spring washer for AA-80	1
				AA-84	021500105	Nut for AA-80	1
AA-51	526873001	Carriage	1	AA-85	527571000	Damper cylinder, Return	1
AA-52	527242001	Roller	6	AA-86	007401415	Screw for AA-85	1
AA-53	048030345	Snap ring	6	AA-87	021400105	Nut for AA-86	1
AA-54	526875001	Axle for AA-52	4	AA-93	007501815	Screw for AA-85	3
AA-55	526876001	Eccentric Axle for AA-52	2	AA-94	025050235	Washer for AA-93	3
AA-56	021400105	Nut for AA-54, 55	6	AA-95	028050247	Spring washer for AA-93	3
AA-57	028040247	Spring washer for AA-54, 55	6	AA-96	007400815	Screw for video amp. bracket	2
AA-58	525544001	Head adjusting knob	1	AA-97	028040247	Spring washer for AA-96	2
AA-59	525025001	Head lock knob	1	AA-98	025040235	Washer for AA-96	2
AA-60	028040247	Spring washer for AA-59	1	AA-100	529564001	Retainer	2
AA-61	526877001	Carriage ribbon guide axle	1	AA-101	526936001	Retainer holder	1
AA-62	526878000	Ribbon guide roller	2	AA-102	025040235	Washer for AA-101	1
AA-63	048020345	Snap ring for AA-61, AA-70	2	AA-103	028040247	Spring washer for AA-104	2
AA-64	028040247	Spring washer for AA-61, AA-70	2	AA-104	007400715	Screw for AA-101	2
AA-65	021400105	Nut for AA-61, AA-70	2	AA-105	021500105	Nut for AA-106	2
AA-66	529129001	Head bracket	1	AA-106	526879001	Belt tension axle	1
AA-67	525002001	Fork for head adjustment	1	AA-107	526880001	D.B. Guide plate	1
AA-68	007400715	Screw for AA-67	1	AA-108	028050247	Spring washer for AA-106	1
AA-69	028040247	Spring washer for AA-68	1	AA-109	021500105	Nut for AA-106	1
AA-70	526910001	Head ribbon guide axle	1	AA-110	025040136	Washer for AA-54	1
AA-75	525047000	Head bracket guide	1	120	63508104-2001	Reference item 2 part of Video Amp. 1	1
AA-76	007301415	Screw for AA-75	2			63060330 Section 7	
AA-77	028030243	Spring washer for AA-76	2				

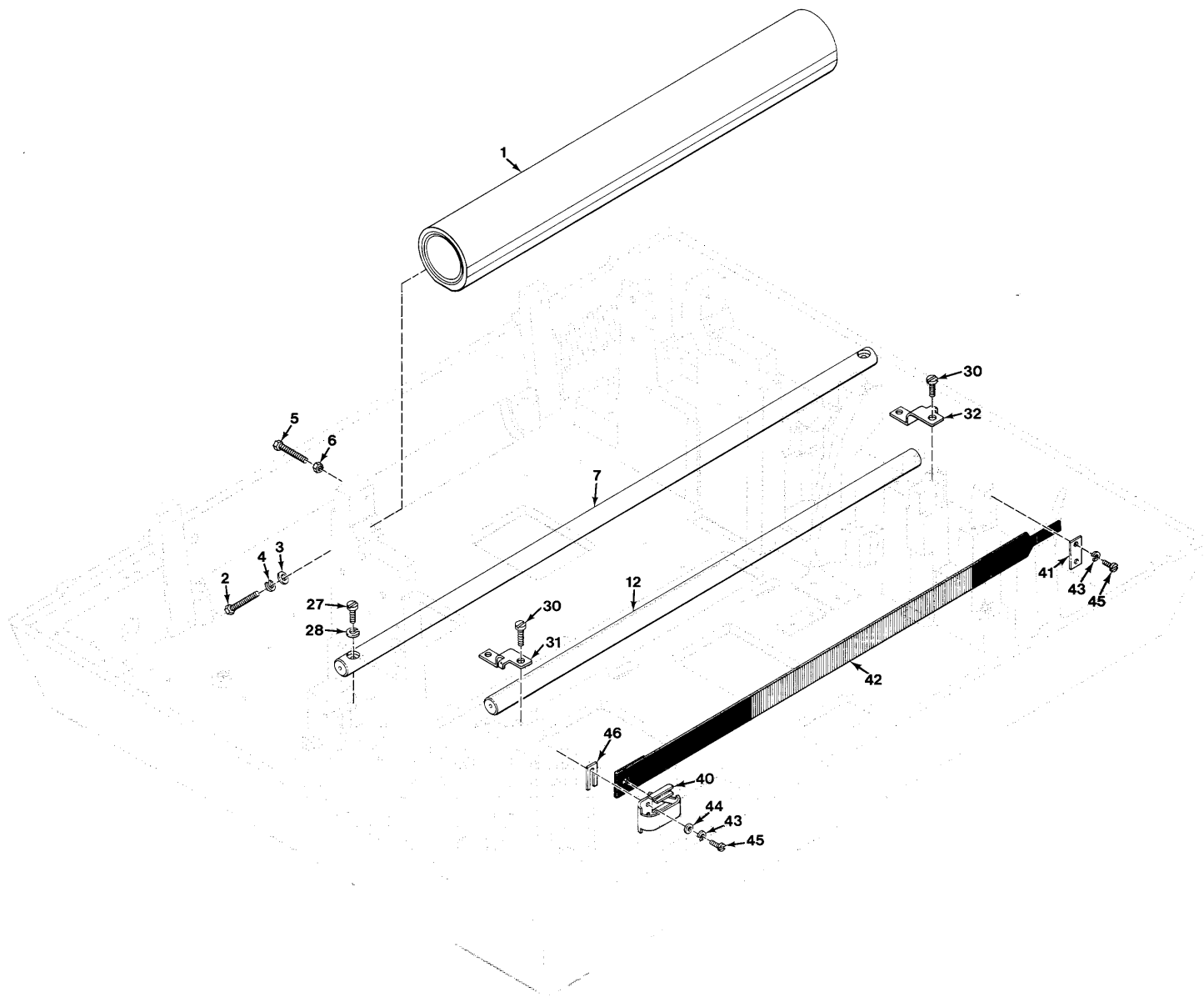


Figure 8-2. PLATEN – AB



**Figure AB PLATEN**

Reference Number	Part Number	Part Name	Quantity
AB-1	526722001	Platen	1
AB-2	017402216	Screw for AB-1	2
AB-3	025040236	Washer for AB-2	2
AB-4	028040247	Spring Washer for AB-2	2
AB-5	017402216	Screw for AB-1	2
AB-6	021400106	Nut for AB-5	2
AB-7	526919001	Guide bar for Carriage (Rear)	1
AB-12	526920001	Guide Bar for Carriage (Front)	1
AB-27	007502016	Screw for AB-7	2
AB-28	028050247	Spring Washer for AB-27	2
AB-30	007401016	Screw for 31, AB-32	4
AB-31	526960001	Guide Bar Set Plate (L)	1
AB-32	526961001	Guide Bar Set Plate (R)	1

M 0029 (AA)

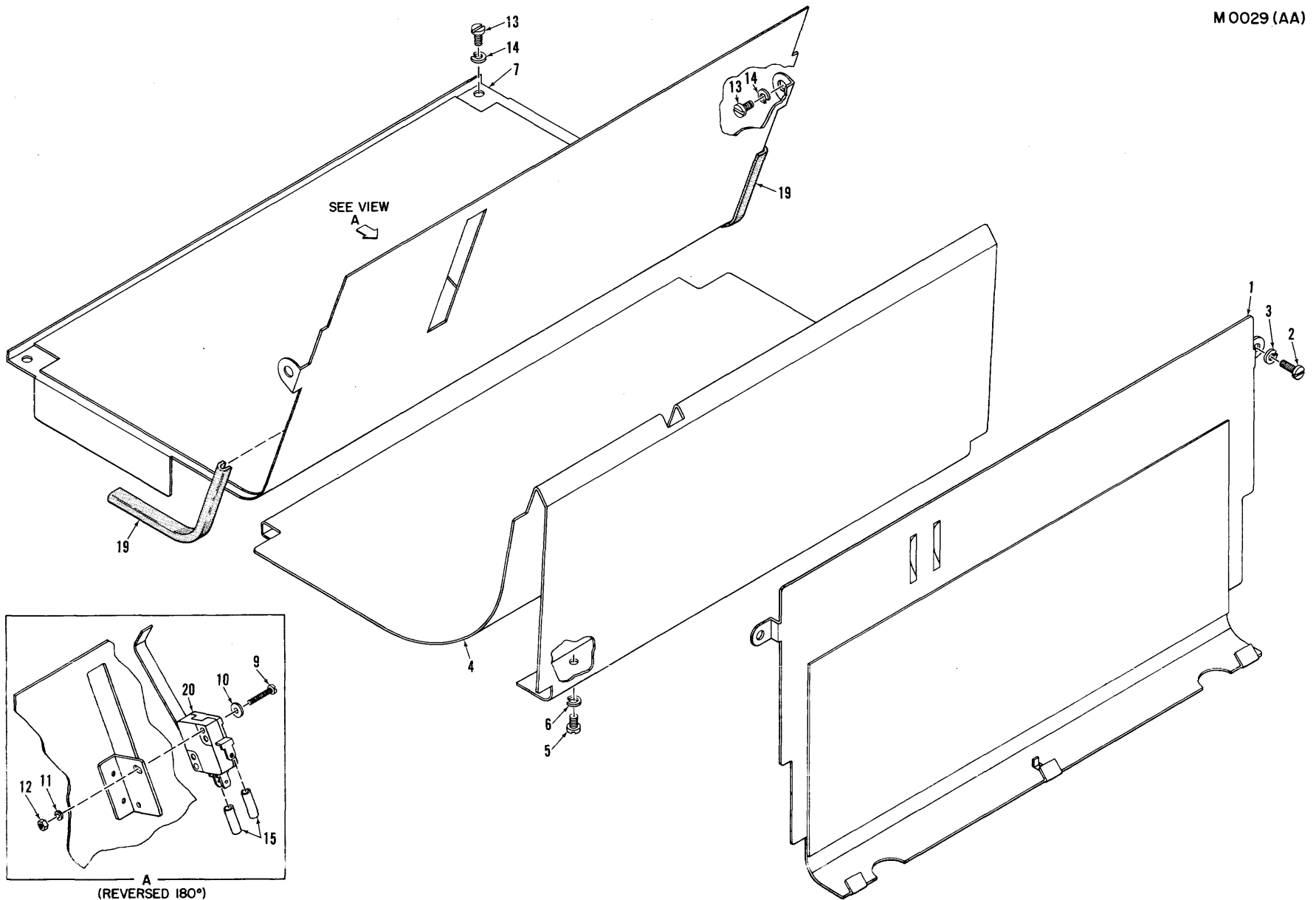


Figure 8-3. PAPER PAN - AC

8-9

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## Figure AC PAPER PAN

Reference Number	Part Number	Part Name	Quantity
AC-1	526520001	Paper Pan unit (front)W/Soundproofing	1
AC-2	007400715	Screw for AC-1	2
AC-3	028040247	Spring washer for AC-2	2
AC-4	526526001	Paper pan unit (center) W/Soundproofing	1
AC-5	007400715	Screw for AC-4	3
AC-6	028040247	Spring washer for AC-5	3
AC-7	526530001	Paper pan unit (rear) W/Soundproofing	1
AC-9	007021615	Screw for AC-8, M2 16mm, F Fil	2
AC-10	025630235	Flat Washer for AC-9, M2	2
AC-11	028020247	Spring washer for AC-9, M2	2
AC-12	021020105	Nut for AC-9	2
AC-13	007400715	Screw for AC-7	4
AC-14	028040247	Spring washer for AC-13	4
AC-15	525675001	Insulating tube	2
20	526676001-1001	Micro-switch unit (with actuator)	1

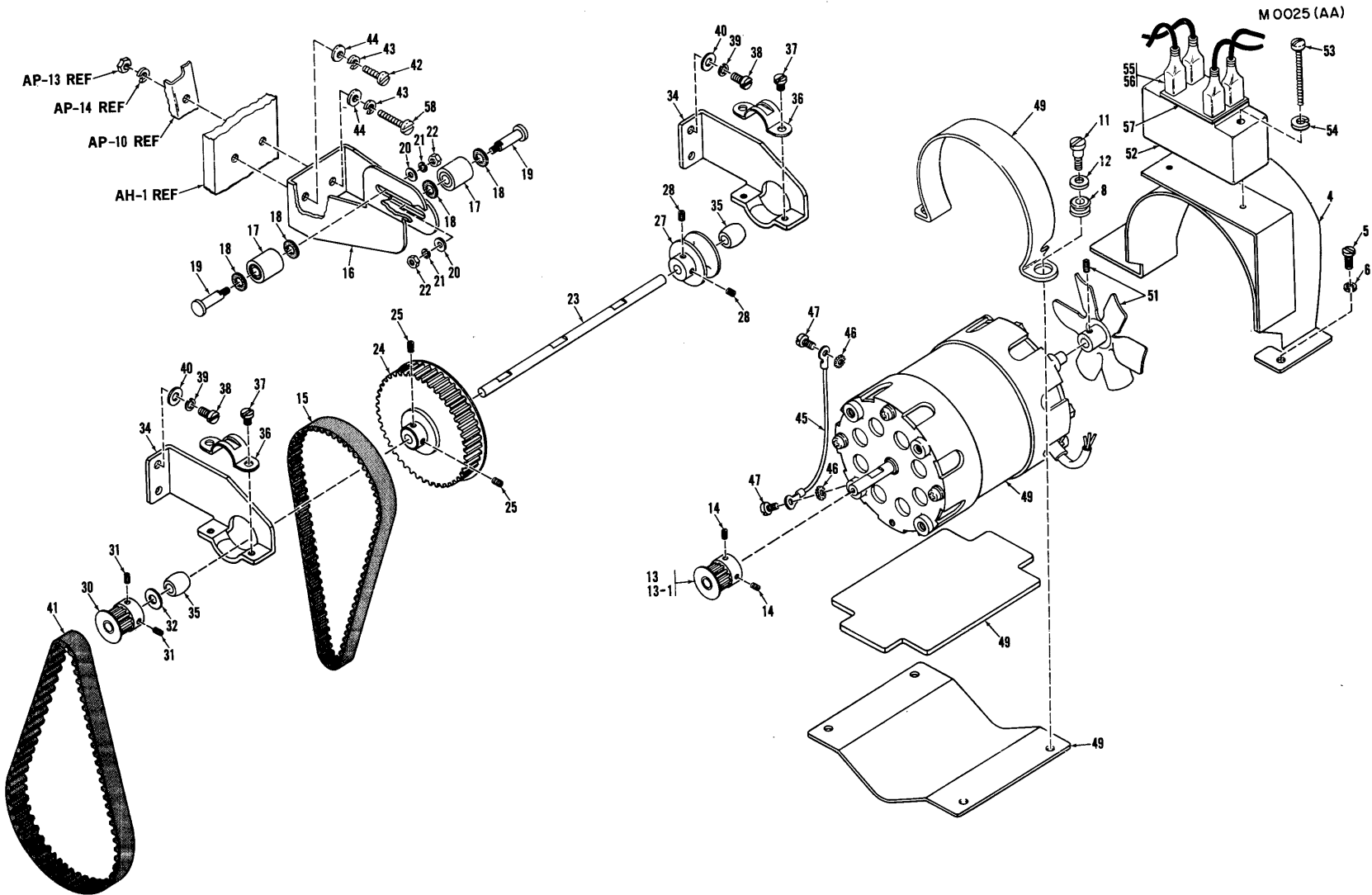


Figure 8-4. DRIVING MECHANISM (PART 1) – AD

## Figure AD DRIVING MECHANISM - PART 1

Reference Number	Part Number	Part Name	Quantity
AD-4	526778001	Motor Fan Cover	1
AD-5	007400716	Screw for AD-4	1
AD-6	028040247	Spring Washer for AD-5	1
AD-8	510101001	Grommet for AD-7	4
AD-11	526645001	Screw for AD-7	4
AD-12	510061001	Washer for AD-11	4
AD-13	526509001	Motor Pulley (60Hz)	1
AD-13-1	526508001	Motor Pulley (50 Hz) (Option)	1
AD-14	525744001	Screw for AD-13	2
AD-15	526746001	Timing Belt 140—L	1
AD-16	527890001-2001	Tensioner Bracket	1
AD-17	525703001	Tensioner (L)	2
AD-18	511146001-2001	Felt Washer	4
AD-19	526649001	Screw (L)	2
AD-20	025030133	Washer for AD-19	2
AD-21	028030247	Spring Washer for AD-19	2
AD-22	021300106	Nut for AD-19	2
AD-23	529409001-2001	Center Shaft	1
AD-24	526628001	Center Pulley	1
AD-25	525743001	Set-Screw for AD-24	6
AD-27	526926001	Driving Pulley	1
AD-28	525743001	Set-Screw for AD-27	6
AD-30	526509001	Motor Pulley	1
AD-31	525744001	Screw for AD-30	2
AD-32	526634001	Washer for AD-30	1
AD-34	526925001	Bracket for AD-23	2
AD-35	526681001	Retainer (B)	2
AD-36	526637001	Retainer Bracket	2
AD-37	007400415	Screw for AD-36	4
AD-38	007400815	Screw for AD-34	4
AD-39	028040247	Spring Washer for AD-38	4
AD-40	025040235	Washer for AD-38	4
AD-41	526747001	Timing Belt 150-L	1
AD-42	007401015	Screw for AD-16	2
AD-43	028040247	Spring Washer for AD-42	2
AD-44	025040235	Washer for AD-42	2
AD-45	515456001	Ground Wire for AD-1	1
AD-46	550719001	External Lock-Washer for AD-45	2
AD-47	007400515	Screw for AD-45	2
AD-49	526986001	Motor Set (110V 50/60 Hz) standard, includes mtg. set, also motor requires no P.M. - (Long life ball bearings).	1
AD-51	526994001	Main Motor Fan and Set-Screw, used for AD-49	1
	63060188-6001	Kit, motor control, 110 volts (24V-140V Relay) Note: This kit contains items 52 through 57.	1
AD-52	39072001-1001	Relay, Solid State (4.5-10V)	1
AD-53	34000031-2001	Screw, M3 P 0.5 x 30 mm lg, Pan/Slot Hd.	2
AD-54	34000456-2004	Washer, Lock, Spring	2
AD-55	31460009-2001	Clip, Receptacle	4
AD-56	35010001-2001	Boot, Terminal, Insulator	4
AD-57	63060135-2001	Board, Insulator	
AD-58	007401815-2001	Screw for AD-16 and AP-10	1

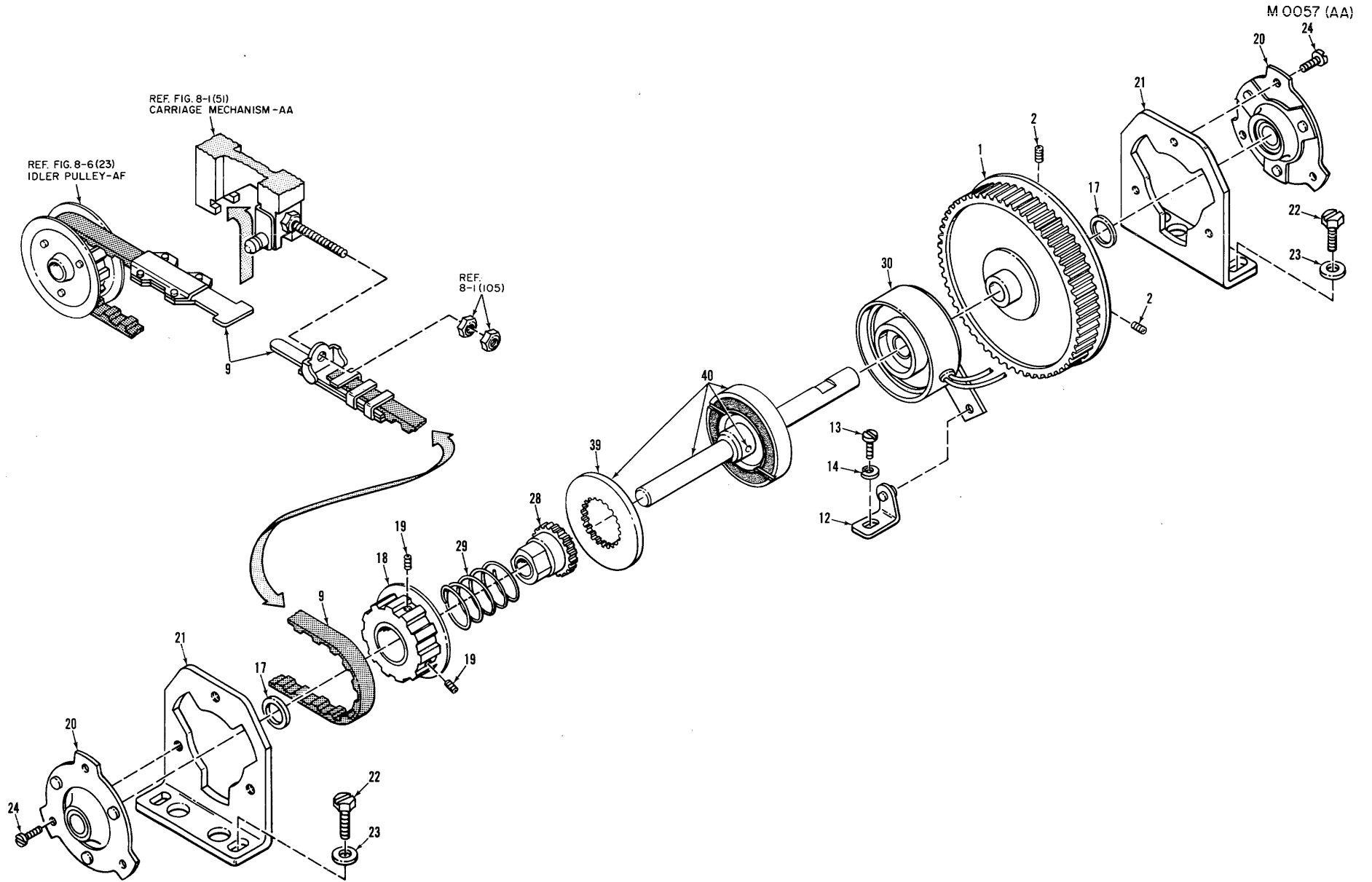


Figure 8-5. DRIVING MECHANISM (PART 2) - AE

## Figure AE DRIVING MECHANISM (2)

(This Parts List Applies to Preload Clutch Only)

Reference Number	Part Number	Part Name	Quantity
AE-1	526643001	Driving pulley	1
AE-2	525744001	Set-screw for AE-1	2
AE-9	526882001	Driving belt unit	1
AE-12	525631001	Clutch turning stopper (L)	1
AE-13	007400616	Screw for AE-12	1
AE-14	025040236	Washer for AE-13	1
AE-17	526943001	Spacer	2
AE-18	526950001	Drive Pulley (C)	1
AE-19	525743001	Set-screw for AE-18	2
AE-20	525092001	Bushing unit	2
AE-21	525090001	Bushing bracket	2
AE-22	525752001	Bolt for AE-21	4
AE-23	025060236	Washer for AE-22	4
AE-24	007400616	Screw for AE-20	6
AE-28	527681001	Hub	1
AE-29	527679001	Clutch spring	1
AE-30	526717001	Clutch field	1
AE-39	529566001-2001	Clutch armature (NON-GROOVE)	1
	529562001-5001	Preload Clutch, Complete	1
		Note: This unit is assembled with parts covering AE-28, 29, 30 and 40.	
AE-40	529563001-5001	Pre-Load rotor armature pin	1
		Note: This unit is assembled with parts covering grooved rotor , shaft, pin, clutch armature (AE-39) (non-groove)	
	529841001-6001	Kit, Pre-Load clutch, mechanical	1
		Note: This kit is assembled with items 28, 29, 40.	

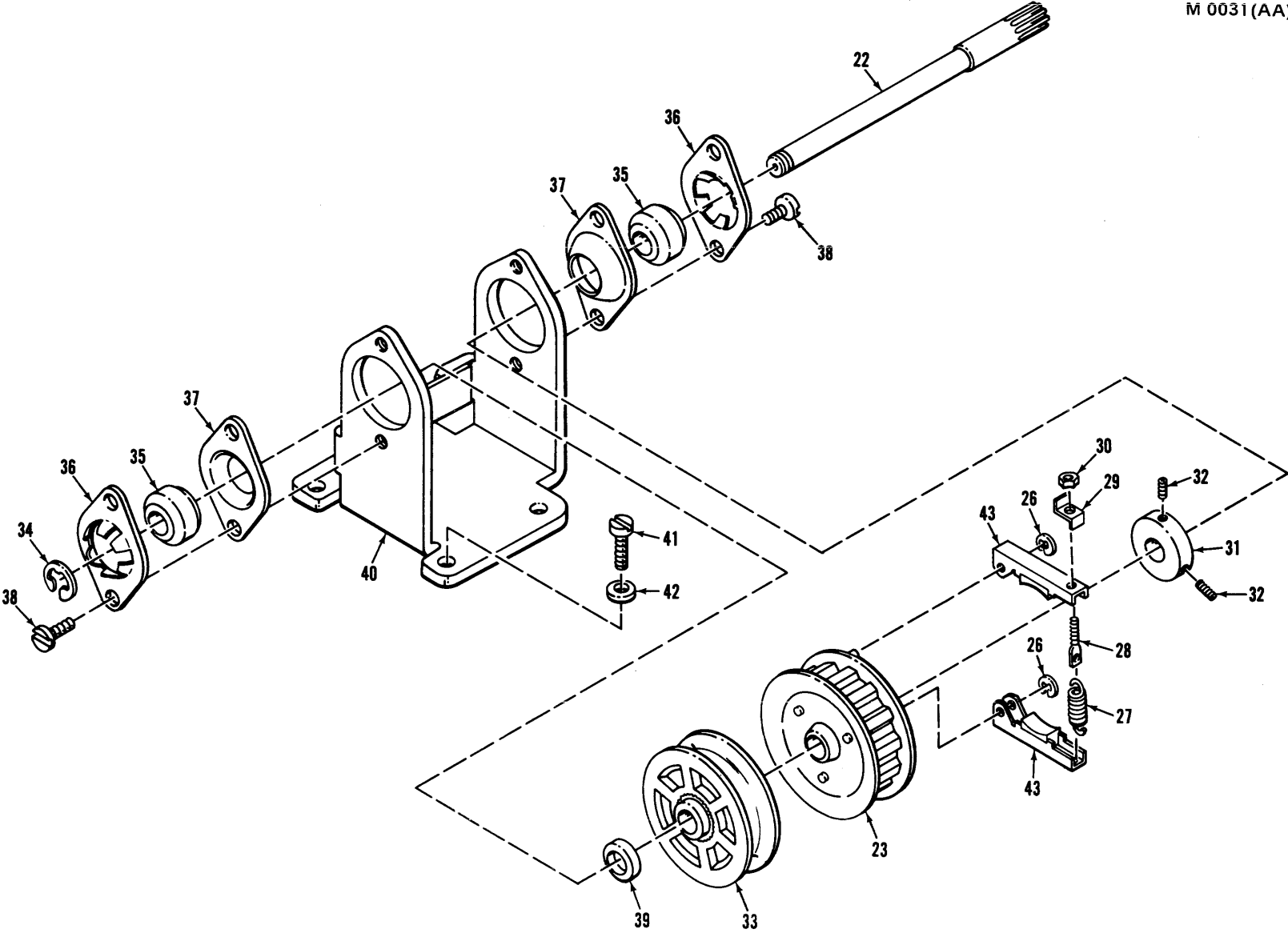


Figure 8-6. IDLER PULLEY – AF



## Figure AF IDLER PULLEY

Reference Number	Part Number	Part Name	Quantity
AF-21	527730001	Idler pulley assembly Note: This unit is assembled with parts covering from reference AF-22, 23 and 26 to AF-43.	1
AF-22	5277729001	Idler pulley shaft (pinion)	1
AF-23	527688001	Idler pulley	1
AF-26	048020346	Snap ring	2
AF-27	527701001	Spring for AF-43	1
AF-28	527702001	Threaded shaft for AF-26	1
AF-29	527703001	Nut holder	1
AF-30	021300113	Nut	1
AF-31	527704001	Friction sleeve	1
AF-32	525744001	Screw	2
AF-33	526655000	Return pulley	1
AF-34	048060346	Snap ring for AF-22	1
AF-35	526680001	Retainer (C)	2
AF-36	527981000	P.F. retainer	2
AF-37	525207001	Holder	2
AF-38	007400516	Screw	4
AF-39	526917001	Spacer	1
AF-40	526904001	Idler pulley holder	1
AF-41	007400816	Screw for AF-40	4
AF-42	028040247	Spring washer for AF-41	4
AF-43	529214001	Brake Shoe Holder (includes attached brake shoe)	2

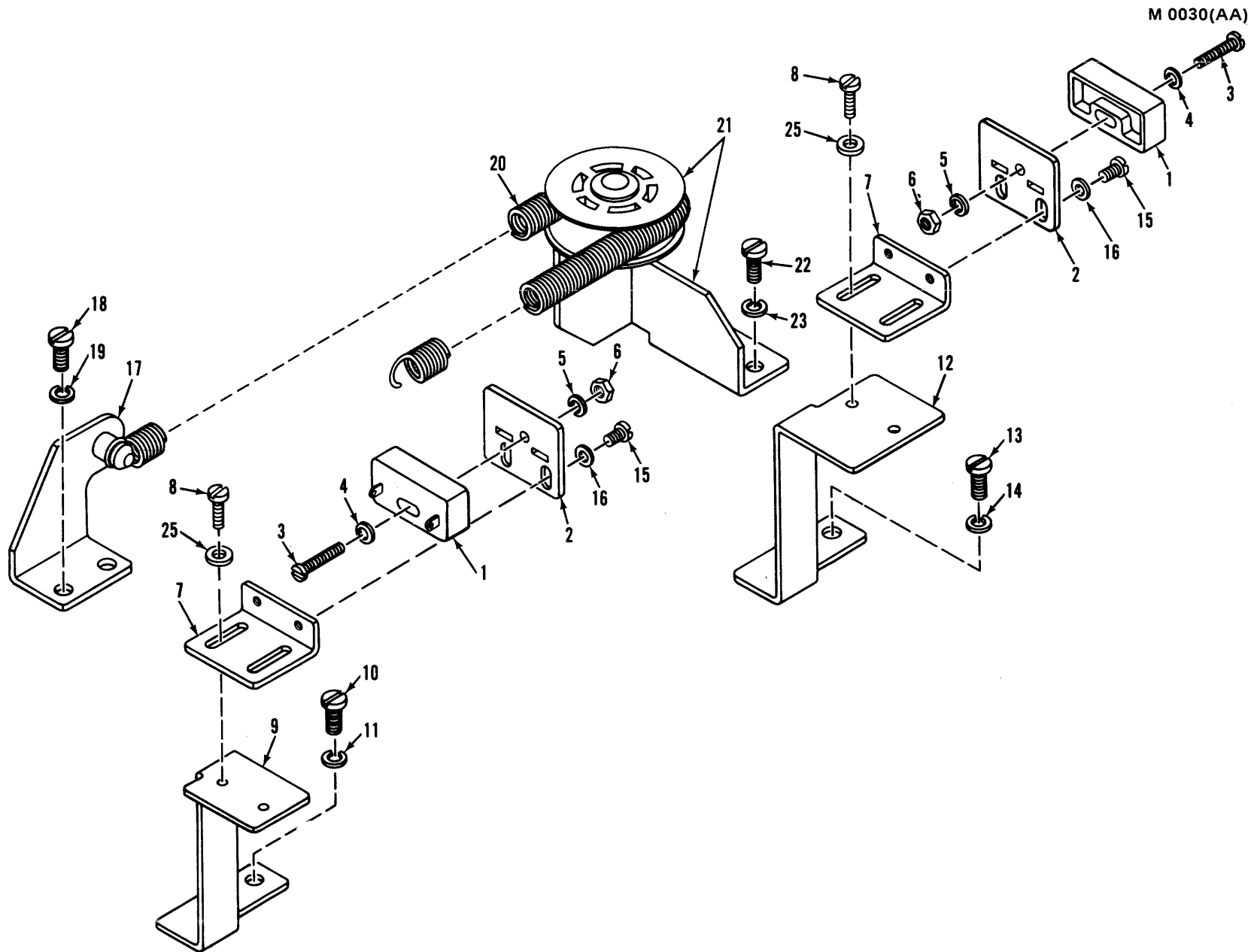


Figure 8-7 REED SWITCH – AG

## Figure AG REED SWITCH

Reference Number	Part Number	Part Name	Quantity
AG-1	525721001	Reed switch (Left and Right)	2
AG-2	525725001	Adjusting holder for AG-1	2
AG-3	001301403	Screw for AG-1	2
AG-4	025030133	Washer for AG-3	2
AG-5	028030247	Spring washer for AG-3	2
AG-6	021300106	Nut for AG-3	2
AG-7	525169001	Reed switch holder	2
AG-8	007300716	Screw for AG-7, 9	4
AG-9	526911001	Reed switch holder (L)	1
AG-10	007400816	Screw for AG-9	2
AG-11	028040247	Spring washer for AG-9	2
AG-12	526912001	Reed switch holder (R)	1
AG-13	007400816	Screw for AG-12	2
AG-14	028040247	Spring washer for AG-13	2
AG-15	007300516	Screw for AG-2, 7	4
AG-16	025030133	Washer for AG-15	4
AG-17	526756001	Return spring holder	1
AG-18	007400816	Screw for AG-17	2
AG-19	028040247	Spring washer for AG-18	2
AG-20	526663001	Spring (carriage return)	1
AG-21	526710001	Return idler and holder	1
AG-22	007400816	Screw for AG-21	2
AG-23	028040247	Spring washer for AG-22	2
AG-25	025030236	Washer for AG-8	4

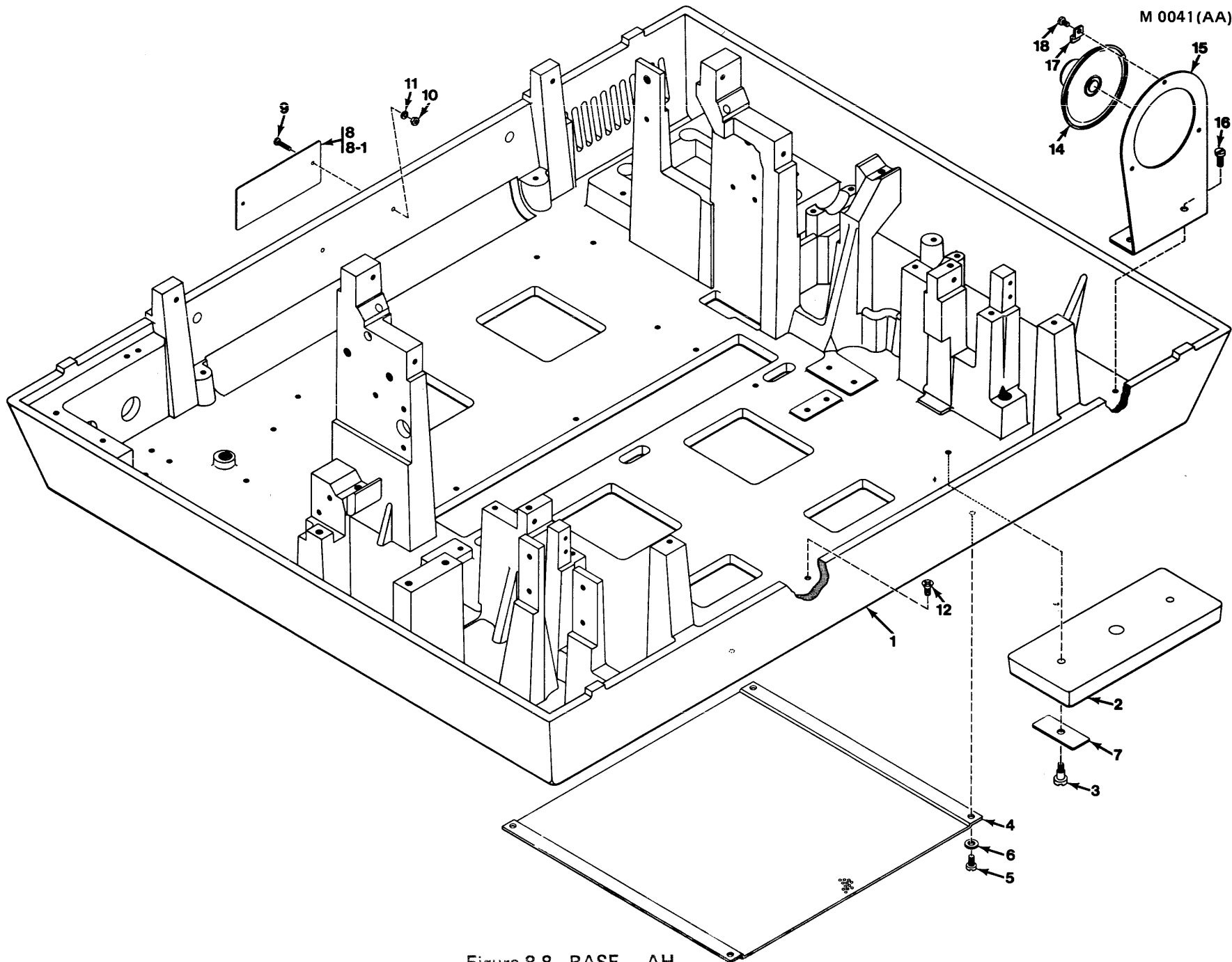


Figure 8-8. BASE - AH

## Figure AH BASE

Reference Number	Part Number	Part Name	Quantity
AH-1	526962001	Base	1
AH-2	526739001	Rubber Foot	4
AH-3	526740001	Screw for AH-2	8
AH-4	526753001	Bottom Plate	1
AH-5	007400816	Screw for AH-4	4
AH-6	025040236	Washer for AH-5	4
AH-7	526741001	Plate for AH-2	8
AH-8	526816001	Rating Plate 110V- 120V	1
AH-8-1	526954001	Rating Plate 220V- 240V	1
AH-9	001021014	Screw for AH-8, 8-1	2
AH-10	021020106	Nut for AH-8, 8-1	2
AH-11	028020247	Spring Washer	2
AH-12	004400816	Mtg Screw for Power Driver Board	3
	63060189-6001	63060105 (Refer to Fig. 8-19/12) Speaker Unit (Option) Kit	1
		Note: Assembled with reference No's AH-13 through AH-18.	
AH-13	526825001	Speaker and bracket ass'y	1
AH-14	526824001	Speaker	1
AH-15	526766001	Speaker Bracket	1
AH-16	007400816	Screw for AH-15	2
AH-17	526767001	Clamp for AH-14	3
AH-18	007300416	Screw for AH-17	3

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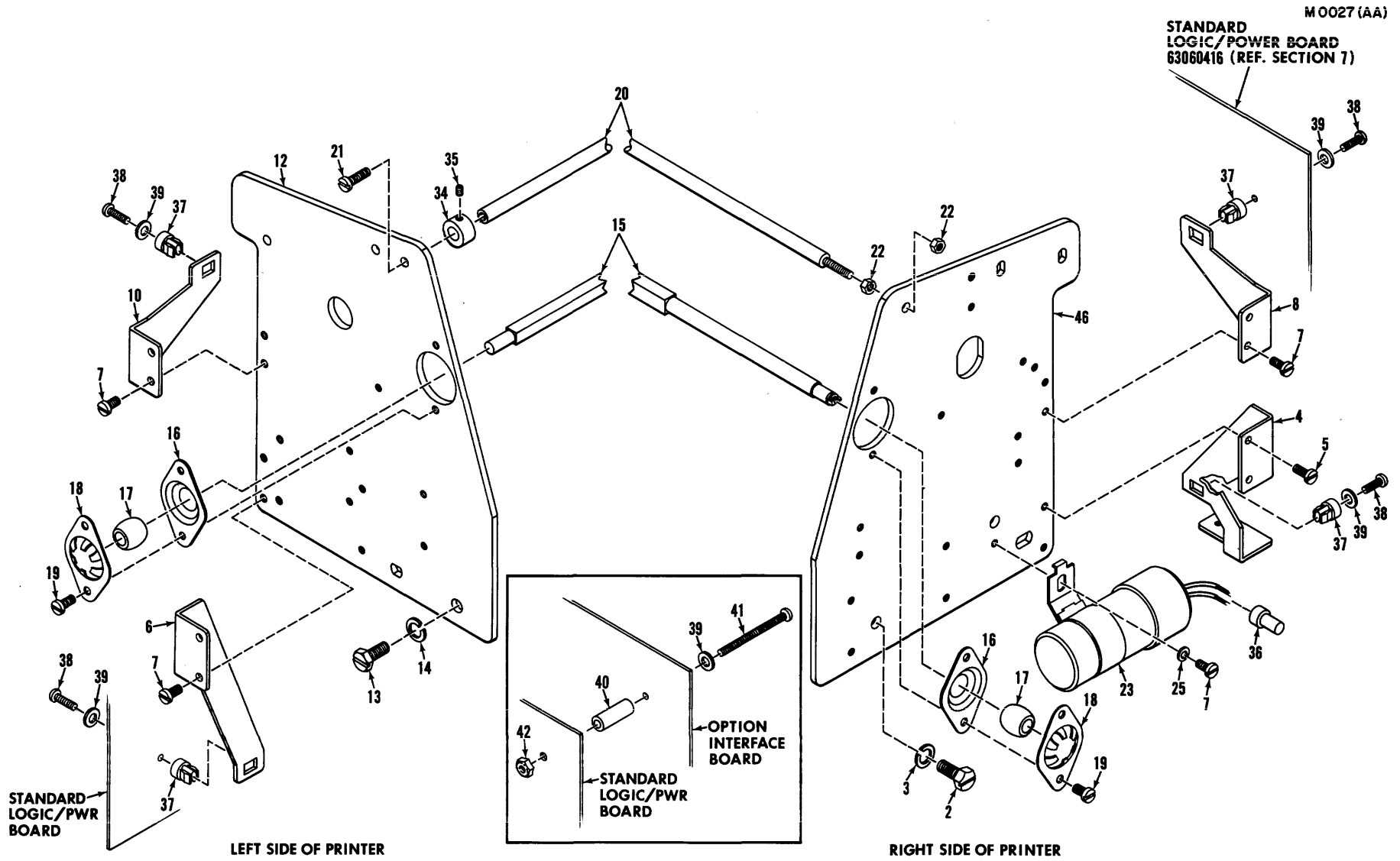


Figure 8-9. FRAME - AI

REV. H

Figure AI FRAME

Reference Number	Part Number	Part Name	Quantity
AI-2	525752001	Bolt for AI-1	2
AI-3	028060247	Spring Washer for AI-2	2
AI-4	526705001	PC Board Holder (RL)	1
AI-5	007400416	Screw for AI-4	2
AI-6	526706001	PC Board Holder (LL)	1
AI-7	007400816	Screw for AI-6, 8 10, 23	7
AI-8	526707001	PC Board Holder (RU)	1
AI-10	526708001	PC Board Holder (LU)	1
AI-12	526546001	Frame (L)	1
AI-13	525752001	Bolt for AI-12	2
AI-14	028060247	Spring Washer for AI-13	2
AI-15	526538001	Paper Feed Shaft	1
AI-16	525207001	Retainer Holder (A)	2
AI-17	525208001	Retainer (D)	2
AI-18	527891001-2001	Retainer Holder (B)	2
AI-19	007400516	Screw for AI-1, 46	4
AI-20	5265 39001	Paper Feed Guide Shaft	1
AI-21	007401016	Screw for AI-20	1
AI-22	021400106	Nut for AI-20	2
AI-23	526624001	Capacitor, Starter	1
AI-25	025040236	Washer for AI-24	1
AI-34	525551001	Pin Feed Stopper	1
AI-35	525743001	Screw for AI-34	1
AI-36	525674001	Connector	1
37	33680123-05	Tinnerman Clip	4
38	34527207-2001	Screw	4
—	63500132-6001	Kit, Interface Hardware, Mtg. NOTE: This kit is made up of items 39,40,41 and 42.	1
39	34000019-2001	Washer, Flat, Fibre, No. 6 x .375OD	2
40	36614411-2040	Spacer, 0.25 Dia, No. 6 Clear, 0.68Lg. Nylon	2
41	34537387-2001	Screw, Pan Hd. 8-32 x 1.38 Lg.	2
42	33680123-2005	Nut, No. 8, Sheet Metal Expansion	2
46	529280001-2001	Frame, (Right), Series 300	1

M 0021 (AA)

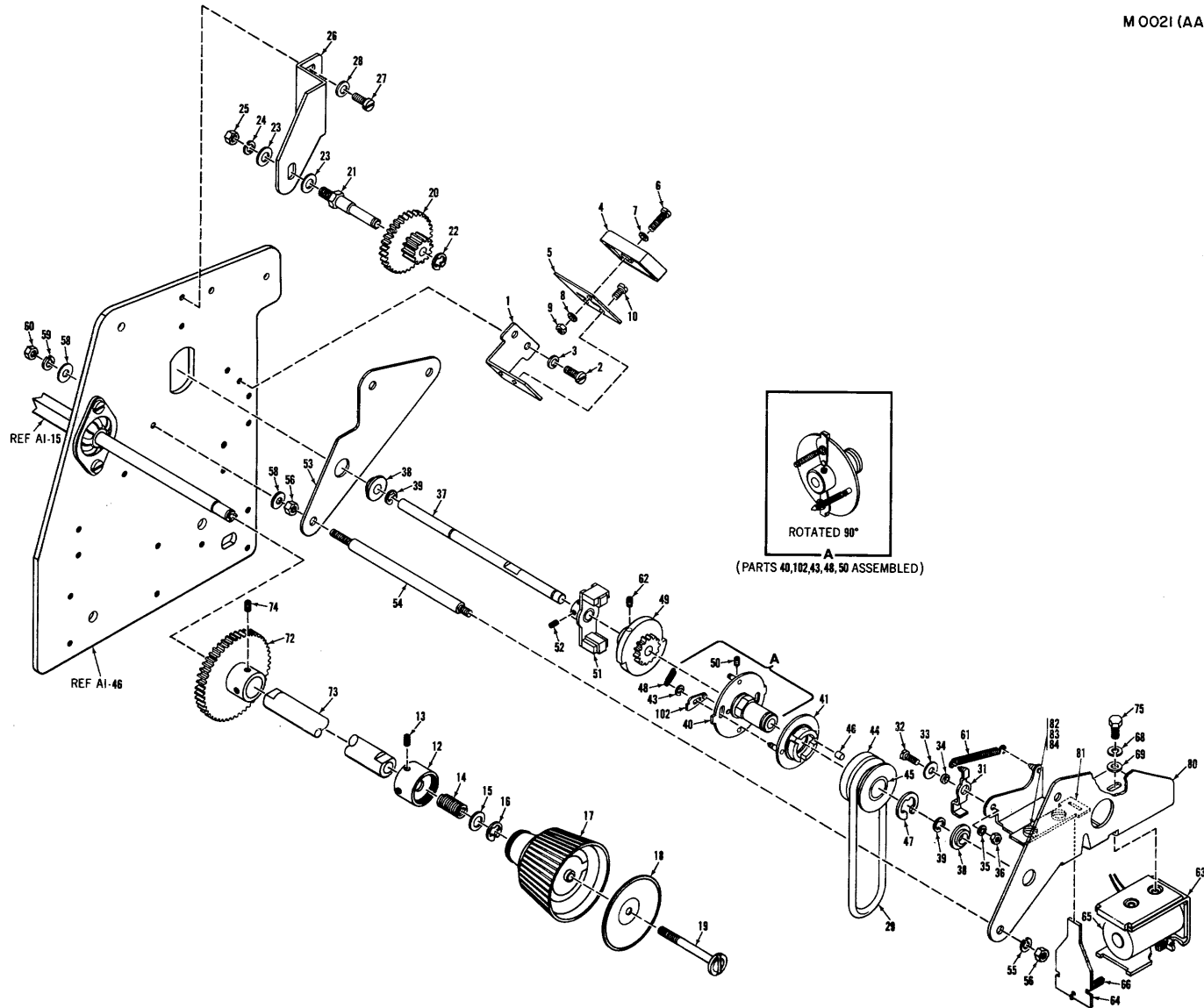


Figure 8-10. PAPER FEED – AJ



Figure AJ PAPER FEED

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Reference Number	Part Number	Part Name	Quantity	Reference Number	Part Number	Part Name	Quantity
AJ-1	526544001	Bracket Reed Switch, Line Counter	1	AJ-54	526660001	PF chassis shaft	3
AJ-2	007400816	Screw for AJ-1	2	AJ-55	028040247	Spring washer for AJ-54	3
AJ-3	028040247	Spring washer for AJ-2	2	AJ-56	021400106	Nut for AJ-54	3
AJ-4	525721001	Reed switch, line counter	1	AJ-57	021400106	Nut for AJ-54	3
AJ-5	525725001	Adjusting holder for AJ-4	1	AJ-58	025040236	Washer for AJ-54	6
AJ-6	001301403	Screw for AJ-4	1	AJ-59	028040247	Spring Washer for AJ-54	3
AJ-7	025030133	Washer for AJ-6	1	AJ-60	021400106	Nut for AJ-54	3
AJ-8	028030247	Spring washer for AJ-6	1	AJ-61	511091001	Spring for AJ-31	1
AJ-9	021300106	Nut for AJ-6	1	AJ-62	525743001	Screw for AJ-49	2
AJ-10	007300516	Screw for AJ-5	2	AJ-63	527856001-2001	Clutch Magnet Core	1
AJ-12	525769001	Paper Feed Knob Coupler	1	AJ-64	525351001-2001	Armature	1
AJ-13	525748001	Screw for AJ-12	2	AJ-65	527027001	Clutch Magnet Coil	1
AJ-14	525768001	Spring for AJ-12	1	AJ-66	527026001	Spring for AJ-64	1
AJ-15	025060136	Washer for AJ-12	1	AJ-68	028030247	Spring Washer for AJ-67	2
AJ-16	048050346	Snap ring for AJ-12	1	AJ-69	025030236	Washer for AJ-67	2
AJ-17	526821001	Paper feed knob	1	AJ-70	527032001	Clutch Magnet Unit	1
AJ-18	526719001	Ornamental plate for AJ-17	1			Note: This part is assembled with parts covering reference number AJ-63 through AJ-66.	
AJ-19	526745001	Screw for AJ-17	1	AJ-71	526957001	Paper Feed Assembly	1
AJ-20	526675001	Paper feed idle gear	1			Note: This part is assembled with parts covering reference number AJ-29 through AJ-41, AJ-43 through AJ-57, and AJ-61 through AJ-69, AJ-75, and AJ-79.	
AJ-21	526674001	Axle for AJ-20	1				
AJ-22	048040346	Snap ring for AJ-21	1	AJ-72	527599000	PF Gear	1
AJ-23	025050236	Washer for AJ-21	2	AJ-73	526964001	PF Coupling (Short)	1
AJ-24	028050247	Spring washer for AJ-21	1	AJ-74	52743000-2001	PF Screw for item AJ-72	1
AJ-25	021500106	Nut for AJ-21	1	AJ-75	527249001	Bolt for AJ-63	2
AJ-26	526673001	PF idle gear holder	1	AJ-76	526993001	PF Gear Unit	1
AJ-27	007400816	Screw for AJ-26	2	AJ-77	526605001	PF Clutch Unit (4 inches per second)	1
AJ-28	025040236	Washer for AJ-27	2			Note: This unit is assembled with parts covering from reference no's AJ-40 through AJ-48.	
AJ-29	526867000	O-ring	1	AJ-78	526699001	Line Counter, Reed Switch Unit	1
AJ-31	525753001	Back Stopper Pawl	1			Note: This unit is assembled with parts covering from reference no's AJ-4 to AJ-9.	
AJ-32	007300803	Screw for AJ-31	1	AJ-79	529862001-5001	PF Chassis Unit	1
AJ-33	503092001	Washer for AJ-32	1			Note: This unit is assembled with parts covering from reference no's 80 through 84.	
AJ-34	525756001	Collar for AJ-32	1	80	529460001-2001	PF Chassis Plate	1
AJ-35	028030247	Spring washer for AJ-32	1	81	525903001-2001	Clutch Slide Pawl	1
AJ-36	021300106	Nut for AJ-32	1	82	529461001-2001	Screw, M3, PO.5	2
AJ-37	526672001	PF clutch shaft	1	83	028030243-2001	Spring Washer, M3	2
AJ-38	525353001	Bearing for AJ-37	2	84	021300105-2001	Nut, Hex. M3. PO.5	2
AJ-39	048040346	Snap ring for AJ-37	2	AJ-102	527854001-2001	Clutch Releasing Pawl	2
AJ-40	526607001	PF clutch inner cam	1				
AJ-41	525333001	FF clutch releaser	1				
AJ-43	048020346	Snap ring for AJ-42	2				
AJ-44	526927001	PF clutch pulley	1				
AJ-45	526686000	Bearing insert (press-fitted)	1				
AJ-46	508532001	Roller	3				
AJ-47	048080346	Snap ring for AJ-37	1				
AJ-48	510062001	Spring for AJ-40	2				
AJ-49	526685001	PF cam	1				
AJ-50	525743001	Screw for AJ-49	2				
AJ-51	526602001	One line counter (L)	1				
AJ-52	525747001	Screw for AJ-51	2				
AJ-53	526680001	PF chassis (L)	1				

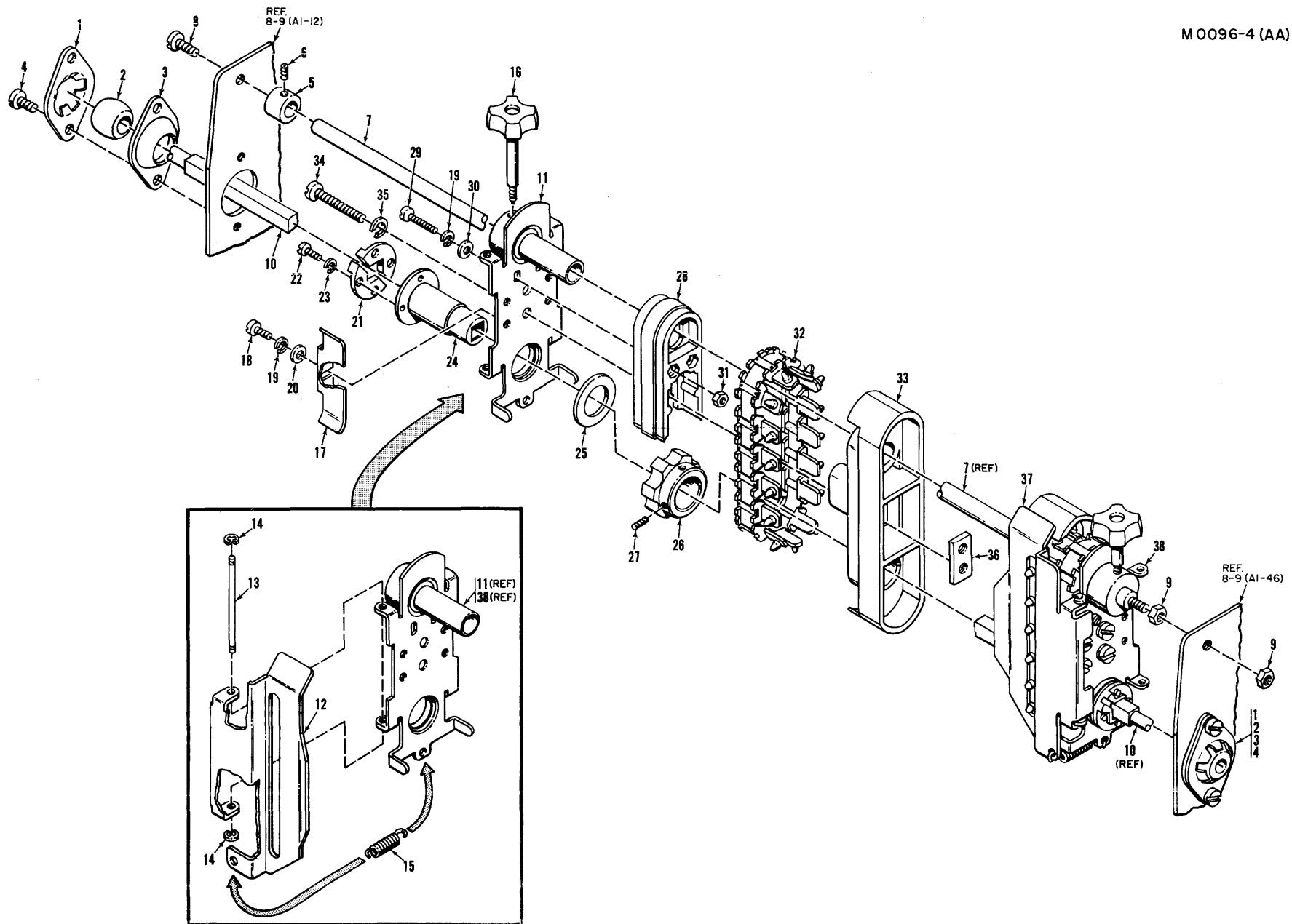
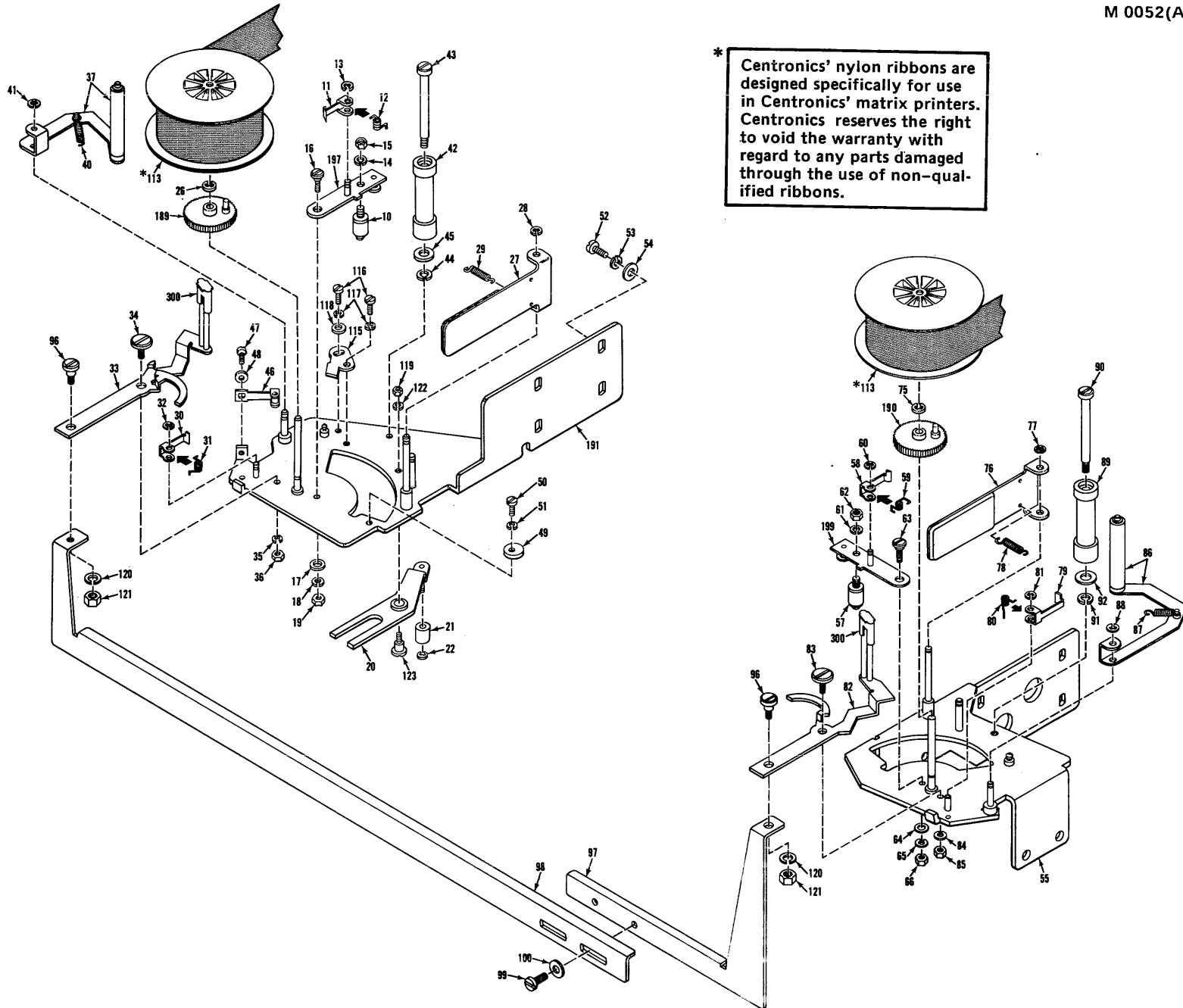


Figure 8-11. PIN FEED ASSEMBLY AND PAPER DRIVE SHAFT

ITEM	PART NUMBER	DESCRIPTION	QTY.	REF. SYMBOL
PAPER DRIVE SHAFT AND PARTS (REF: Fig. 8-9)				
1	527891000-2001	. Holder, Retainer (B)	2	AI-45
2	525208001-2001	. Bearing, Retainer (D)	2	AI-17
3	525207001-2001	. Holder, Retainer (A)	2	AI-16
4	007400516-2001	. Screw for Frame Supports, Left and Right, Ref. Fig. 8-9 (12, 46)	4	—
5	525551001-2001	. Pin Feed Stopper	1	AI-34
6	525743001-2001	. Set-screw for item 5	1	—
7	526539001-2001	. Shaft, Guide, Paper Feed	1	AI-20
8	007401016-2001	. Screw for item 7	1	—
9	021400106-2001	. Nut for item 8	2	AI-22
10	526538001-2001	. Shaft, Paper Feed	1	AI-15
PIN FEED ASSEMBLY				
—	527447001-5001	. Pin Feed Unit (Left), Complete Note: This unit is assembled with parts covering item number 11 through 36.	1	AI-52
11	527792001-5001	.. Holder, Pin Feed (left)	1	AI-53
12	527419001-2001	.. Gate, Paper Holder (left)	1	AK-54
13	527418001-2001	.. Pin for item 12, 37	2	AK-48
14	048015346-2001	.. Snap-Ring for item 13	4	—
15	527806001-2001	.. Spring for item 12, 37	2	AK-50
16	527422001-2001	.. Knob, Locking (all Models)	2	AK-51
17	527416001-2001	.. Guide, Pin Attachment	2	AK-43
18	007309406-2001	.. Screw for item 17	4	—
19	028030243-2001	.. Washer, Lock, Spring	8	—
20	025030236-2001	.. Washer for item 18	4	—
21	527415001-2001	.. Set Plate, Paper Drive Slide Shaft	4	AK-27
22	007029316-2001	.. Screw for item 21	8	—
23	028020247-2001	.. Washer, Lock, Spring	8	—
24	527406001-2001	.. Drive Sleeve	2	AK-26
25	527407001-2001	.. Spacer for item 26	2	AK-31
26	527408001-2001	.. Drive Pulley for item 24	2	AK-30
27	525747001-2001	.. Set-screw for item 26	2	AK-31
28	527405000-2001	.. Idler Slide	2	AK-33
29	007301616-2001	.. Screw for item 28	4	—
30	025030136-2001	.. Washer, Flat for item 29	4	—
31	021300106-2001	.. Nut for item 29	4	AK-36
32	527449001-5001	.. Pin Feed Belt Unit	2	AK-38
33	527793001-5001	.. Belt Guide Unit	2	AK-39
34	007402806-2001	.. Screw for item 33	4	AK-40
35	028040247-2001	.. Washer, Lock, Spring for item 34	4	AK-41
36	527414001-2001	.. Plate Nut for item 34	2	AK-42
37	527417001-2001	.. Gate, Paper Holder (right)	1	AK-48
38	527448001-5001	.. Pin Feed Holder (right)	1	AK-25
—	527446001-5001	. Pin Feed Unit (right), Complete Note: This unit is assembled with part numbers covering from items 13 through 38.	1	AK-24



\* Centronics' nylon ribbons are designed specifically for use in Centronics' matrix printers. Centronics reserves the right to void the warranty with regard to any parts damaged through the use of non-qualified ribbons.

Figure 8-12. RIBBON FEED – AL (PART 1 OF 2)

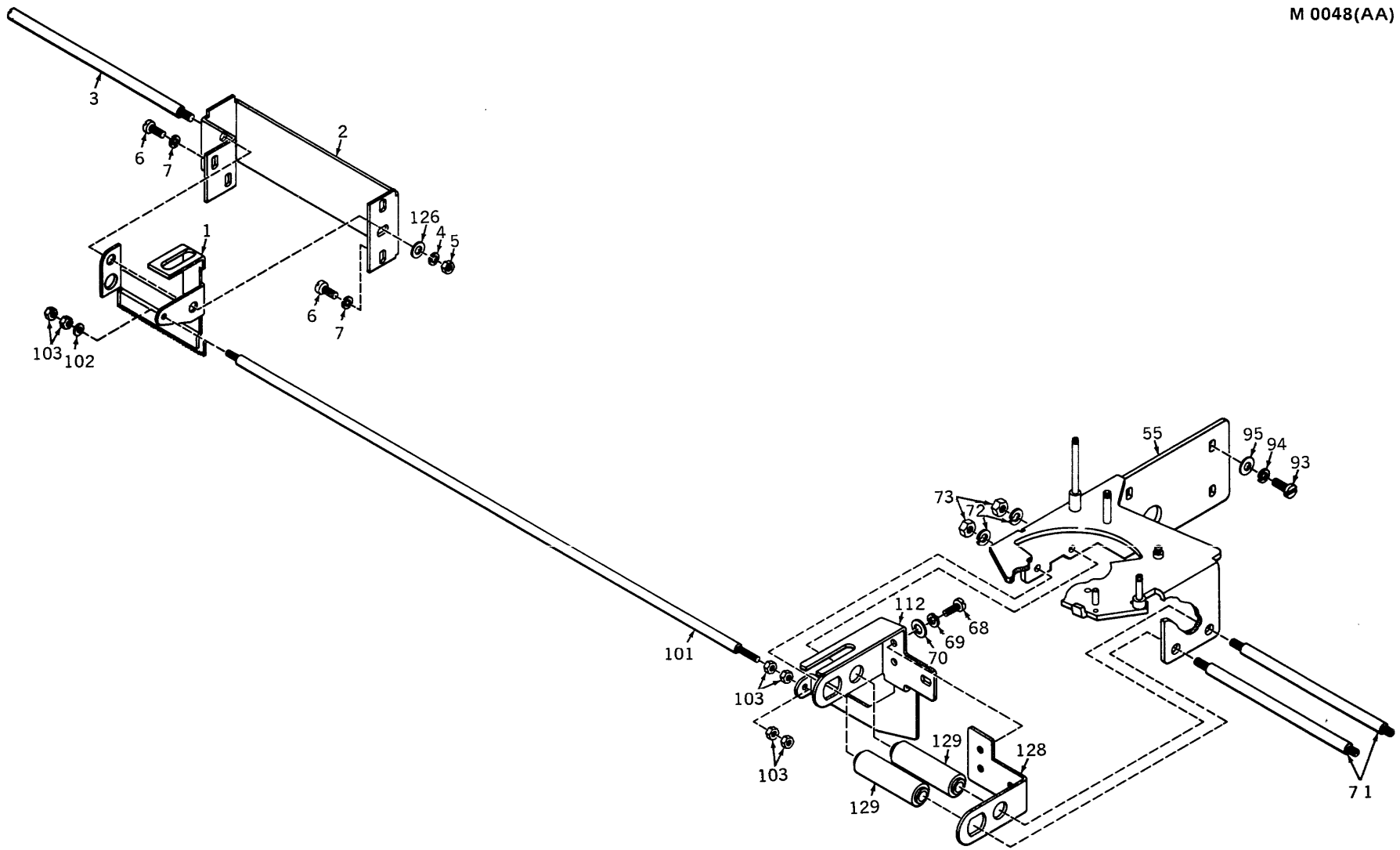


Figure 8-13. RIBBON FEED – AL (PART 2 OF 2)

# Figure AL RIBBON FEED

Reference Number	Part Number	Part Name	Quantity	Reference Number	Part Number	Part Name	Quantity
AL-1	526928001	Ribbon feed rack	1	AL-51	028030247	Spring Washer for AL-50	1
AL-2	526728001	RF rack guide plate	1	AL-52	007400816	Screw for AL-191	4
AL-3	526603001	Shaft for AL-1 (L)	1	AL-53	028040247	Spring Washer for AL-52	4
AL-4	028040247	Spring washer for AL-3	1	AL-54	025040236	Washer for AL-52	4
AL-5	021400106	Nut for AL-3	1	AL-55	526695001	Ribbon Holder (R)	1
AL-6	007400816	Screw for AL-2	4	AL-57	526692001	R pawl operator roller	1
AL-7	028040247	Spring Washer for AL-6	4	AL-58	526567001	R feed pawl (R)	1
AL-10	526692001	R pawl operator roller	1	AL-59	526568001	Spring for AL-58	1
AL-11	526594001	R feed pawl (L)	1	AL-60	048020346	Snap ring for AL-58	1
AL-12	526595001	Spring for AL-11	1	AL-61	028040247	Spring washer for AL-199	1
AL-13	048020346	Snap ring for AL-11	1	AL-62	021400106	Nut for AL-199	1
AL-14	028040247	Spring washer for AL-10	1	AL-63	526570001	Screw for AL-199	1
AL-15	021400106	Nut for AL-10	1	AL-64	526569001	Washer for AL-63	1
AL-16	526570001	Screw for AL-197	1	AL-65	028030247	Spring washer for AL-63	1
AL-17	526569001	Washer for AL-16	1	AL-66	021300106	Nut for AL-63	1
AL-18	028030247	Spring washer for AL-16	1		526932001	R pawl operator link unit	1
AL-19	021300106	Nut for AL-16	1			Note: This is assembled with	
AL-20	527741001	R pawl operator link (L)	1			parts covering from	
AL-21	526565001	Roller for AL-20	1			reference number AL-68	
AL-22	048020346	Snap ring for AL-20	1			to AL-70, AL-112, AL-128	
AL-26	048030346	Snap ring for AL-25	1			and AL-129	
AL-27	526817001	Ribbon holder (L)	1	AL-68	007400816	Screw for AL-128	3
AL-28	048020346	Snap ring for AL-27	1	AL-69	028040247	Spring washer for AL-68	3
AL-29	511198001	Spring for AL-27	1	AL-70	025040236	Washer for AL-68	3
AL-30	526591001	Ribbon stop pawl (L)	1	AL-71	526585001	Shaft for AL-55	2
AL-31	526592001	Spring for AL-30	1	AL-72	028040247	Spring washer for AL-71	2
AL-32	048020346	Snap ring for AL-30	1	AL-73	021400106	Nut for AL-71	2
AL-33	526596001	Ribbon releaser (L)	1	AL-75	048030346	Snap ring for AL-74	1
AL-34	526731001	Screw for AL-33	1	AL-76	526817001	Ribbon holder (R)	1
AL-35	028030247	Spring washer for AL-34	1	AL-77	048020346	Snap ring for AL-76	1
AL-36	021300106	Nut for AL-34	1	AL-78	511198001	Spring for AL-76	1
AL-37	526694001	R tension roller Unit (L)	1	AL-79	526560001	Ribbon stop pawl (R)	1
AL-41	048020346	Snap ring for AL-37	1	AL-80	526561001	Spring for AL-79	1
AL-42	526580000	Guide roller	1	AL-81	048020346	Snap ring for AL-79	1
AL-43	526579001	Axle for AL-42	1	AL-82	526571001	Ribbon releaser (R)	1
AL-44	028040247	Spring washer for AL-43	1	AL-83	526731001	Screw for AL-82	1
AL-45	025040336	Washer for AL-43	1	AL-84	028030247	Spring washer for AL-83	1
AL-46	526581001	R releaser holder	1	AL-85	021300106	Nut for AL-83	1
AL-47	007300516	Screw for AL-46	1	AL-86	526574001	R tension roller unit (R)	1
AL-48	025030236	Washer for AL-47	1	AL-87	526578001	Spring for AL-86	1
AL-49	526813001	R pawl operator (L) stopper	1	AL-88	048020346	Snap ring for AL-86	1
AL-50	007300716	Screw for AL-49	1	AL-89	526580000	R guide roller	1

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## Figure AL RIBBON FEED (CONT'D)

Reference Number	Part Number	Part Name	Quantity	Reference Number	Part Number	Part Name	Quantity
AL-90	526579001	Axle for AL-89	1	AL-126	025040130	Washer for AL-3	1
AL-91	028040247	Spring washer for AL-90			526696001	R pawl operator unit (R)	1
AL-92	025040336	Washer for AL-90	1			Note: This unit is assembled with parts covering from AL-57 to AL-62, and AL-191	
AL-93	007400816	Screw for AL-55	4				
AL-94	028040247	Spring washer for AL-93	4				
AL-95	025040236	Washer for AL-93	4	AL-128	526804001	R pawl operator link (R) plate	1
AL-96	526929001	Screw for AL-33, 82	2	AL-129	526805001	Sleeve	2
AL-97	526930001	R rod link (R)	1		526698001	R pawl operator unit (L)	1
AL-98	526931001	R rod link (L)	1			Note: This unit is assembled with parts covering from AL-10 to AL-15 and AL-197	
AL-99	007400816	Screw for AL-97, 98	2				
AL-100	025040236	Washer for AL-99	2	AL	526599001	R pawl operator link unit (L)	1
AL-101	526914001	Ribbon feed bar	1			Note: This unit is assembled with parts covering from reference number AL-20 to AL-22.	
AL-102	025030236	Washer for AL-101	2				
AL-103	021300106	Nut for AL-101	6				
AL-112	5269150-01	R pawl operator link (R)	1				
AL-113	63002293-5001 XP	Black Ribbon with twin spool	1	AL	526694001	R Tension roller unit (L)	1
	63002293-5002	(Red)	1			Note: This unit is assembled with parts covering from reference no. AL-37 to AL-39.	
	63002293-5003	(Blue)	1				
	63002293-5004	(Green)	1				
AL-115	526832001	R pawl operator (L) stopper	1				
AL-116	007300616	Screw for AL-115	2	AL	526555001	Ribbon Feed Unit	1
AL-117	028030247	Spring washer for AL-116	2			Note: This unit is assembled with parts covering from reference number AL-1 to AL-5 and AL-126.	
AL-118	025030236	Washer for AL-116	1				
AL-119	021300106	Nut for AL-123	1				
AL-120	028030247	Spring washer for AL-96	2				
AL-121	021300106	Nut for AL-96	2	AL-189	527774001	R Feed ratchet (L)	2
AL-122	028030247	Spring washer for AL-123	1	AL-190	527775001	R Feed ratchet (R)	2
AL-123	526831001	Screw for AL-20	1	300	63002294-2001	Ribbon Guide Cap	2
	526547001	Ribbon feed assembly (right)	1	AL-191	527893001-2001	Ribbon holder plate (Left)	1
		Note: Assembled with parts covering reference number AL-55 through AL-73, AL-75 through AL-92, AL-112 and AL-190, AL-191		AL-197	527800001-2001	Ribbon pawl operator (left)	1
				AL-199	527804001-2001	Ribbon pawl operator (right)	1
	527892001-5001	Ribbon feed assembly (left)	1				
		Note: Assembled with parts covering reference number AL-10 through AL-22, AL-26 through AL-51, AL-115 through AL-119, AL-122, AL-123 and AL-189, AL-191, 197.					

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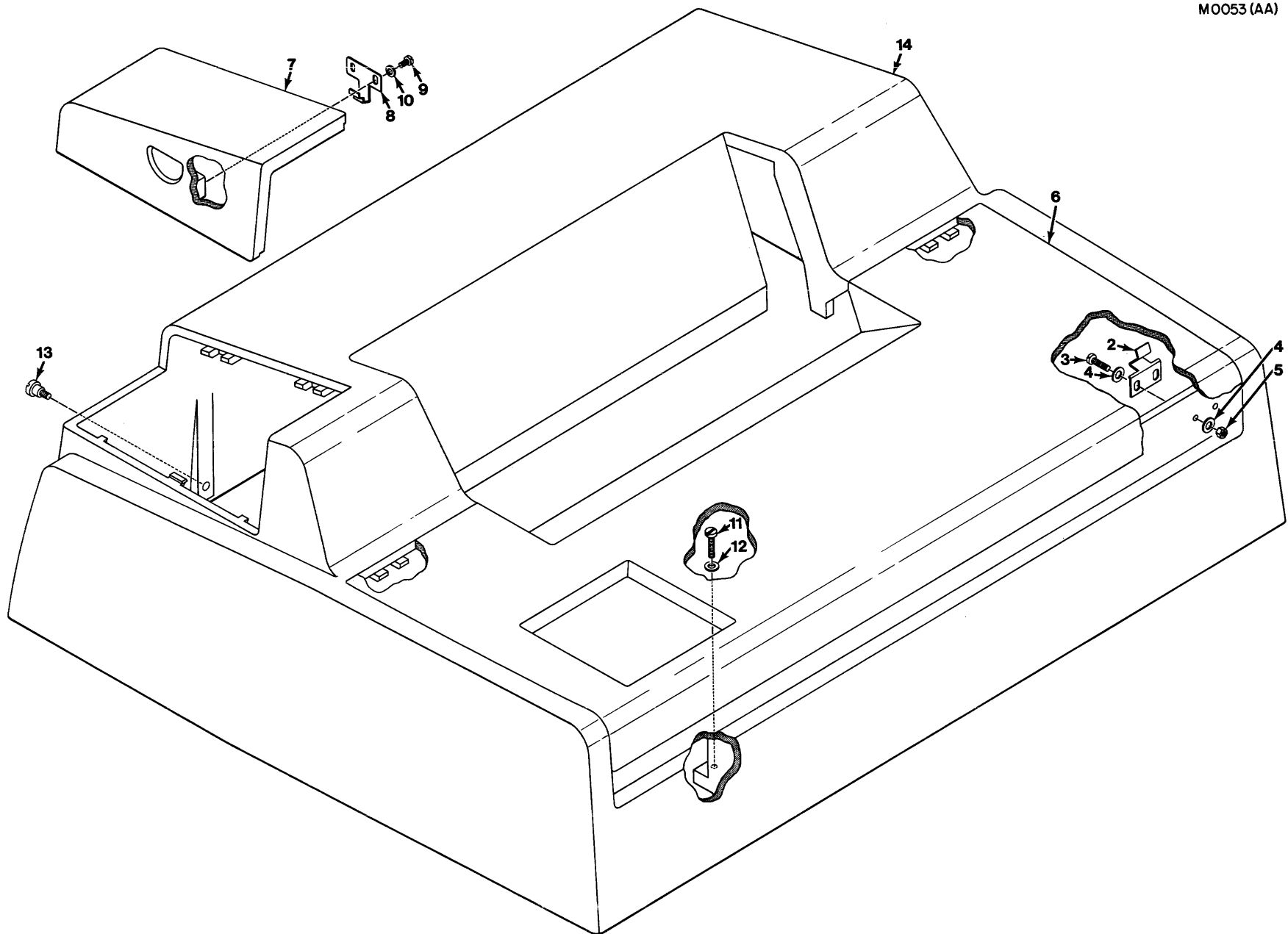


Figure 8-14. COVER - AM



## Figure AM COVER

Reference Number	Part Number	Part Name	Quantity
AM-2	526630001	Spring for AM-1	2
AM-3	007401416	Screw for AM-2	4
AM-4	025040236	Washer for AM-3	8
AM-5	021400106	Nut for AM-3	4
AM-6	526738001	Top cover	1
AM-7	526799001	Form feed cover	1
AM-8	526636001	Spring for AM-7	1
AM-9	007300516	Screw for AM-7	2
AM-10	025030236	Washer for AM-9	2
AM-11	007401416	Screw for AM-1	2
AM-12	025040236	Washer for AM-11	2
AM-13	526613001	Screw for AM-1	2
AM-14	526736031-xxxx	Cover (unpainted)	1

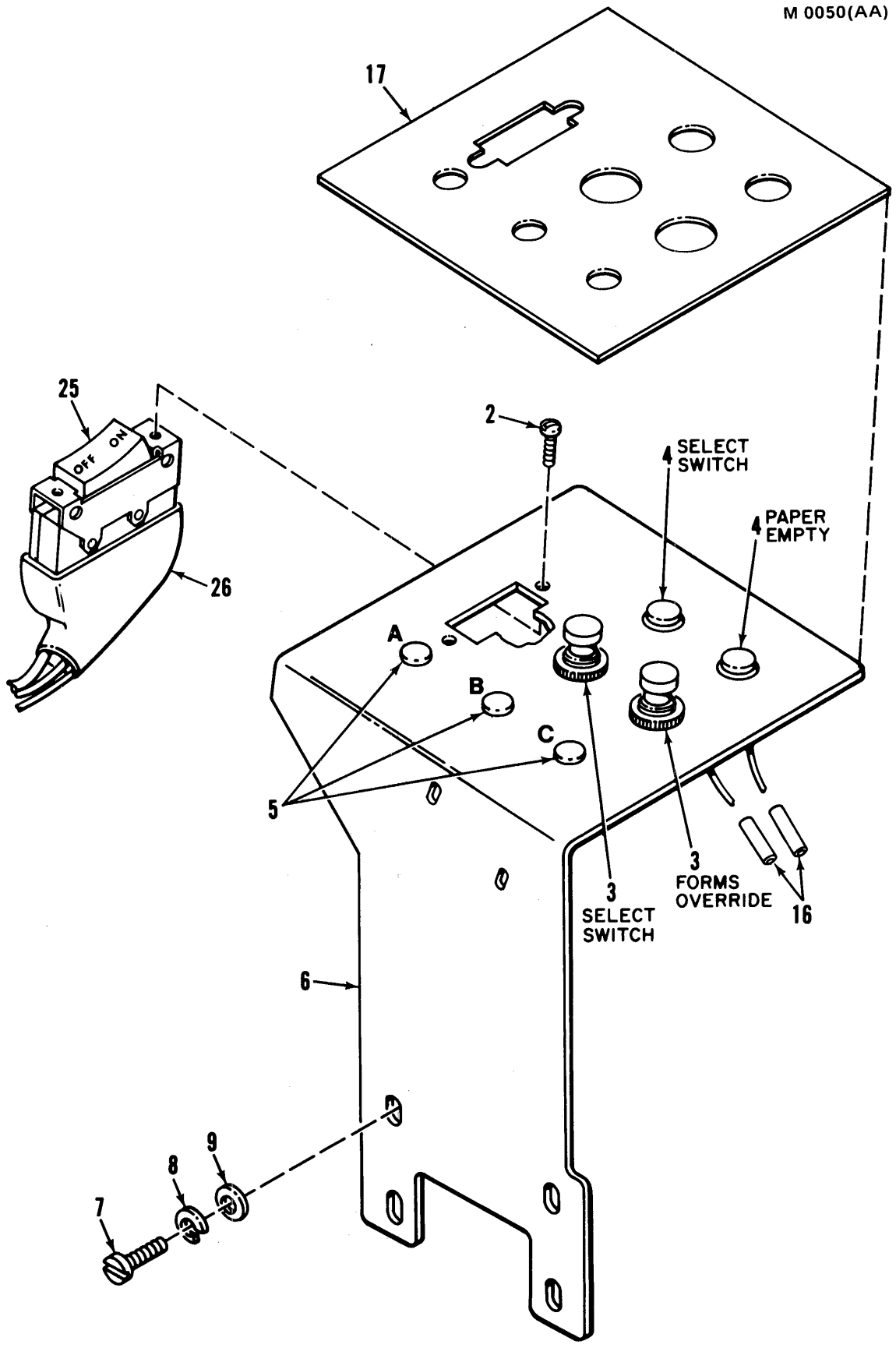
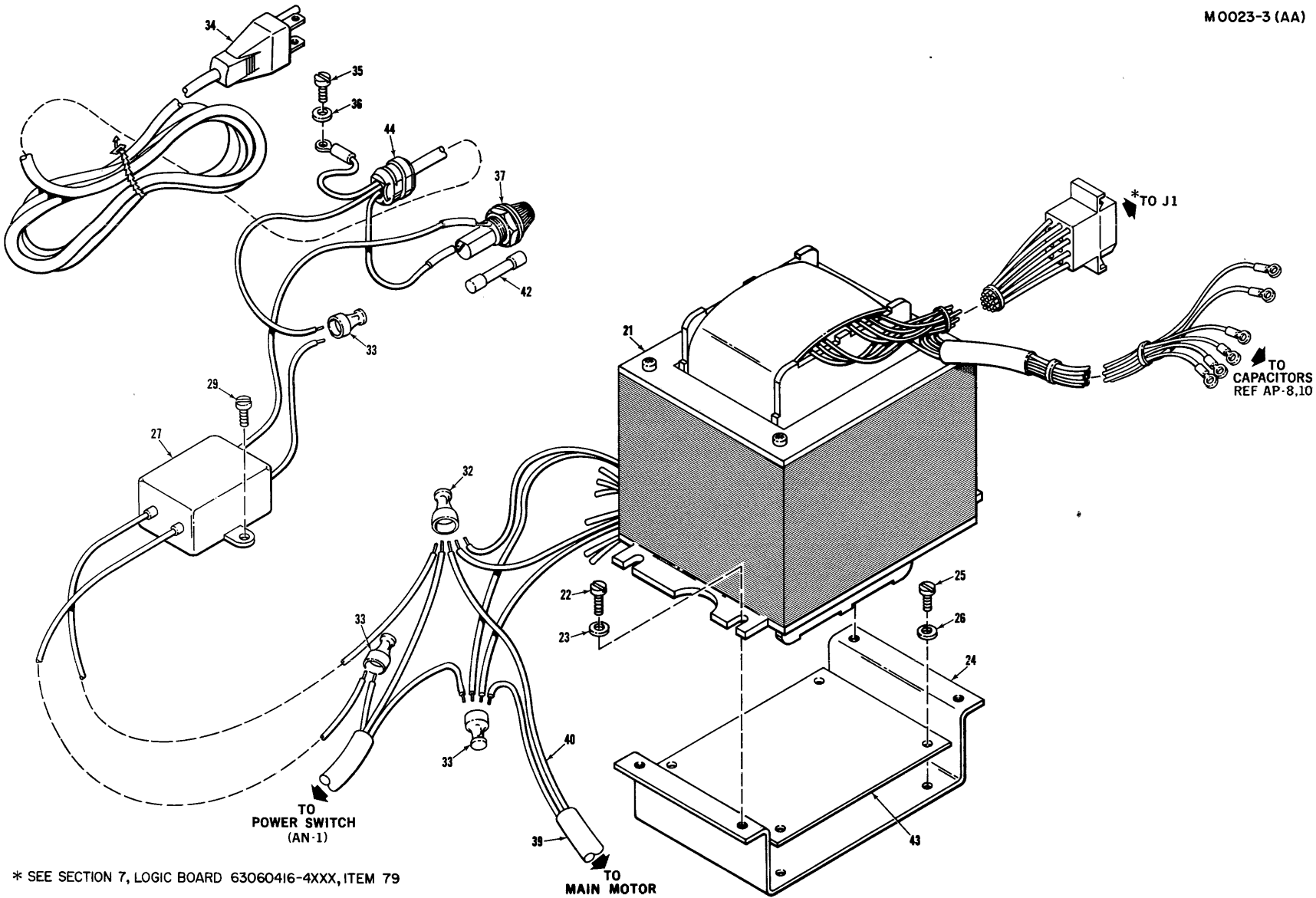


Figure 8-15. OPERATOR PANEL - AN

## Figure AN OPERATOR PANEL

Reference Number	Part Number	Part Number	Quantity
AN-2	526765001	Screw for AN-1	2
AN-3	529086001 -1001	Select Switch	2
AN-4	526752001	Pilot Lamp	2
AN-5	525864002	Button	3
5A	39092504-1001	Line Feed Switch (Option) (SPST) (Option)	1
5B	39092000-1001	Single/Double Line Feed Switch (Option) (SPDT)	1
5C	39092502-1001	Top of Form Switch (Option) (SPST)	1
AN-6	526661001	Operator Panel	1
AN-7	007400815	Screw for AN-6	4
AN-8	028040247	Spring Washer for AN-7	4
AN-9	025040235	Washer for AN-7	4
AN-16	526935001	Tube, Insulation	2
AN-17	63060183-3003	Control Panel Overlay (Blk, Bkgd.)	1
AN-25	529054001 -1001	Power Switch	1
AN-26	529050001	Cap, for AN-25	1



\* SEE SECTION 7, LOGIC BOARD 63060416-4XXX, ITEM 79

Figure 8-16. MULTITAP TRANSFORMER AND ELECTRICAL COMPONENTS (PART 1 OF 3) - AO

## Figure AO ELECTRICAL COMPONENTS (1)

Reference Number	Part Number	Part Name	Quantity
AO-21	52920001-1001	Multi-tap transformer	1
AO-22	007400815	Screw	4
AO-23	025040235	Washer	4
AO-24	527735001	Transformer Holder	1
AO-25	007400815	Screw	4
AO-26	025040235	Washer	4
AO-27	527768001	Line filter	1
AO-29	007300415	Screw for line filter	2
AO-33	525674001	Connector	4
AO-34	526782001	Supply cord	1
AO-35	007400515	Screw	1
AO-36	550719002	Washer	1
AO-37	526773001	Fuse holder	1
AO-39	525675001	Insulating tube	2
AO-40	526812001	Motor connector wire	1
AO-42	528352001	Fuse (3A), 115 VAC	1
AO-42-1	528351001	Fuse (2A), 230 VAC	1
AO-43	527927001	Insulating cover	1
AO-44	526772001	Strain relief collar for item AO-34	1

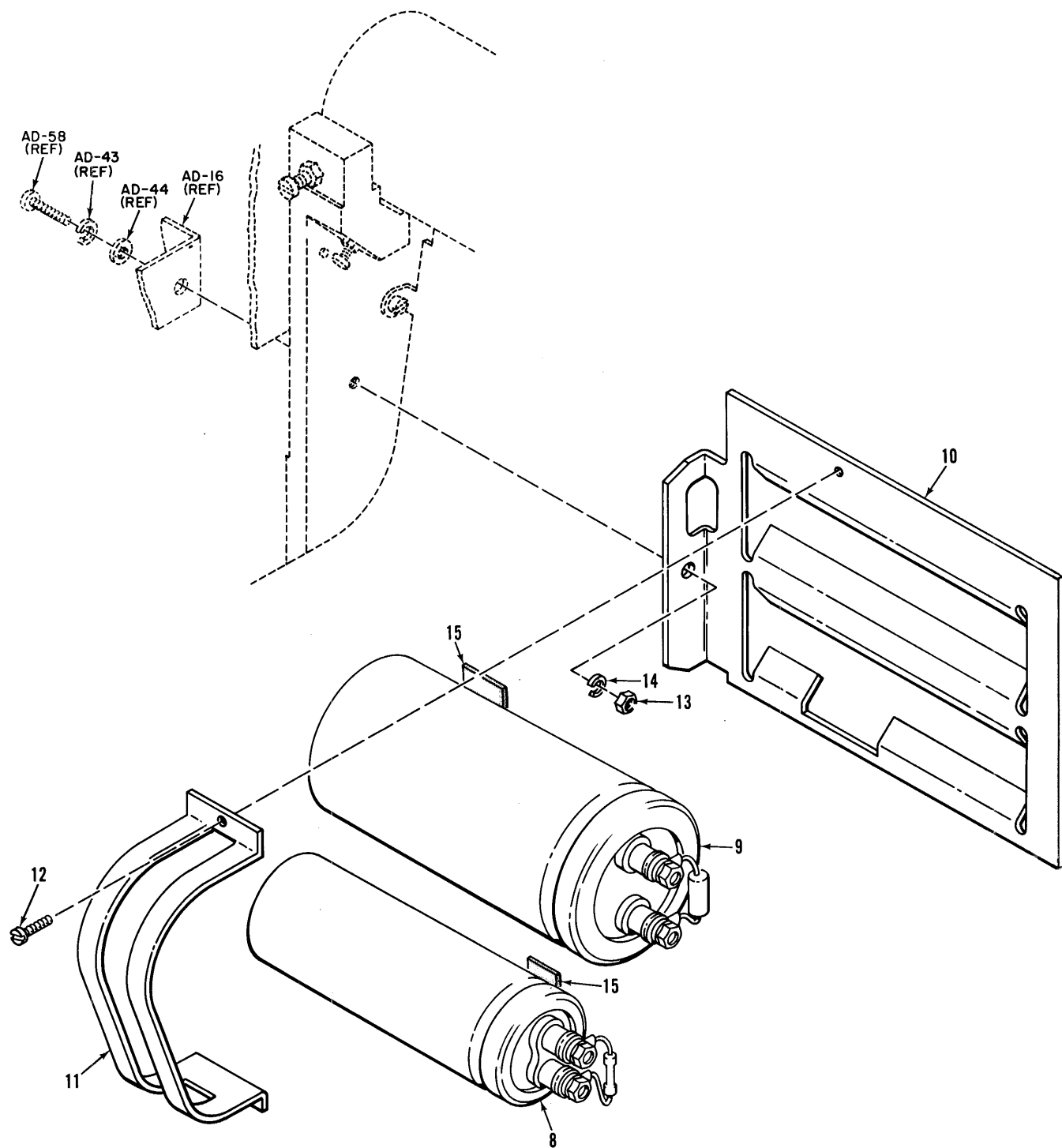


Figure 8-17. ELECTRICAL COMPONENTS (PART 2 OF 3) – AP

## Figure AP ELECTRICAL COMPONENTS (2 OF 3)

Reference Number	Part Number	Part Name	Quantity
AP-8	529091001 -1001	Capacitor 10,000 uf, 25V (+5V Power Supply (see Fig. 4-17)	1
AP-9	529093001 -1001	Capacitor (10,000 uf, 50V) (35 Volt Power Supply) (see Fig. 4-19)	1
AP-10	527724001	Bracket, Capacitor	1
AP-11	527725001	Clamp, Capacitor	1
AP-12	007301016	Screw	1
AP-13	021400106	Nut	1
AP-14	028040247	Washer	1
AP-15	525846001	Rubber Cushion for AP-8 and AP-9	2

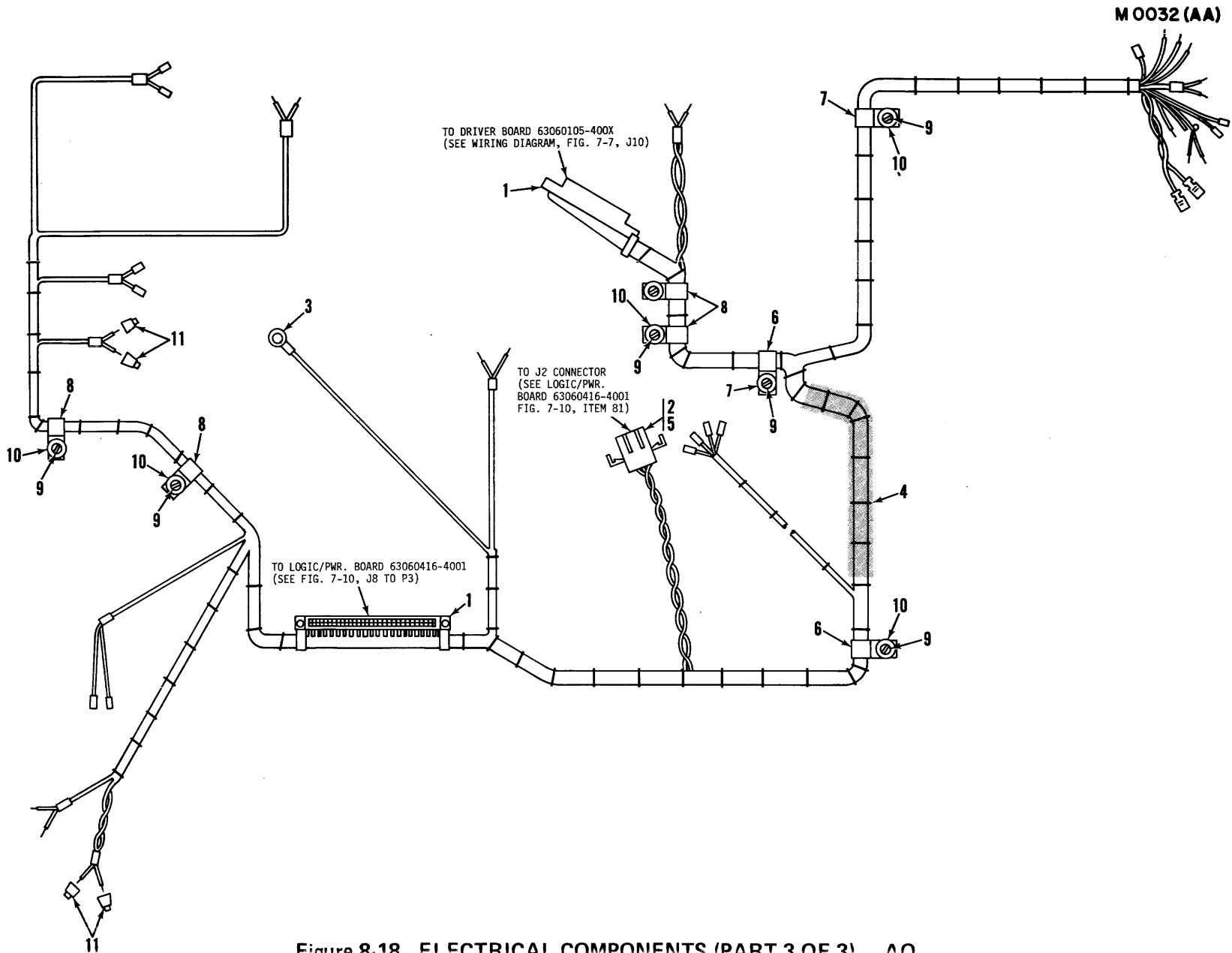


Figure 8-18. ELECTRICAL COMPONENTS (PART 3 OF 3) - AQ



## Figure AQ ELECTRICAL COMPONENTS (PART 3 OF 3)

Reference Number	Part Number	Part Number	Quantity
—	526783001-4001	Wire Harness Unit (Main) Note: This assembly contains items 1 through 5	1
AQ-1	525673001-1001	Connector, 44-pin (J8)	2
AQ-2	525961001-2001	Pin for item 5	12
AQ-3	526781001-2001	Ring Terminal	1
AQ-4	526827000-1001	Harness w/o connector	1
AQ-5	526785000-1001	Connector, with ears, 12-pin	1
AQ-6	525907000-1001	Clamp, cable, No. 9	2
AQ-7	525758000-1001	Clamp, cable, No. 5	1
AQ-8	120679001-1001	Clamp, cable, Type B	2
AQ-9	007400715-1001	Screw for AQ-6, 7, 8, 12	7
AQ-10	025040136-1001	Washer for AQ-9	7
AQ-11	207221600-1001	Cap, Splice	4
AQ-12	525567000-2001	Clamp, Cable No. 8	2

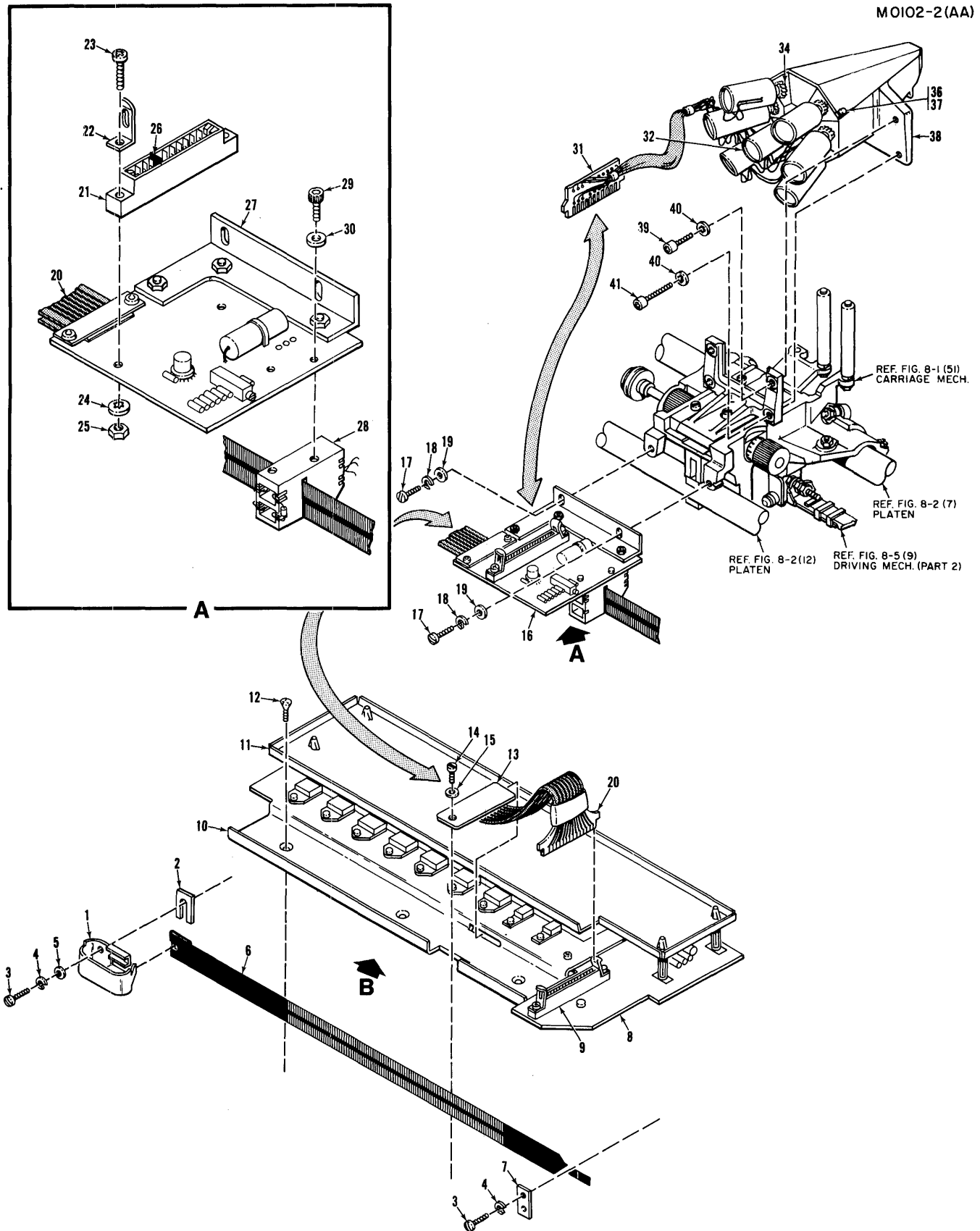


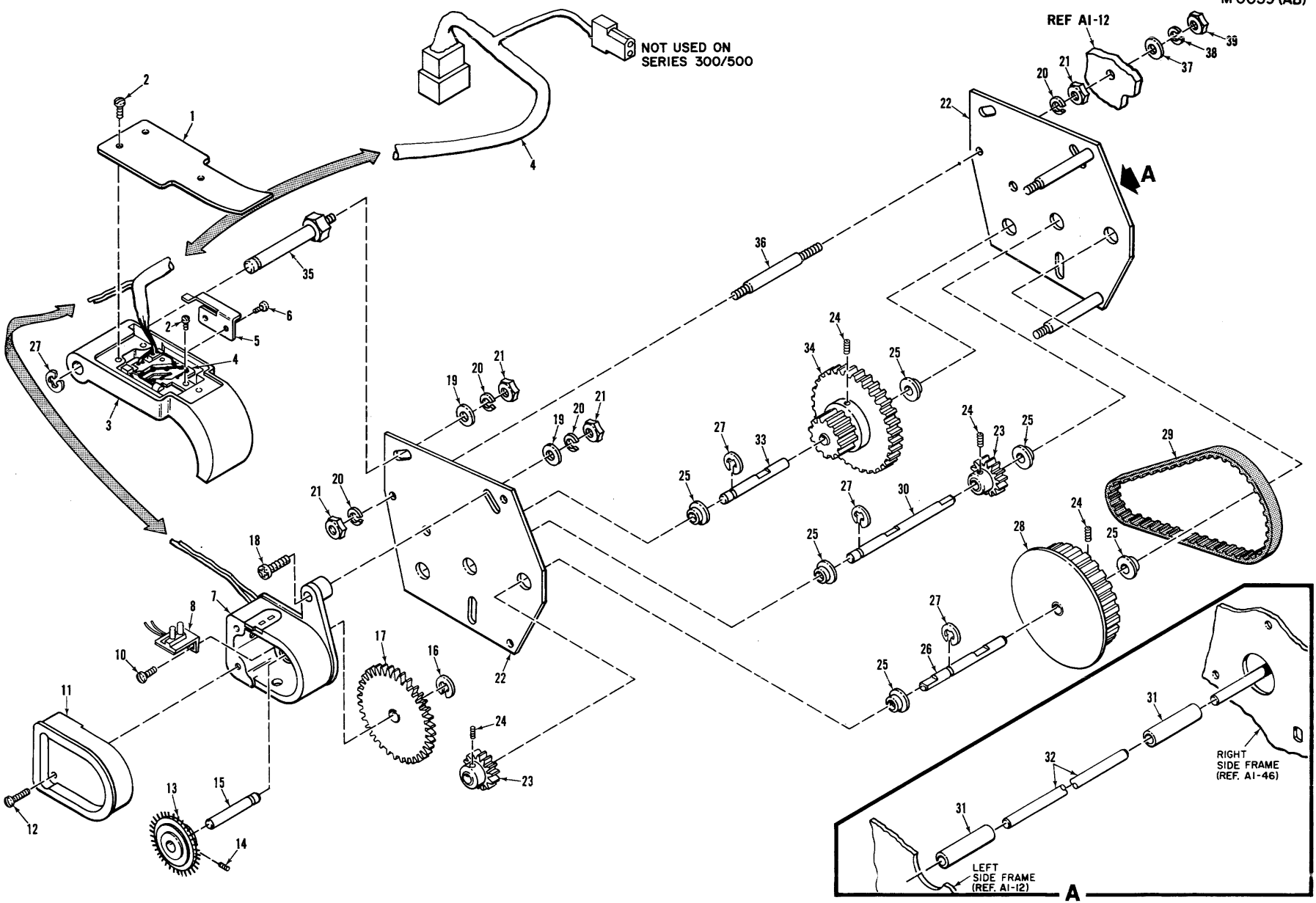
Figure 8-19 PRINT HEAD AND ASSOCIATED ASSEMBLIES

LIST OF MATERIALS  
PRINT HEAD AND ASSOCIATED ASSEMBLIES  
(REFERENCE FIGURE 8-19)

ITEM	PART NUMBER	DESCRIPTION	QUANTITY	REF. SYMBOL
<u>TIMING FENCE</u>				
—	63060194-6001	. Kit, Timing Fence Note: This kit consist of items 1 through 7.	1	—
1	63508140-2001	.. Clasp, Timing Fence	1	—
2	63500113-2001	.. Shim, Timing Fence	6	—
3	34000352-2032	.. Screw, Pan Hd/Slotted, M3 x 0.5 x 6 mm Lg	4	—
4	34000455-2004	.. Washer, Split Lock, No. M3	4	—
5	34000452-2004	.. Washer, Flat, No. M3	4	—
6	63060179-5001	.. Timing Fence Ass'y (80 Char.)	1	—
7	63508106-2001	.. Clamp, Timing Fence	1	—
<u>POWER DRIVER BOARD</u>				
—	63060105-4005	. †Power Driver Board Ass'y (without Brake) Note: This assembly consists of items 8 through 11.	1	—
8	63060003-2001	.. PC Board, Power Driver	1	—
9	31230011-1001	.. Connector, Edge, 20-Pin	1	—
10	63060113-2001	.. Heat Sink/Mtg. Bracket	1	—
11	63060114-2001	.. Shield, Power Driver	1	—
12	004400815-2001	. Screw, M4 x 8 mm Lg, Phil. Hd.	3	—
13	63060117-5001	. Clamp, Ribbon Cable	1	—
14	007400815-2001	. Screw, M4 x 8 mm Lg, Flat Hd/Fil.	1	—
15	025040235-2001	. Washer, Flat, No. M4	1	—
<u>VIDEO AMPLIFIER BOARD</u>				
16	63060330-4001	. †Video Amplifier Board Ass'y Note: This assembly consists of items 20 through 30.	1	—
17	007400816-2001	. Screw for Video Amp. Bracket	2	—
18	028050247-2001	. Washer, Lock	2	—
19	025040236-2001	. Washer, Flat	2	—
20	63001021-2001	.. Fingerboard, Ribbon Cable (part of item 16)	1	—
21	31230011-1001	.. Connector, Edge (20-pin)	1	—
22	63002300-2001	.. Clip, P.C. Board	2	—
23	34517165-2001	.. Screw, 4-40 x 1/2-in. Lg, cap., hex., Soc.	2	—
24	34815005-2001	.. Washer, Int Tooth, No. 4	2	—
25	34712005-2001	.. Nut, Hex, 4-40	2	—
26	31240456-2002	.. Key, Polarizing (Between Contact C-3, D-4)	1	—
27	63508104-2001	.. Bracket Mtg. Video Amp. Board	1	—
28	63002634-5001	.. Optic Pickup, Phototransistor	1	—
29	34507087-2001	.. Screw, 2-56 x 1/4-in. Lg, Pan/Phil Hd	2	—
30	34902007-2001	.. Washer, Flat No. 2, Internal	2	—
<u>PRINT HEAD</u>				
—	63002437-4001	. Print Head Assembly Die Cast, 7-wire, Ruby Note: This assembly contains items 31 through 38.	1	—
31	63001039-2001	.. Fingerboard, Solenoid	1	—
32	63002476-4001	.. Solenoid Ass'y (straight wire)	7	—
34	63002122-2001	.. Nut, Locking, Solenoid	7	—
36	34507067-2001	.. Screw, 2-56 x 3/16-in. Lg, Pan/Phil Hd	4	—
37	34805007-2001	.. Washer, Int Tooth, No. 2	4	—
38	63002462-4001	.. Head Sub-assembly	1	—
39	34114161-2001	. Screw, Recessed Socket Cap, Hex 4-40 x 1/2-in. Lg	2	—
40	34815007-2001	. Washer, Int Tooth, No. 4	4	—
41	34114201-2002	. Screw, Recessed Socket Cap, Hex, 4-40 x 5/8-in. Lg	4	—

† Refer to Section 7 for complete component listing.

NOT USED ON  
SERIES 300/500



8-43

REV. H

Figure 8-20. VERTICAL FORMAT UNIT (OPTION)

LIST OF MATERIALS  
 SERIES 300 VERTICAL FORMAT UNIT (VFU) ASSEMBLY (OPTION)  
 LIGHT EMITTING DIODE (LED)  
 (6 LINES PER INCH/4 INCHES PER SEC. (IPS) (180° DRIVE)

Item	Part Number	Description	Quantity
-	63060173-6005	Kit, Vertical Format Unit(Factory Installed) Note: This kit is assembled with parts covering from 1 to 39 and 40.	1
-	63060125-5003	L.E.D. Tape Reader Assembly Note: This assembly is assembled with parts covering from 1 to 36, except items 31 and 32.	1
-	63002671-4002	L.E.D. Tape Reader Assembly American Drive Note: This assembly is assembled with parts covering from 1 to 17.	1
-	529419001-5001	L.E.D. Tape Reader Unit Upper Note: This assembly is assembled with parts covering from 1 to 6.	1
1	525388001-2001	Lid	1
2	007200416-2001	Screw, M2 x 4 mm Lg. Flat Hd. Fillister	4
3	525840001-2001	L.E.D. Housing Upper	1
4	529386001-2001	L.E.D. P.C. Board Assembly	1
5	525377001-2001	Spring Plate	1
6	007300416-2001	Screw, M3 x 4 mm Lg. Flat Hd. Fillister	2
-	63002674-5001	Tape Reader Lower Gen. Use Mod. Note: This assembly is assembled with parts covering from 7 to 17.	1
-	528532001-5001	L.E.D. Tape Reader Unit Lower Note: This assembly is assembled with parts covering from 7 to 16.	1
7	528533001-2001	L.E.D. Housing (lower) with Mask	1
8	528534001-4001	L.E.D. P.C. Board Ass'y	1
10	007200416-2001	Screw, M2 x 4 mm Lg. Flat Hd. Fillister	1
11	525374001-2001	Cover	1
12	007301216-2001	Screw, M3 x 12 mm Lg. Flat Hd. Fillister	2
13	525363001-2001	Sprocket	1
14	525746001-2001	Set-Screw, M3 x 3 mm Lg.	2
15	525365001-2001	Shaft	1
16	048030346-2001	Snap Ring	1
17	63060134-2001	Spur Gear 36T 24P	1
18	34527207-2001	Screw	2
19	34922005-2001	Washer No. 6 Flat	3
20	34828005-2001	Washer No. 6 Split Lock	9
21	34722007-2001	Nut, Hex No. 6-32	9
22	63060126-2001	Mounting Plate, Tape Reader	2
23	63060162-5001	Spur Gear Ass'y 14T 24P	2
24	33912045-2001	Screw Hex Soc. Set 4-40 x 1/8	4
25	36011005-2001	Bearing Bronze	6
26	63060129-2001	Shaft, Pivot	1
27	33115144-2018	Retaining Ring	4
28	63060159-5001	Timing Pulley 28T	1
29	36400003-2001	Timing Belt	1
30	63060127-2001	Shaft, Driver	1
-	62000139-6001	Kit, Drive Shaft VFU 300 Series Note: This kit is assembled with items 31 and 32.	1
31	63060321-2001	Coupling, Tube	2
32	63060143-2001	Shaft, Drive	1
33	63060128-2001	Shaft Idler Pulley	1
34	63060161-5001	Intermediate Gear Pulley Ass'y	1
35	63060131-2001	Shaft, Pivot Tape Reader Cover	1
36	63060132-2001	Spacer, Rod	3
37	34922007-2001	Washer No. 6 Flat	3
38	34828005-2001	Washer No. 6 Split Lock	3
39	34722007-2001	Nut, Hex No. 6-32	3
-	63060173-6001	Kit, Vertical Format Unit (Field Retrofit)	1
40	39092502-1001	Switch, Pushbutton SPST Panel Mtg. (TOF) (Ref. Fig. 8-15/5C)	1

## APPENDIX A

This appendix lists the timing used in printer Models 301, 306, 306C, 500, 501 and 588 that is programmed into the universal timing chip ME28 by jumper platform X2 on the 300/500 Logic/Power Supply Board (63060416). Table A-1 lists the timing along with the associated printer model, maximum number of characters per line and the X2 jumper(s) used to implement the timing. For example: The line feed (LF) timing for Model 301 is 10-milliseconds and is programmed by the connection of pin 5 to pin 12 on jumper platform X2.

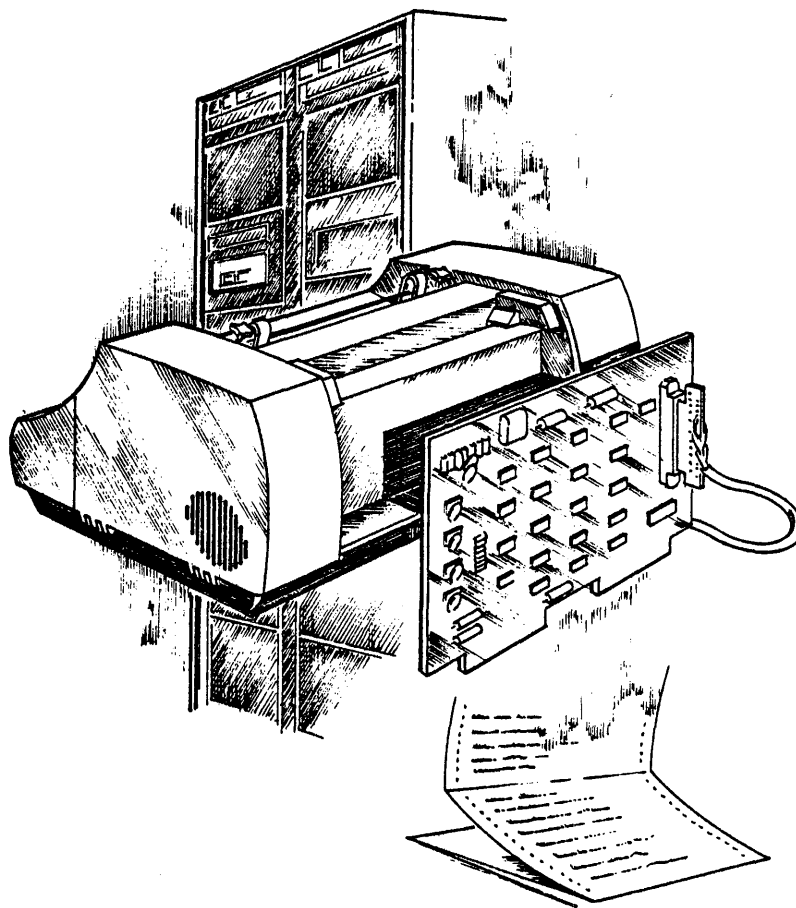
**Table A-1. TIMING PROGRAMMED BY X2 JUMPER PLATFORM**

MODEL	MAXIMUM CHARACTERS PER LINE (CPL)	LF (ms) / X2 JUMPER	DLYLF (ms) / X2 JUMPER	STROBE (usec) *	STROBE DELAY TIME (usec) / X2 JUMPER(S)
301	80	10/5-12	40/8-9	450	370/1-16, 3-14
306	80	16/6-11	60/-	450	660/1-16
500	132	16/6-11	60/-	450	660/1-16
501	132	10/5-12	40/8-9	450	370/1-16,3-14
588	132	16/6-11	60/-	450	776/-
306C	80/132 96/132 80/120 96/120	16/6-11	60/-	450	Selected Time/1-16,2-15  When printing 80 or 96 CPL, time is 660. For 120 or 132 CPL, time is 370.

\* Delayed Strobe (DLYSTB) signal has the same timing as  $\overline{\text{STROBE}}$  (450 usec).  
This timing cannot be programmed.



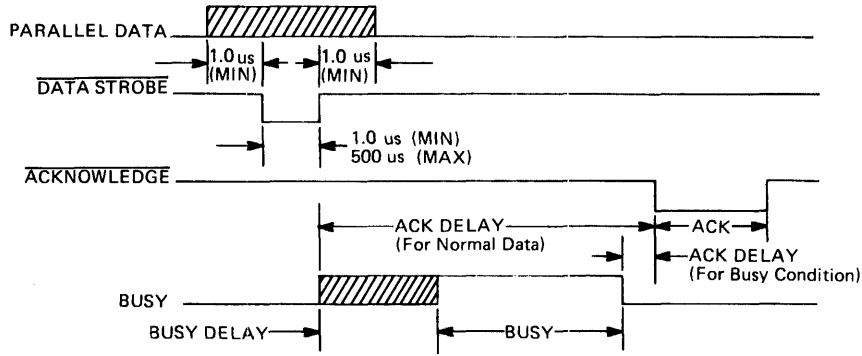
APPENDIX B  
PARALLEL INTERFACE SPECIFICATIONS



All standard Centronics printers contain a common 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 is to provide the user with the technical information required to interface directly to a standard Centronics printer, or if necessary to design a special interface to adapt the printer to a particular terminal. Note that specifications and descriptions within this appendix apply to Centronics standard RO printer models and do not necessarily apply to Centronics teleprinter models 308, 330, 508, 530 and 761.



# INTERFACE TIMING



NORMAL DATA INPUT TIMING

	101/101A/101S	101AL	102A	102AL	103	104	301	306	306C	306SC
ACK DELAY	7 usec.	2.5-10 usec.	7 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.
ACK	4 usec.	2.5-5.0 usec.	4 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.

BUSY CONDITION TIMING

	101/101A/101S	101AL	102A	102AL	103	104	301	306	306C	306SC
BUSY DELAY	0	0-1.5 usec.	0	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.
ACK DELAY	0	0-10 usec.	0	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.
ACK	4 usec.	2.5-5.0 usec.	4 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.
<b>BUSY DURATION:</b>										
Line Feed	75-105 msec.	75-105 msec.	75-105 msec.	16 msec. (single LF) 51 msec. (double LF) 75-105 msec. (multiple LF)	125 msec. (single LF) 25 msec. (double LF) 70-77 msec. (multiple LF)	10 msec. (single LF) 25 msec. (double LF) 70-77 msec. (multiple LF)	70-100 msec.	75-105 msec.	75-105 msec. (single LF)	35-50 msec.
Vertical Tab (1-inch)	300-310 msec.	300-310 msec.	300-310 msec.	300-310 msec.	1.4 sec.	1.4 sec.	160-200 msec.	300-310 msec.	250 msec.	155-170 msec.
Form Feed (11-inches)	3-3.5 sec.	3-3.5 sec.	3-3.5 sec.	3-3.5 sec.	1.4 sec.	1.4 sec.	1.5-2.0 sec.	3-3.5 sec.	2.75 sec.	1.40-1.42 sec.
Delete	3 msec.	100-400 usec.	3 msec.	100-400 usec.	160-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.
Bell	2 sec.	0	2 sec.	0	0	0	0	0	0	0
Select	3 msec.	100-400 usec.	3 msec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.
Deselect	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected
Print Command	6 msec./char plus 75-105 msec. LF	6 msec./char plus 75-105 msec. LF	470-500 msec. (total)	410-415 msec. (total)	6 msec./char plus 16 msec. LF	300 msec.	6 msec./char plus 70-100 msec. LF	8.4 msec./char plus 75-105 msec. LF	10/8.4/6.6/6.0 msec./char (10/12/15/16.5 cpi)	8.4 msec./char plus 35-50 msec.
(Return time-no busy)	(240 msec. max)	(240 msec. max)	(0)	(0)	(0)	(0)	(270 msec. max)	(270 msec. max)	(270 msec. max)	(270 msec. max)

NORMAL DATA INPUT TIMING

	500	501	503	588	500D	501D	588D	700	701
ACK DELAY	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.	2.5-10 usec.
ACK	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.

BUSY CONDITION TIMING

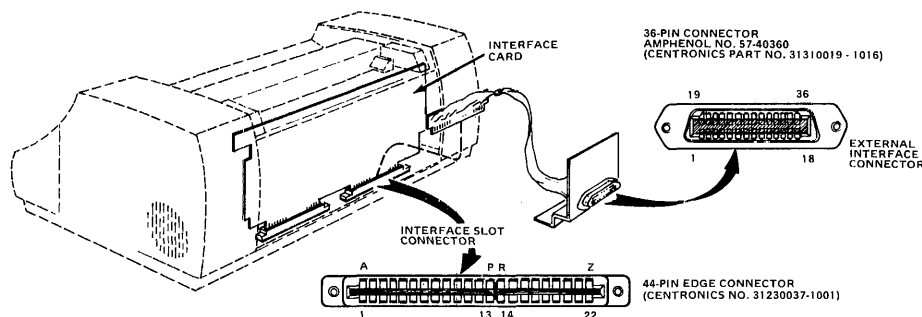
	500	501	503	588	500D	501D	588D	700	701
BUSY DELAY	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.	0-1.5 usec.
ACK DELAY	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.	0-10 usec.
ACK	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.	2.5-5.0 usec.
<b>BUSY DURATION:</b>									
Line Feed	75-105 msec.	70-100 msec.	16 msec. (single LF) 51 msec. (double LF) 25-75 msec. (multiple LF)	75-105 msec.	20 msec.	20 msec.	20 msec.	75-105 msec.	75-105 msec.
Vertical Tab (1-inch)	300-310 msec.	160-200 msec.	125 msec.	250 msec.	20 msec.	20 msec.	20 msec.	240-270 msec.	240-270 msec.
Form Feed (11-inches)	3-3.5 sec.	1.5-2.0 sec.	1.4 sec.	2.75 sec.	20 msec.	20 msec.	20 msec.	2.07-2.11 sec.	2.07-2.11 sec.
Delete	100-400 usec.	100-400 usec.	160-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.
Bell	0	0	0	0	0	0	0	0	0
Select*	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.	100-400 usec.
Deselect	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected	Until printer is selected
Print Command	8.4 msec./char plus 75-105 msec. LF	6 msec./char plus 70-100 msec. LF	6 msec./char plus 16 msec. LF	11.3 msec./char plus 75-105 msec. LF	8.4/7 msec./char (10/12 cpi) +20 msec. LF	6 msec./char +20 msec. LF	11.3/9.4/6.9 msec./char (10/12/16.5 cpi) +20 msec. LF	16.7 msec./char	16.7 msec./char
(Return time-no busy)	(400 msec. max)	(400 msec. max)	(0)	(400 msec. max)	(400 msec. max)	(400 msec. max)	(400 msec. max)	2.2 sec (max)	(0)

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

**NOTE:** For Models 301, 306, 306C, 500, 501 and 588, this table reflects the busy timing associated with Logic/Power Supply Board 63060104. For Timing associated with new logic board 63060416, refer to section 4 of this manual.

## STANDARD INTERFACE SIGNALS

The following table describes the standard interface signals available at both the interface slot connector and the external interface connector of all Centronics Printers.



SIGNAL NAME	INTER-FACE CONN.	INTER-FACE SLOT	SOURCE	DESCRIPTION
(DATA STROBE)	Pin 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 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	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. For 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 (Formerly SS signal, older version)
OSCXT	15	H	Printer	A 100 KHz signal (Models 101, 101A, 102A, 101S) or 100-200 KHz signal (All other models).
± OV	16	A		Signal ground
Chassis Gnd	17	—	Printer	Frame ground
+5V	18	13	Printer	+5 Volt power buss
(INPUT PRIME)	31, 30	L, 10	Input Device	A level which clears the printer buffer and initializes the logic. (Not in 101).
FAULT	32	M	Printer	A level that indicates a printer fault condition such as paper empty, light detect, or a deselect condition. (Not in 101).
Line Count Pulse	34, 35	2, D		Both sides of the line count switch appear at the interface connector. This switch is opened and closed during each line feed operation. A level delivered to the switch would be pulsed off and on each time a line feed operation is performed. (Series 300 and 500 except 306SC, 503).
Not Used	36			

### NOTES:

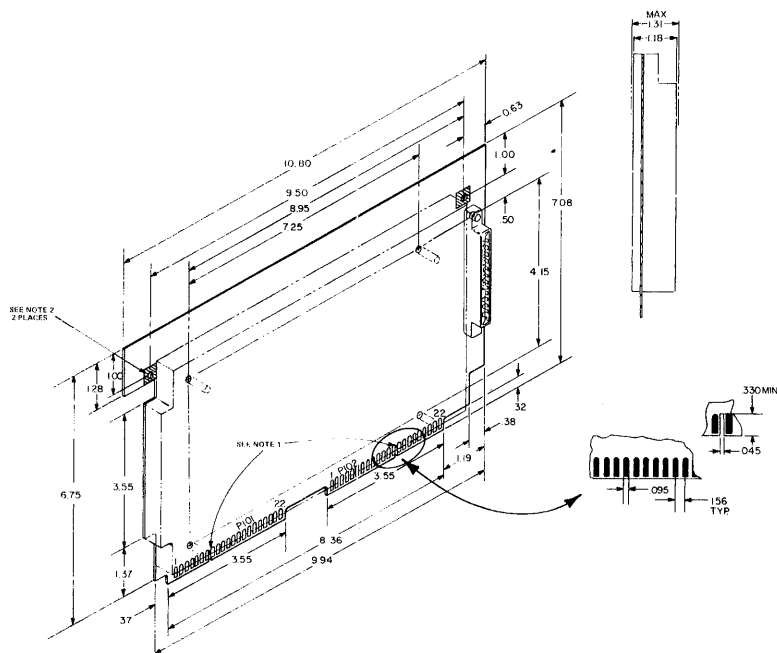
1. Second pin number indicates twisted pair return (± OV).

## INTERFACE SPECIFICATIONS

- INTERFACE ADAPTER:** All Centronics printers are designed to accept a special interface board. In some models, this interface slot is a standard feature. Other models must have an optional interface adapter to accommodate the interface card. Models which require this optional adapter are the 301, 306, 306C, 500, 501, 588, 700 and 701.
- INTERFACE SLOTS:** Models 102AL, 103, 104, 306SC and 503 have two interface slots. All other models have one slot.
- TOTAL AVAILABLE INTERFACE POWER:** +5 Volts  $\pm$  5% at 800 ma.  
+12 Volts  $\pm$  10% at 200 ma.  
-12 Volts  $\pm$  10% at 200 ma.
- INTERFACE CIRCUIT SPECIFICATIONS:**
- Voltage Levels:** 0V and +5V (nominal), TTL logic (SN7400 series)
- Logic Levels:** A logic ONE (or high) signal is defined as a voltage in the range of +2.4 Volts to +5 Volts, not to exceed a peak positive voltage of +5.5 Volts.  
A logic ZERO (or low) signal is defined as a voltage in the range of 0.0 Volt to +0.4 Volt, not to exceed a peak negative voltage of -.5 Volt.
- Current Requirements:** The printer interface can source up to 0.320 ma at +2.4 Volts for a high signal output, and sink up to 14 ma for a low output.  
Similarly, the sending device interface must be able to source 0.320 ma at +2.4 Volts for a high signal output and sink up to 14 ma for a low output.
- Line Termination:** The printer interface terminates input data lines DATA1 - DATA8 with 1000 ohms to +5 Volts, and control lines DATA STROBE and INPUT PRIME with 470 ohms to +5 Volts.
- MAXIMUM DISTANCE:** A local interface should be located no more than 10 feet from the printer, when using the standard printer interface circuits.
- PHYSICAL DIMENSIONS:** The diagram below shows the maximum envelope of a pc board which can be accommodated by the interface slot in all current Centronics printers. The Series 102 printers may, however, require a slight modification to accept this board. Depending on its depth, if the card is used in the 102A or in the second interface slot (nearest the speaker) of a 102AL, the speaker may have to be relocated to the fan housing.  
More detailed information on allowable dimensions for the interface board is contained on Centronics drawing 62000215.

3. ALL DIMENSIONS IN INCHES.
2. .50 x .50 AREA FREE OF COMPONENTS AND ETCH BOTH SIDES, 2 PLACES.
1. LOCATE KEYSLOTS AS FOLLOWS:  
CONNECTOR P101 BETWEEN PINS 7 AND 8.  
CONNECTOR P102 BETWEEN PINS 13 AND 14.

NOTES:



Fold

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