MODEL 737-1/737-2

PRINTER

37400780 REV A

MAY 1981

TECHNICAL MANUAL

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SECTION 1
GENERAL INFORMATION

1.1 SCOPE OF THIS MANUAL

This manual contains detailed information on the theory, maintenance, adjustment, and parts replacement of the Centronics Model 737-1 and 737-2 dot matrix printers. The basic differences between the two models are line voltage and frequency, fuse value and ribbon motor voltage and frequency. The contents of this manual are intended for use by qualified service personnel who are trained in the maintenance of electronic and electro-mechanical equipment. Operation, installation, preventive maintenance, character set samples, control codes, and interface information are covered in the Operators Manual P/N 37400781-9001.

1.2 GENERAL DESCRIPTION

Refer to Figure 1-1. The Model 737 is a compact, parallel-input printer that prints proportionally-spaced and monospaced characters (upper and lower case) in a high-density dot matrix. The proportional character set is printed in an N×9 (N=6 to 18) dot matrix at an average of 14 characters per inch (cpi). The 10 cpi monospaced characters are formed in a 7×8 dot matrix, 80 characters per 8-inch line. The condensed (16.7 cpi) monospaced character set provides 132 characters per 8-inch line.

The input code format is 7-bit parallel ASCII, positive true logic. Using host-generated control codes, the proportional, 10 cpi monospaced, and 16.7 cpi monospaced characters can be elongated to form double-width characters; thus, six different styles are available. Right justification of proportional and 16.7 cpi monospaced characters is accomplished by host-generated justification spaces (dot spaces) of 1 to 6 dot widths. Backspacing and underlining are additional host-controlled functions.

In the ON-LINE mode of operation, control codes provide full and half-line paper feed (forward and reverse) to print subscript and superscript characters. In the LOCAL mode, a front panel switch provides one-line feed or continuous paper feed, forward and reverse.

The paper supply may be standard 9½ inch fan-fold forms, 8½ inch roll paper or single sheets. The ribbon is a 15-yard Zip-Pack unit that is easy to replace. The mobius loop in the ribbon insures maximum life, allowing the top and bottom of the ribbon to be used.

The 737-2 features character sets for six countries: The United States of America, France, United Kingdom, Germany, Italy, and Sweden/Finland. The character set is selected by a switchpack setting prior to power-up of the printer. When the power is turned on, the printer logic recognizes the switch settings and is prepared to print characters for that country. Additional country character sets are available as field-installed character ROM's. Refer to the Operators Manual for the description of the character sets for this printer.

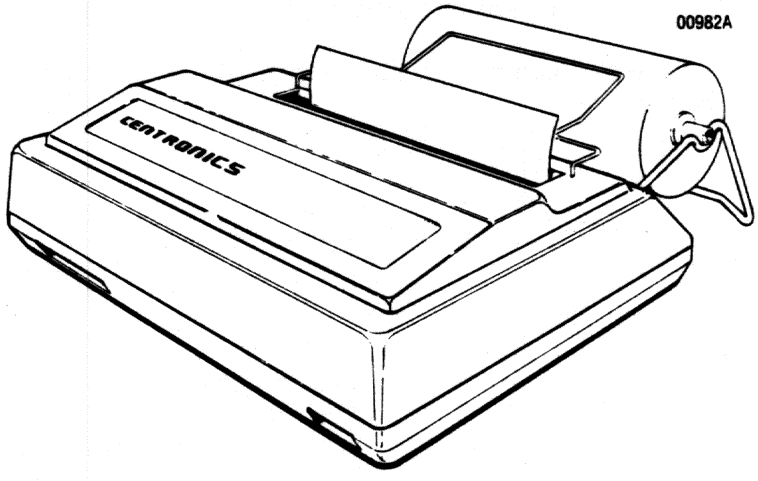

Figure 1-1 737 Printer with Roll Paper

1.3 SPECIFICATIONS

Printing Speed	22 lines per minute (lpm) at 80 characters per line (cpl) or 60 lpm at 20 cpl left justified
Characters Per Line	80 maximum (10 cpi); 132 maximum (16.7 cpi)
Print Width	8 inches (204 mm) maximum
Character Structure	7 x 8 Dot Matrix (Monospaced) N x 9 Dot Matrix (Proportionally Spaced)
Line-Feed Buffer	Capacity of 255 pending line feeds
Line-Feed Repeat Rate	12 line feeds/second
Vertical Spacing	6 lines per inch
Horizontal Spacing	Monospaced: 10 or 16.7 characters per inch (cpi) Proportional: 8.2 to 24.6 cpi depending on text; 13 to 14.5 cpi average density. Numerics 12.5 cpi (monospaced) for tabulation.
Parallel Data Input Connector	40-pin PC edge connector
Code Structure	Standard US ASCII; 7 bits, parallel
Input Data Rate	Up to 2,200 characters/second
Character Sets*	Primary: 96 US ASCII monospaced characters Secondary: 96 US ASCII proportionally-spaced characters
Input Voltage/Frequency/Fuse	(737-1) 120 Vac +5%, −10%; 60 Hz ±1 Hz; 1A SB Fuse (737-2) 230 Vac +10%, −5%; 50 Hz ±1 Hz; 1/2A SB Fuse
Power Required	100 watts, maximum
Size	14½"W x 11"D x 5"H; (368 mm) x (279 mm) x (127 mm)
Weight	12 lbs. (5.4 kg)
Ribbon (12 per box)	15 yard Zip-Pack mobius loop (Centronics P/N 63701712-6001)
Paper Handling	Cut sheets, 8½" (21.6 mm) wide Rolls, 3½" to 8½" (88.9 to 21.6 mm) W x 5" (127 mm) diameter; 1" (25.4 mm) core; 3 ply maximum Fanfold, 228 mm (9") pin to pin; adjustable ±1 mm (Optional) 238 mm; adjustable ±1 mm

* Model 737-2 has switch-selectable country character sets for USA, France, United Kingdom, Germany, Italy and Sweden/Finland.

SECTION 2
THEORY OF OPERATION

2.1 BASIC DESCRIPTION (Figure 2-1)

All logic, control, drive, and power supply circuits are contained on one printed circuit board. The print mechanism rides on a carriage driven by a DC motor. The printing is performed in the forward direction only, printing up to nine dots per column. The paper feed (line feed) rollers are driven by a stepping motor which is capable of forward and reverse line feed; manual and computer controlled. The ribbon drive (AC motor) moves ribbon past the print head at all times except when the carriage actuates the sensor at the leftmost carriage position. The power supply provides +5V regulated for the logic, +5V EXT for host device sense, +12V regulated for motor drive, +17V unregulated for solenoid and motor drive, and 24 VAC for the ribbon motor.

The host device transmits 7-bit parallel (ASCII) data and a strobe to the printer logic. The printer logic initiates and controls all transmissions from the host by the control signals ON-LINE, DEMAND, ACKNLG, and BUSY. When the microprocessor has processed a complete line (or when a print command code is sent), the microprocessor directs the printer to print the characters, column by column. Print head actuation is performed by energizing solenoids that drive circular pins, forming dot matrix characters and underlines. The carriage moves forward at five inches per second, with a somewhat faster carriage return speed.

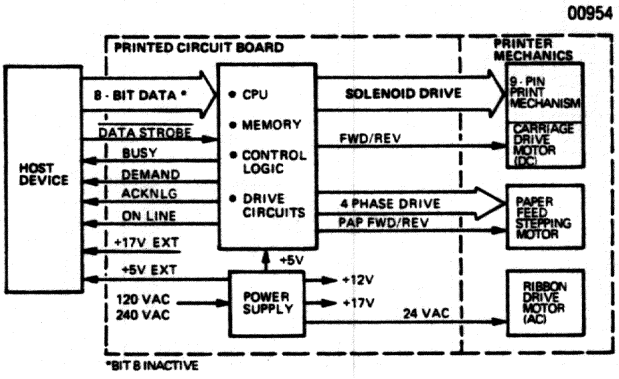

Figure 2-1 Basic Block Diagram

The printer is capable of printing 80 monospaced characters per line; 10 characters per inch (10 cpi). The monospaced matrix is 7 × 8, in upper and lower-case characters. Monospace descenders (y, g etc.) do not touch the underline (if used), which is provided by activating the 9th pin for all characters to be underlined (including intercharacter and interword spaces if appropriate). Underline may be turned on or off anywhere within a line and as many times as desired, for all character sets. Monospaced characters may be condensed to 16.7 cpi, resulting in 132 characters per line.

The proportionally-spaced character set is printed in N × 9 (N = 6 to 18) dot matrix. The proportional descenders (y, g etc.) will run into the underline because the 9th pin is used to form proportional descenders. Proportional text may be right justified through the use of intercharacter and inter-word spaces generated by the host device.

Average character spacing for proportional is approximately 14 cpi; however, numerals 0-9 are monospaced at 12.5 cpi to allow tabulation. Rather than counting characters to determine a full line, dot positions are counted for the proportional set, 1200 dot positions making a full line. If the host device does not transmit a Carriage Return (CR) to end the line at this point, the logic terminates the line with CR after counting and accepting every column of the character that exceeds a count of 1185, regardless of the width of the character (even an elongated W). The remainder of the truncated word (if this is the case) would begin on the next line. For monospaced 10 cpi, CR occurs at 80 characters, and for condensed (16.7 cpi), CR occurs at 132 characters.

All three basic character sets (proportional, monospaced and condensed) may be elongated beginning anywhere in the line after the host transmits ESC, SO. Elongation is accomplished by simply printing each character column twice. This results in half as many characters per inch for all character sets, and a wider, bold-appearing character. ESC, SI terminates the elongated characters.

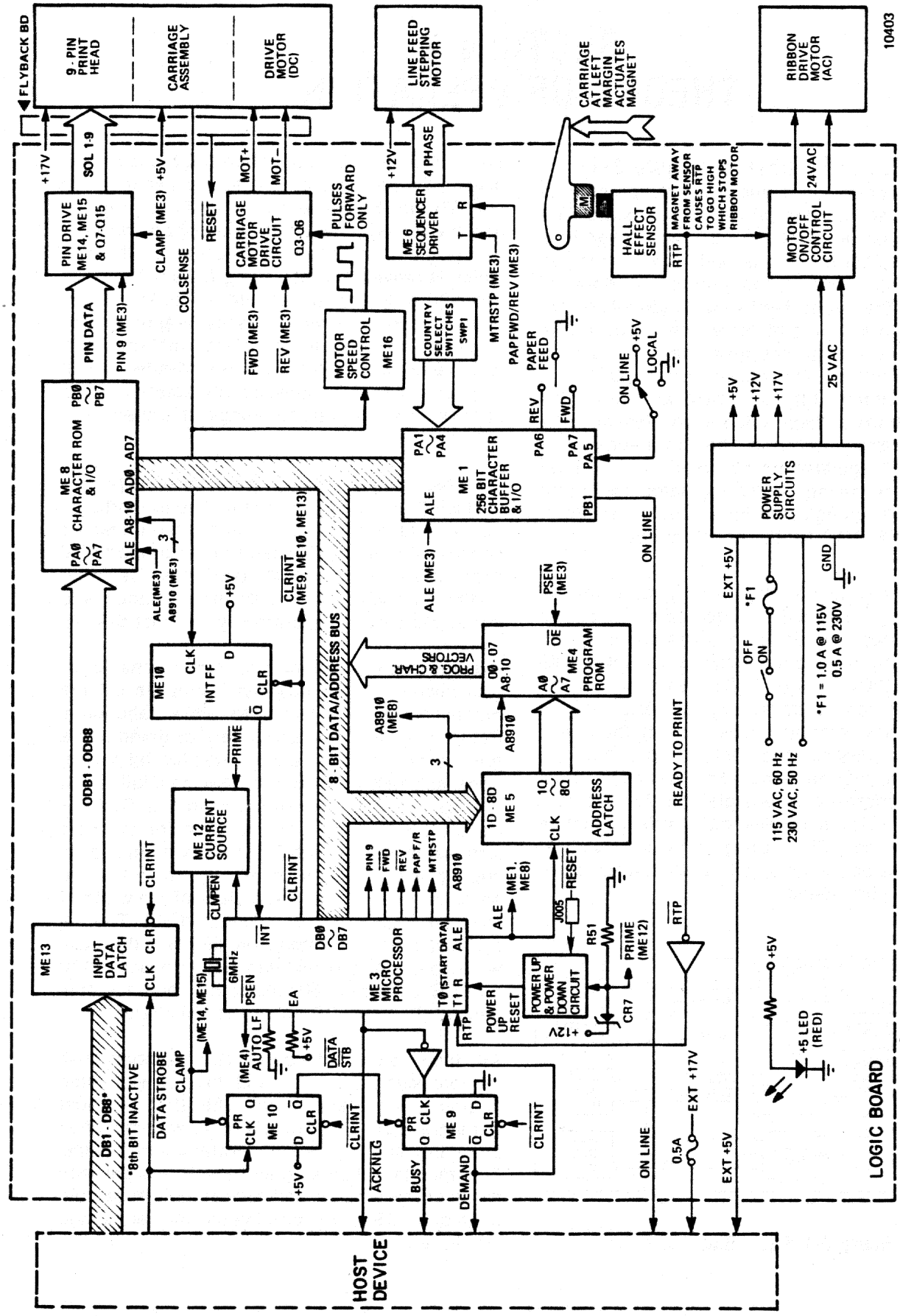

Figure 2-2 Detailed Block Diagram

2.2 DETAILED DESCRIPTION

2.2.1 MICROPROCESSOR

Refer to Figure 2-2. The microprocessor (ME3; 8049) controls all communication on the data/address bus, communication to the host and reception of data from the host. The basic clock (6 MHz) provides the time base for all timing pulses, motor steps and sequences used in the printer. ME3 contains 128 bytes of RAM and a storage capability of 255 consecutive Line Feed commands. An Auto LF load resistor is provided so that CR (Carriage Return) codes are followed by a Line Feed without additional command (if R11, 270 ohm resistor is removed, the Auto LF is disabled).

Principle input signals to ME3 are as follows: $\overline{\text{RESET}}$ is used to start the power-up and initialize routines. RTP (Ready to Print) is true at the Test 1 input when the carriage is positioned for printing the first character of the line near the left margin. The Busy FF (Q NOT is DEMAND) is applied to the Test 0 input to indicate storage of new data to be processed. The EA (External Access) input is tied to a Logic 1, directing program memory fetches toward the external memory (ME4 ROM). If a masked 8049 ROM containing program is installed, the EA input is pulled to ground by a zero ohm resistor, and the resident program of the 8049 is used instead of the external memory. This description assumes external program memory. COLSENSE from the carriage sets the Interrupt FF at the $\overline{\text{INT}}$ input. The rotating magnet on the carriage generates 100 COLSENSE pulses per inch, 800 per line. Internal to ME3, the software converts two COLSENSE pulses to three Column Interrupts when processing proportional and condensed (Figure 2-3). This provides 1200 character dot columns (positions where pins may or may not be driven depending on the text). The 10 cpi monospaced character set uses 800 columns (80 characters); thus, the special conversion is disabled for 10 cpi monospaced.

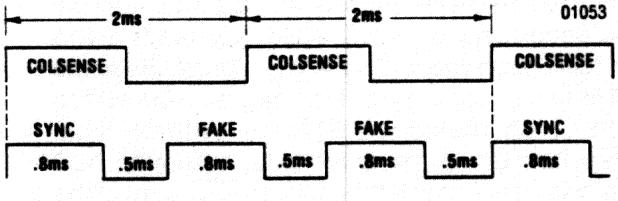

Figure 2-3 Software Interrupt Timing (Print Strobe)

Principle outputs from ME3 are as follows: ME3 uses DB0-DB7 as a bi-directional bus for transferring data, address and column patterns for pin driving. The program residing in ME4 is transferred to the Microprocessor over this bi-directional bus. Pin 9 from P25 of ME3 carries 9th pin data for underlining all characters sets and for descenders of the proportional set. High order bit addressing of ME4 and ME8 is provided by A8910 when 8 bits of address are not adequate. A8910 are the P20, P21, and P22 outputs of ME3. ALE (Address Latch Enable) is sent to ME1 and ME8 to latch the address bits. The bus is then available to accept the data being addressed. ALE also clocks ME5 Address Latch to hold address to ME4 which has no latch capability. $\overline{\text{PSEN}}$ (Program Store Enable) is developed shortly after ALE during a program memory fetch and provides an $\overline{\text{OE}}$ (Output Enable) for ME4, placing the contents of the location addressed onto the bus. $\overline{\text{CLMPEN}}$ (Clamp Enable) pulse triggers ME12 after initialization. This enables ME12 to current source the pin drivers. $\overline{\text{CLRINT}}$ (Clear Interrupts) resets ME13 Latch, the Data Strobe FF and Busy FF. $\overline{\text{FWD}}$ and $\overline{\text{REV}}$ (P11 and P12 of ME3) control the direction of the carriage drive motor. PAP FWD/REV (P26 of ME3) controls the direction of the Line Feed stepping motor. PAP FWD/REV low at ME6 allows normal (forward) line feed. MTRSTP is the Motor Step pulse (P27 of ME3) generated by the internal timer. Eight MTRSTP pulses equal one line feed (one-sixth inch of paper). At the MTRSTP pulse rate of 100 pps, paper moves at 2 inches per second.

Microprocessor outputs not shown in Figure 2-2 are found on print 63680148 and are as follows: IO/$\overline{\text{M}}$ (P26 of ME3, same line as PAP FWD/REV) selects the I/O or Memory function of ME1 and ME8. IO/$\overline{\text{M}}$ (low) selects RAM in ME1 and ROM in ME8. CE (Chip Enable) for ME8 is output at P23 and CE for ME1 is output at P24. $\overline{\text{RD}}$ (Read the bus) is an output strobe to enable data onto the bus for the microprocessor to read. At ME1, $\overline{\text{RD}}$ allows the microprocessor to read a print character code from RAM or to examine switch settings at Port A. At ME8, $\overline{\text{RD}}$ allows the microprocessor to read a character column from ROM for printing or to accept new data from Port A (ODB1-ODB8). $\overline{\text{WR}}$ (Write the bus) is an output strobe used to write data into an outboard memory. For ME1, $\overline{\text{WR}}$ writes data into RAM or Port B. For ME8, $\overline{\text{WR}}$ writes pin driving pulses onto Port B.

2.2.2 PROGRAM MEMORY

ME4 ROM contains the initialize routine, all program for this system and vectors (starting addresses) for character matrix data contained in ME8. The ROM has 11 address lines, 2048 locations, and an 8-bit data output bus. In this circuit, $\overline{CE}$ (Chip Enable) is actively tied to ground and the data output is enabled by PSEN at the $\overline{OE}$ input (pin 20). The 8 LSB of address are latched to the A0-A7 inputs by ME5 (clocked by ALE). The three MSB are A8910 (P20, 21, 22 of ME3).

2.2.3 INPUT DATA LATCH

The Input Data Latch stores each byte of input data as it is transmitted by the host device. The code format is 7-bit ASCII, positive true logic. The 8th bit is inactive in this system. The host transmits DB1-DB7 for approximately 3 microseconds and a $\overline{DATA\ STROBE}$ of about 1 microsecond, transmitted in the middle of the data window. The trailing edge (up-clock) of the strobe clocks the data into ME13. The data is available at the 1Q-8Q outputs until $\overline{CLRINT}$ clears the latch. $\overline{DATA\ STROBE}$ also sets the Data Strobe FF, which presets the Busy FF. The T0 input to the microprocessor goes low, and when the program tests for zero at this input, the new data is processed.

2.2.4 CHARACTER BUFFER AND I/O

ME1 contains a 256 x 8 bit RAM that stores characters not yet printed. All addressing and data transfers are performed on the bi-directional bus $\overline{AD0\text{-}AD7}$. ALE (Address Latch Enable) is used to latch the Address, CE (Chip Enable) and IO/$\overline{M}$ inputs. When CE is low, the AD0-AD7 input lines go to a high-impedance state so that this chip does not influence the bus. Latching occurs on the trailing edge (down-clock) of ALE. DATA is written into or read from ME1 depending on the status of $\overline{WR}$ or $\overline{RD}$ inputs. IO/$\overline{M}$ determines whether the RAM or one of the ports is written or read. If IO/$\overline{M}$ is low, RAM is selected. RESET (high) clears all registers and ports during power up, programming the C/SR (Command/Status Register) bits 0 and 1 so that Port A and Port B are inputs. Later in the initialization routine, Port B is instructed to be an output port. In this system, Port A (PA0-PA7) is used only as an input for examining switches. The ONLINE/LOCAL switch is input at PA5 and is written out at PB1 during a $\overline{WR}$ cycle by the microprocessor. Data cannot be sent by the host device unless ONLINE (and DEMAND) is active, as the initialization program hangs up in a tight loop until ONLINE is high. In the LOCAL mode, the PAPER REV/FWD switch controls the direction of the Line Feed stepping motor that drives the paper feed roller. Pressing the switch momentarily produces one line feed in that direction. Holding the switch for more than one-half second produces continuous line feed for as long as the switch is held.

2.2.5 CHARACTER ROM AND I/O

ME8 contains an EPROM (Erasable, Programmable Read-Only Memory) of 2048 x 8 capacity in which the character column data reside. Only eight pin positions (vertical) can be stored; thus, for underlining and for proportional descenders, 9th pin data is transmitted by the Microprocessor during the print operation. The starting address for each character is indicated by vectors contained in ME4 Program ROM. The bi-directional bus AD0-AD7 is used to transfer data and addresses. Three additional bits A8-A10 are used as the high order address to the ROM. $\overline{CE}$ (Chip Enable, low) is actively tied to ground and CE (high) is used to enable ME8. When CE is low, the chip is deselected and AD0-AD7 go to the high-impedance state. The selection of the ME8 ports (PA, PB) and the direction of data are accomplished by addressing and writing two independent 8-bit registers, DDR A and DDR B (Data Direction Registers A and B). Port A is selected by AD0 and AD1 low; Port B is selected by AD0 high and AD1 low. DDRA is addressed by AD0 low, AD1 high. DDR B is addressed by AD0 high, AD1 high. Although individual lines of each port may be written as input or output, all Port A lines are new data inputs from the host device and all Port B lines are pin drive outputs to the ME14-ME15 high-voltage drivers. All ones written into a DDR make that port an output and all zeroes make that port an input. The DDR's cannot be read. ALE latches the address lines AD0-AD7 and A8-A10, CE, $\overline{CE}$ and IO/$\overline{M}$ on the trailing edge (down-clock). $\overline{RD}$ low reads ROM or an I/O port out to the bus, depending on IO/$\overline{M}$. IO/$\overline{M}$ low reads ROM and IO/$\overline{M}$ high reads Port A (new data). Because $\overline{IOR}$ is tied to Logic 1, $\overline{RD}$ high causes AD0-AD7 to go to a high impedance. $\overline{IOW}$ low (with CE high) writes Port B with pin drive data, assuming AD0 high was previously latched. With $\overline{IOW}$ active, the state of IO/$\overline{M}$ is ignored. RESET high (occurs during power up) programs all port pins to be inputs.

2.2.6 CURRENT SOURCE AND CLAMP

Although the NE555 is normally used as an R-C timer/clock circuit, ME12 acts as a bias current source for the solenoid drivers, Q7-Q15. During normal operation, the bias is on the borderline of transistor conduction so that the pins are driven immediately and reliably when the ME14-ME15 drivers deliver the 800-usec pin drive pulses. Although Q7-Q15 are shown on the print as transistors, they are actually Darlington pairs with internal protection from solenoid transients. ME12 is triggered ON by the microprocessor pulse $\overline{\text{CLMPEN}}$ after initialization and is active as a bias current source until power down. Power down is sensed by zener diode CR7 supplied by +12V. When the zener voltage falls below conduction, the pull-down resistor R51 immediately generates $\overline{\text{PRIME}}$ to shut off ME12 making CLAMP low. This presets Data Strobe FF and Busy FF to inhibit host data transmission, and shuts off bias to the solenoid drive transistors. $\overline{\text{RESET}}$ is also presented to the microprocessor, as ME15-2 provides a rapid discharge sink for C2 (20 uF) through R13 (47 ohms).

2.2.7 MOTOR DRIVE AND SPEED CONTROL

The print carriage is driven on a rack by a reversible DC motor through a reduction gear train. Motor direction is controlled by $\overline{\text{FWD}}$ and $\overline{\text{REV}}$ from the microprocessor. The basic power source is +17 VDC, and heavy-current polarity switching is provided by power transistors Q3-Q6 connected in complementary-symmetry. These four transistors effectively reverse the motor connection to the +17V supply; Q3 and Q6 conducting when $\overline{\text{FWD}}$ is active, Q4 and Q5 conducting when $\overline{\text{REV}}$ is active.

The Motor Speed Control is a closed-loop feedback circuit for setting and regulating the forward carriage speed. The circuit compensates for variations in temperature and line voltage. Refer to schematic 63680148 for the following description.

The COLSENSE pulse rate (frequency) from the carriage is proportional to motor speed; thus, COLSENSE is used as the tachometer inputs to Motor Control chip ME16. The differential (+ and −) tachometer inputs are provided by the ME2 inverters. The rate of COLSENSE pulses is 500 Hz (one pulse every 2 msec) at the desired carriage speed of five inches per second. The COLSENSE pulses trigger a pulse generator inside ME16. The resulting constant-amplitude pulses are partially integrated by R55-C29, the pulsating DC applied to the ME16 comparator (−MD). The reference input (+MD) to the comparator is a steady DC level from potentiometer R59 (Speed Adjust). The comparator outputs a modulated DC waveform whose duty cycle is about 50% at the desired motor speed of five inches per second. This pulse-width modulated waveform is applied through the ME7 driver to the power transistor Q3, which intermittently applies +17V to the MOT+ terminal. Ground return from the MOT− terminal is provided by Q6, which is on when $\overline{\text{REV}}$ is inactive.

If the motor tends to slow down, COLSENSE pulses are less frequent, resulting in a greater duty cycle (more ON time than OFF) from the comparator; thus, the motor speeds up to normal. During the carriage return, the Motor Speed Control is not active and the motor operates at about twice the speed as in the forward direction.

2.2.8 CARRIAGE MOTOR STALL TIMEOUT

The carriage motor is protected from burnout by the microprocessor, which monitors COLSENSE pulses. If a print head jam or related failure occurs, the timer in the microprocessor is programmed for an interval of 30 seconds. If no more COLSENSE pulses are developed during this interval, the microprocessor removes power from the carriage drive motor by making $\overline{\text{FWD}}$ and $\overline{\text{REV}}$ both high at transistors Q3-Q6, which disables the drive current.

2.2.9 LINE FEED MOTOR CIRCUIT

The Line Feed motor is a reversible, 4-phase stepping motor. 10-ms rep rate pulses are provided by the microprocessor; 8 MTRSTP (Motor Step) pulses produce one-sixth of an inch of paper feed. Forward and reverse stepping are controlled by PAP FWD/REV (P26 of ME3). PAP FWD/REV low at ME6-3 provides forward line feed. P26 is time shared with IO/$\overline{\text{M}}$ control of ME1 and ME8. The field of the stepper motor is supplied with +12V and (pulsed) ground sink is provided by the Q1-Q4 outputs of ME6. The rotor is a multipole permanent magnet whose poles are spaced so that 8 motor steps produce one line feed by turning the drive roller one-sixth inch.

2.2.10 RIBBON MOTOR CONTROL CIRCUIT

The ribbon motor runs almost continuously, stopping only when the carriage actuates the Hall effect sensor by moving the magnet away from S1 (UGN 3013) at the left margin. The control works

as follows: while the magnet is against the sensor, $\overline{RTP}$ is low, which turns Q2 on. This allows gate current for Q1 (silicon-controlled rectifier) which provides a conductive bridge for diodes CR1-CR4. Two diodes conduct with each alternation from T1; either CR1+CR4 or CR3+CR2. Thus, 24 VAC is applied to the AC motor (the diodes do not rectify, they are switches). When the magnet is moved away from the sensor, $\overline{RTP}$ goes high and Q2 shuts off, removing gate current from Q1, opening the bridge and stopping the motor. If the carriage moves forward again to prepare for another line of printing, the magnet actuates the sensor, $\overline{RTP}$ goes low and the microprocessor prepares the print routine.

2.2.11 POWER SUPPLY CIRCUIT

Transformer T1 steps the line voltage (115 VAC, 60 Hz; 230 VAC, 50 Hz) down to 25 VAC center-tapped for full-wave rectification by CR5 and CR6. Large filter capacitor C3 (10K uF) provides pre-filtering for the regulator circuits and is the dynamic current source for the solenoids. C3 charges up to the peak of the rectified waveform and is +17 VDC before heavy loading. +17 VDC is applied to regulators VR1 (EXT +5V), VR2 (+12V), and VR3 (+5V Logic). The regulator circuits have post-filtering provided by C5, C6, and C7. Indicator LED (DS1) glows red to indicate that the +5V logic supply is functioning.

2.2.12 FLYBACK PROTECTION CIRCUIT

The flyback circuit is contained on a small PCB that plugs into J004 on the Logic PCB. A flexible ribbon cable completes the circuit to the print head. The circuit works as follows. (Refer to schematic 63680173).

The silicon diodes and zener diodes protect the solenoid drive transistors from switching transients. Additionally, a 2.5A fuse in series with each solenoid provides overload protection. Capacitor C1 filters the commutator noise from the DC motor and C2 filters the +5V line to the Hall effect sensor that produces column sense (COLSENSE) pulses.

The electronic circuitry generates a reset to the microprocessor whenever there is a print head jam, paper jam, etc. This reset removes power from the carriage drive motor and solenoids. The operational amplifiers monitor MOT + and MOT − to determine when the motor is powered. Column sense pulses are monitored by charging a capacitor (C5) at the input to another operational amplifier. Solenoid current is monitored at Q1 as an additional condition for generating the reset. Failure of COLSENSE pulses for about 250 milliseconds allows C5 to discharge. This failure, along with power to motor or current through any solenoid applies a reset (low) through J005 to ME15-pin 2 which discharges C2 on the Logic PCB. This resets the microprocessor and associated logic circuitry.

2.3 POWER UP/DOWN ROUTINES

2.3.1 POWER UP/INITIALIZE ROUTINE

Refer to Figure 2-2. When the power switch is turned on, the +5V logic supply gets up to Logic 1 (approximately +3V) in a few milliseconds. A R-C delay provided by C2 (20 uF) and R12 (12K ohms) holds a low on pin 3 of inverter ME11 for 100 milliseconds. Inverter ME7-8 holds the $\overline{RESET}$ input to microprocessor ME3 low. ME11-4 provides a high level to the RESET inputs of ME1 and ME8. The CLAMP from ME12 is low, disabling the solenoid drivers and presetting Data Strobe FF and Busy FF to inhibit host data. After the power-up reset circuit C2-R12 times out, the microprocessor performs the initialization routine which includes the following: disable column interrupt with $\overline{CLRINT}$, which also clears the Input Data latch ME13 and Data Strobe FF, releasing the preset on the Busy FF; addressing the DDR's and CSR's of ME1 and ME8 to set up the ports; prevent pin firing; select the primary character set (10 cpi monospaced); clear 8049 memory and move the pointer to the top of RAM; clear the data buffer in ME1; enable the solenoid drive current source ME12 with CLMPEN; check for print head at left margin (RTP) and home it if required; check for ONLINE at ME1 (loop here if LOCAL) and prepare for host data.

2.3.2 POWER DOWN ROUTINE

Whenever the AC line voltage takes an extended dip, or if power is lost to the printer for any reason, the printer circuitry prevents pin driving and data transmission from the host device as follows: The +12V applied to zener diode CR7 falls below the zener voltage and resistor R51 (150 ohms) generates $\overline{PRIME}$ (low) before the +5V logic supply falls below logic 1. $\overline{PRIME}$ makes CLAMP go low, removing solenoid driver bias (disabling pin driving). CLAMP also presets Data Strobe FF which sets Busy FF, inhibiting data from the host device. The microprocessor (ME3), ME1, and ME8 are also reset. All print codes in ME1 data buffer are lost. When the host device polls the printer status, ONLINE is low and EXT +5V is low, indicating power down at the printer.

2.4 INPUT DATA CYCLE

Data is sent by the host device when ONLINE is active and $\overline{\text{ACKNLG}}$ has set DEMAND to invite data. The character set has been selected by power up or by the host transmitting ESC, DC1; ESC, DC3, or ESC, DC4. The host sends a 7-bit ASCII code and a strobe. The code is latched at ME13 and made available at ME8, Port A. The strobe alerts the 8049 microprocessor that a new input code is available, so the 8049 calls the code in, using the 8-bit bidirectional bus. BUSY is set to inhibit transmissions from the host until this code is completely processed. The 8049 strips the 8th bit, ignores NULL codes (0000000) and treats deletes (1111111) as NULL codes. No operation takes place for NULL's and the next data is called in.

The 7-bit ASCII code is decoded in the 8049 to determine if it is a control code, in this sequence: BS, LF, CR, ESC, SO, and SI. If not a control code, the dot column width of this character or space is determined, considering whether Elongation is active and whether the character is 10 cpi, 16.7 cpi or proportional. The character count is also kept (except for proportional) so that the Buffer Full condition can be determined to end the line if the host neglects sending CR. Thus, the dot column width is added to the column count and the 7-bit ASCII code is sent to the 8156 RAM (ME1) where it is stored (buffered). Note that some control codes (SO, SI) are immediately buffered and the next code is called in. Buffered codes comprise the line to be printed, when appropriate.

If an ESC control code is decoded, an Escape sequence is recognized and the next code is called to be examined. For example, if the code following ESC is SO, the Set Elongated Characters sequence is decoded and this condition is set in the 8049. Characters and spaces following this sequence will be elongated, the column count being doubled for each character and space. If the code following ESC is decoded as a character whose dot column width is less than 7, a Justification Space sequence is recognized (ESC, 1 thru ESC, 6). The column count is increased by the designated space and the code is buffered as a character.

When CR is decoded, or when Buffer Full occurs, the program calls the Print Routine. Note that all other control codes that are terminators also call the Print Routine. For a list of control codes and their functions, refer to the Operators Manual.

2.5 PRINT CYCLE

The Print Cycle is entered when a CR code is received or a Buffer Full condition exists. Any terminator control code will also result in the program switching from the Input Data Cycle to the Print Cycle. Assuming that the carriage is at the left margin and has stepped forward to generate RTP (Ready to Print), the print head is in position to drive pins to form characters. A line of characters, spaces, and control codes is held in the Print Buffer (ME1; 8156) in the form of 7-bit ASCII codes.

The first 7-bit ASCII code is transferred from the Print Buffer to the 8049 over the 8-bit bidirectional bus. The character is decoded to determine whether it is a control code (such as an ESC, DC3 sequence to select 10 cpi) or a printable character. If a printable character such as upper case A, a separate table must be consulted depending on whether the character set is monospaced or proportional. The 8049 adds an offset to the ASCII code and addresses the 2716 ROM (ME4) to obtain the vector for this character. The vector is the starting address of the pin data for the character. The pin data resides in ME8 ROM in the form of vertical columns, each column in an adjacent location. For proportional characters, both the starting and ending addresses must be determined because the width format is not constant (N = 6 to 18 dots wide).

To print characters, the 8049 addresses the ME8 ROM to transfer the pin data over the bidirectional bus. After possible minor reconstruction, each sequential column of data is transmitted back over the bus to drive the pins to form the character as the print head moves to the right. Synchronization for pin drive is provided by COL-SENSE pulses from the carriage. For spaces, no pins are driven. If proportional descenders require 9th pin drive, the vertical position of the column within ME8 ROM is shifted up by one dot so that the 9th pin data is sent to the 8049 on the 8th data line. Characters with descenders have no ascenders, so no data is lost in the vertical shift. In the 8049, the column is shifted back down and the 9th pin is transmitted separately but synchronized with the 8-bit drive.

Underline data is not contained in ME8 ROM as a character; continuous 9th pin drive is issued directly from the 8049 while underline is active. Underline and 9th pin descenders merge as a single 9th pin drive. Only the vertical rule (with

underline active) drives 9 pins simultaneously.

When proportional and 16.7 cpi monospaced characters are being printed, the additional print strobes (described previously) are generated from COLSENSE pulses (3 print strobes from 2 COLSENSE pulses) so that more characters per inch are printed although the carriage moves forward at a constant 5 inches per second.

Whenever a printed line is interrupted by an ESC, FS (Half Line Feed) or similar control code, the carriage always returns to the left margin sensor and moves forward, counting COLSENSE pulses to reach the appropriate position to print the next "line." This is done to obtain the greatest positional accuracy because overshoot caused by carriage momentum is washed out in this manner.

SECTION 3
MAINTENANCE AND TROUBLESHOOTING

3.1 GENERAL

This section contains information on maintaining and troubleshooting the printer. Routine preventive maintenance is contained in the Operators Manual. Troubleshooting procedures contained in this section aid in isolating malfunctions to defective components or required adjustments.

3.2 SERVICE CLEANING & LUBRICATION

This cleaning and lubrication procedure should be performed by qualified service personnel whenever the printer requires servicing or repairs which require the cover assemblies to be removed. The procedures should be performed prior to detailed service and repair procedures as some malfunctions can be caused by dust, ribbon chaff, paper chaff, residue build-up, or inadequate lubrication.

1. Remove the printer cover assemblies per instructions in Operators Manual.

2. Visually inspect the interior of printer for loose wires, connectors, and hardware, wearing of cables, and badly worn or damaged parts.

3. Remove the Mechanism Assembly per paragraph 5.2 and set it to one side.

4. Using a soft bristle brush sweep away the paper and dust residue from the printer base and printed circuit board.

5. Clean the print head and carriage assembly using soft bristle brush to remove dust and residue.

6. Gently remove all dried ink from the front of the print head using a soft, clean, lint-free cloth.

7. Clean contaminated parts of the rest of the mechanism assembly using a freon-moistened lint-free cloth. Pay particular attention to the carriage shafts and the paper roller end-plate bushings.

8. Clean the carriage shafts by applying several drops of lubricating oil to a soft, clean lint-free cloth, then moving the print head to the left side of printer and lightly rubbing the shafts to remove residue build-up. Move print head to the right side of the printer and clean the left side of the shafts.

9. Clean the paper drive roller and the end plate bushings using a soft, clean, lint-free cloth, then apply one drop of light lubricating oil to both paper roller end plate bushings. Cycle the paper roller using the thumbwheels to allow the oil to seep into the bushings.

10. Reassemble the printer and continue with service procedures. After completion of service, clean all external surfaces using a mild detergent and a soft, clean, lint-free cloth.

3.3 TROUBLESHOOTING

Table 3-1 lists some malfunctions which may occur, the probable causes, and the remedies. The procedures referenced in the detailed troubleshooting chart should be performed by qualified service personnel who have been trained to maintain and repair complex electronic and electromechanical equipment.

Table 3-1 Detailed Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	REMEDY
Printer on, but inoperative.	Interface cable not connected.	Connect cable.
	Defective Logic PCB.	Replace Logic PCB per paragraph 5.4.
Head drags (wide smudge on paper).	Head gap improperly adjusted.	Adjust printer head gap. (See paragraph 4.3).
	Defective head-carriage assembly.	Replace defective head-carriage assembly. (See paragraph 5.8).
Light smudge under print line.	Head gap improperly adjusted.	Adjust printer head gap. (See paragraph 4.3).
	Defective head-carriage assembly.	Replace head-carriage assembly. (See paragraph 5.8).
Tear or creases in paper (jams).	Head gap improperly adjusted.	Adjust printer head gap. (See paragraph 4.3).
	Defective head-carriage assembly.	Replace head-carriage assembly. (See paragraph 5.8).
Print too light.	Head gap improperly adjusted.	Adjust printer head gap. (See paragraph 4.3).
	Worn out or defective ribbon.	Replace ribbon. (See ribbon loading procedure in Operators Manual).
	Defective head-carriage assembly.	Replace head-carriage assembly. (See paragraph 5.8).
Left hand margin wanders.	Defective Logic PCB.	Replace Logic PCB. (See paragraph 5.3).
	Defective mechanism assembly.	Replace mechanism assembly. (See paragraph 5.2).
Prints too slowly.	Printer requires general cleaning and lubrication.	Clean and lubricate printer. (See paragraph 3.2).
	Rotor/Hall effect device improperly adjusted.	Adjust rotor/Hall effect device. (See paragraph 4.4).
	Print speed improperly adjusted.	Adjust print speed. (See paragraph 4.5).
	Defective Logic PCB.	Replace Logic PCB. (See paragraph 5.3).
	Defective head-carriage assembly.	Replace head-carriage assembly. (See paragraph 5.8).
	Defective mechanism assembly.	Replace mechanism assembly. (See paragraph 5.2).

Table 3-1 Detailed Troubleshooting Chart (cont'd)

TROUBLE	PROBABLE CAUSE	REMEDY
Prints erratically (missing dots).	Defective 9-wire head ribbon cable assembly.	Replace 9-wire head ribbon cable assembly.
	Defective 8049 microprocessor.	Replace 8049 microprocessor.
	Defective Logic PCB.	Replace Logic PCB. (See paragraph 5.3).
	Defective print head.	Replace print head, 9-wire flex circuit.
Same dot(s) always missing.	Defective ribbon cable.	Replace 9-wire head ribbon cable assembly.
	Defective flyback board.	Replace flyback board.
	Defective Logic PCB.	Replace Logic PCB. (See paragraph 5.3).
Pin No. 9 prints too lightly.	Defective head-carriage assembly.	Replace head-carriage assembly. (See paragraph 5.8).
	Defective platen assembly.	Replace platen assembly. (See paragraph 5.9).
Line feed operates improperly.	Printer requires general cleaning and lubrication.	Clean and lubricate printer. (See paragraph 3.2).
	Line feed stepper belt/pulley improperly adjusted.	Adjust belt tension or tighten pulley. (See paragraph 5.4).
	Defective line feed stepper motor assembly.	Replace line feed stepper motor. (See paragraph 5.4).
	Defective mechanism assembly.	Replace mechanism assembly. (See paragraph 5.2).
	Defective Logic PCB.	Replace Logic PCB. (See paragraph 5.3).
Carriage emits thumping noise while printing.	Printer requires general cleaning and lubrication.	Clean and lubricate printer. (See paragraph 3.2).
	Defective carriage molded rack assembly.	Replace carriage molded rack assembly. (See paragraph 5.5).
	Defective head-carriage assembly.	Replace head-carriage assembly. (See paragraph 5.8).
	Defective mechanism assembly.	Replace mechanism assembly. (See paragraph 5.2).
Excessive print density at beginning of print line (over-print).	Defective Logic PCB.	Replace Logic PCB. (See paragraph 5.3).
No ribbon movement.	Ribbon drive motor connector J002 unplugged.	Check for proper connection.
	Defective ribbon drive motor.	Replace ribbon drive motor.
	Defective Logic PCB.	Replace Logic PCB. (See paragraph 5.3).

SECTION 4
ADJUSTMENTS

4.1 INTRODUCTION

Certain malfunctions and marginal operation may require that the printer be adjusted. Adjustment should also be performed whenever an affected part is replaced in the printer. The following adjustment procedures are contained in this section.

- Printer Head Gap Adjustment
- Rotor/Hall Effect Sensor Clearance Adjustment
- Print Speed Adjustment

All of the procedures contained in this section are performed with the printer cover assemblies removed. Refer to the Operators Manual for the procedure for removing the printer cover assemblies, and to Section 5 for other removal procedures as required. Only the Print Speed adjustment is performed with power applied to the printer.

WARNING

Care must be taken when adjusting the printer with the covers removed and power applied to the printer as injury can result from contact with moving parts of the printer or areas within the printer where hazardous voltages are present.

Before performing any adjustment procedure contained in this section, read the procedure carefully to ensure that it is understood, that the appropriate tools and accessories are available, and that care is exercised when performing the adjustment.

4.2 TOOLS AND ACCESSORIES

The procedures contained in this section require the following tools and accessories:

4.2.1 TOOLS

- 1/4 inch flat tip screwdriver
- 1/4 inch nut driver
- 5/8 inch nut driver
- No. 1 Phillips screwdriver
- .004 feeler gauge
- .005 feeler gauge
- .014 feeler gauge
- 2 mm Allen wrench
- .050 Allen wrench

4.2.2 ACCESSORIES

- 3/8 inch ignition wrench with overall length less than 2 inches
- Mini-Exerciser
- Mini-Exerciser interface cable

The accessories listed above may be obtained from Centronics.

4.3 PRINTER HEAD GAP ADJUSTMENT

Refer to Figure 4-1 and perform the following:

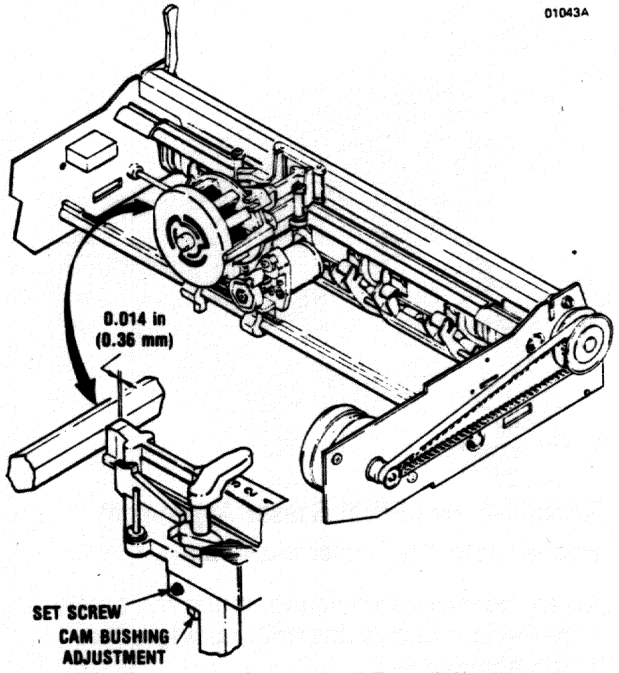

Figure 4-1 Printer Head Gap Adjustment

1. Remove the printer cover assemblies.
2. Remove the mechanism assembly per paragraph 5.2.
3. Carefully move the print head to the center of the printer mechanism. Handle the carriage by the sturdy casting area above the carriage rack.
4. Place the print head release lever in position 3 and insert a .014 inch feeler gauge between the nose of the print head and the platen.
5. Loosen the set-screw located on the left side of the head carriage assembly using a 2 mm Allen wrench.
6. Adjust the cam-bushing adjusting nut located under the left side of the head-carriage assembly until the .014 inch feeler gauge slips easily between the print head nose and the platen.

NOTE

Ensure that the print head release lever is maintained in position 3 during this adjustment.

7. Tighten the set-screw loosened in step 3. using a 2 mm Allen wrench.

4.4 ROTOR/HALL EFFECT SENSOR CLEARANCE

Refer to Figure 4-2 and perform the following:

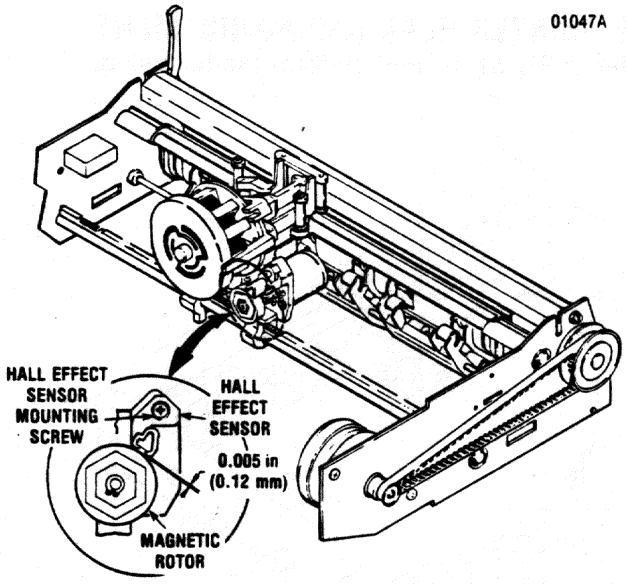

Figure 4-2 Hall Effect Sensor Adjustment

1. Remove the printer cover assemblies.
2. Loosen the Hall effect sensor mounting screw on the head carriage assembly using a No. 1 Phillips screwdriver.
3. Insert a .005 feeler gauge between the sensor and the magnetic rotor.
4. Move the sensor against the feeler gauge until the gauge can be moved with slight friction, then tighten the mounting screw.
5. Insert a .004 feeler gauge between the sensor and the magnetic rotor. The gauge should fit loosely.
6. Carefully move the head carriage assembly and observe the rotor. The rotor should rotate without touching the sensor.

4.5 PRINT SPEED ADJUSTMENT

Refer to Figure 6-4 for the location of R69 (print speed adjustment pot).

1. Remove printer cover assemblies.
2. Set up printer for testing with Mini-Exerciser.
   - Connect Mini-Exerciser using ribbon interface cable.
   - Place right-hand (outer) switch on Mini-Exerciser in down position (print spaces).
   - Place POWER ON/OFF switch in OFF position.
   - Place ONLINE/LOCAL switch in ONLINE position.
   - Connect power cord to a 3-wire grounded outlet. Make certain that the voltage and frequency are correct for the printer model (115V, 60 Hz for 737-1; 230V, 50 Hz for 737-2).
3. Place POWER ON/OFF switch in ON position and observe that the power on LED illuminates.
4. Place ONLINE LOCAL switch in LOCAL position. The print head will move to the left margin, then to the right margin and back. Each time the print head reaches the right margin and reverses direction a line feed is executed. This action continues until the printer is turned off or the ONLINE/LOCAL switch is placed in the LOCAL position.
5. Determine the number of times the print head moves from left to right in one minute (lines per minute) by observing print head movement and using a watch or clock. The proper rate is from 22 to 24 lines per minute.
6. Adjust potentiometer R59 until the proper rate (22 to 24 lines per minute) is achieved.

NOTE

If a scope is available, monitor Column Interrupts at TP1 or ME3, pin 6. Adjust potentiometer R59 for a time interval of 2.0 to 2.1 milliseconds between pulses (with carriage moving forward).

SECTION 5
REMOVAL AND REPLACEMENT

5.1 SCOPE OF THIS SECTION

This section contains removal and replacement procedures which should be performed by trained service personnel. Some procedures require special tools and adjustments. Replacement of line fuse F1 and the automatic line feed resistor are contained in the Operators Manual P/N 37400781. Table 5-1 lists recommended spares for depot-level maintenance where only major components are replaced.

5.2 MECHANISM ASSEMBLY (Reference Figure 5-1)

When replacing the mechanism assembly, be certain to observe the CAUTIONS to avoid damage to the printer.

1. Place power switch in the OFF position and remove plug from the wall outlet. Remove the top cover and body cover as detailed in the Operators Manual.

CAUTION

Before removing the connector from J003 in step 2., move the print carriage to the extreme right to allow room to grasp the connector and to avoid damage to the carriage assembly. Also, support the circuit board at the base of J003 by pressing down with the fingers of the other hand while pulling up on the body of the connector. DO NOT pull on the wires.

2. Remove the stepping motor power connector from J003. See CAUTION above. Remove transformer ground connection from mechanism assembly.

3. Carefully unplug the ribbon connector from the Flyback Board Connector at the middle of the printed circuit board. Unplug J005 single wire connector and transformer ground connector.

4. Release the mechanism assembly from the printer base by pulling out slightly on the retaining tabs at both sides. Lift the mechanism assembly up and out.

5. Carefully unplug the ribbon cable from the connector on the carriage and save the cable for the replacement mechanism.

CAUTION

Before installing replacement mechanism assembly, check/adjust the following clearances: print head to platen and Hall effect sensor to magnetic rotor as detailed in Section 4. IMPORTANT: Move the carriage to the right side before installing the replacement mechanism assembly; otherwise, the RTP actuator arm may erroneously be positioned to the left side of the RTP assembly, which would result in damage to the carriage rack.

Table 5-1 Recommended Spare Parts

DESCRIPTION	PART NUMBER	QTY. PER MACH. POPULATION		
		100-250	251-500	501-1000
Assy, Mechanism (228 mm) Short	63680202-5003	12	22	40
Assy, Mechanism (238 mm) Long	63680202-5002	12	22	40
PCB, Logic Board (737-1)	63680147-4001	2	3	6
PCB, Logic Board (737-2)	63680147-4002	2	3	6
Assy, Ribbon Drive Motor (737-1)	63669271-4001	2	3	6
Assy, Ribbon Drive Motor (737-2)	63669271-4002	2	3	6
Box of 12 Ribbons	63701712-6001	–	–	–
Assy, Head/Carriage	63669278-5002	0	1	2
FF Hd Assy, 9 Wire Flex Circuit	62001100-5006	1	2	4
Assy, Ribbon Cable 9 Wire Hd	63680142-4001	2	3	6
Assy, Carriage Motor Drive	63669264-4001	2	3	6
LF Stepping Motor Assy	63680114-4001	0	1	2
Carriage Rack, Molded	63669240-2001	1	2	4
Line Fuse; 1A SB (737-1)	39030000-1001	10	20	40
Line Fuse; 0.5A SB (737-2)	39030016-1001	10	20	40
Assy, 8049 IC Microprocessor	63669503-4006	2	3	6

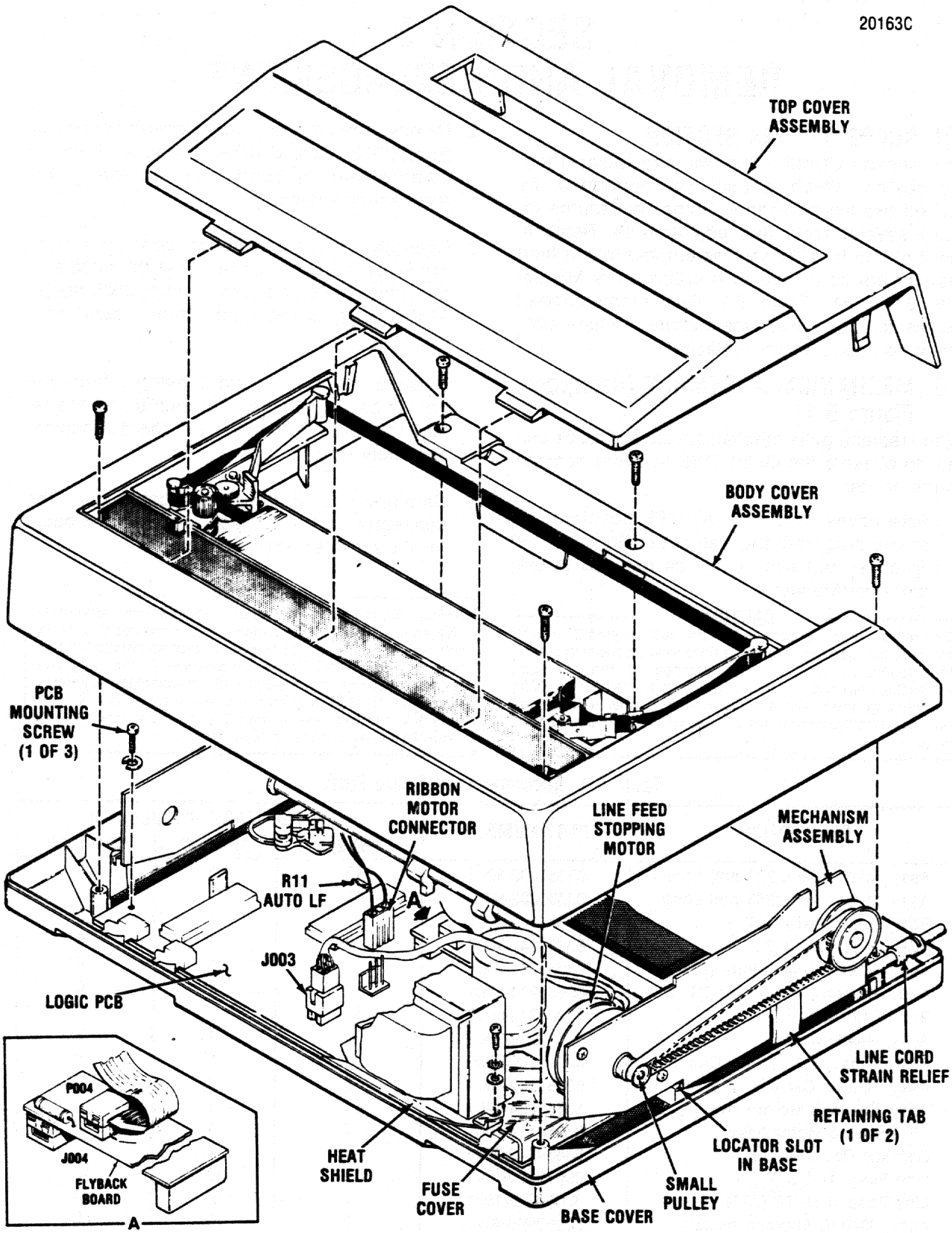

Figure 5-1 Mechanism Assy. Replacement

6. Install the replacement mechanism assembly by carefully indexing the side plates into the locator slots in the base, then lock the retaining tabs into the slots on the side plates. Connect transformer ground.

7. Install the ribbon cable, plugging it carefully into the sockets on the carriage and the flyback board (see inset, Figure 5-1). The ribbon cable must loop behind the strain-relief bar on the carriage assembly. Plug in single wire connector J005 and transformer ground connector.

8. Plug the stepper motor cable connector into J003.

9. Reassemble the top cover and body cover.

5.3 PCB LOGIC BOARD (Reference Figure 5-1)

When replacing the PCB logic board, removal of the assemblies is required as follows:

1. Place power switch in the OFF position and remove plug from the wall outlet. Remove the cover assemblies as detailed in the Operators Manual.

2. Remove the mechanism assembly per paragraph 5.2. Be certain to read the CAUTIONS for removal/replacement of the mechanism assembly.

3. Remove one Phillips-head screw at the left front corner of the PCB and two Phillips-head screws at transformer T1. Save the transformer heat shield and plastic high voltage (fuse) shield for replacement if appropriate.

CAUTION

When removing the PCB from the base, or when inserting the replacement PCB, take care not to damage the switches, which extend out of the front panel.

4. Disengage the rear edge of the PCB by sliding it toward the front. Lift up at the rear edge and carefully pull the PCB out of the base, disengaging the line cord strain relief from the base. Unplug single wire connector J005 and remove the Flyback Board and save it for replacement if appropriate.

5. Install the replacement PCB, making certain that the shields from step 3. are properly installed, and that the line cord strain relief is indexed properly at the rear of the base. Refer to steps 4., 3., 2., and 1. as required for reassembly.

5.4 LINEFEED STEPPING MOTOR (Reference Figure 5-1)

To replace the linefeed stepping motor assembly, removal of the assemblies is required as follows:

1. Place power switch in the OFF position and remove the plug from the wall outlet. Remove the cover assemblies as detailed in the Operators Manual.

2. Remove the mechanism assembly per paragraph 5.2. Be certain to read the CAUTIONS for removal/replacement of the mechanism assembly.

3. Remove the two Phillips-head screws and mounting hardware and remove the line feed stepping motor assembly and drive belt.

4. (If necessary) Remove the small pulley from the motor shaft using a 0.050" Allen hex key and install the pulley on the shaft of the replacement motor. Place it fully onto the shaft, but do not cause binding at the bearing. Tighten the Allen screw.

5. Align the replacement motor at the mounting position and slip the belt onto the pulleys. Mount the motor using the hardware of step 3.

6. Remove the slack in the belt by drawing the motor toward the front of the printer, then tighten the hardware.

CAUTION

Do not over-tighten the belt, as this could result in premature failure of the stepper motor.

7. Install the mechanism assembly and cover assemblies. Refer to steps 2. and 1. as required.

5.5 CARRIAGE RACK, MOLDED (Reference Figure 5-2)

To replace the carriage rack, removal of the assemblies and removal of the lower carriage shaft is required as follows:

1. Place power switch in the OFF position and remove plug from wall outlet. Remove the cover assemblies as detailed in the Operators Manual.
2. Remove the mechanism assembly per paragraph 5.2.
3. On the left side plate, remove the rack tension leaf spring mounting screw with a 6.5 mm (¼") nut driver. Remove the retaining ring from the end of the lower carriage shaft and the retaining ring inside the left side plate.
4. On the right side plate, remove only the inside retaining ring from the lower carriage shaft.
5. Carefully slide the carriage shaft out of the right end plate. With the carriage shaft removed, the molded rack may now be removed.

CAUTION

The rack is not symmetrical, and must be installed so that the teeth are provided at the left end for the RTP function. The end with more teeth is also identified by a molded stud on the end.

6. Insert the replacement rack, observing the CAUTION above. Insert the carriage shaft and orient the retaining ring on the right end so that it does not interfere with the end of the rack. Insert all retaining rings in this manner.
7. Insert the rack tension leaf spring so that it tightens the rack.
8. Install the mechanism assembly and cover assemblies, referring to steps 2. and 1. as required.

5.6 BASE COVER ASSEMBLY (Reference Figure 5-1)

To replace the base cover, remove the assemblies as follows:

1. See the power removal WARNING (paragraph 5.1). Remove the cover assemblies per the Operators Manual.
2. Remove the mechanism assembly per paragraph 5.2.

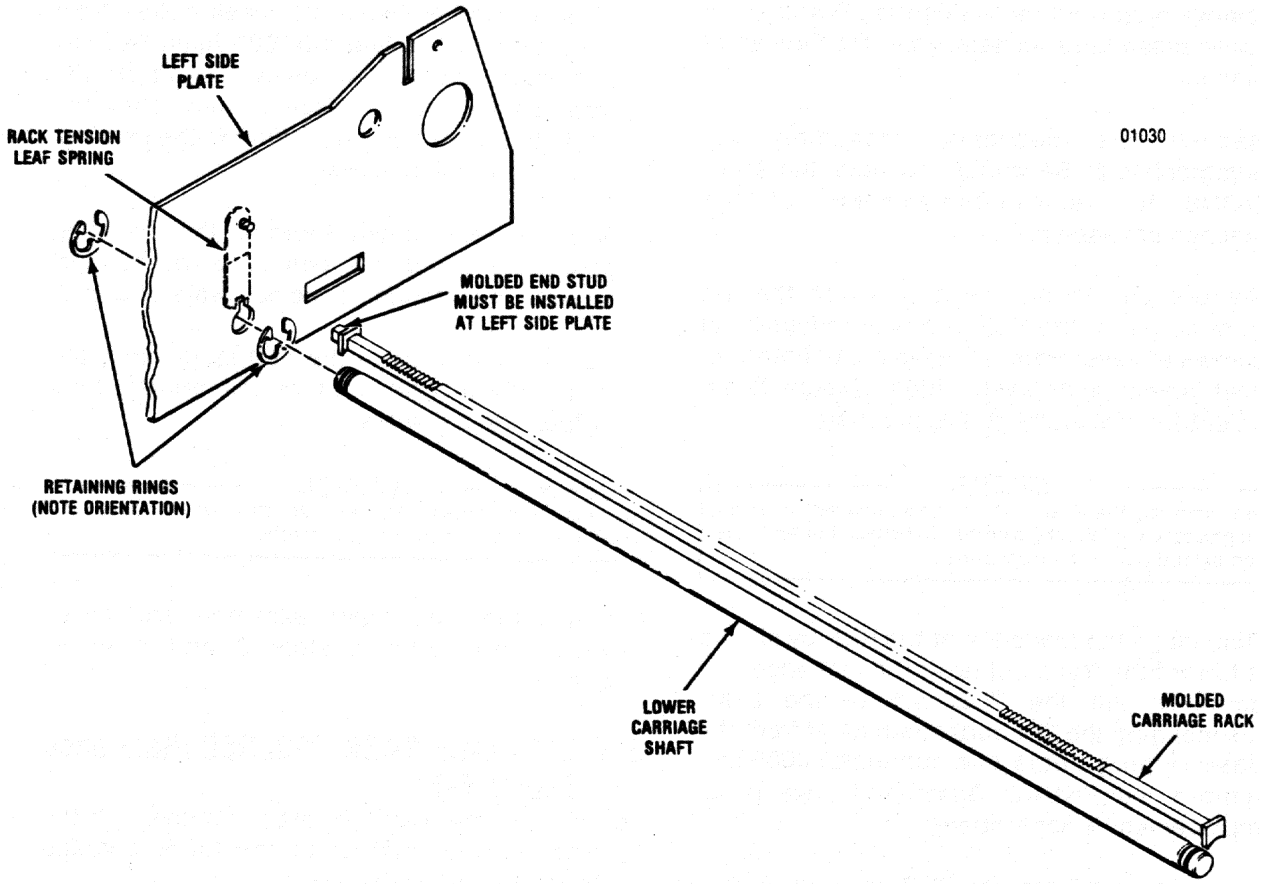

Figure 5-2 Molded Carriage Rack

3. Remove the PCB logic board per paragraph 5.3.

4. Reinstall all assemblies on the replacement base cover. Refer to steps 3., 2., and 1. as required.

5.7 BODY COVER ASSEMBLY (Reference Figure 5-1)

To replace the body cover assembly, proceed as follows:

1. Place the power switch in the OFF position and remove the plug from wall outlet. Remove the cover assemblies per the Operators Manual.

2. Install the replacement body cover assembly consisting of the body cover, soundproofing, ribbon drive motor assembly, capstan, and ribbon tensioner.

3. Install a new Zip-Pak ribbon per the Operators Manual.

5.8 HEAD-CARRIAGE ASSEMBLY (Reference Figure 5-3)

Replacement of the head-carriage assembly requires removal of the assemblies as follows:

1. Place the power switch in the OFF position and remove plug from the wall outlet. Remove the cover assemblies per the Operators Manual.

2. Remove the mechanism assembly per paragraph 5.2.

CAUTION

When removing the carriage shafts, take care not to score the shafts, as this could result in rough carriage movement or excessive wear of the carriage. Also, the carriage must be supported and handled carefully during removal and replacement.

3. Remove the two outside retaining rings from the carriage shafts at the right side plate, using a ¼" flat blade screwdriver, then remove the four inside retaining rings from the carriage shafts.

4. Remove the rack tension leaf spring from the left side plate using a 6.5 mm (¼") nut driver.

5. Carefully press the right ends of the carriage shafts through the side plate, and move them out through the left side plate.

6. Remove the molded rack from the mechanism assembly and set the defective head-carriage assembly aside.

7. Align the replacement head-carriage assembly and insert the nylon rack through the carriage bushings, then index the ends of the rack into the slots in the side plates. See CAUTION below.

CAUTION

The rack is not symmetrical, and must be installed so that the end with the molded stud is at the left side plate. The additional rack teeth are required for the RTP function.

8. Install the carriage shafts and rack tension leaf spring, referring to steps 5., 4., and 3. as required. See NOTE below.

NOTE

Before installing the mechanism assembly on the base, perform the clearance check/adjustment on the head-carriage assembly for the print-head to platen gap and the Hall effect sensor (Column Sense) and rotating magnet gap as detailed in Section 4.

9. Install the mechanism assembly and cover assemblies, referring to steps 1. and 2. as required.

5.9 PLATEN ASSEMBLY (Reference Figure 5-4)

Replacement of the platen assembly requires removal of the assemblies as follows:

1. Place the power plug in the OFF position and remove the plug from the wall outlet. Remove the cover assemblies per the Operators Manual.

2. Remove the mechanism assembly per paragraph 5.2.

3. Remove one mounting screw from the side plate at each end of the platen using a 6.5 mm (¼") nut driver.

4. Remove the defective platen assembly by lifting upward at each end.

5. Install the replacement platen assembly by inserting it firmly into the index slot at each side plate. Insert and tighten the 6.5 mm mounting screws.

6. Check the print-head to platen gap and adjust if required per Section 4.

7. Install the mechanism assembly and cover assemblies, referring to steps 2. and 1. as required.

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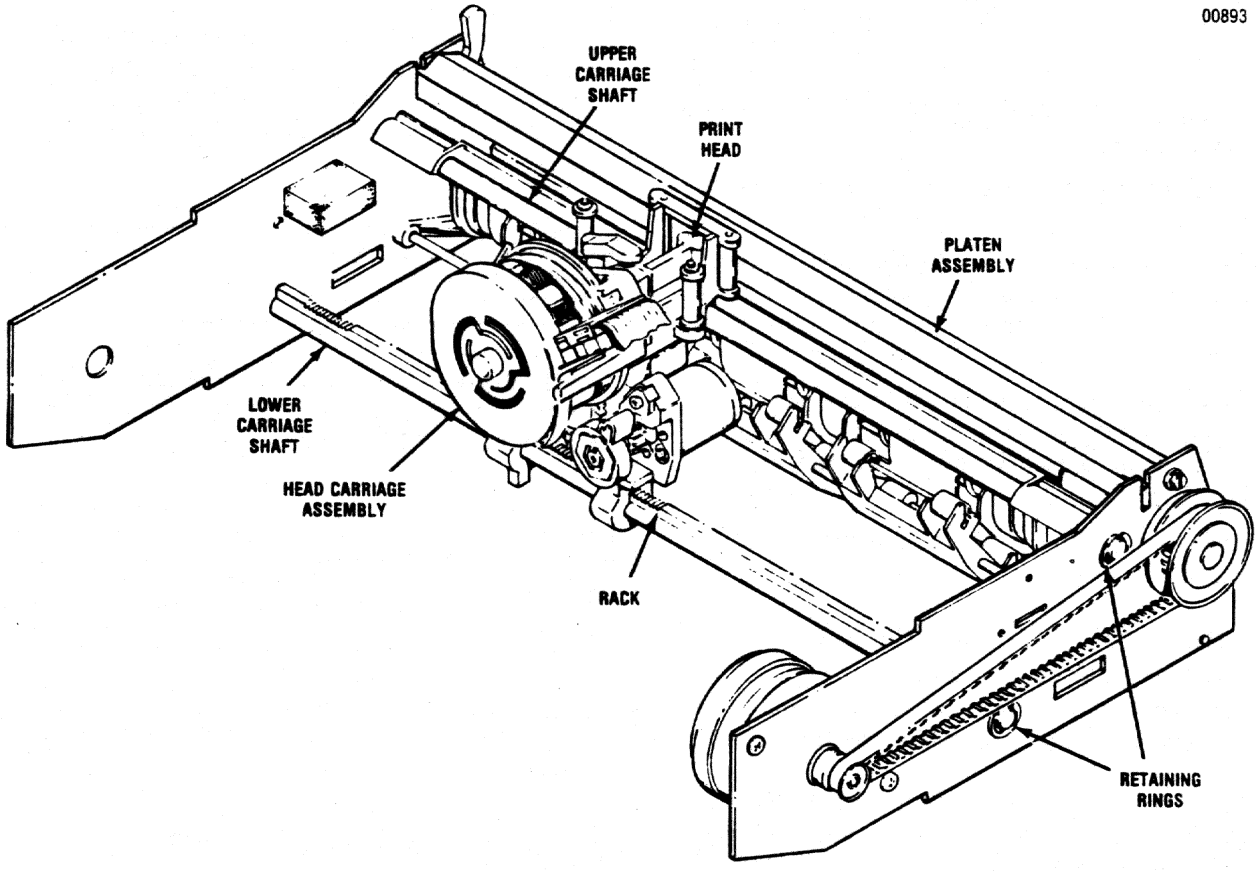

Figure 5-3 Head-Carriage Assembly Replacement

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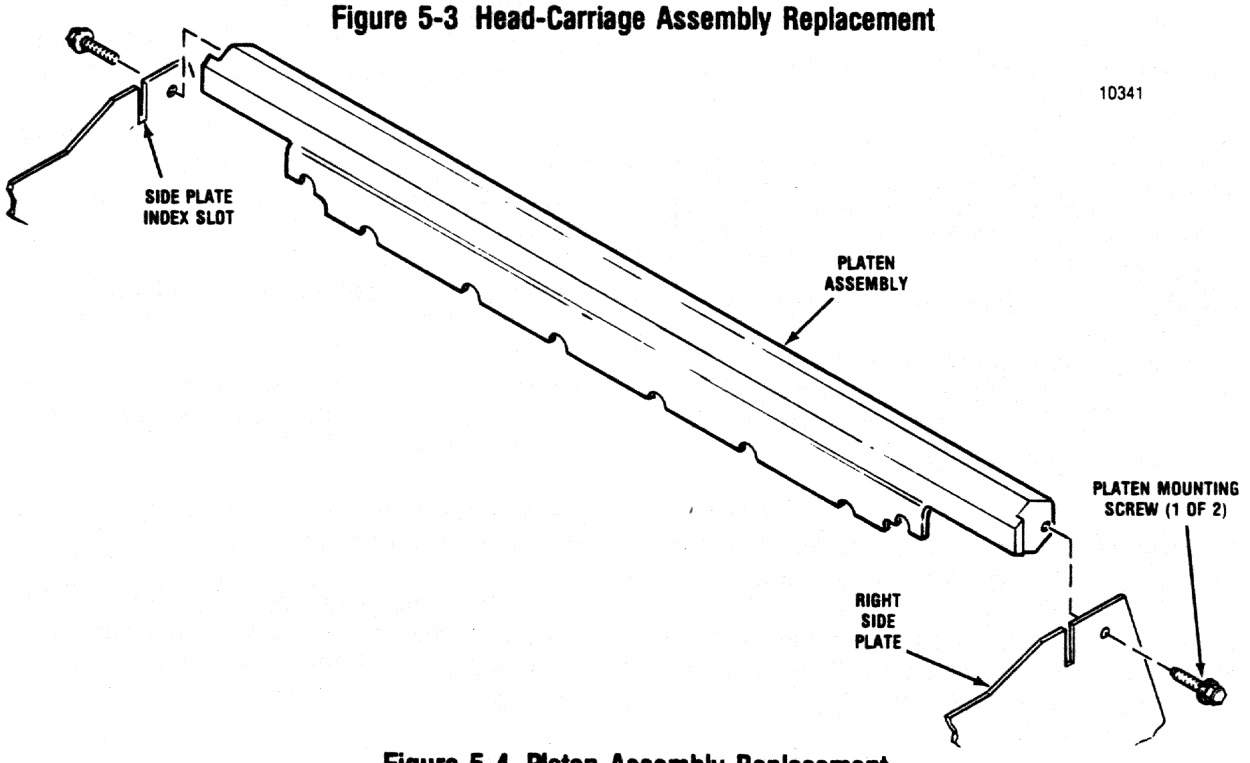

Figure 5-4 Platen Assembly Replacement

SECTION 6
SUPPORTING ILLUSTRATIONS

6.1 PURPOSE OF THIS SECTION

This section contains drawings and schematics to aid in troubleshooting the 737 Printer.

6.2 FLYBACK BOARD SCHEMATIC (63680173-9001)

The schematic for the small Flyback Board is illustrated in Figure 6-1. Figure 6-2 illustrates the assembly.

6.3 MAIN LOGIC BOARD SCHEMATIC (63680148-9001)

The schematic for the Main Logic PCB is illustrated in Figure 6-3.

6.4 MAIN LOGIC BOARD ASSEMBLY (63680147-9001)

The assembly drawing for the Main Logic PCB is illustrated in Figure 6-4.

6.5 737 INTERCONNECTION SCHEME

Figure 6-5 illustrates the interconnection of the 737 Printer. The actual locations of the connectors may not be as shown in the illustration.

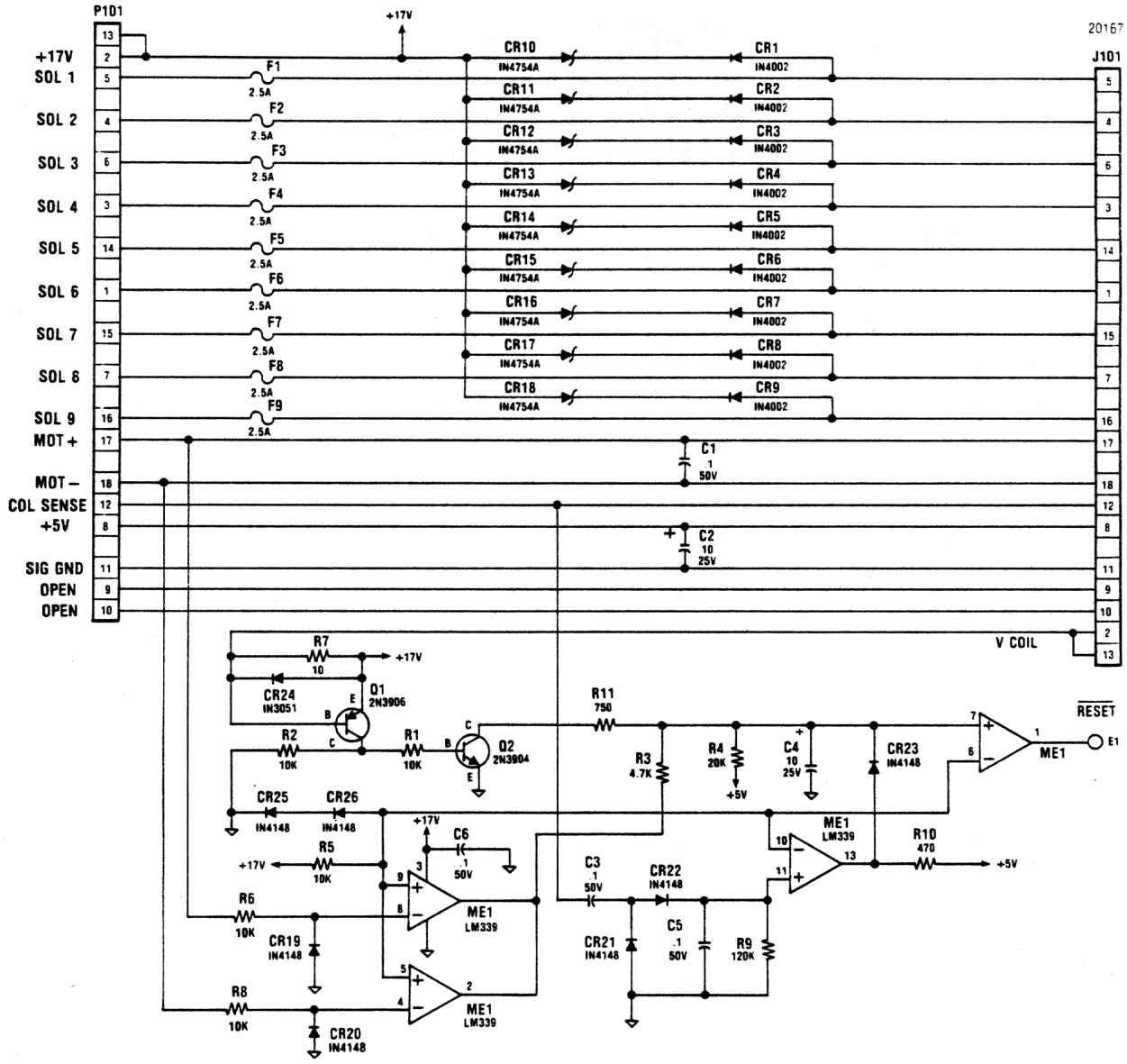

Figure 6-1 Flyback Board Schematic

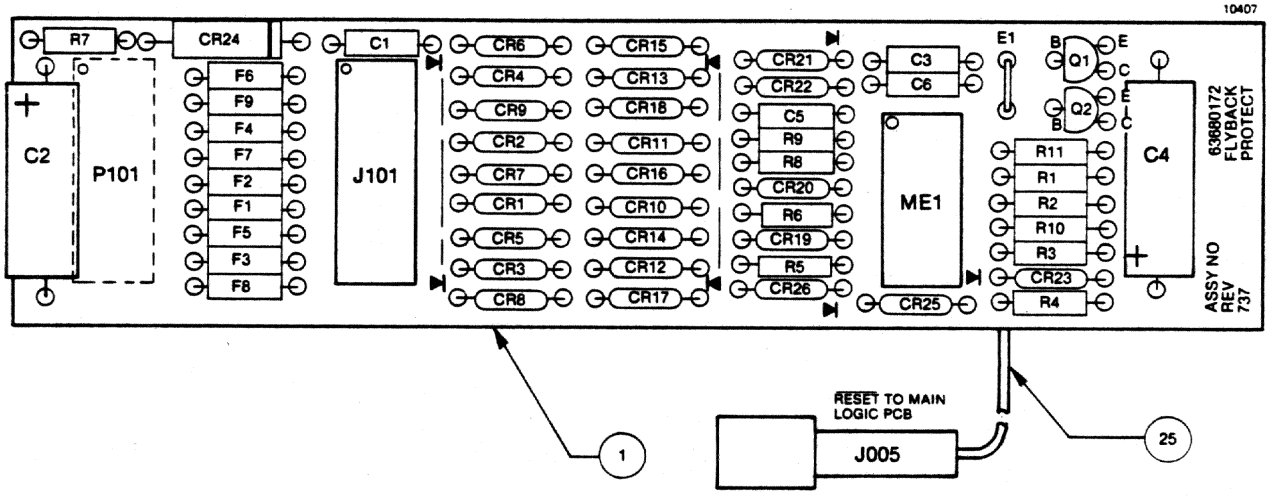

Figure 6-2 Flyback Board Assembly

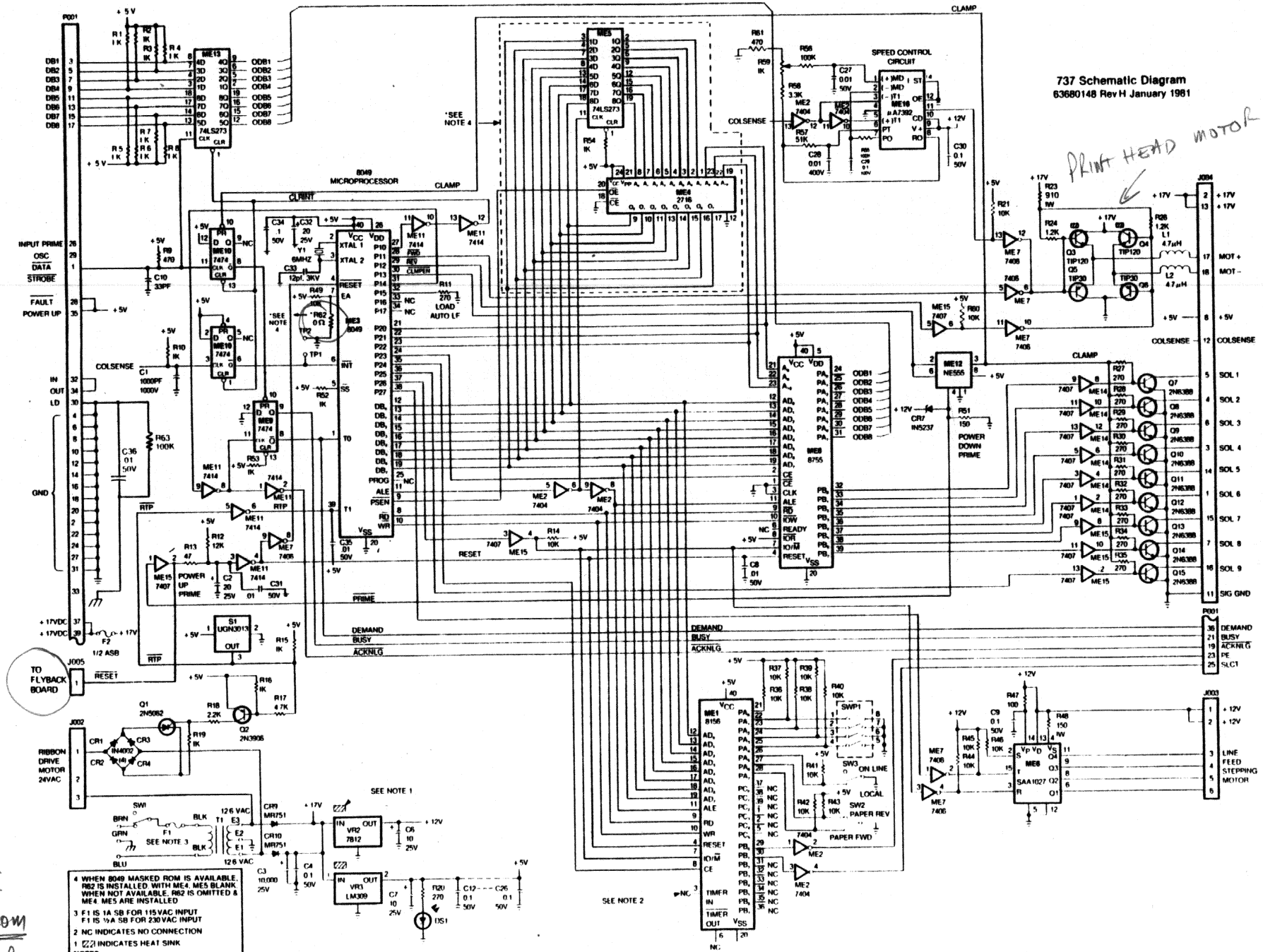

Figure 6-3 737 Main Logic Schematic

8049 MAY OR MAY NOT HAVE ROM

IF ROM & R62 then int. ROM USED.

IF NOT THEN R62 OMITTED & EXT ROM USED.

∴ any board with R62 must be a masked 8049

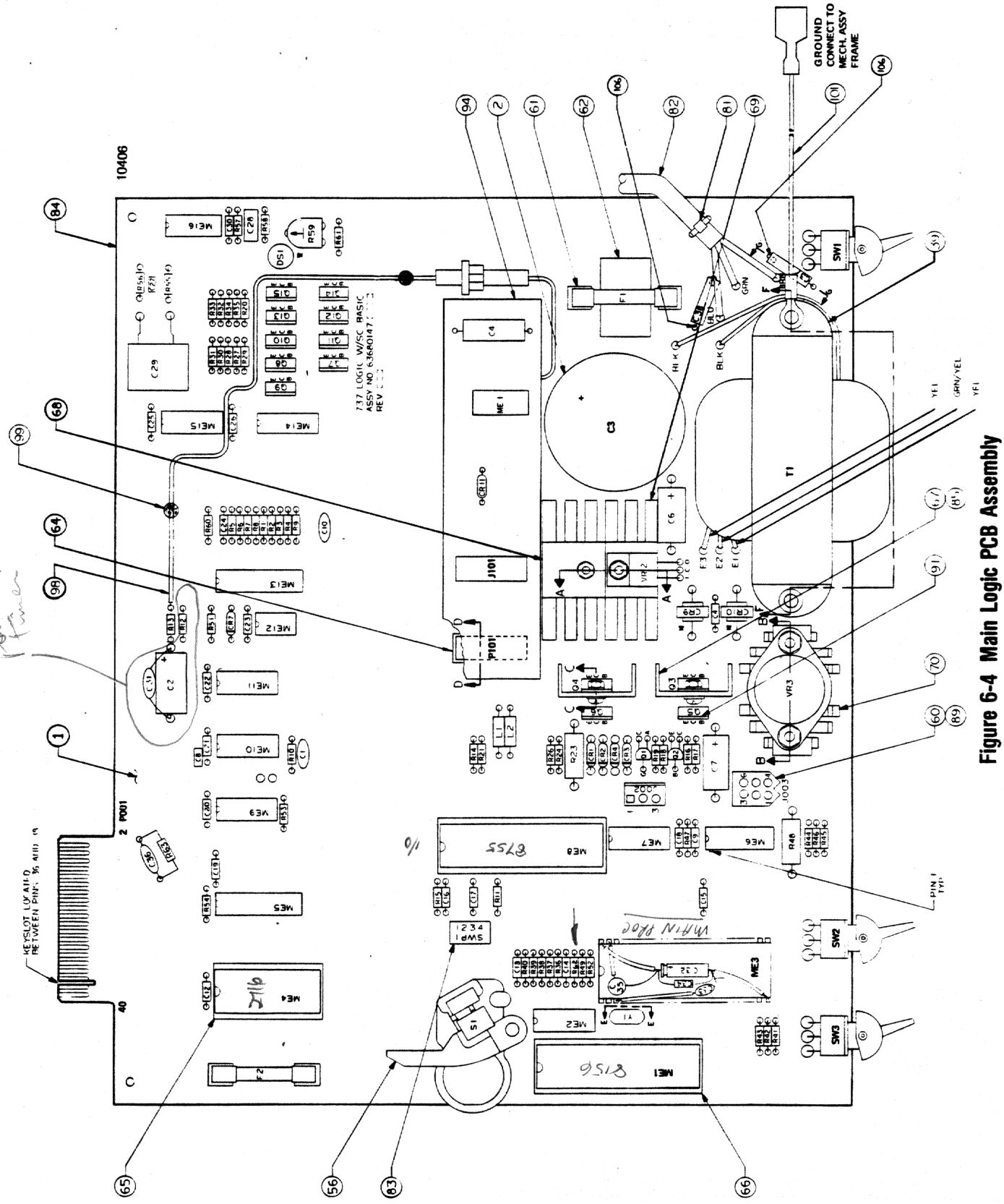

Figure 6-4 Main Logic PCB Assembly

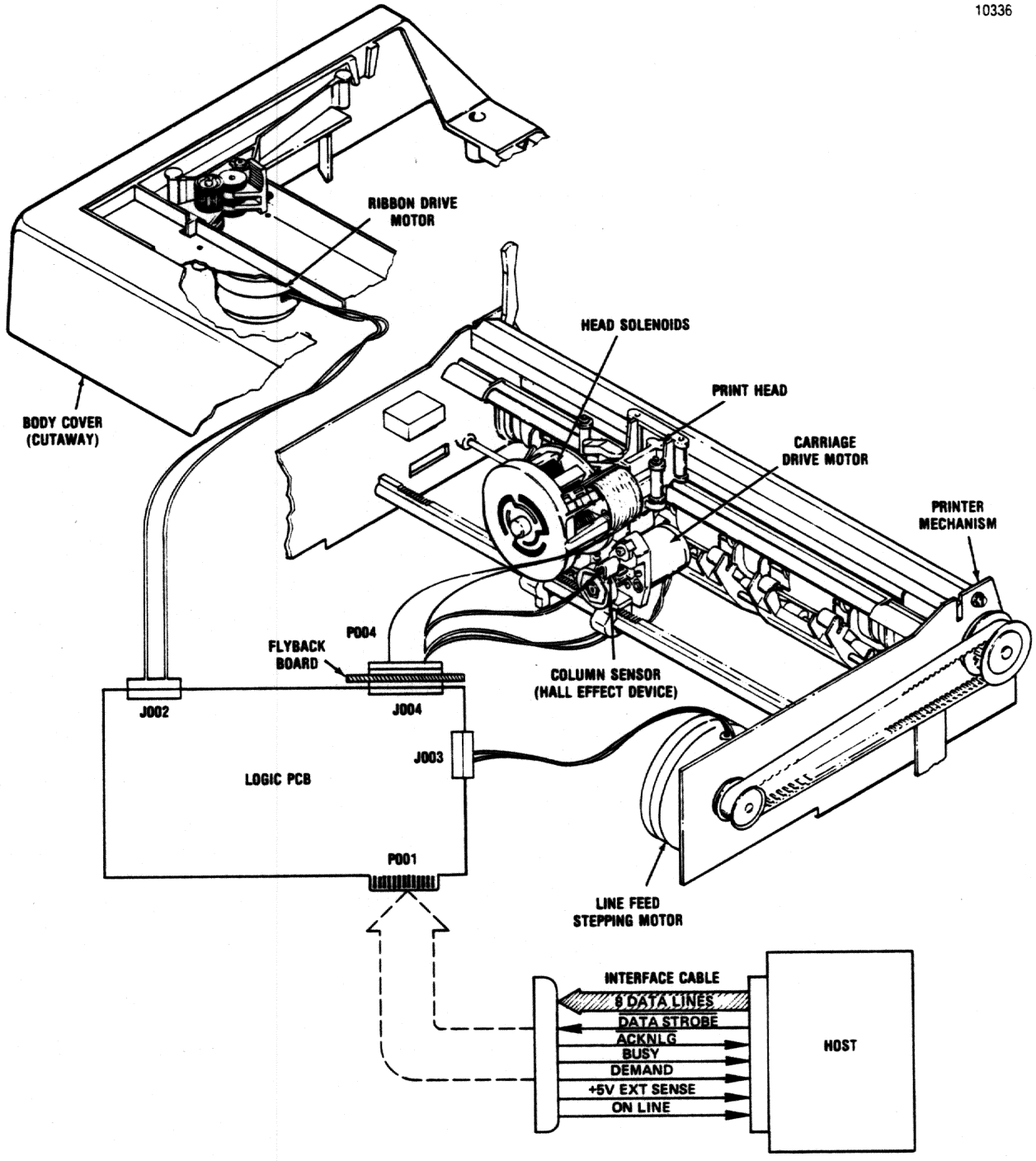

Figure 6-5 Interconnection Scheme

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