DataMetrics™

Fully Mission Capable™

Model 4680 Thermal Printer Manual

Operation and Maintenance Manual with Illustrated Parts List

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RECORD OF REVISIONS

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TABLE OF CONTENTS

INTRODUCTION

The instructions in this manual provide the information necessary to perform maintenance functions ranging from simple checks and replacement to complete shop-type repair on DataMetrics 4680 Thermal Printer, PN 109500-118.

The manual is divided into separate sections:

Description and Operation
Testing and Fault Isolation
Disassembly
Cleaning
Inspection and Check
Repair
Assembly
Fits and Clearances
Illustrated Parts List

Each section is divided into numbered operations. When appropriate, operations are in turn divided into paragraphs, which are identified with upper case alphabetical characters. Detailed procedures then are divided into steps, which are identified with Roman numerals enclosed in parenthesis. In a few instances, steps are further broken down into sub steps, which are identified with lower case alphabetical characters enclosed in parenthesis.

Refer to the Table of Contents for the page location of applicable sections. An explanation of the use of the Illustrated Parts List is provided in the Introduction to that section.

All weights and measurements in the manual are in English units, unless otherwise stated. Metric torque conversions are located in table 801.

This manual has not been verified at time of Basic issue. The manual will be revised after verification (when production hardware becomes available), and at various other times as necessary, to reflect current information.

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DESCRIPTION AND OPERATION

1. General

A. Purpose and Scope of Manual

This manual provides information to familiarize shop personnel with the physical and functional characteristics of the DataMetrics Corporation's Model 4680 High Resolution, Half-Page, Airborne, Thermal Printer (Part No. 109500-118). It is intended for use by the technician involved in the maintenance of electronic equipment. Unit and subassembly descriptions re provided to familiarize personnel with the operation of the equipment to the extent necessary to aid them in performing troubleshooting and fault isolation on a shop replaceable assembly. Information pertaining to maintenance practices concerning testing, disassembly, cleaning, inspection and check, repair and assembly also are provided to assist in any way possible.

B. Related Publications

Related publications that deal with the thermal printer will be supplied when available and as applicable based on using agency input.

2. Leading Particulars

Various specifications of the thermal printer are provided in Table 1.

Table 1. Printer Specifications

DIMENSIONS	
Height	6.00 inches
Width	5.00 Inches
Depth	7.56 inches
WEIGHT	8.9 lbs. max. (with roll of paper)
INPUT POWER REQUIREMENTS	115 VAC 400 Hz ± 10%, standard aircraft power
POWER CONSUMPTION	
Idle Mode	20 W
Print Mode	80 W (avg.)
PRINTING SPECIFICATIONS	
Print Technique	Nonimpact thermal
Print Rate	0 to 160 lines per minute
Print Density	Variable 7 lines per inch
Character Pitch	Variable
Character Type	10 x 16 dot matrix (40/80 col. only)
Character Set	ASCII, 64 character subset standard
Plot Resolution	152 dots per inch horiz. and vert.
Paper Type	Thermal
Paper Capacity	100 ft. continuous roll, 4-3/8 in. wide
ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature	-15°C to +55°C
Storage Temperature	-55°C to +71°C
Vibration	MIL-STD-810B, 2g
Shock	MIL-STD-810B, 10g each axis
Acoustic Noise	MIL-STD-1472, less than NC-40
Relative Humidity	0 to 95%
Fungus Resistance	Incorporates no Fungus nutrient
ELECTRICAL CONNECTOR	MS3112E14-19P

3. Physical Description

The thermal printer, as shown in Figure 2, is contained within a 6.00 inch by 5.00 inch by 7.56 inch metal housing. It can be mounted in a standard electronic console panel with the Four Dzus Fasteners located on the printer front panel. Electrical connection to the system is achieved through a 19-pin connector (MS3112E14-19P) located at the rear of the unit.

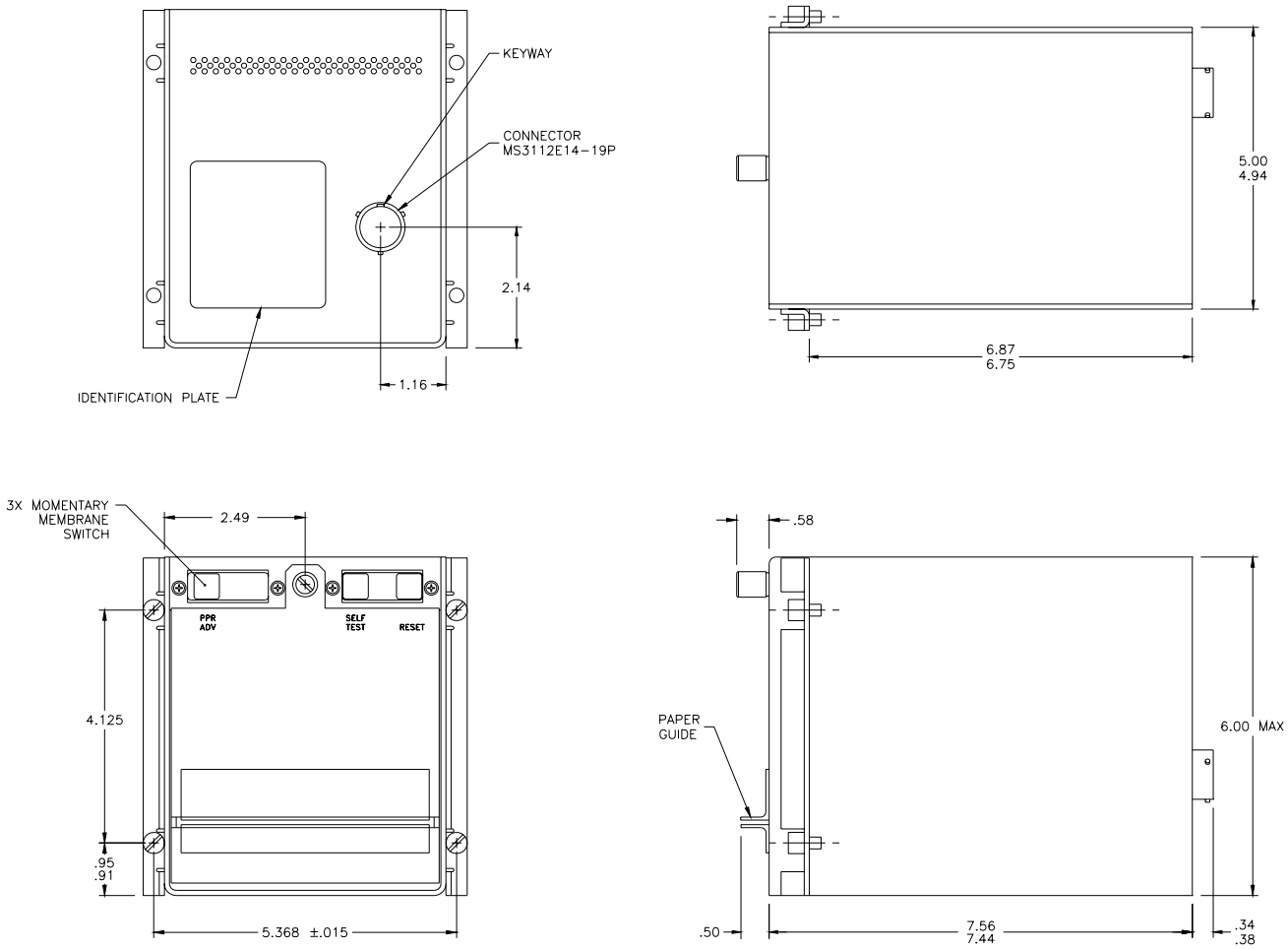

Figure 1. Thermal Printer Model 4680

User interaction with the unit is achieved through three pushbutton switches. The physical locations of the switches are shown in Figure 2 with their corresponding functions detailed in Table 2.

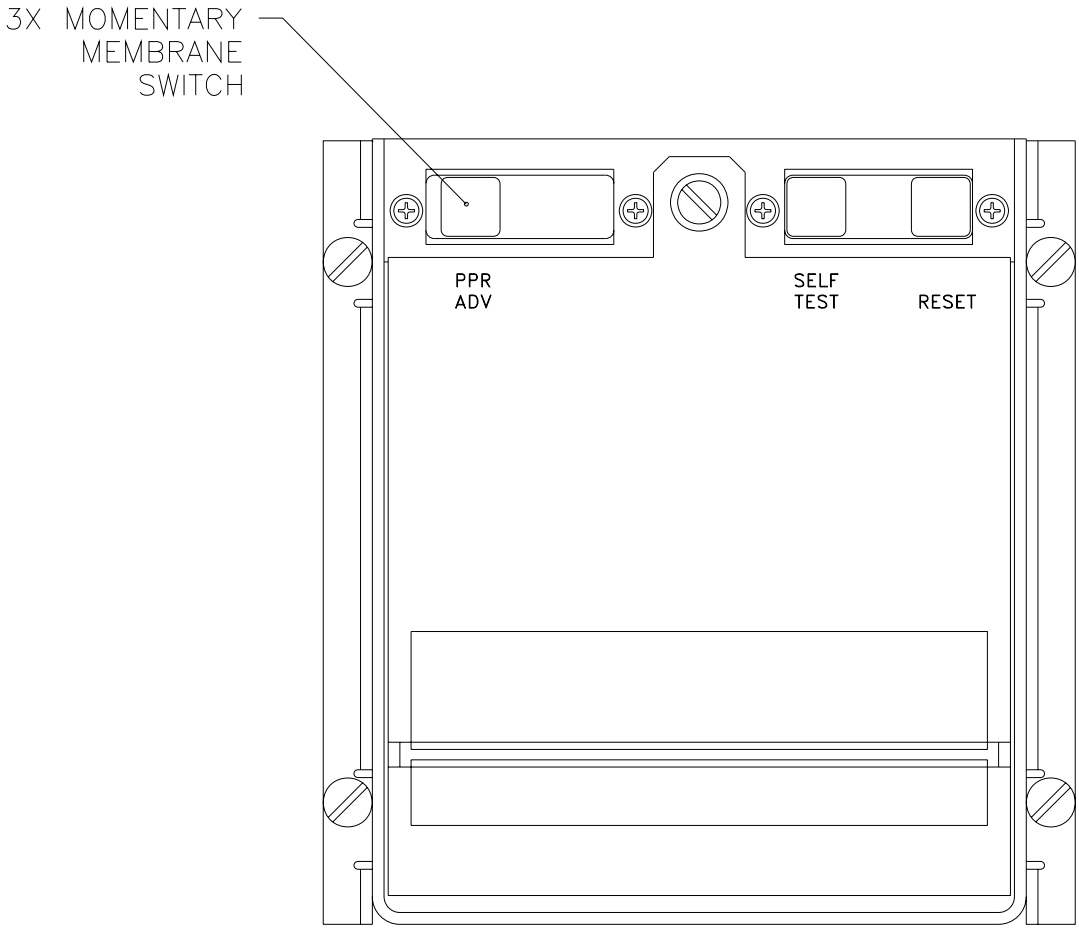

Figure 2. Control Switch Locations

Table 2. Front Panel Functions

PPR ADV (Paper Advance) pushbutton switch	Permits paper advancement when not printing message
SELF TEST–pushbutton switch	Used to print a character set test pattern
RESET–pushbutton switch	Resets printer

The major assemblies that comprise the thermal printer are listed in Table 3 with brief descriptions and relevant functions included. For a detailed parts list, consult the IPL at page 1001 of this manual.

Table 3. Main Assemblies

ASSEMBLY	DESCRIPTION	FUNCTION
Logic PCB	Microprocessor controlled circuitry	Provide and receive control signals for proper printer function
Power Supply PCB	Voltage conversion circuitry	Provide required voltages
Stepper Motor	Four-phase digitally controlled motor	Advance paper
Thermal Printhead	Array of electrically activated heating elements	Print characters
Door	Hinged plate	Dust preventive
Control	Interactive switches	Provide user interaction
Chassis	Framework	Containment

4. Functional Operation

A. General System Operation (Reference Figure 3)

The 4680 Thermal Printer can be broken down into five basic modules. The input section receives serial data from the host computer and converts it to parallel data for processing by the CPU. The input section also monitors the status of the front panel switches.

The processor section stores incoming data in the RAM memory until a print command is received, at which time it interprets the stored data and retrieves pre-formatted characters from the ROM memory for output-to-output ports. The processing section also controls and monitors the print pulse and motor phases.

The output section contains a latch and driver for the printhead data and the clock lines. Also contained in the output section are the motor phase latches, print pulse, and strobe lines for the printhead.

The driver section contains the high power drivers for the motor phases and power regulators for the printhead.

The power supply section supplies all operating power for the printer.

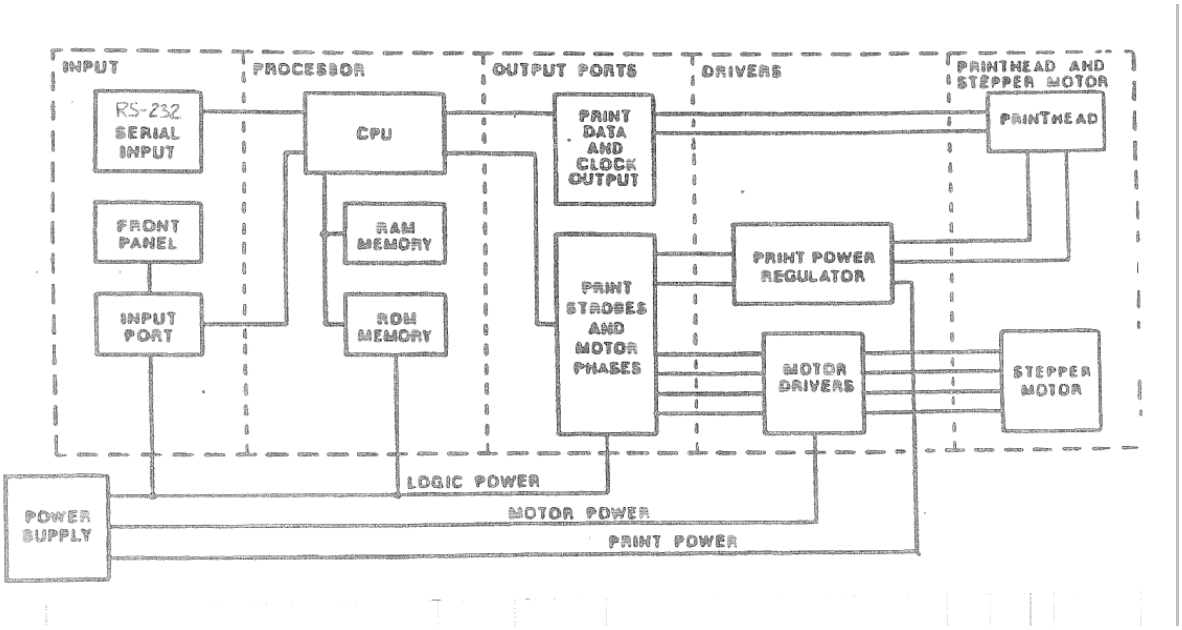

Figure 3. General System Operation

B. Detail System Operations

The 4680 Thermal Printer is divided into three sections: logic, power supply, and print mechanics. The following provides detailed information for the three sections.

(1) Logic (Reference IPL, Figure 3)

The Logic Section is contained on the logic PCB. It accepts an RS-232 serial data stream from the host computer, buffers and decodes those signals for the stepper motor and printhead, monitors printhead performance, generates status signals and status conditions, and performs bite checks on power-up as follows:

1. Walking one test through RAM
2. Sum check of each ROM
3. Printhead maximum pulse (10 msec) test

The logic PCB assembly consists of four functional sections: microprocessor control, memory, input/output, and interface. Two connectors interface the assembly to the rest of the printer.

(a) Microprocessor control section

The Microprocessor control section consists of the microprocessor, an address latch, and a memory and I/O decoder. The microprocessor's internal clock is controlled by an 8.00 MHz crystal, which runs the processor at 4 MHz. The processor generates six major control signals that synchronize all operations of the printer. A brief description of each signal is provided in Table 4.

The processor also generates an 8-bit data bus, used for the transfer of all data between system components and a 16-bit address bus. The low order 8 bits of the address bus are generated from address latch U3, while the high order 8 bits of the address bus are generated directly from the processor. Upon power-up, the microprocessor is initialized by reset circuitry. Execution of the control program residing in U11 begins immediately at location 0000H. Detection of a power fault in the POK signal will cause the generation of a Printer Fault Status (Status #6) to the host computer.

Table 4. Operational Control Settings

READ (RD)	Read Control - A low level on RD indicates the selected memory location or I/O device is to be read and that the data bus is available for the data transfer. The rising edge of the RD is used to latch selected memory or I/O data into a processor from the location.
WRITE (WR)	Write Control - A low level on the WR indicates the data on the data bus is to be written into the selected memory or I/O location. The rising edge of this line is used to latch the data from the bus into the selected memory or I/O location.
ADDRESS LATCH ENABLE (ALE)	It occurs during the first clock state of a machine cycle and enables the data bus to be latched into U3 as the lower 8 bits of address bus. The falling edge of ALE is set to guarantee setup and holdup times for the address information.
IO/M	Input/Output/Memory Control - A machine cycle status line that indicates the status of the current machine cycle. A low level indicates a memory operation, while a high level indicates an I/O operation.
CLOCK (CLK)	Clock output used as system clock. The period of CLK is twice the period of crystal Y1.
RESET	Reset output used to initialize all system components. The signal is synchronized to the processor clock and lasts an integral number of clock periods.

(b) Memory section

section interface directly to the microprocessor control section via the 8-bit data bus and the 16-bit address bus. The address partitioning of the memory components is shown in Table 5.

Character PROM's U9 and U10 store all of the dot information for the selected print format. The character dots are stored in a 10 x 16 matrix.

Program PROM U11 stores the control program that determines the operation of microprocessor U13. This program controls every operation of the printer.

The page buffer RAM temporarily stores the incoming data to be printed. It has a capacity of 1920 characters.

The line buffer RAM temporarily stores the data for the current print line.

(c) Input/output section

The input/output section of the logic assembly consists of six ports. Three of these are located within the 8155 RAM (Chip U14) and correspond to ports 41H, 42H, and 43H. The other three are composed of latches U1, U2 and U3 with respective ports of 10H (output), 00H (output) and 00H (input). Further details of each port are provided on the following pages.

Table 5. Address Partitioning

REF DES	COMPONENT	DESCRIPTION	MEMORY RANGE (Hexadecimal)
U9	110756-0115	66/80 column character PROM	1000H - 1FFFH
U10	110755-0115	40 column character PROM	3000H - 3FFFH
U11	109528-0106	Program PROM	0000H - 0FFFH
U12	SRM2018C-12	CMOS Page And Line buffer RAM	2000H - 27FFH
U14	ID8155J	Scratch Values and Stack	4000H - 40FFH

1 Port 41H

Input port 41H accepts 8 bits of ASCII data from the interface section for eventual storage in the page buffer. This port is read by the microprocessor on an interrupt basis. The interrupt handling software stores the data in the page buffer until an ETX, ETB, or buffer full condition is detected which causes the buffer to be printed. The interface section generates the interruption

2 Port 42H

Port 42H is an output port that generates five status signals to the interface section. These are Status A, Status B, Status C, Printer Status, and Ready/Busy. These five status signals and the status conditions they represent are detailed in Figure 9.

When a Status #4 or #7 condition exists, the printer will continuously provide the status line signals as shown. When a Status #0 condition exists, a message transfer can begin. No message begins to be printed until ETX or ETB is received and the appropriate error checks are made. In the event of a Status #6 or #2 occurring in the block of data which follows a previous block ending in ETB, the printer should begin a 1.7 minute time out and if exceeded, print the following message: MESSAGE INCOMPLETE

Table 6. Status Signals

STATUS LINE			**STATUS CONDITION**	
Printer Status	Status A B C	Ready/ Busy	Status Number	Description
1	1 1 1	1	#7	Printer power OFF, not installed, or inoperative
1	1 1 0	1	#6	Error in printer
1	1 0 1	1	#5	Printer busy acknowledging characters
1	1 0 0	1	#4	Local/test mode
1	0 1 0	1	#2	Printer buffer overrun
1	0 0 1	1	#1	Printer initialized
1	0 0 0	0	#0	Printer ready

After a message transfer is completed, Status #6, #5, #2, or #0 will remain until no longer applicable, unless overwritten by another status. However, Status #6 and #2 will be presented for approx. 100 msec and any message causing these conditions will be cleared without printing. When the first character of text is not SOH or STX, then Status #6 should be activated for approx. 100 msec.

3 Port 43H

Port 43H is utilized in a handshaking mode with Port 41H. Additionally, bits 3 and 4 of Port 43H are utilized as output ports for controlling the set-reset latch that drives alert relays #1 and #2 (K1 and K2 on the power supply assembly). At the time of receipt of an STX character, the printer will close the circuit between two pins of the service connector so that a current of 1 AMP (resistive load) may flow through an external device fed from a 28 VDC source. The switching component in the printer is capable of hard-line current flow in either direction. The contact closure is electrically isolated from the printer.

4 Input port 00H

Input port 00H monitors the front panel SELF TEST and PPR ADV (paper advance) switches.

5 Output port 00H

Output port 00H generates control signals for the stepper motor and printhead. Bits 0 to 3 generate 4-phase, 90° overlapping control steps. Bits 4 and 5 generate the control signals for enabling the two drive halves of the printhead. Bits 6 and 7 generate the control signals that enable the print pulse generator.

The print pulse generator consists of a temperature controlled, one-shot multi-ibrator (U8) with gating provided by chips U5 and U7. Temperature information is supplied to U8 from an NTC thermistor physically located on the printhead. The print pulse supplied to the printhead is actively controlled over a range of 700 microseconds to 2 milliseconds. This keeps the printhead operating temperature within safe operating limits.

6 Output port 10H

Output port 10H supplies the clock and serial data (dot) information to the printhead.

(d) Interface Section

1 Input

The interface input section consists of a single line receiver section of a MAX232 integrated circuit. It receives standard RS-232 data signal and converts it to a TTL signal. The embedded software is designed to process an odd parity, 7-bit data word with 1 stop bit at 2400-baud rate. The converted signal is inverted in U18 and sent to RES 5.5 of the microprocessor, U13, and U4. The microprocessor accepts the serial data directly.

2 Output

The interface output section provides drive capability for the status signals and the CTS signal for the RS-232 interface. A hex open-collector buffer, U22, is used to supply the status output. The MAX232, A1U1, converts the Ready/busy signal to an RS-232 compatible CTS signal.

(2) Power Supply

The 4680 Thermal Printer Power Supply is a custom power conversion unit operating in the linear mode. The power supply accepts primary aircraft power, 115 VAC 400Hz ±10%, and converts it to the following voltages within the printer (listed here with primary function):

+5 VDC	Logic circuitry, 1.5 Amp ±2%
+4.9 VDC	CMOS RAM page buffer
+6 VDC	Stepper motor, 3.0 Amp unregulated motor drive voltage with 4-phase stepper motor circuit
+20 VDC	Print voltage, 16 Amp peak for printhead C1 and C2 with TTL compatible ON/OFF control

The power supply also includes the pre-driver and drive transistors for the 4-phase stepper motor, the regulated bank switches for the printhead, a power supply internal voltage monitor, and the two alert relays.

The power supply unit is constructed as a modular assembly with two major subassemblies. Each major subassembly consists of a right angle shaped heat sink with a printed circuit board attached to it. The two major subassemblies are fastened to each other back-to-back to make up the overall power supply.

Both the high line and the return line of the 115 VAC input are routed through the input connector J1 to the RFI inductor/filter input. The power input return line ACN connects from the RFI inductor/filter output to wire T1-2 of the power transformer T1. The power input high line ACL is routed from the RF1 inductor/filter output and connected over fuse F1 to wire T1-1 of the power transformer primary.

Three transformer secondaries feed full wave rectifier circuits with charge capacitors to generate raw DC-voltage as required.

(a) Logic circuit voltage

The raw AC-voltage from transformer secondary T1-6, 7, and 8 is stabilized using a 3-terminal, adjustable IC regulator U1 (LM217). This regulator, housed in a TO-3 can, is mounted on the heat sink of the input assembly. The stabilized logic voltage is also used as source for a separate RAM holdover supply that allows retention of data in RAM during voltage outages. The RAM holdover voltage uses capacitor C6 (680 microfarads), which is decoupled from the +5 VDC power source to inhibit rapid discharge, as an energy storage element. The RAM memory, which is put into the stand by mode during power outages, uses only a few microamperes of current and the 680 microfarad capacitor is capable of supplying this current without dropping below minimum voltage requirements for the RAM memory for a considerable length of time (10 seconds or more).

(b) Stepper motor voltage

The stepper motor drive circuit consists of a 6 VDC unregulated voltage source derived from transformer secondary T1-3, 4, 5, and a conventional 4-phase stepper motor drive circuit. The 6 VDC voltage source is located on the input assembly and employs diodes CR2 and CR3, charge capacitor C1, and bleeder resistor R28. The 4-phase motor driver has four type 7406 input buffers driving a set of 2N6300 Darlington drive transistors.

(c) Printhead voltage

The AC voltage from transformer secondary T1-9, 10, and 11 is rectified and filtered to make a 20 VDC raw DC power source available. Two IC voltage regulator modules (LM723) equipped with external Darlington pass transistor assemblies (Q6 and Q7, 2N6285) are used to regulate and control the voltages supplied to printhead C1 and C2. Each may use current up to 16 Amperes at a duty factor of 25% or less. This amounts to a total maximum average current consumption of 8.0 Amperes for both print voltages. The compensation inputs of the LM723 integrated circuit regulator are employed to enable the print voltage for the duration of the print pulse only (1 millisecond). Open collector inverters of chip U2 and U2 (7406), which are in turn controlled by external logic circuitry, are used as drive circuits for the ON/OFF control of the print voltage regulators.

(d) Voltage monitor

The Voltage monitoring function, which applies a signal to the logic board if any one of the three voltages falls below a predetermined value, consists of a reference circuit and a type LM139 quad-comparator. The voltages monitored are (1) the raw print voltage that is about +20 VDC, (2) the +5 VDC logic voltage, and (3) the +6 VDC motor drive voltage.

The 6.2-volt reference voltage uses a constant current (CR15, CR16, R17, and Q8) to feed zener diode VR1. The voltage limits that generate a POK signal are as follows:

Critical value for 5V is	4.3V
Critical value for 6V is	2.9V
Critical value for 15V is	9V

The printer status generated from the POK signal is a Status #6. To reset, turn the power OFF, then turn the power back ON. Voltage divider R18, R19, and R20 steps the 6.2V reference down to about a 2.5 level. This level is then connected to the negative inputs of the comparators. The monitored voltages, stepped down as required with resistive voltage dividers, are applied to the positive inputs of the comparators. If any one of these voltages drop below the reference the respective open-collector comparator output forces the POK signal low.

The comparator outputs are combined in wire or gate manner with signal pull-up resistor R27. A low level of the POK signal informs the printer logic that the printer power supply is not ready because one of the required voltages is below its normal operational value.

(3) Print mechanics

(a) Paper transport system

The Paper Transport System is part of the front access door and consists of a stepper motor, a drive belt and a drive roller. These components of the system are responsible for proper movement of the paper from the paper spool to the printer exit. A single thumbscrew latch permits the door to be pivoted outward and down allowing access to the paper spool. This configuration facilitates easy paper replacement and procedures of inspection and cleaning.

(b) Printing mechanism

The printing mechanism is a thermal printhead that utilizes heat generation to produce characters on thermal paper. It consists of no moving parts but is spring loaded against the drive roller by a cantilevered pivot mounting bracket. The schematic in Figure 4 shows the circuitry responsible for providing proper print signals.

Figure 4. Thermal Schematic

TEST AND FAULT ISOLATION

1. General

This section utilizes procedures to verify the thermal printer's capability of functioning efficiently and to identify problems that may exist with corresponding solutions. If printer is verified as functioning properly, it is cleaned and returned to service. If problems exist, consultation of the fault isolation section should provide the means of isolating and repairing the problem.

2. Test Equipment

The Test Equipment required to perform the following test procedures and fault isolation are listed in Table 101. If equivalents exist which will perform the same function, they may be used as replacements.

Table 101. REQUIRED TEST EQUIPMENT

DESCRIPTION	PART NUMBER	MANUFACTURER
Test PC with Win NT 4.0		
Variable Auto Transformer	115VAC 400Hz	
Digital Voltmeter		Fluke
Oscilloscope		Tektronix

3. Test Conditions

Unless otherwise specified in the individual test procedure, all tests shall be conducted at ambient laboratory conditions.

4. Test Procedures

A. Fundamental Test Procedure

(1) Open door and check that sufficient paper exits for testing.

(2) Connect 115 VAC, 400 Hz, to printer via rear connector.

(3) Press PPR ADV switch. Verify that paper exits through front slot of door without any printing or unfamiliar noise occurring.

(4) Press SELF TEST switch. Verify that a 40-column test pattern similar to Figure 101 is printed. Inspect printout for legible characters and existence of additional paper to ease message separation.

(5) Press SELF TEST switch again and verify that a 66-column test pattern is printed similar to Figure 102. Inspect printout for legible characters and existence of additional paper to ease message separation.

(6) Press SELF TEST switch again and verify that an 80-Column Test Pattern is printed similar to Figure 103. Inspect printout for legible characters and existence of additional paper to ease message separation.

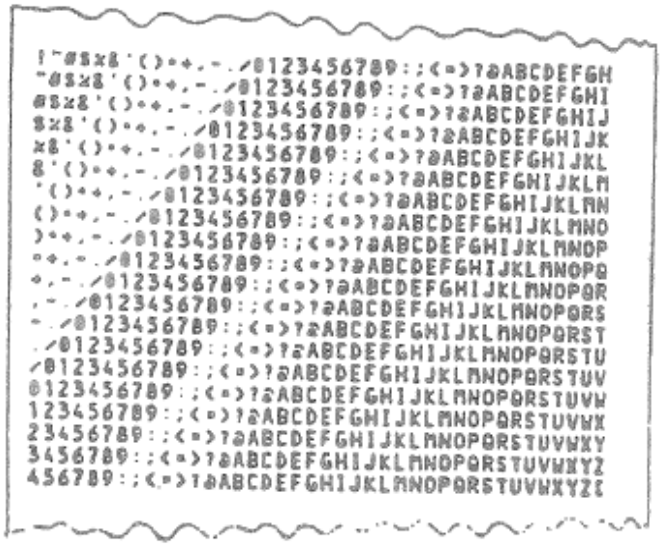

Figure 101. 40 Column Test Pattern

Figure 102. 66 Column Test Pattern

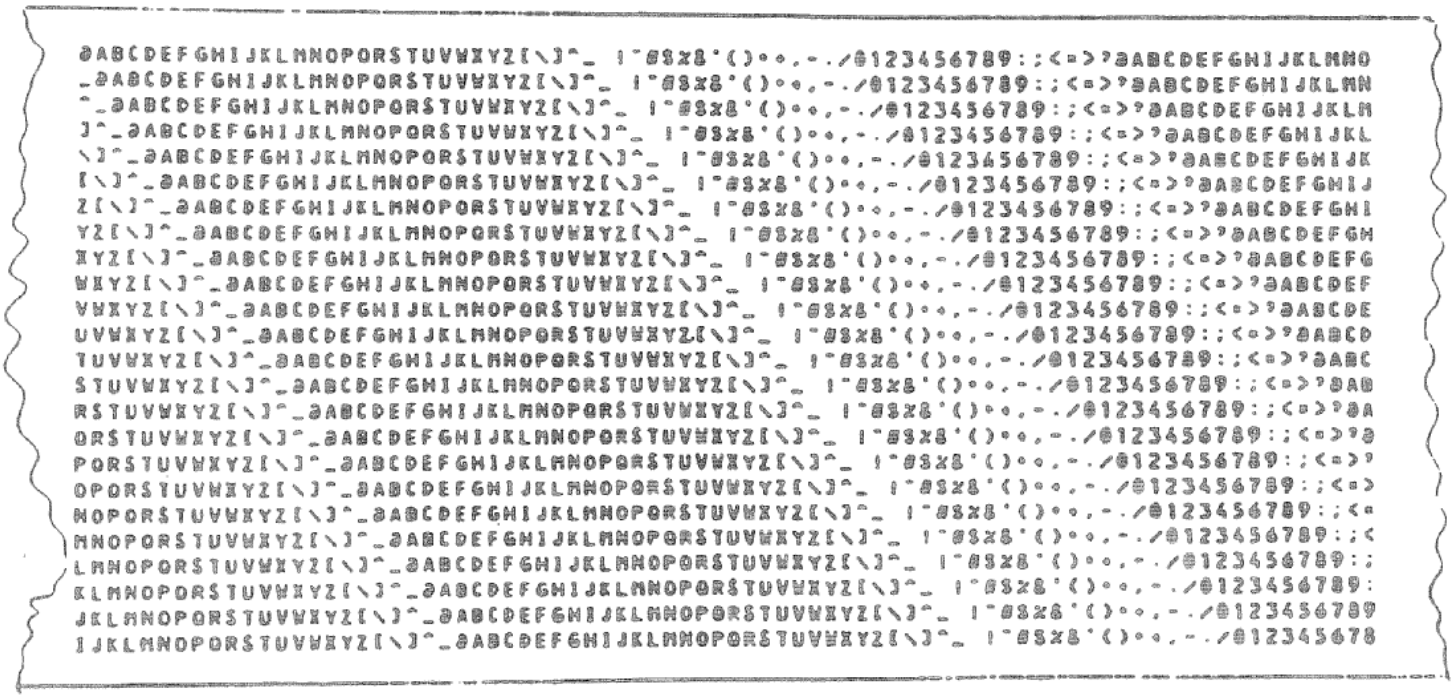

Figure 103. 80 Column Test Pattern

B. Test Configuration

(1) Connect test equipment in configuration shown in Figure 104.

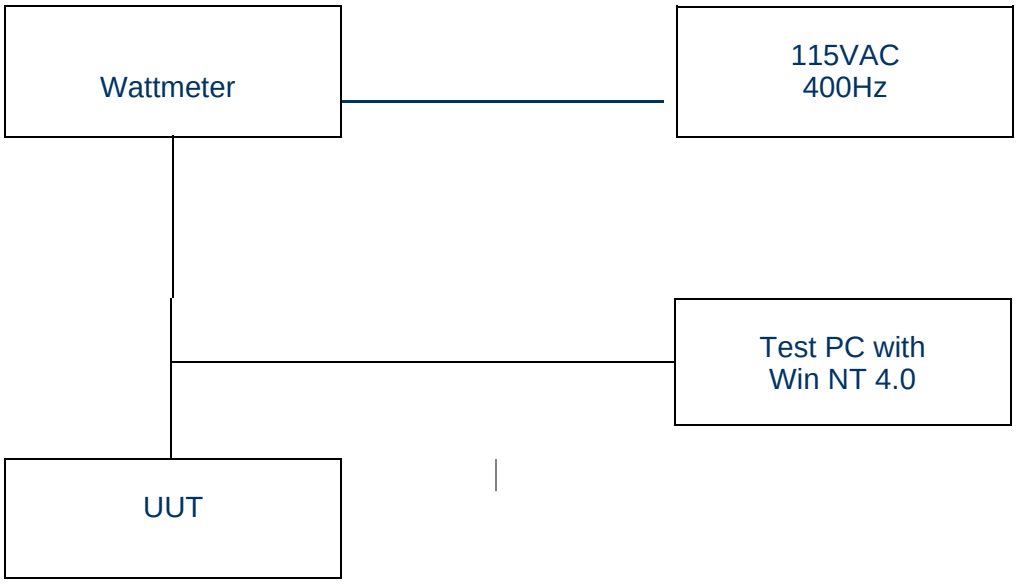

FIGURE 104. TEST CONFIGURATION

5. Fault Isolation

CAUTION: CIRCUIT BOARDS CONTAIN ESD AND SHOULD BE WORKED ON AT APPROPRIATE BENCH LOCATION.

A. Use the problem description at the beginning of Figures 105-112 to locate the proper fault isolation diagram for corrective action implementation.

B. Utilize schematics in Figures 113-115 and circuit board assemblies in IPL Figures 4, 9 and 10 to locate components mentioned in fault isolation diagrams.

   The prefix abbreviations L, PSI, and PSO correspond to logic PCB, power supply input PCB and power supply output PCB. They also respectively correlate to the IPL Figures previously mentioned.

PROBLEM: Printer is not operating in any mode.

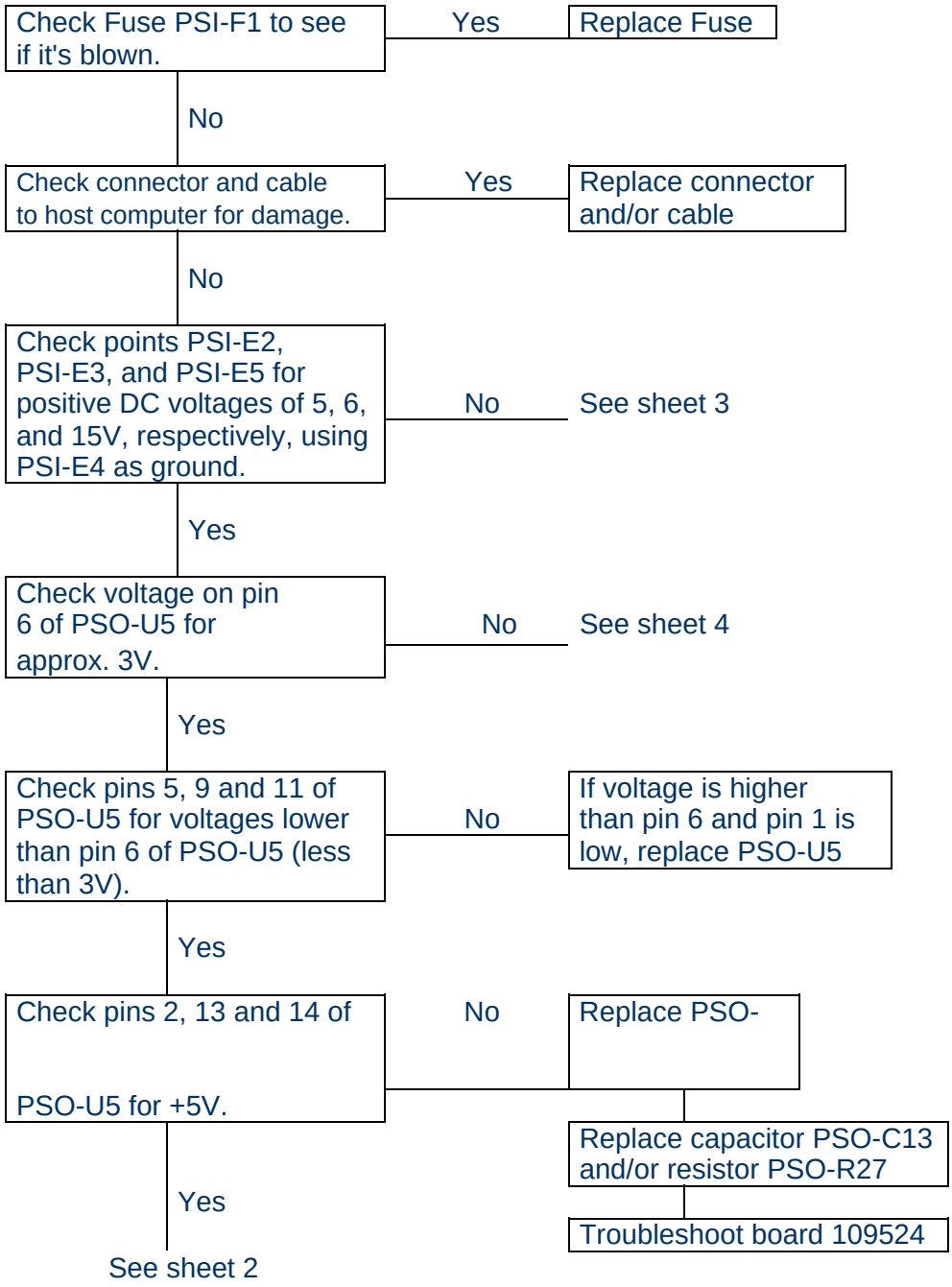

Figure 105. Fault #1 Diagram (1 of 4)

(Continued from Sheet 1)

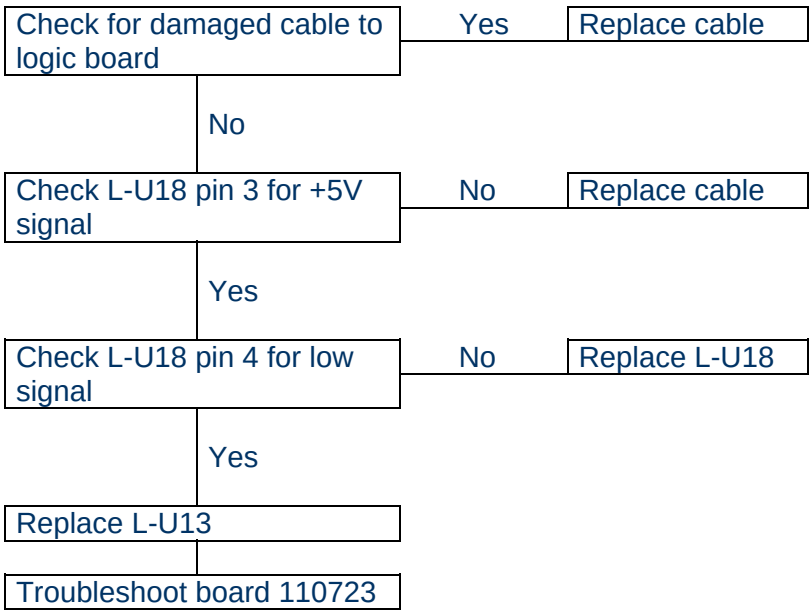

Figure 105. Fault #1 Diagram (2 of 4)

(Continued from Sheet 1)

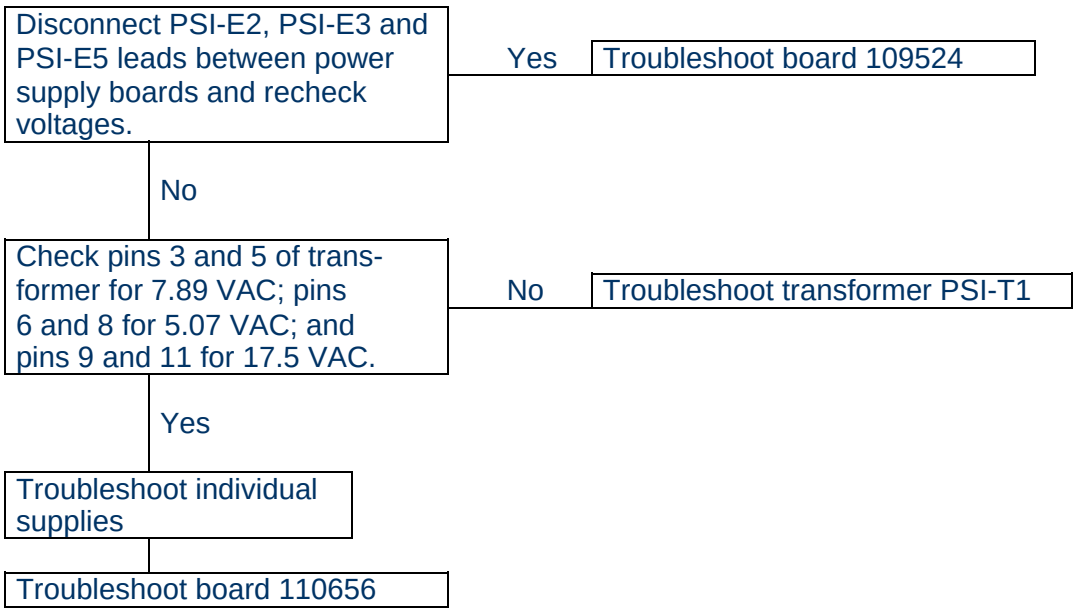

Figure 105. Fault #1 Diagram (3 of 4)

(Continued from Sheet 1)

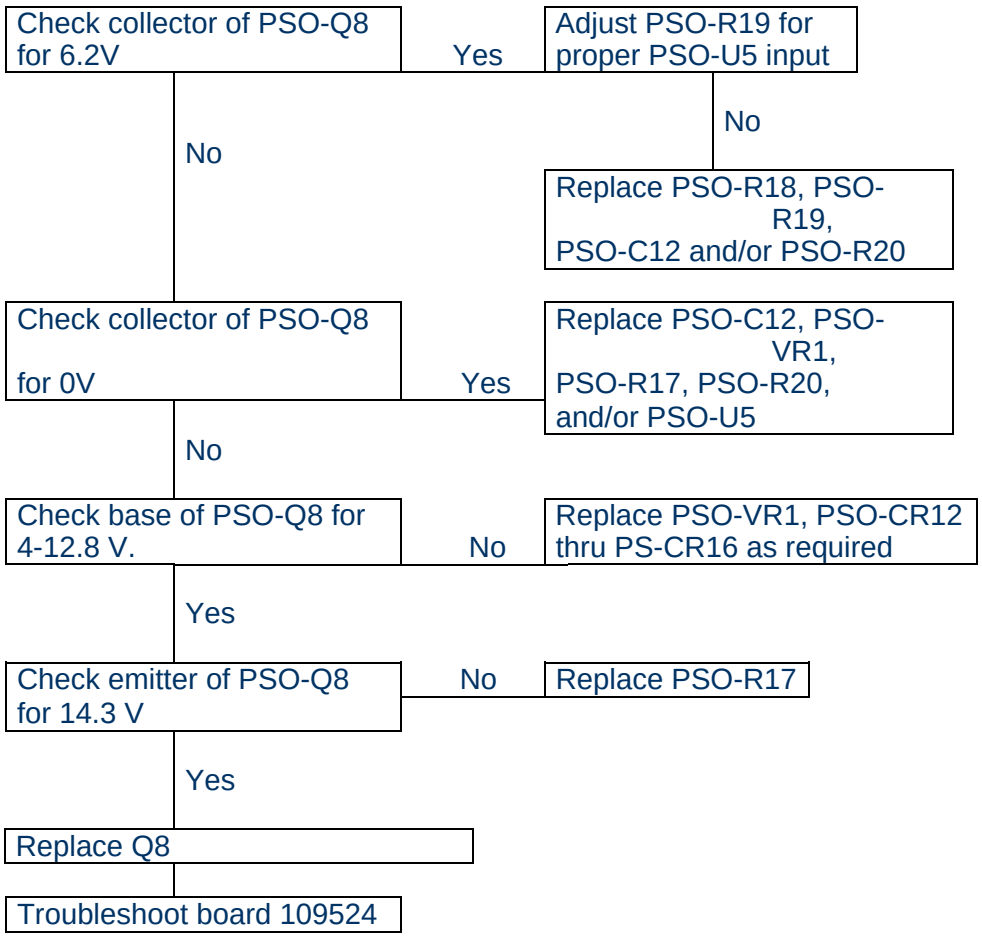

Figure 105. Fault #1 Diagram (4 of 4)

PROBLEM: No host computer communication with printer.

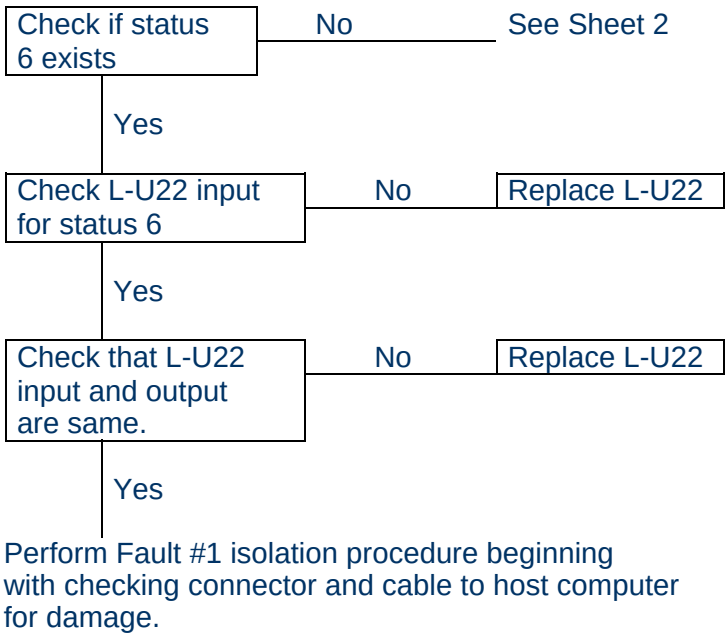

Figure 106. Fault #2 Diagram (1 of 2)

(Continued from Sheet 1)

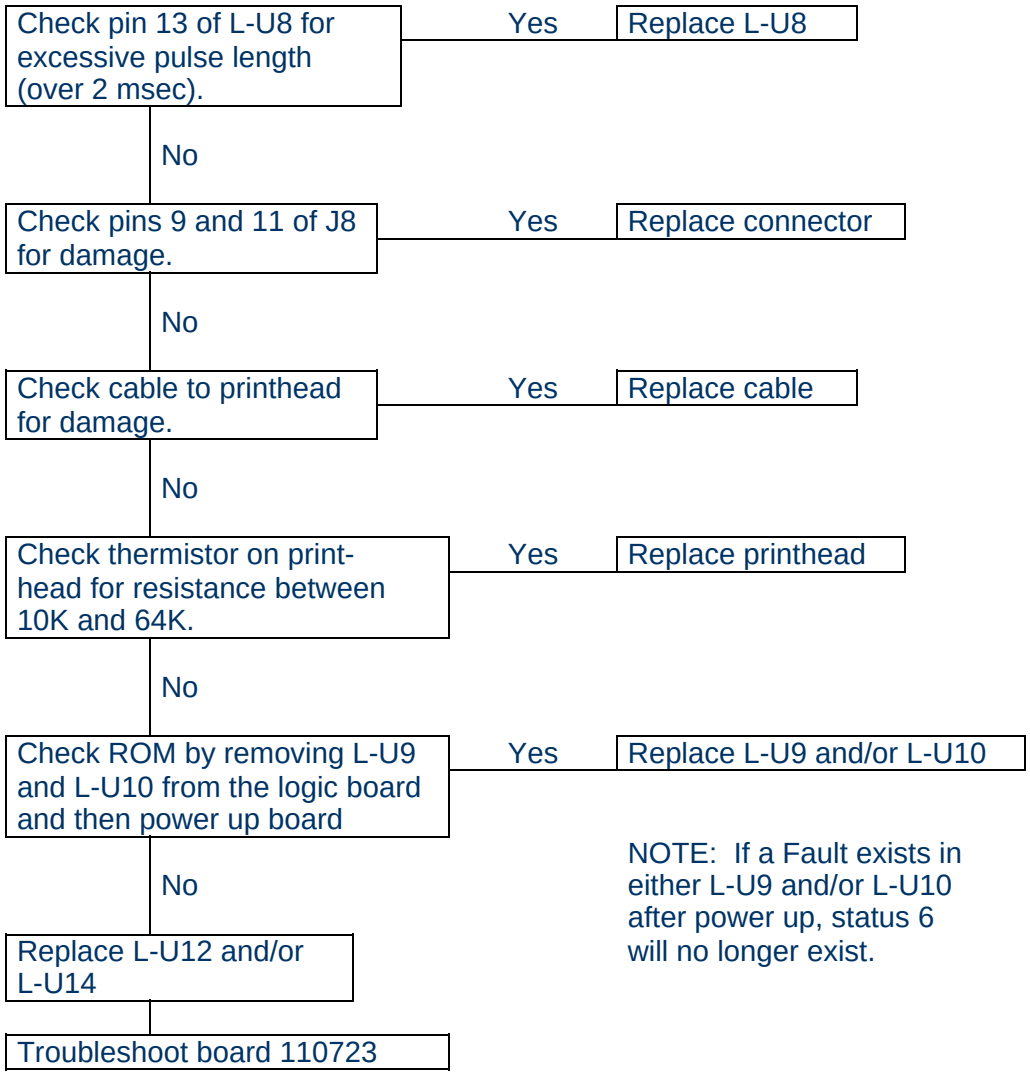

Figure 106. Fault #2 Diagram (2 of 2)

PROBLEM: Paper does not advance or chatters when advancing causing vertically compressed characters when printing.

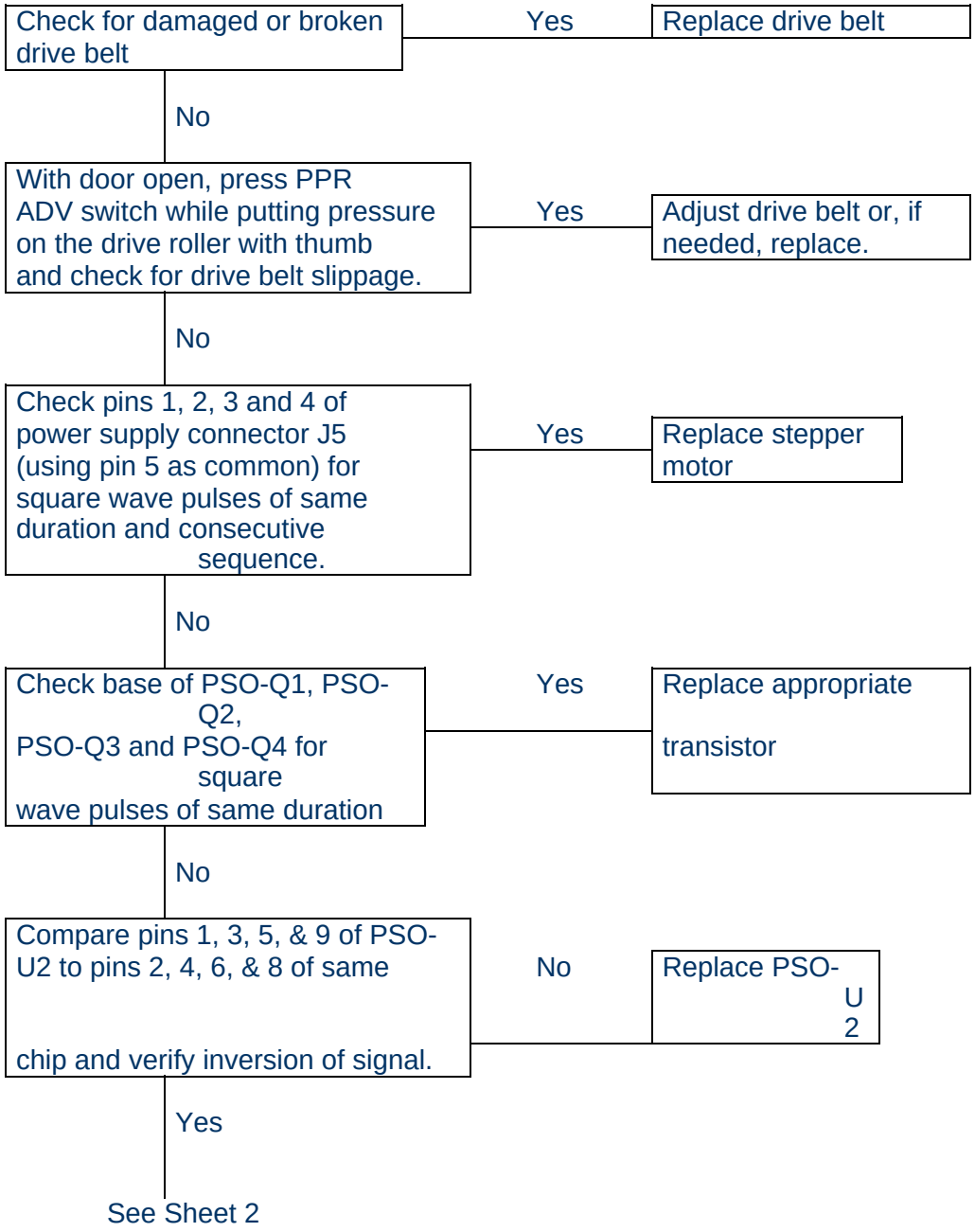

Figure 107. Fault #3 Diagram

(Continued from Sheet 1)

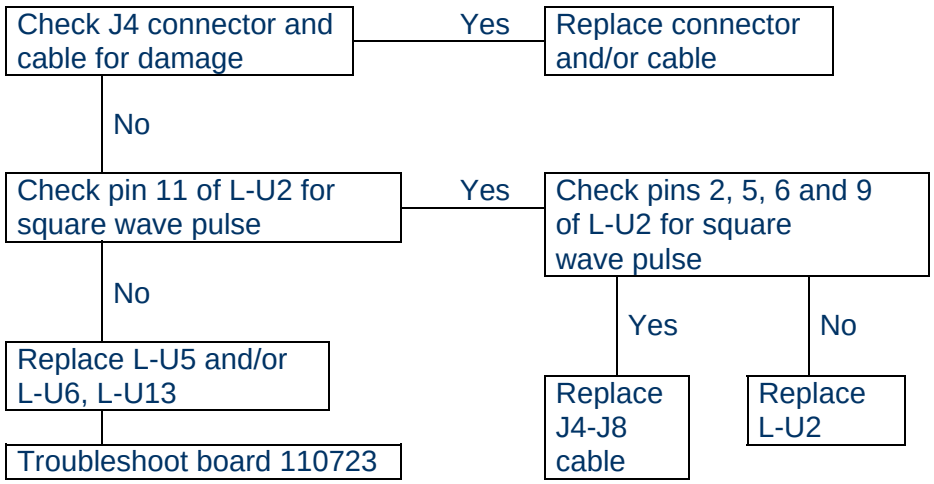

Figure 107. Fault #3 Diagram (2 of 2)

PROBLEM: No print from host computer.

NOTE: This procedure is to be performed with data being supplied to the printer from the host computer.

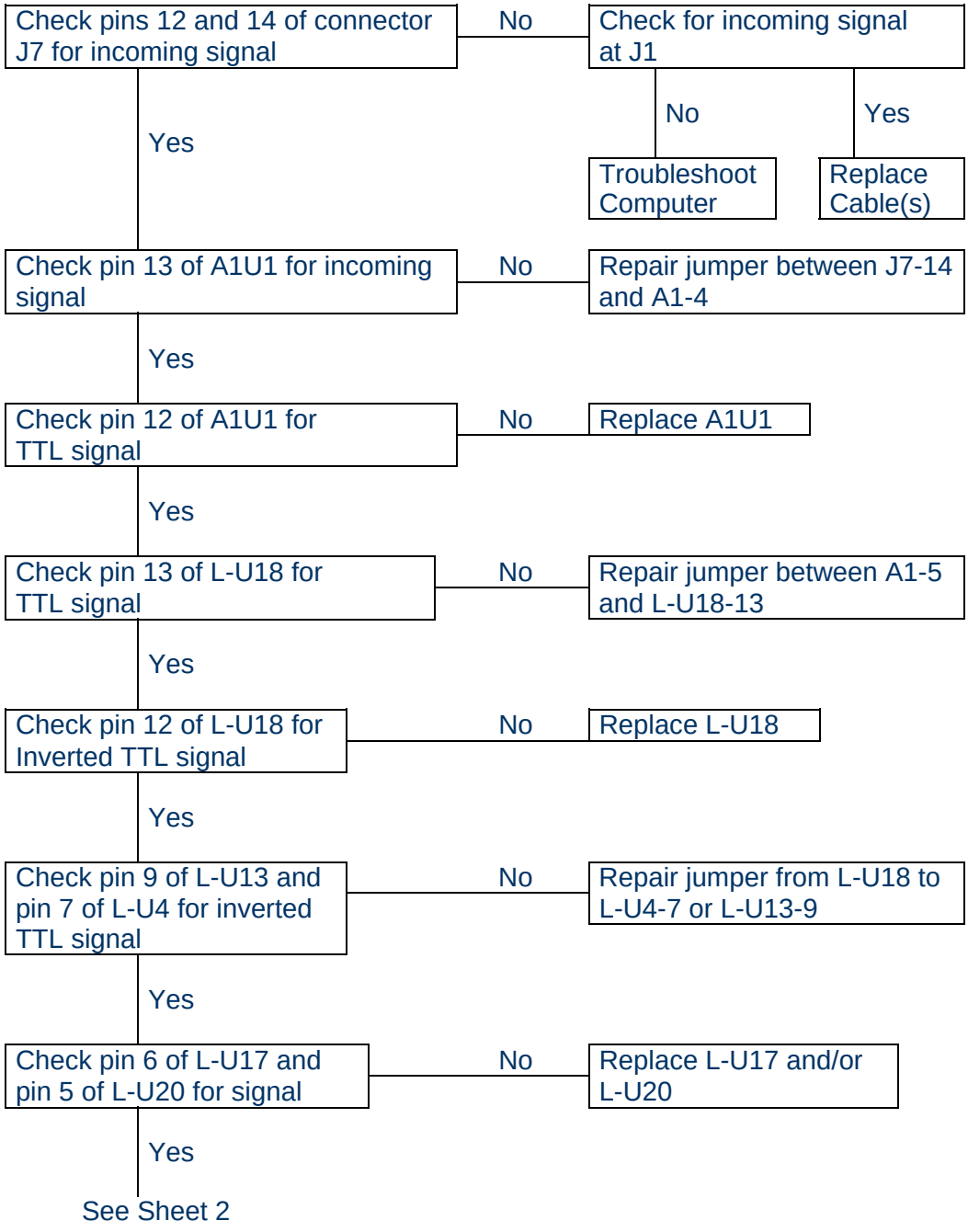

Figure 108. Fault #4 Diagram (1 of 2)

(Continued from Sheet 1)

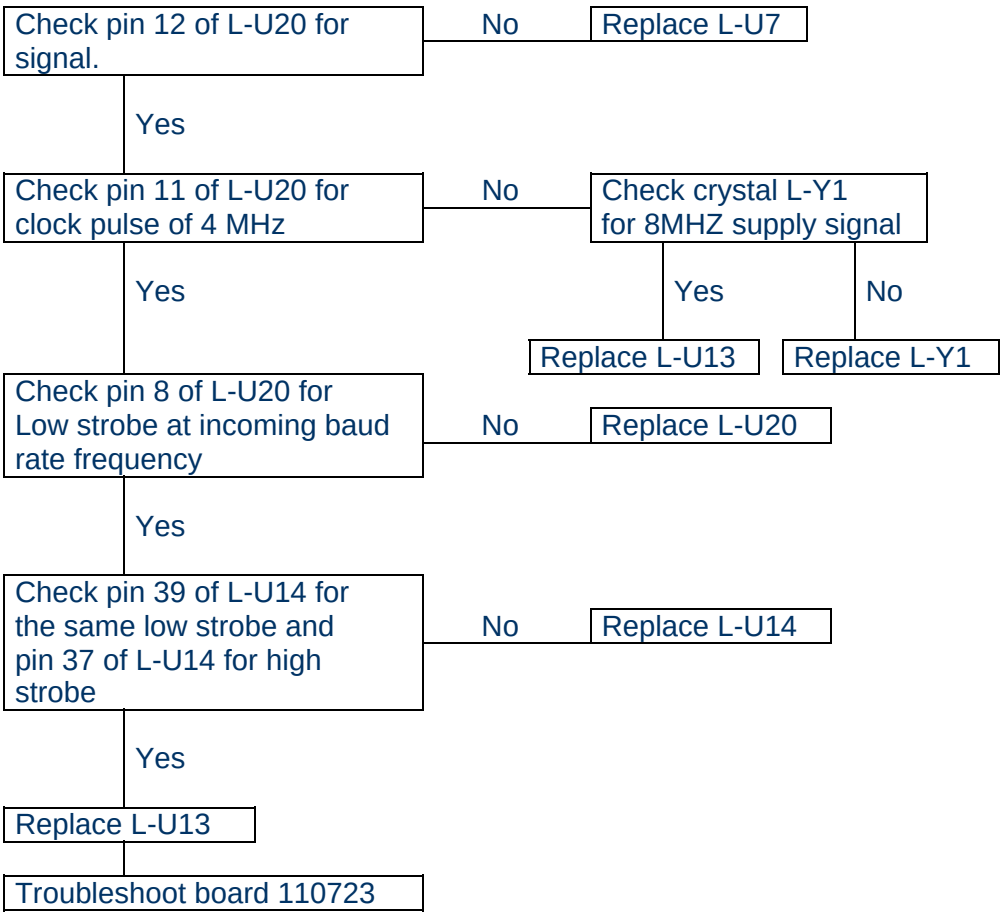

Figure 108. Fault #4 Diagram (2 of 2)

PROBLEM: No print from self-test.

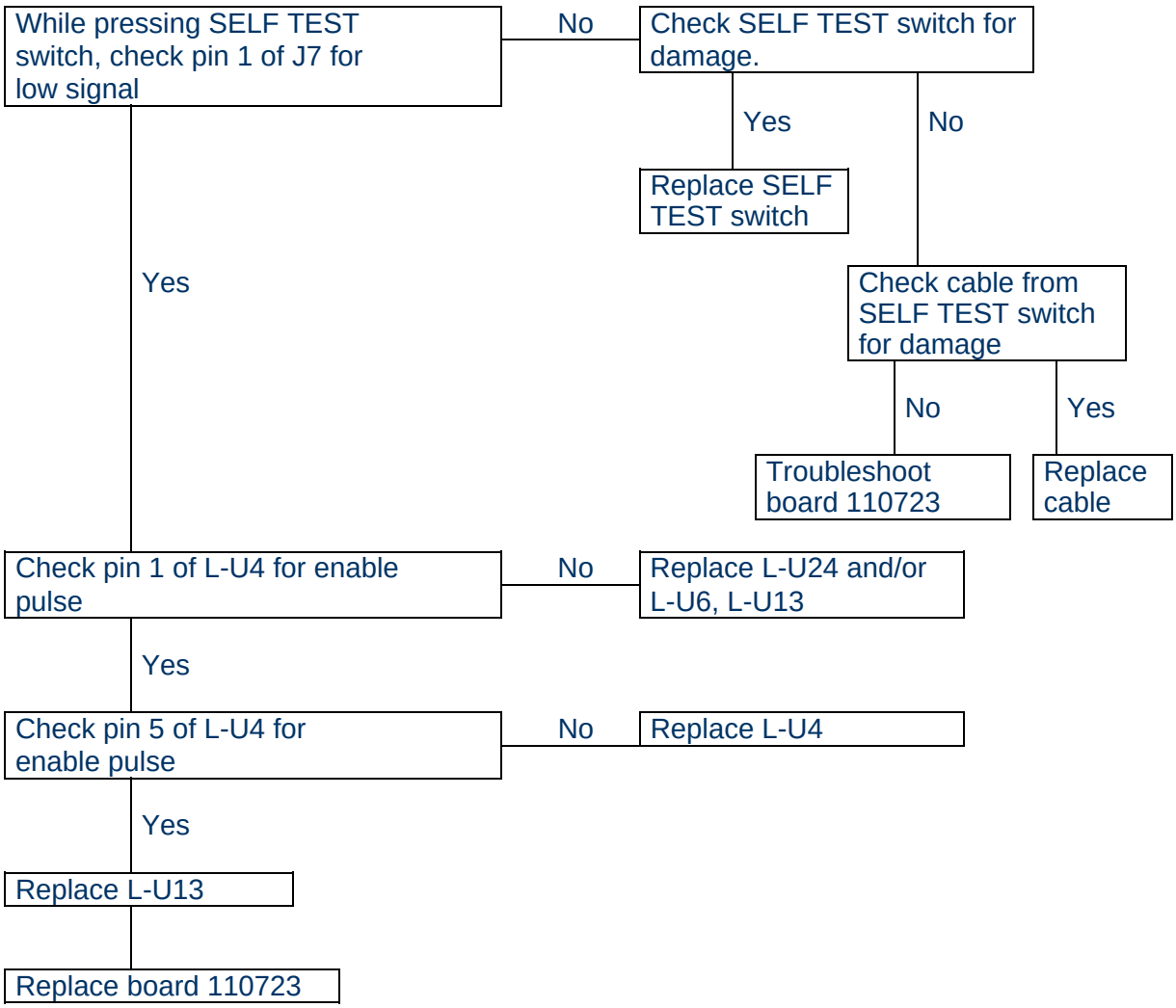

Figure 109. Fault #5 Diagram

PROBLEM: No print from host computer or SELF TEST. Paper movement but no print.

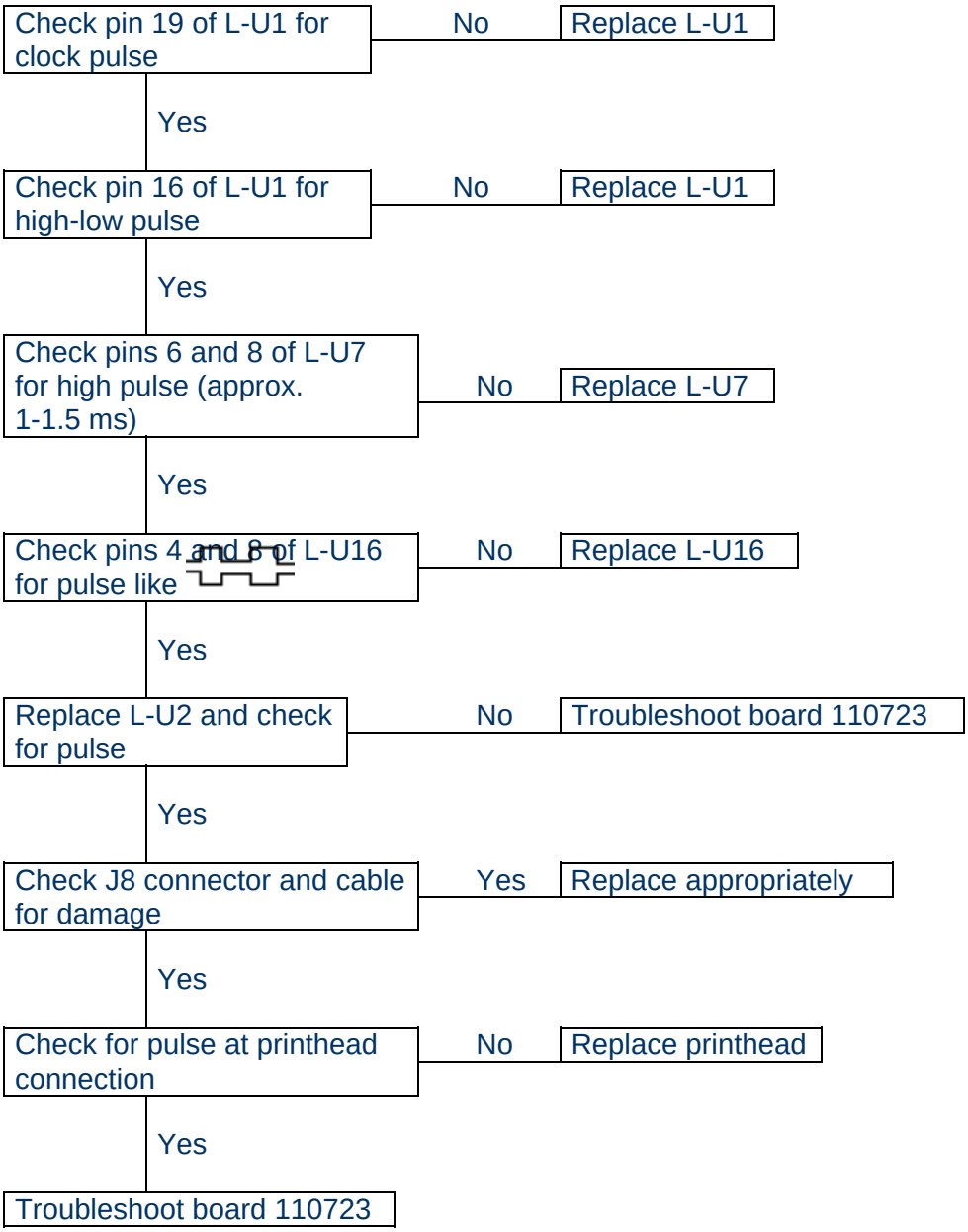

Figure 110. Fault #6 Diagram

PROBLEM: Every other dot missing on printout.

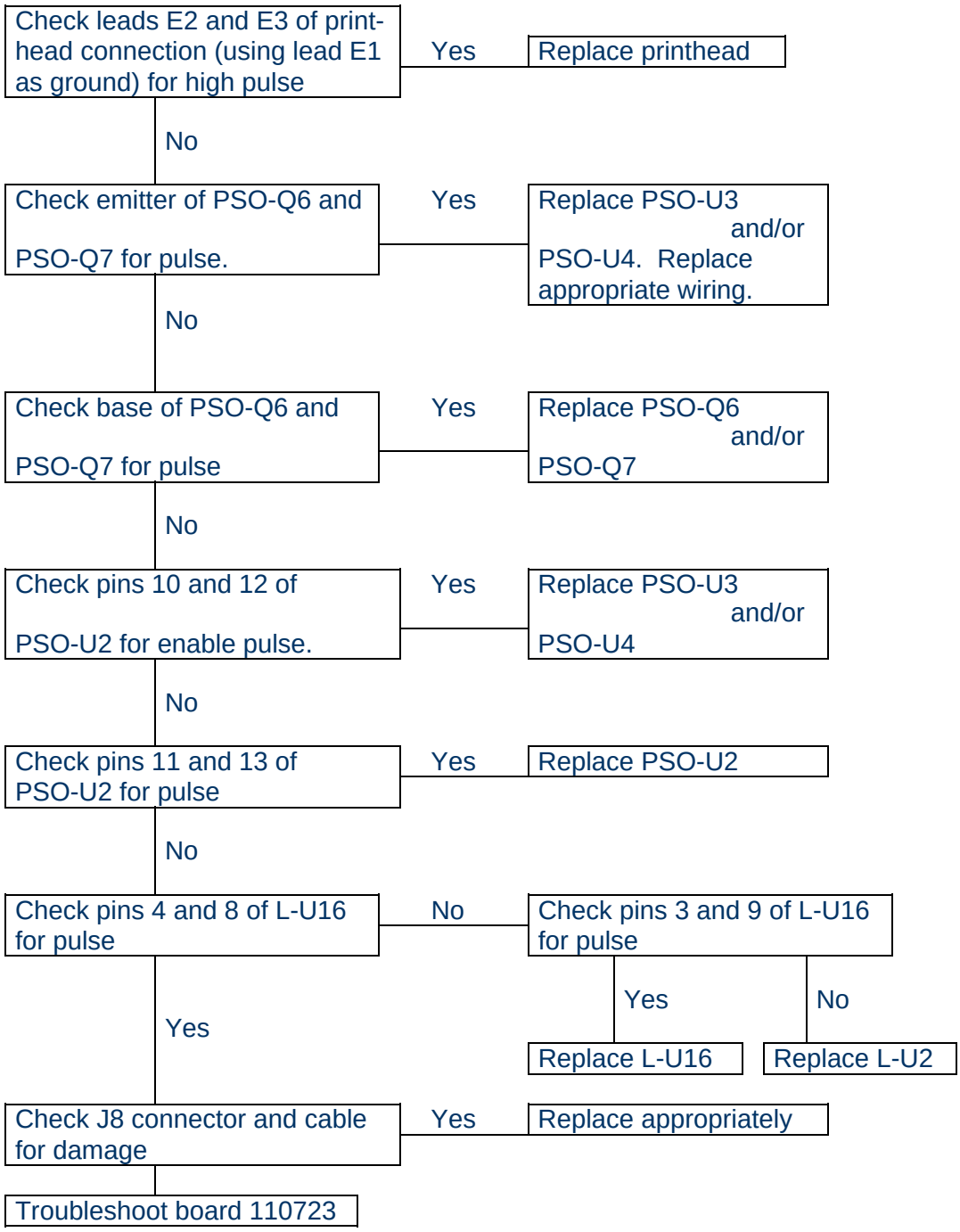

Figure 111. Fault #7 Diagram

PROBLEM: Part of printout is missing, i.e. half of page.

Replace printhead

PROBLEM: Very light or very dark printout.

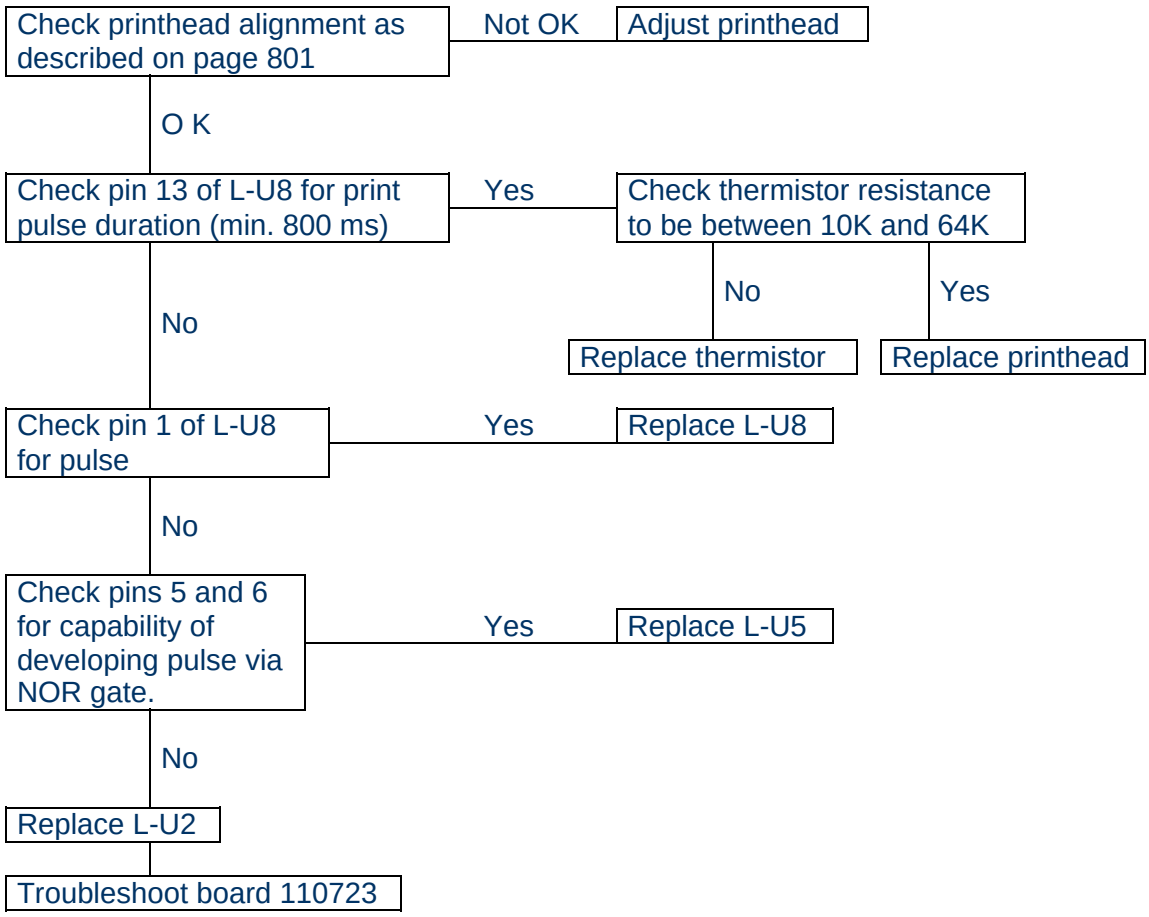

Figure 112. Fault #8 and #9 Diagram

Figure 113. Interconnection Diagram

Figure 114. Logic Schematic (1 of 2)

Figure 114. Logic Schematic (2 of 2)

Figure 115. Power Supply Schematic

DISASSEMBLY

1. General

This section details disassembly steps required to remove assemblies and sub-assemblies of the 4680 Thermal Printer for cleaning, inspection and check, and repair. Complete disassembly is unnecessary for normal repair operations.

2. Tools Required

No special tools are required during disassembly of printer.

3. Assembly and Subassembly Removal

A. Chassis Cover Removal. (Reference IPL, Figure 1)

(1) Loosen captive screw on front of door assembly by turning counterclockwise until completely free.

(2) Remove six flat head screws (2) from the top of both sides of printer chassis.

NOTE: The logic PCB is attached to the chassis cover and, by connectors P2, P7 and P8, to interior of printer.

(3) Carefully lift chassis cover to extent necessary for reaching connectors P7 and P8 and release connector locks.

(4) Remove connectors P7 and P8 by gently pulling straight back on pull tabs W3 and W4.

(5) Remove connector P2 from power supply input PCB allowing chassis cover removal.

B. Logic PCB Removal. (Reference IPL, Figure 3)

(1) Follow steps 1 through 5 of section 3.A.

CAUTION: LOGIC PCB CONTAINS ESD AND SHOULD BE HANDLED APPROPRIATELY.

(2) Remove logic PCB from chassis cover by removing four flat washers (8), four lock washers (9), and four flat head screws (10).

C. Door Removal. (Reference IPL, Figure 5)

(1) Follow steps 1 through 5 of section 3.A.

(2) Open door completely.

(3) Release stepper motor wire harness from chassis by removing the flat head screw (2), loop clamp (5), loop clamp washer (6), flat washer (7) and hex lock nut (8). (Reference IPL, Figure 17)

(4) Unscrew the two points on P5 connector of the stepper motor wire harness from J5 connector on the power supply output assembly.

(5) Separate P5 from J5.

(6) Remove the two flat head screws (27) from each side of the printer chassis.

(7) Slide door assembly forward slightly and remove the shim stock from between the printer chassis and the door assembly.

(8) Extract stepper motor wire harness from between printer chassis and thermal printhead using extreme caution to avoid damage to the wire harness.

(9) Remove door pivot (23) from door assembly.

(10) Remove door assembly from printer chassis.

D. Rear Chassis Cover Removal. (Reference IPL, Figure 1)

(1) Follow steps 1 through 5 of section 3.A.

(2) Remove four flat head screws (2) from both sides of the rear section of the printer chassis.

(3) Remove the three flat head screws (9) from the bottom of the rear section of the printer chassis.

CAUTION: DUE TO REAR SECTION OF PRINTER CHASSIS BEING CONNECTED TO INTERIOR OF PRINTER, USE CARE WHEN REMOVING TO AVOID BREAKING CONNECTIONS.

(4) Remove the rear chassis cover (8).

E. Power Supply Removal. (Reference IPL, Figure 1)

(1) Follow steps 1 through 4 of section 3.D.

(2) Remove the two flat head screws (10) securing the spacer bar to both sides of the printer chassis.

(3) Place printer on its side and remove the six flat head screws (11) securing power supply assembly to chassis.

(4) Return printer to an upright position and release locks on connector P6.

(5) Remove connector P6 by gently pulling straight back on pull tab.

(6) Slide power assembly as far to the rear of the main chassis as possible.

(7) Remove the three hex nuts (38), three lock washers (37) and three solder lugs (39) from the E1, E2 and E3 posts and tag wires. (Reference IPL, Figure 10)

(8) Carefully remove power supply assembly from the printer chassis.

F. Thermal Printhead Removal. (Reference IPL, Figure 1)

(1) Follow steps 1 through 5 of section 3.A.

(2) Lay main chassis on its side and remove two flat head screws (4) from bottom of main chassis.

(3) Return main chassis to upright position.

(4) Disconnect leads E1, E2 and E3 by removing the three hex nuts (38) and three lock washers (37) from correlative power supply posts and tag wires. (Reference IPL, Figure 10)

(5) Release locks on connector P6.

(6) Remove connector P6 from printhead by gently pulling straight back on pull tab W5 while carefully lifting printhead out of main chassis.

4. Disassembly of Assemblies and Subassemblies

A. Annunciator Panel Disassembly (Reference IPL, Figure 3)

(1) Follow steps 1 and 2 of section 3.B.

(2) Remove the four flat head screws (13). The annunciator panel is now free of the chassis cover.

B. Logic PCB Disassembly. (Reference IPL, Figure 4)

(1) Follow steps 1 and 2 of section 3.B.

CAUTION: LOGIC PCB CONTAINS ESD AND SHOULD BE HANDLED APPROPRIATELY.

(2) Components U9, U10 and U11 may be removed by gently pulling component straight up with the appropriate tool, being sure not to bend or break the leads.

(3) All other components may be removed by desoldering the part or component from the back of the logic PCB assembly and either extract it from the front or remove it from the back.

C. Door Disassembly. (Reference IPL, Figure 5)

(1) Follow steps 1 through 11 of section 3.C.

(2) Remove the upper paper guide (31) by removing the three flat head screws (29) from the door.

(3) Remove the lower paper guide (28) by removing the three flat head screws (29) from the door.

(4) Remove the stiffener (19) by removing the two flat head screws (24) from both sides of door assembly.

(5) Loosen the four flat head screws (15, 16) which secure the stepper motor bracket (18) and clamp (1) to the door so that drive belt (12) tension is relieved.

(6) Carefully spread door sides slightly apart and remove the drive roller (11) and drive belt (12).

(7) Press inward on the two flanged bearings (13) in the door and remove.

(8) Remove the stepper motor wire guide (22) by removing the flat head screw (30), flat washer (21) and hex lock nut (20) which secure it to the door.

(9) Stepper motor removal.

(a) Remove the stepper motor clamp (1) by removing the two flat head screws (16) which secure it to the door.

(b) Remove the motor (4) by removing the two pan head screws (10), two flat washers (3) and two hex lock nuts (2) which secure it to the bracket (18).

(10) Remove the small pulley (5) by removing the two setscrews (6) which secure it to the stepper motor shaft.

(11) Remove the motor bracket (18) by removing the two flat head screws (15), two flat washers (9) and two hex lock nuts (8) which secure it to the door.

D. Rear Chassis Cover Disassembly. (Reference IPL, Figure 6)

(1) Follow steps 1 through 4 of section 3.D.

(2) Remove the RFI inductor/filter (1) by removing the four flat head screws (2) which secure it to the rear chassis cover.

(3) Remove the J1 connector (5) by removing the four flat head screws (2), four flat washers (4), four hex lock nuts (6) and solder lug (10) which secure it to the rear chassis cover.

E. Power Supply Disassembly.

(1) Follow steps 1 through 8 of section 3.E.

(2) Separate the power supply input assembly from the power supply output assembly by removing the following: (Reference IPL, Figure 8)

(a) Two pan head screws (7), two round spacers (6), four flat washers (2) and two hex lock nuts (1).

(b) One pan head screw (8), two flat washers (2), one round spacer (6) and one hex lock nut (1).

(c) One pan head screw (9), two flat washers (2) and one hex lock nut (1).

(d) Spacer bar (4) from between the two power supply assemblies (3,5).

CAUTION: EXERCISE EXTREME CARE WHEN HANDLING ANY WIRE HARNESS TO PREVENT DAMAGE TO WIRE CONNECTIONS.

(3) If it's necessary to separate the two power supply assemblies completely, desolder the four jumper wires (12, 13) from either assembly.

(4) Power supply input disassembly. (Reference IPL, Figure 9)

(a) Separate 400 Hz power transformer T1 (29) from the heat sink by removing the two flat head screws (23), two flat washers (24) and two hex lock nuts (25).

NOTE: If T1 requires replacement, desolder all wires at the transformer connections and tag appropriately.

(b) Separate rectifier bridge assembly BR1 (22) from the heat sink by removing the pan head screw (26), one flat washer (11) and hex lock nut (12).

NOTE: If BR1 requires replacement, desolder all wires at the rectifier bridge assembly and tag appropriately.

(c) Voltage regulator removal.

1 Remove two pan head screws (10), four flat washers (11) and two hex lock nuts (12).

2 Desolder at two points on back of PCB.

3 Remove voltage regulator U1 (19) and mica insulator (20).

4 Clean with a lint-free cloth to remove thermal compound.

(d) Separate heat sink from PCB by removing pan head screw (26), two flat washers (11) and hex lock nut (12).

(e) Remove J2 connector (9) by desoldering the nine points on the back of the PCB and removing pan head screw (10), flat washer (11), hex lock nut (12) and spacer (13).

(f) Remove J3 connector (6) by desoldering the 16 points on the back of the PCB.

(g) All remaining components may be removed from the power supply input PCB assembly by desoldering points of interest on back of PCB and subsequently removing component from front.

(5) Power supply output disassembly. (Reference IPL, Figure 10)

(a) Transistors Q1 through Q4 (46), Q6 and Q7 (43) removal.

1 Remove two pan head screws (40), four flat washers (41) and two hex lock nuts (42) associated with transistor.

NOTE: Transistors Q6 and Q7 require additional removal of crimp lugs (39) and tagging.

2 Desolder at two points on back of PCB.

3 Remove transistor (43 or 46) and respective mica insulator (44 or 47).

4 Clean with a lint-free cloth to remove thermal compound.

(b) When all transistors are removed, the heat sink (10) may be separated from the PCB. (Reference IPL, Figure 8)

(c) Remove J5 connector (24) by desoldering the ten points on the back of the PCB and removing hardware from back of PCB with appropriate tool.

(d) All remaining components may be removed from PCB by desoldering points of interest on back of PCB and subsequently removing component from front.

F. Thermal Printhead Disassembly (Reference IPL, Figure 11)

(1) Follow steps 1 through 6 of section 3.F.

(2) Separate printhead (4) from base plate (1) by removing two shoulder screws (8) curved washer (9) and Delrin washer (10).

(3) Separate printhead (4) from the mounting plate (2) by removing two pan head screws (12) and two flat washers (11).

(4) Release locks of connector J9 and remove connector P9.

(5) Remove printhead springs (3) from baseplate (1) by removing pan head screws (6), self-locking nut (7) and flat washer (11).

CLEANING

1. General

This section provides information to clean the 4680 Thermal Printer. When performing this procedure, disassembly may be required to allow access to desired assemblies. Consult the disassembly section on page 301 for proper disassembly procedure.

Minimum cleaning of the thermal printer is required because of its protected environment. No lubricants are required for maintenance although existing lubricators may contaminate the moving parts inside.

2. Equipment and Materials

The equipment and materials listed in Table 401 will assist in performing this cleaning procedure. Equivalents may be used when appropriate.

Table 401. Cleaning Equipment and Materials

EQUIPMENT AND MATERIALS	SOURCE
Industrial Washing Unit	Commercially available
Industrial Laboratory Oven	Commercially available
Detergent Powder (Alcojet Cleaner)	Commercially available
Source of De-Ionized Water	Commercially available
Vacuum cleaner	Commercially available
Freon TF	Commercially available
Cleaning fluid	Miltope P/N S237-6973
Windex Cleaner	Commercially available
Cotton swab	P/N 5993233
Lint-free cloth	Commercially available
Cleaning tissue	Kimwipes
Soft brush	Commercially available
Small stiff-bristled brush	Commercially available

3. Cleaning Procedure

A. Interior

(1) Open front door and remove paper spool.

(2) Vacuum paper dust and fragments from the printer chassis interior and inside of front door paper drive mechanism.

CAUTION: DO NOT USE ISOPROPYL ALCOHOL FOR CLEANING ANY SURFACE. DO NOT SPRAY CLEANING FLUID DIRECTLY INTO PRINTER ELECTRONICS.

B. Printhead

Clean roller with cotton swab moistened with Freon TF or Miltope cleaning fluid.

C. Drive roller

Clean roller with lint-free cloth moistened with Freon TF or Miltope cleaning fluid.

D. Exterior

Clean exterior with lint-free cloth or cleaning tissue moistened with Freon TF or Miltope cleaning fluid.

E. Dirt or grease

Clean affected areas with lint-free cloth, cleaning tissue, soft brush or small stiff-bristled brush (as deemed necessary) moistened with Freon TF or Miltope cleaning fluid. Occasionally, vigorous brushing may be required for complete removal.

F. Circuit Card Assembly (CCA) Cleaning Procedure (Optional)

This cleaning procedure has been implemented to remove corrosive materials from CCA's resulting from liquid contamination (spills) in the printer. Remove all CCA's from the thermal printer unit as required. All electronic components utilizing sockets can be removed prior to washing to allow for improved CCA cleaning. Place CCA's to be cleaned inside the industrial washer machine on the parts tray standing upright. Add the Alco jet detergent cleaner as required and close the front door. Set washer unit temperature to 155 degrees and start by rotating control to first position. Let the washer unit run through the entire wash and rinse cycle before removing CCA's. Remove and inspect all cleaned CCA's to verify all contaminants have been removed. If required, repeat wash of CCA's. Ensure all CCA's are thoroughly dried by placing them in the laboratory oven for approximately 45 minutes. Verify that the oven temperature does not exceed 150 degrees. Reassemble the cleaned CCA's in the printer and perform automated and/or functional test procedures.

INSPECTION AND CHECK

1. General

This section describes defects to look for when servicing the DataMetrics 4680 Thermal Printer.

2. Inspection/Check

Consult Table 501 for mechanical/electrical defects to look out for. Dirt or corrosion should also be considered as a defect when inspecting.

Table 501. Possible Defects

ASSEMBLY/COMPONENT	DEFECTS
Printer chassis	Bent or distorted metal surfaces; defective hardware or joining surfaces.
Connectors	Bent, broken, loose or disengaged pins; broken, loose or deformed housings; damaged insulators.
Flexible wiring	Broken connections or wire strands; damaged insulation.
Printed circuit cards	Charred or overheated surfaces; broken or otherwise damaged parts.
Electronic components	Overheated or otherwise damaged parts, bent, broken, or loose wires or terminals.

REPAIR

1. General

This section describes the repair procedure for the DataMetrics 4680 Thermal Printer that consists of component level replacement and/or repair. For assistance with component location, consult IPL, page 1001. If component replacement is involved, the disassembly and assembly procedures are found on pages 301 and 701, respectively.

2. Circuit Card Assemblies

A. Electric Components

Utilize standard shop practices when replacing individual electronic components of circuit card assemblies noting original position and polarity of component. Thermal compound or conformal coating utilized on various components should be replaced appropriately to maintain printer's integrity.

B. Solder

Standard shop practices are to be followed when soldering a component to the printed circuit board.

The solder part number is SN63 and conforms to QQ-S-571 specification.

C. Conformal Coating

Replace the conformal coating according to standard shop practices to maintain the printer's integrity whenever the coating has been removed to gain access to a component. It is not, however, to be spread over entire assembly due to existence of regions that are to remain free of it. These regions occur near heat sinks, wires, connectors, mechanical hardware and logic chips U9 through U11. Any other region originally noted to be missing the coating should be maintained in that respect.

Be sure the coating is type UR and spread evenly to maintain a uniform coat over the assembly.

3. Individual Components

A. Flared Components

Standard shop practices are to be followed when removing and/or replacing the components listed in Figure 601. Be sure that the integrity of the part to which the component is attached is maintained and that the part is not subjected to excessive force which would require replacement.

Table 601. Flared Components

DESCRIPTION	IPL FIGURE ITEM NO.	PART NUMBER	QTY.
DZUS Fasteners	2-4		4
Chassis Cover Nut	3-5		1
Captive Screw	5-32		1

B. Flush Fasteners

Standard shop practices are to be followed when removing and/or replacing the flush fasteners listed in Figure 602. Care should be exercised to prevent damage to the surrounding structure.

Table 602. Flush Fasteners

LOCATION	IPL FIGURE ITEM NO.	PART NUMBER	QTY	SCREW SIZE
Door	5-37		6	4-40

C. Wedge Nuts

Standard shop practices are to be followed when removing and/or replacing the wedge nuts listed in Figure 603. Care should be exercised to prevent damage to the surrounding structure.

Table 603. Wedge Nuts

ASSOCIATED HARDWARE

DESCRIPTION	IPL FIGURE ITEM NO.	SCREW SIZE	QTY.
Chassis Cover Mounting Brackets		4-40	6
Rear Chassis Cover Mounting Brackets		4-40	4
Power Supply Input Heat sink		6-32 4-40	4 3
Power Supply Output Heat sink		6-32	2

D. Rivets

Standard shop practices are to be followed when removing and/or replacing the rivets listed in Figure 604. Care should be exercised to prevent damage to the surrounding structure(s).

Table 604. Rivets

ASSOCIATED HARDWARE DESCRIPTION	IPL FIGURE ITEM NO	PART NUMBER	DIAMETER SIZE	QTY
DZUS Fastener Mounting Brackets	2-3		.093	10
Chassis Cover Mounting Brackets	3-2			6
Paper Spool Shaft Retaining Spring	5-26		.094	2
Rear Chassis Cover Mounting Brackets	6-7			4

4. Wiring

A. Ribbon Cables/Connectors

Consult appropriate IPL figure for replacement part number of ribbon cable and/or connector. Cut wire to appropriate length and assemble per standard shop practices.

B. Individual Wires and Supplements

Most of the assemblies listed in Figure 605 have common requirements of solder (P/N SN63) and lacing tape (Type I, Fin B, Size 3) but differ in the other areas listed.

C. Motor Lead Repair

Cut diamond harness within 2 inches of the motor. DO NOT REPLACE SINGLE WIRES. REPLACE ALL WIRES. Prepare new harness to be spliced into the motor harness by fabricating harness as shown on page 1039 and 1040 using connector WTA10PCUT and 22AWG wire. Route harness as required, securing beneath clamp, and splice loose ends onto the motor leads using sleeves 2503668-1 (CPN 5554490). Dress repaired harness as required. Use proper wire color code (Shop stock number 20-22 AWG, Teflon covered)) and insure that entire harness length is within 5% of the original.

NOTE: These components commonly precede motor lead replacement: runs away, pops C/5, sporadic printing, motor grinds but no paper.

HARNESS ASSEMBLY	WIRE GAUGE	SHRINK SLEEVING PART NUMBER	ASSOCIATED CONNECTOR
Annunciator Panel	22		P2
Motor Control	22		P5
Rear Connector - to RFI Inductor/Filter - to Power Supply Input PCB	 20 22		J1
Power Supply Input PCB - Bridge Rectifier BR1 - Transformer T1	 20 20		
Thermal Print head			J9

ASSEMBLY

1. General

This section details the necessary steps for assembling the various assemblies that comprise the DataMetrics 4680 Thermal Printer. Before performing this procedure, insure that assemblies and components pass inspection and check procedure, page 501, and that cleaning procedure, page 401, has been performed.

2. Assembly of Assemblies and Subassemblies

NOTE: Replace all burred or damaged screws.

A. Annunciator Panel Assembly

(1) Install four flat head screws (13) fastening the Annuciator Panel to the cover.

(2) Route cable and connector P2 along the center of one cover, clear of Loic Assembly mount holes.

(3) Attach logic PWB to chassis cover with four flat washers (8), four lock washers (9) and four flat head screws (10). (Reference IPL, Figure 3)

(4) Attach connector P2 to power supply input PCB.

(5) Attach connectors P7 and P8 to logic PCB by pushing gently, but firmly, into place.

(6) Secure connectors P7 and P8 by pushing connector locks into place.

(7) Carefully place chassis cover into position between both sides of the main chassis.

(8) Secure with six flat head screws (2) at top of both sides of main chassis. (Reference IPL, Figure 1)

(9) Close door of printer and secure with captive screw by turning screw clockwise while pushing in.

B. Logic PCB Assembly

CAUTION: LOGIC PCB CONTAINS ESD AND SHOULD BE HANDLED APPROPRIATELY.

(1) Replace components U9, U10 or U11 by gently pushing component straight into socket being sure not to bend or break leads and that pin 1 aligns with original pin 1 position.

(2) All other components may be replaced by soldering replacement on back of PCB after being placed into position on front of PCB with appropriate sleeving if required.

(3) If component replaced had conformal coating on solder side, renew conformal coating.

(4) Follow steps 3 through 9 of section 2.A.

C. Door Assembly (Reference IPL, Figure 5)

(1) Attach motor bracket (18) to door (14) with two flat head screws (15), two flat washers (9) and two hex lock nuts (8), but do not tighten.

(2) Attach small pulley (5) to stepper motor shaft with two setscrews (6), but do not tighten.

(3) Attach stepper motor (4) to bracket (18) using two pan head screws (10), two flat washers (3) and two hex lock nuts (2).

(4) Attach clamp (1) to stepper motor (4) using two flat head screws (16), but do not tighten.

(5) Attach stepper motor wire guide (22) to door with flat head screw (30), flat washer (21) and hex lock nut (20) securing harness to door.

(6) Place flanged bearing (13) on the inside of door in position and push firmly outward until seated.

(7) Repeat step 6 for other side.

(8) Place drive belt (12) on small pulley (5) and drive roller (11).

(9) Carefully spread door sides slightly apart and place drive roller (11) into position.

(10) Ease sides back into position.

(11) Place stiffener (19) into position and secure with two flathead screws (24) on each side of door.

(12) Align small pulley (5) with drive roller (11) pulley and tighten the two setscrews (6).

(13) Move stepper motor assembly until proper tension is restored to drive belt (12).

(14) Tighten four flat head screws (15, 16).

(15) Attach lower paper guide (28) with three flat head screws (29).

(16) Attach upper paper guide (31) with three flat head screws (29).

(17) Door assembly placement.

(a) Place the shim stock into position between printer chassis and door assembly.

(b) Align door assembly with side holes and place door pivot (23) into position.

(c) Secure assembly with two flat head screws (27).

(18) Place stepper motor wire harness between printer chassis and print head using extreme caution to avoid damage to the wire harness.

(19) Attach P5 to J5 and secure by screwing in the P5 points.

(20) Attach the stepper motor harness to chassis by securing loop clamp (5) to chassis with flat head screw (2), loop clamp washer (6), flat washer (7) and hex lock nut (8). (Reference IPL, Figure 16)

(21) Follow steps 4 through 9 of section 2.A.

D. Rear Chassis Cover Assembly (Reference IPL, Figure 6)

(1) Attach RFI inductor/filter to chassis cover with four flat head screws (2).

(2) Attach J1 connector with four flat head screws (2), four flat washers (4), four hex lock nuts (6) and solder lug (10).

(3) Being careful not to pinch wires, place rear chassis cover into position and secure with three flat head screws (9) at bottom of rear chassis cover. (Reference IPL, Figure 1)

(4) Attach four flat head screws (2) to both sides of main chassis cover, but do not tighten.

(5) Follow steps 4 through 9 of section 2.A.

(6) Tighten all screws.

E. Power Supply Assembly (Reference IPL, Figure 8)

(1) Power supply output assembly procedure.

(a) To replace ICs, resistors, capacitors, diodes, and transistor Q8, place into position on PCB front and secure with solder on PCB back.

(b) To replace connector J5, place it into position on PCB front and attach hardware to connector on PCB back with appropriate tool. Secure with solder at ten points on PCB back.

(c) Q1 through Q4 (46), Q6 and Q7 (43) replacement. (Reference IPL, Figure 10)

1 Apply thermal compound (45) to back of mica insulator (44 or 47).

2 Place mica insulator (44 or 47), compound side down, into position.

3 Place transistor (43 or 46) into position.

4 Attach transistor to heat sink with two pan head screws (40), two flat washers (41) and two hex lock nuts (42).

5 Secure transistor with solder at two points on back of PCB.

(d) To reconnect the power supply output to the power supply input, solder the four jumper wires (12, 13) back into position.

(e) Position the spacer bar between the power supply input and output PCB's and secure with two pan head screws (7, 9), a round spacer (6), four flat washers (2) and two hex lock nuts (1).

(f) Complete the securing of the power supply output to input by attaching two pan head screws (7, 8), four flat washers (2), two round spacers (6) and two hex lock nuts (1).

(g) Slide power supply assembly carefully into position within the main chassis and attach E1, E2 and E3 leads with three lock washers (37) and three plain hex nuts (38). (Reference IPL, Figure 10)

(h) Gently but firmly, push connector P6 straight into J6 and secure the connection with the connector locks.

(i) Place printer on its side and secure the power supply to the chassis with six flat head screws (11) (Reference IPL, Figure 1)

(j) Return printer to an upright position and attach the power supply spacer bar to the chassis with two flat head screws (10), but do not tighten. (Reference IPL, Figure 1)

(k) Follow steps 3 through 6 of section 2.D.

(2) Power supply input assembly procedure. (Reference IPL, Figure 9)

(a) To replace transistors, resistors, capacitors, diodes, fuse holders and relays, place into position on the front of the PCB and secure with solder on the back of the PCB.

(b) To replace fuse, gently, but firmly, press fuse into fuse holder.

(c) To replace connector J3, place it into position on the front of the PCB and secure it with solder at the 16 points on the back of the PCB.

(d) Attach connector J2 on the front of the PCB with pan head screw (10), flat washer (11), hex lock nut (12) and round spacer (13). Secure it with solder at the nine points on the back of the PCB.

(e) Attach heat sink to PCB by placing into position and attaching one pan head screw (26), one flat washer (11), and one hex lock nut (12).

(f) Voltage regulator U1 replacement.

1 Apply thermal compound (32) to back of mica insulator (21).

2 Place mica insulator, compound side down, into position.

3 Place U1 into position.

4 Attach U1 to heat sink with two pan head screws (10), four flat washers (11), and two hex lock nuts (12).

5 Secure U1 with solder at two points on back of PCB.

(g) To replace rectifier bridge assembly BR1 (22), attach wires to assembly and solder into place. Attach to heat sink using one pan head screw (26), one flat washer (11) and one hex lock nut (12).

(h) To replace power transformer T1 (29), attach wires to transformer connections and solder into place. Attach to heat sink with two flat head screws (23), two flat washers (24), and two hex lock nuts (25).

(i) Follow steps d through k of section 2.E. (1).

F. Thermal Print head Assembly. (Reference IPL, Figure 11)

(1) Attach two print head springs (3) to base plate (1) with flat washers (10) and self-locking nut (7). Install pan head screw (6) to secure the springs.

(2) Attach the connector P9 to jack J9. Secure with locking tabs (if applicable).

(3) Attach print head (4) to mounting plate (2) by installing pan head screw (12) and flat washer (11), align fuss tabs on the mounting plate with holes in the bottom of the print head.

(4) Attach print head (floating assembly) and mounting plate to base plate (1) by installing Delrin washer (10), curved washer (9) and two shoulder screws (8).

(5) Carefully lower print head into main chassis and gently but firmly, push connector P6 straight into connector J6.

(6) Secure connection with connector locks.

(7) Connect leads E1, E2 and E3 to correlative power supply posts with three lock washers (37) and three hex nuts (38). (Reference IPL, Figure 10)

(8) Lay main chassis on its side and connect print head to main chassis with two flat head screws (4). (Reference IPL, Figure 1)

(9) Return main chassis to upright position.

(10) Follow steps 3 through 9 of Section 2.A.

FITS AND CLEARANCES

1. General

This section describes the adjustments necessary for the DataMetrics 4680 Thermal Printer. Because of the manufacturer's adjustments made prior to delivery, minimal adjustment procedures are required.

2. Shim Utilization

In assemblies that employ the use of shims for maintaining proper clearances, occasional replacement will be necessary. The various shims utilized within or between various assemblies are tabulated below in Table 801.

Table 801. Shims

DESCRIPTION	IPL FIGURE ITEM NO.	PART NUMBER
Door Pivot	5-23	
Door Pivot	5-23	
Drive Roller	5-12	

3. Print head Alignment (Reference IPL, Figure 11)

A. When installing the print head, be sure the leading edge of it is parallel to the door assembly.

B. Remove paper spool from door assembly.

C. With chassis cover off, close printer door to extent necessary for checking the centering of the drive roller between the two protective coverings of the print head.

D. If the drive roller is not centered, loosen either of the two screws (4) associated with the print head mounting bracket to center the drive roller; then retighten. (Reference IPL, Figure 1)

E. Install paper spool and thread paper through door assembly.

F. Install chassis cover per assembly procedure.

G. Apply power to printer and press the SELF TEST switch.

H. Check the self-test printout against that found in Figure 101 for completeness, accuracy and legibility.