

MODEL **FSP** 41-300
FLIGHT STRIP PRINTER



MAINTENANCE AND USERS MANUAL

08.27.98



Boca Systems

Follow best commercial established practices while operating and maintaining the Flight Strip Printer. This includes, but it is not limited to, electrostatic discharge (ESD), power and personal safety.

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1.0 Introduction

The Flight Strip Printer (FSP) Model FSP-41-300 has been developed by Boca Systems, Inc. for the air traffic control environment.

Using direct thermal technology, the printer prints a flight strip 1.0 inch wide by 8.0 inches long. After printing, the flight strips are cut and ejected into a hopper.

This printer accepts commands in accordance with Boca's FGL programming language (as described in Boca's FGL 41 programming guide) via a serial or parallel interface. Additional features and characters have been added and are described in this manual.

The FSP is divided into a Print Head Module and a Power Supply Module, which are connected by an interconnect cable.

2.0 Getting Started

Open the shipping carton and remove the contents. Packing material should be kept for later use. You will find these items in the box:

- Print Head Module—see Figure 1
- Power Supply Module—see Figure 1
- Interconnect cable—see Figure 1
- An ac power cord—not shown
- Hopper—see Figure 5
- Locator tab—not shown
- Two bags containing miscellaneous hardware—not shown.

If your printer was damaged in shipping, or if any items are missing, notify Boca Systems, Inc. immediately at the address below:

1065 South Rogers Circle
Boca Raton, FL 33487

(561) 998-9600 / (561) 998-9609 (fax)

3.0 A Tour of the Flight Strip Printer

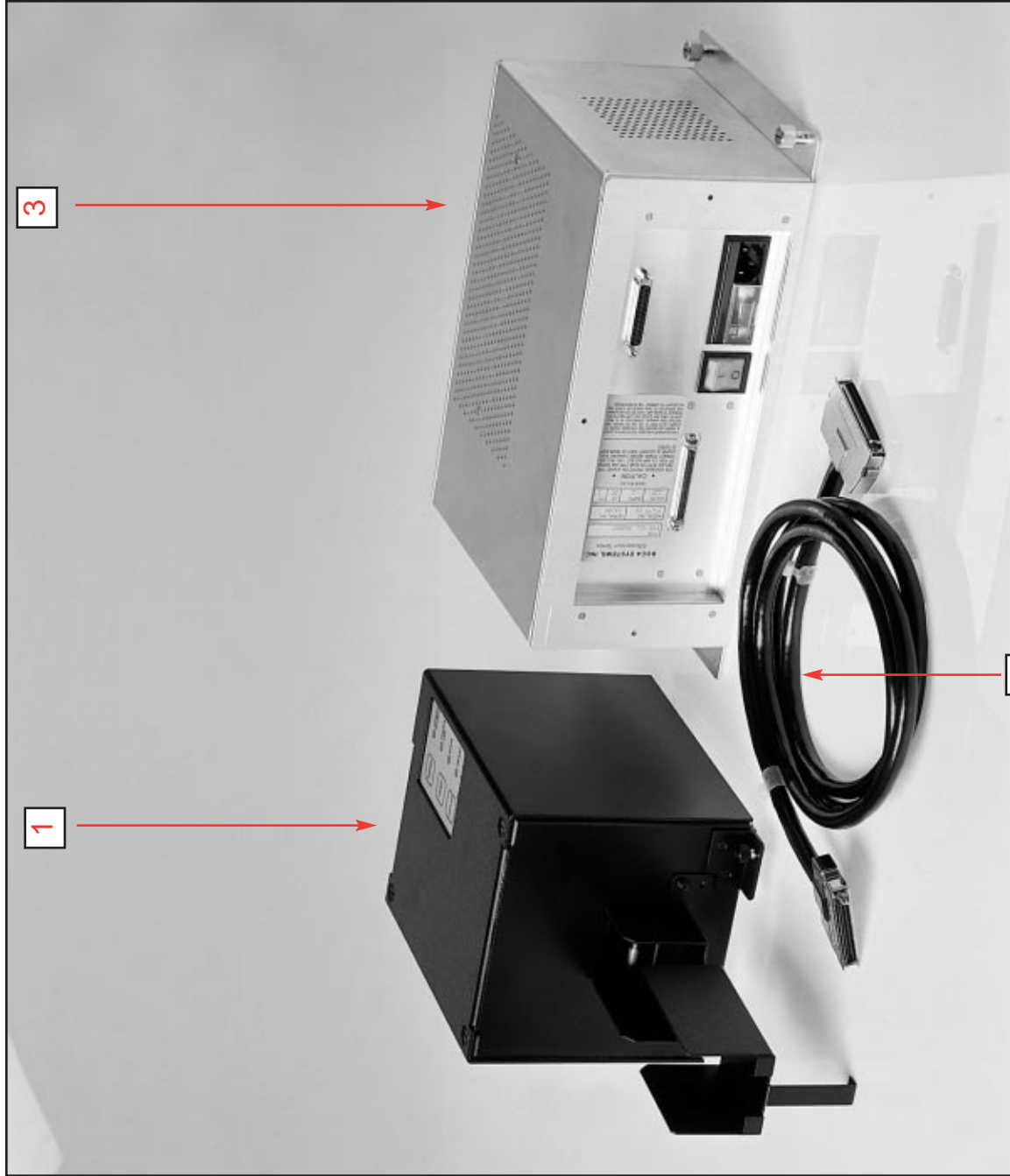


Figure 1
**Flight Strip Printer (FSP)
41-300**

- 1 - Print Head Module
- 2 - Interconnect Cable
- 3 - Power Supply Module

Figure 2

Power Supply Module (Cover Removed)

- 1 - Connector Board, Interconnect Cable (Power Supply Module)
- 2 - AC Switch
- 3 - AC Filter Fuse Holder
- 4 - Fuse, 2 amp SLOW BLOW
- 5 - I/O Module

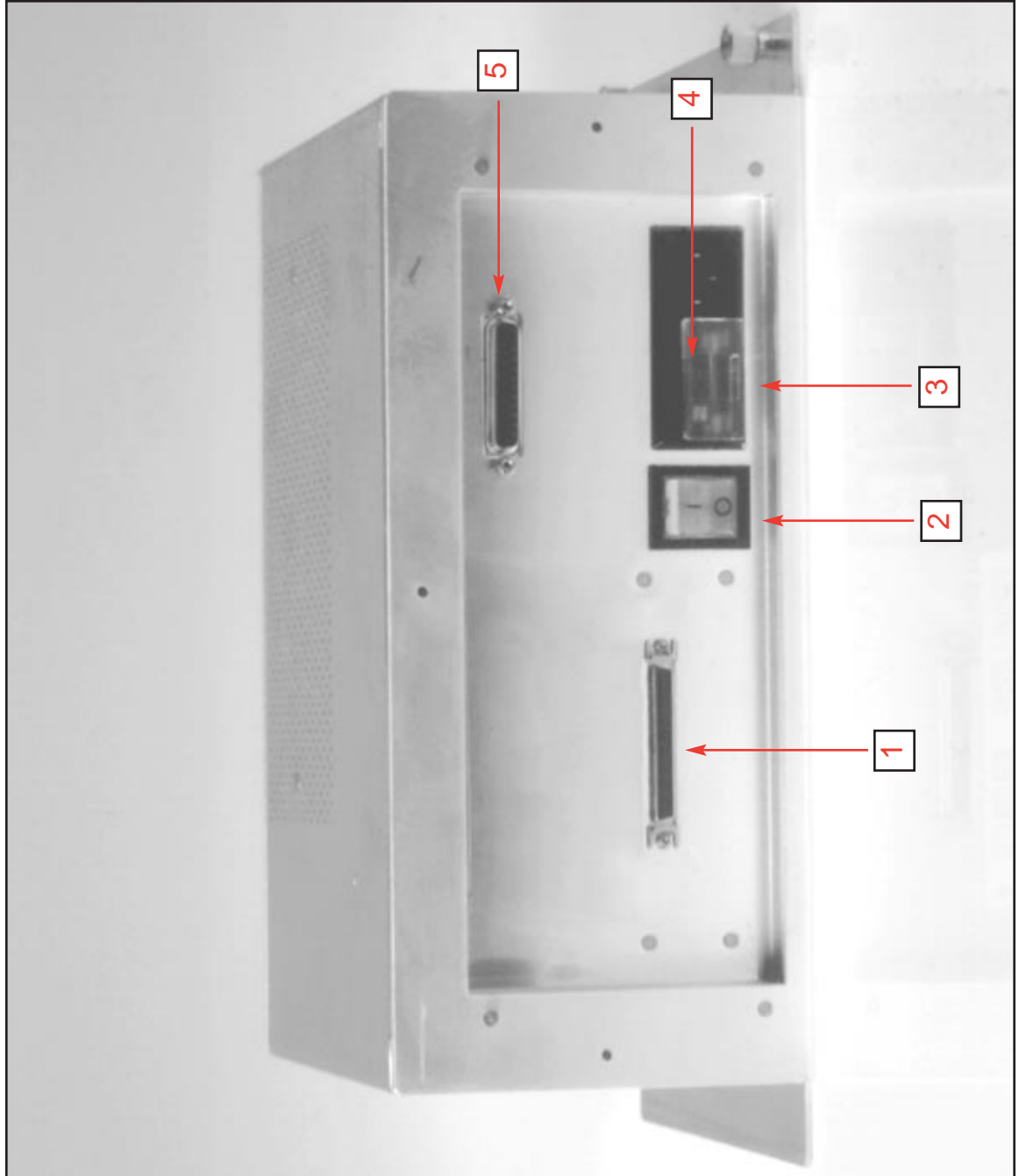
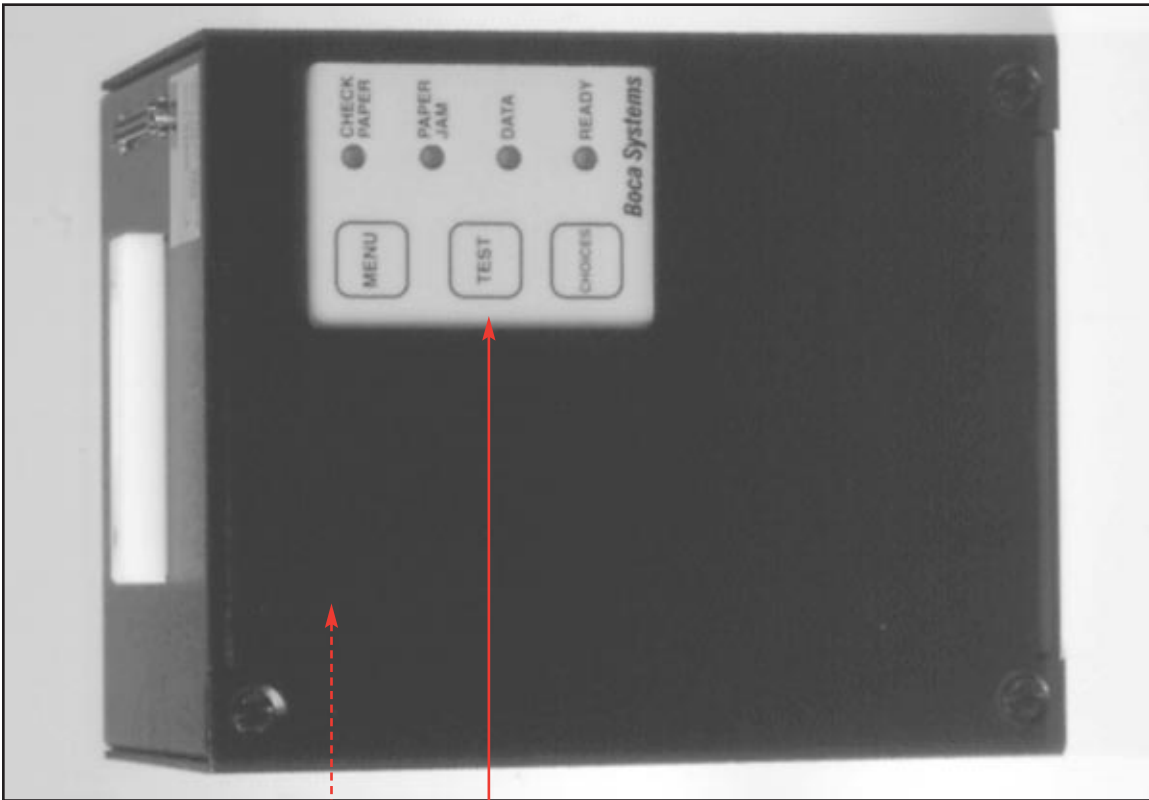


Figure 3
**Print Head Module
(Top View)**

1 - Control Panel Assembly
(Mounted under Cover)

2 - Touch Panel



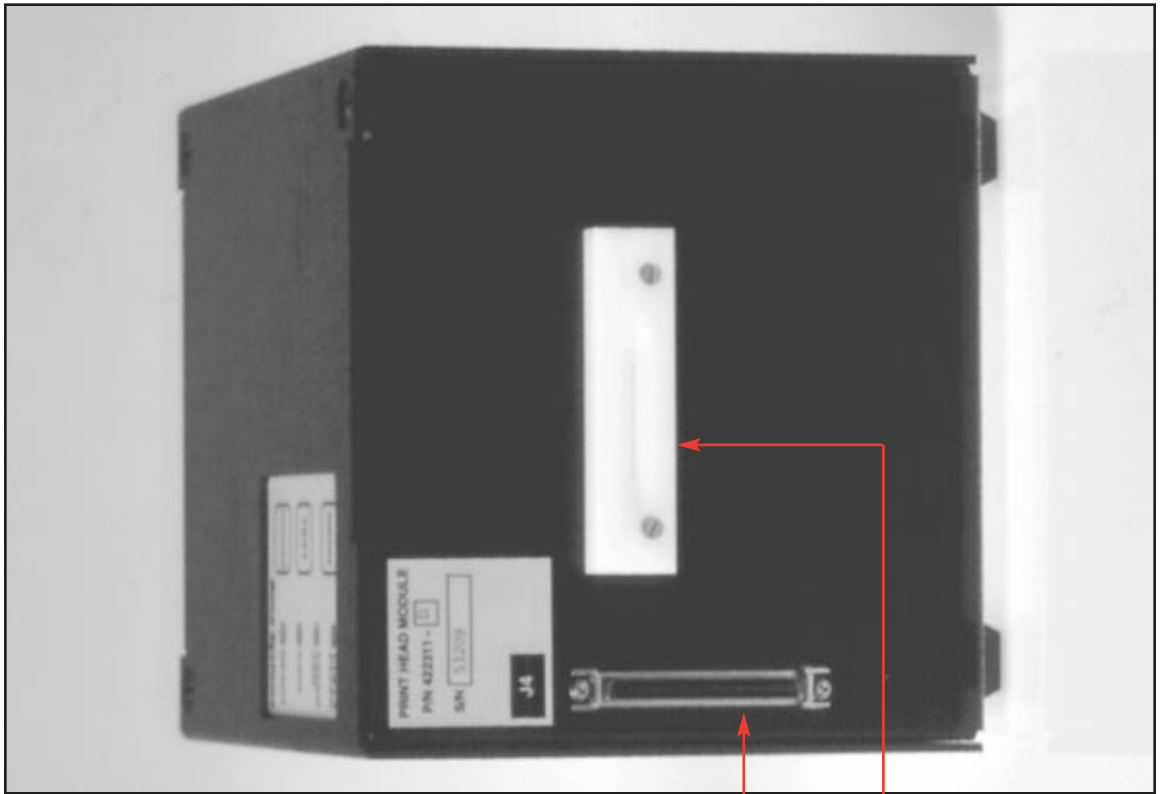
1

2

Figure 4
**Print Head Module
(Rear)**

1 - Connector Board,
Interconnect Cable
(Print Head Module)

2 - Input Bezel



1

2

Figure 5

Print Head Module Profile (Cover Removed)

- 1 - Stepper Motor
(Mounted behind Plate)
- 2 - Pulley, 20T
- 3 - Pulley, 30T
- 4 - Cutter Assembly
- 5 - Hopper
- 6 - Belt, Timing 102T
- 7 - Print Head Cable
- 8 - Mounting Post (x4)

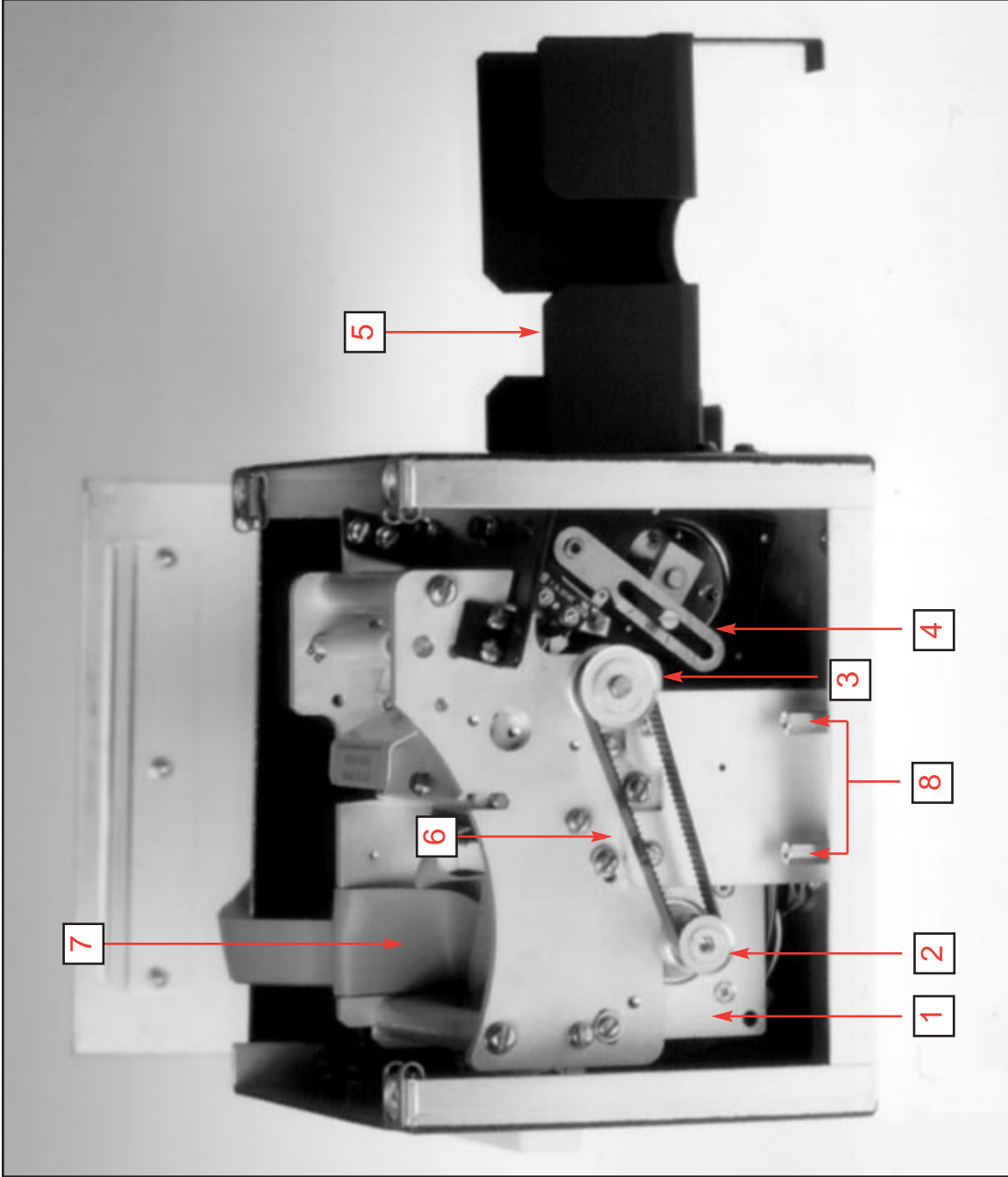


Figure 6
**Print Head Module
(Cover Removed)**

- 1 - Print Head
- 2 - Head Release Lever
- 3 - Print head ribbon cable
- 4 - Print head mounting screws
- 5 - Hopper
- 6 - $\frac{1}{2}$ pan head screws

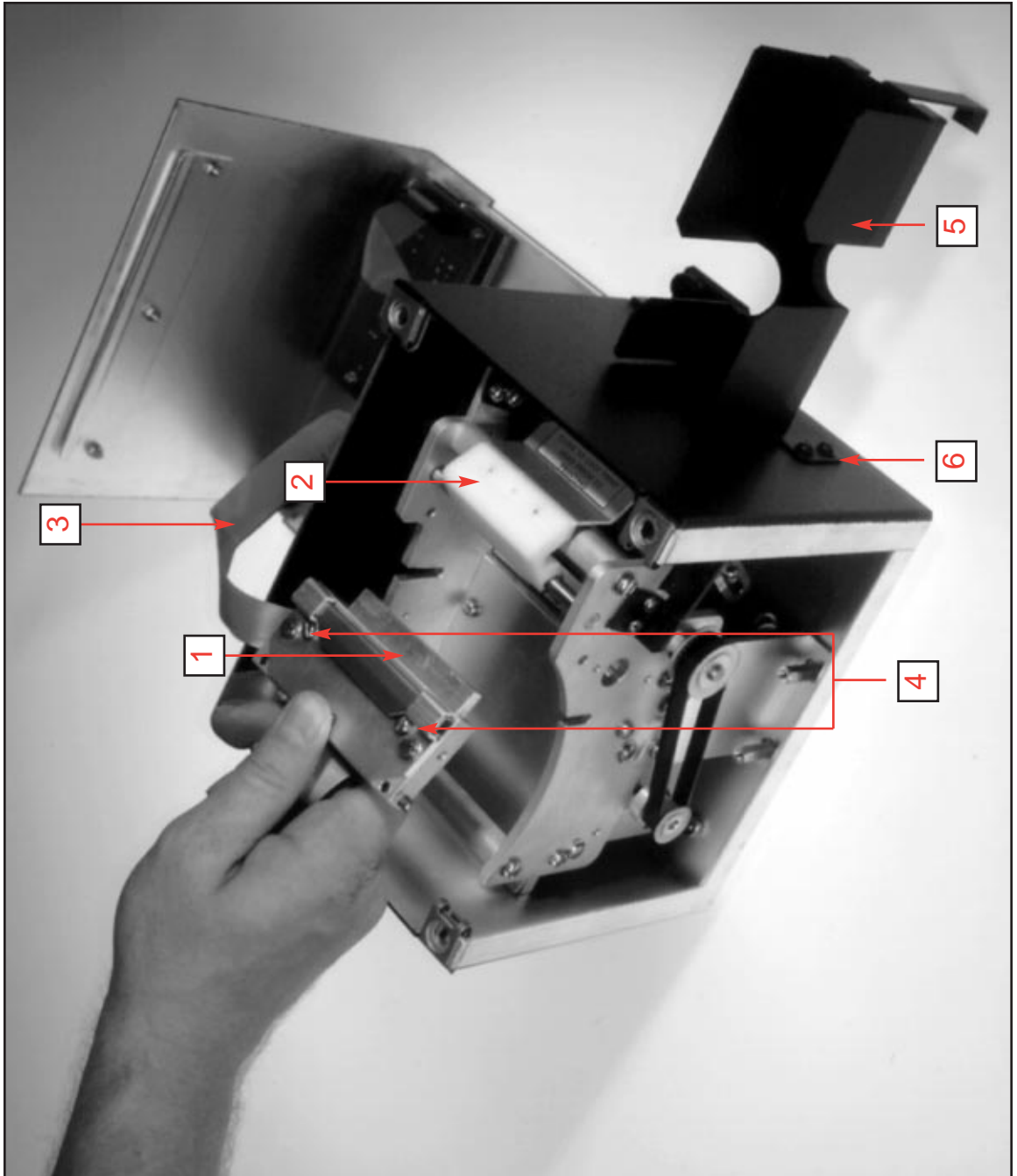


Figure 7
Print Head Module

- 1 - Cutter
- 2 - Cutter Opto
(Mounted to Opto Bracket)
- 3 - Input Bezel
- 4 - Outboard Support Plate
- 5 - Paper Feed Opto

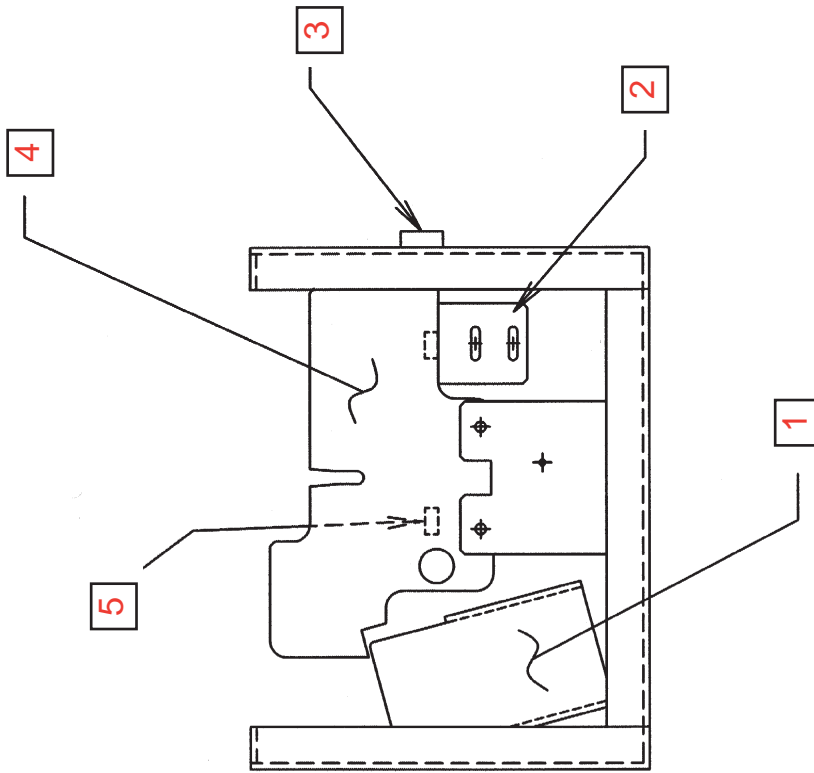


Figure 8
**Top View of Optos
and Platen**

- 1 - Optical Detector, Feed
- 2 - Platen
- 3 - Optical Detector, Cutter
- 4 - Weep Hole

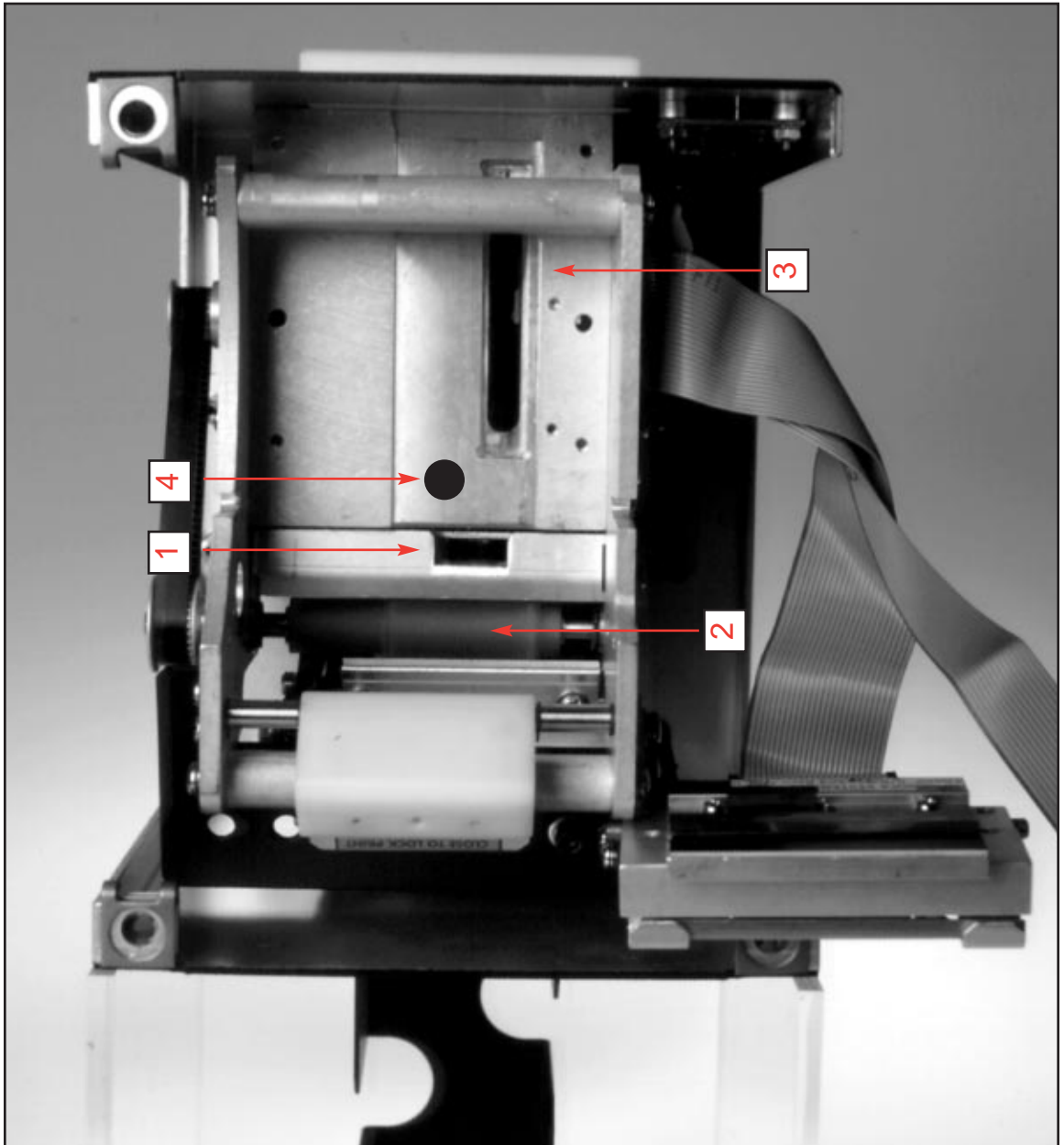
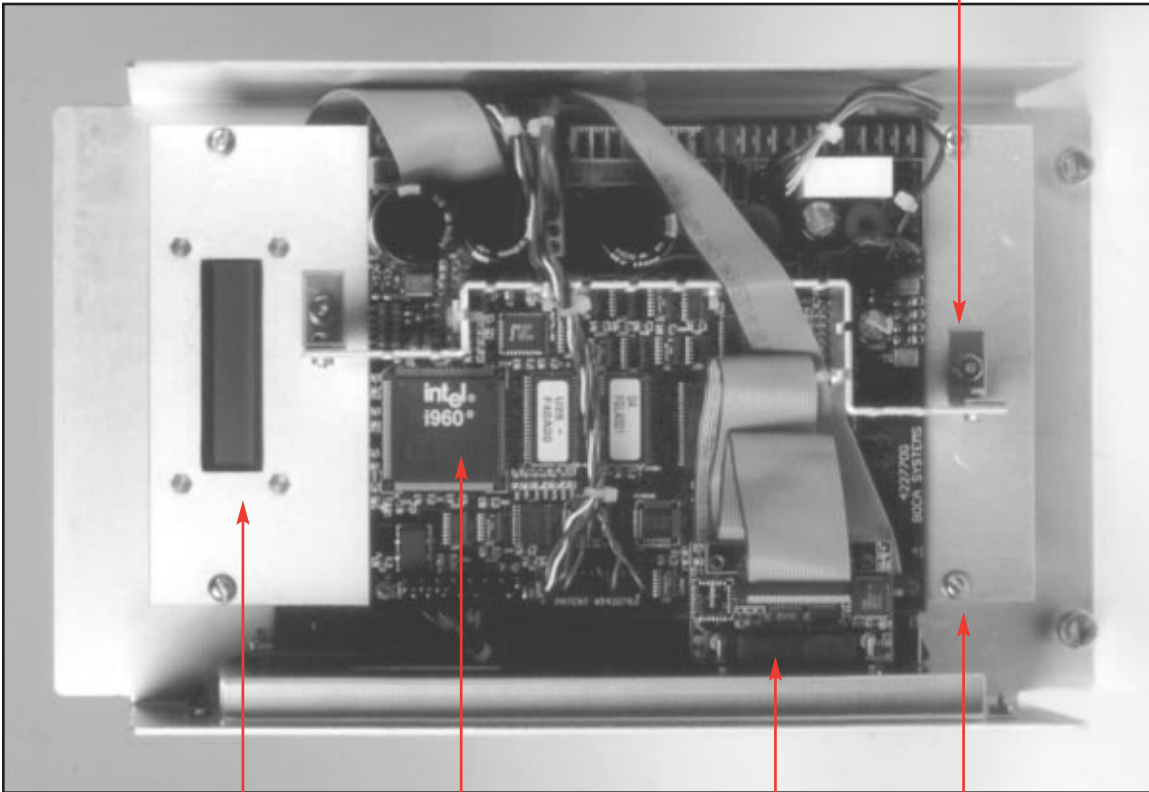


Figure 9
**Power Supply Module
(Cover Removed)**

- 1 - LCD Display
- 2 - Logic Board
- 3 - I/O Module
- 4 - Pan Head Screw (x4)
- 5 - Mounting Screws (x2) to heat sink



1

2

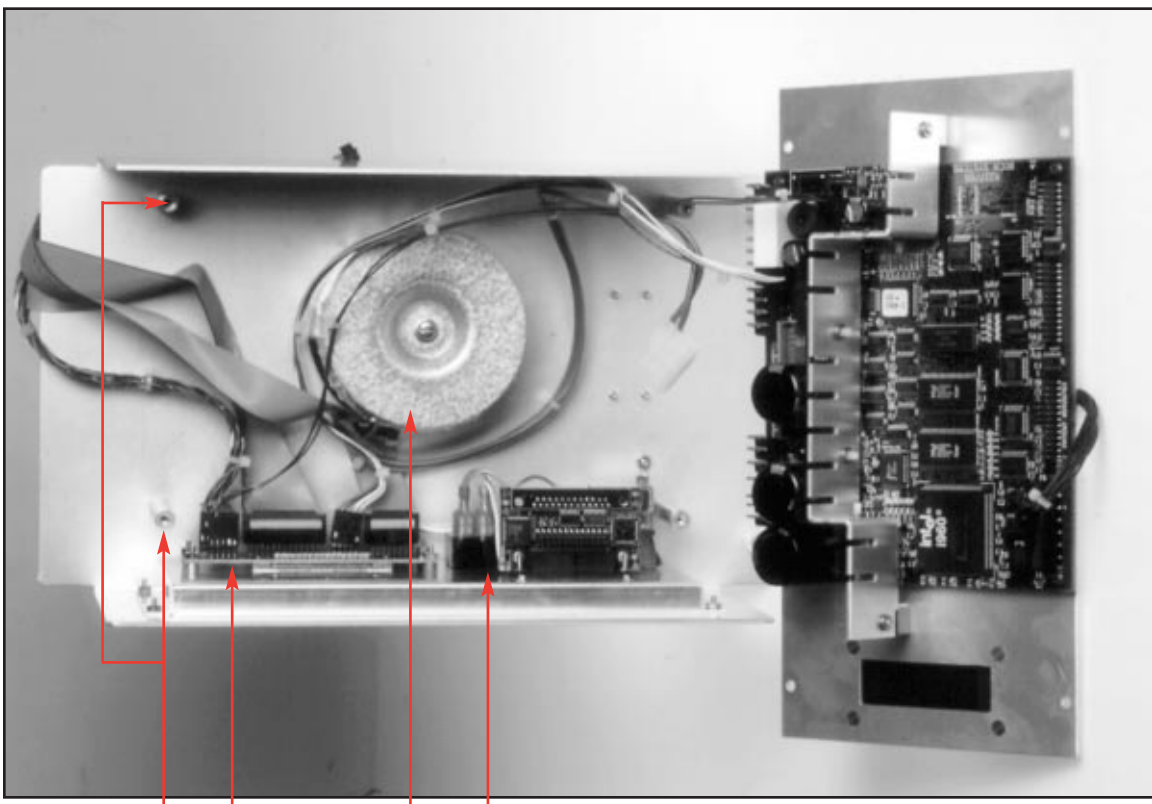
3

4

5

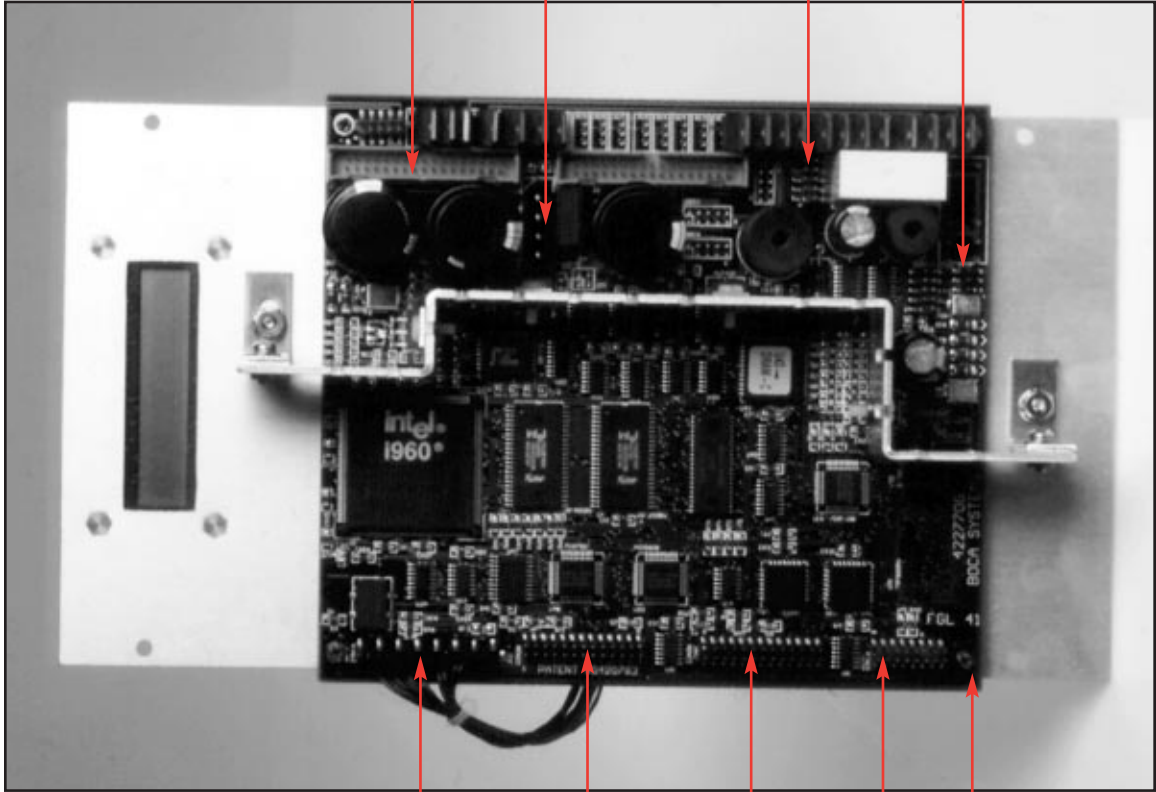
Figure 10
**Power Supply Module
(Logic Board Removed)**

- 1 - Mounting Post (x4)
- 2 - Connector Board
- 3 - Transformer, Toroid
- 4 - AC Switch



- 1
- 2
- 3
- 4

Figure 11
Logic Board Connectors



- Logic Board
- 1 - JDC
 - 2 - JINT
 - 3 - JLCD
 - 4 - JCTL
 - 5 - Logic Board Fastener (x4)
 - 6 - JXFRM
 - 7 - JS1
 - 8 - JCUT
 - 9 - J5

3 1 2 4 5

9 6 7 8

4.0 Where to Locate Your Printer

When selecting a printer location, please consider the following guidance:

- Place it in a cool, clean, dry, well ventilated area that allows you to freely load the flight strips, connect cables, and open the printer housing (should this become necessary).
- Make sure there's enough room below or behind the printer for storing and feeding flight strips.
- Mount the printer in the appropriate location.

CAUTION: THIS UNIT SHOULD BE INSTALLED ON A TABLE TOP OR INSIDE A COUNTER. IT SHOULD NEVER BE INSTALLED ON THE FLOOR.

5.0 Printer Installation

To install the flight strip printer, perform the following steps:

1. Position the printer components in the desired location. Make sure that the Power Supply Module and the Print Head Module have the same serial number.
2. Make sure the power switch, located on the Power Supply Module, is in the OFF position.
3. Using the supplied hardware (6-32 screws, flat washers, and lock washers), attach the hopper to the Print Head Module.
4. Connect power to the appropriate power source 110V or 220V. The proper voltage is indicated on the label affixed to power supply module.

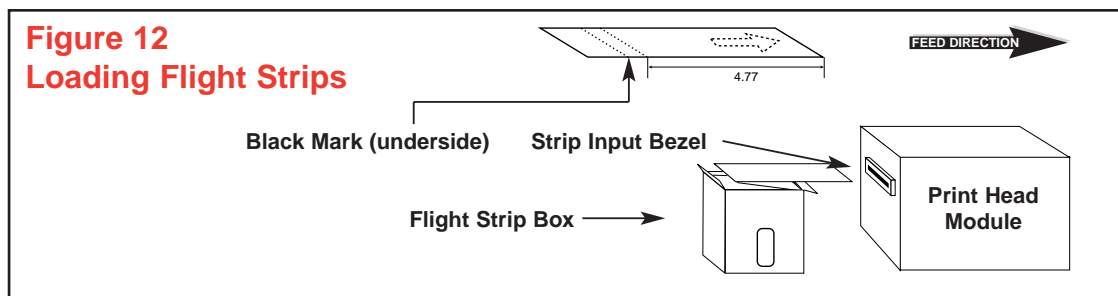
6.0 Loading Paper into the Printer

To load the flight strip into the printer, perform the following steps:

1. Move the ac switch to the ON position.
2. The CHECK PAPER LED lights on the control panel and an audible alarm (optional) sounds for several seconds.
3. Remove all strips from the hopper, if present.
4. Remove the last strip from the printer, if present.
5. Remove the long flag on top of the box and leave the two top end tabs on the box. The end tabs act as guides for the strips as they exit the box.
6. Position Flight Strip box behind the printer
7. With a smooth motion, insert the leading edge of the flight strips (green thermal side up, black mark 4.77 inches from leading edge) into the bezel until it is automatically positioned by the printer.

CAUTION: The printer may jam if paper is inserted prior to printer power-up.

8. Verify that the READY light is illuminated. The printer is now READY for use.



NOTE: The loading sequence should be followed on a step-by-step basis as listed above. If flight strips do not automatically load, remove the cover from the printer module by turning the three captive screws 1/4 turn counterclockwise. Ensure that the print head lever is snapped closed. Replace the cover.

NOTE: Hopper holds a maximum of 35 strips. Strips will fall onto the floor after 35 strips.

7.0 Standard Interface Pinouts

7.1 Serial Pinouts

RS232 (Standard)

Pin	Function
2	Printer Transmit
3	Printer Receive
7	Ground
5,20	DTR (Printer Ready)
4,22	RTS (+5Vdc)

RS232 (PC type)

Pin	Function
2	Printer Receive
3	Printer Transmit
5	RTS (+5Vdc)
6	DTR (Printer Ready)
7	Ground
8	CD (+5Vdc)

7.2 Typical RS232 Pin Connections

(Standard) 25 PIN PC		(Standard) 9 PIN PC		(PC Type) 25 PIN PC		(PC Type) 9 PIN PC	
BOCA	CPU	BOCA	CPU	BOCA	CPU	BOCA	CPU
2	3 RXD	2	2 RXD	2	2 TXD	2	3 TXD
3	3 TXD	3	3 TXD	3	3 RXD	3	2 RXD
7	7 GND	7	5 GND	5	5 CTS*	5	8 CTS*
20	6 DSR	20	6 DSR	6	6 DSR	6	6 DSR
20	5 CTS*	20	1 CD*	7	7 GND	7	5 GND
20	8 CD*	20	8 CTS*	8	8 CD*	8	1 CD*

* Optional Connection

RS422

Pin	Function
1	Frame ground
7	Signal ground
15	Receive (+)
17	Receive (-)
19	Transmit (+)
25	Transmit (-)

7.3 Parallel Pinout

Pin	Function
1	Strobe (negative)
2-9	Data (DB0-BD7)
10	ACK (negative)
11	BUSY
12	PAPER OUT
15	ERROR (negative)
18	Ground

NOTE: The above pinouts may vary on certain printers due to special customer request.

8.0 Standard Configuration

The FSP41-300 Flight Strip Printer is factory configured for specific customer requirements using an enhanced FGL41 package. Printing resolution is 300 dots per inch. For complete information on the FGL 41 Programming Language, please see the programming guide.

FGL41 printers allow the user to adjust various printer options through the control panel.

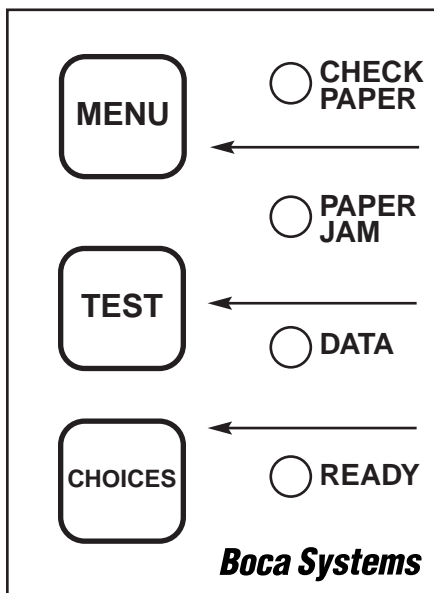


Figure 13
Control Panel

Selects proper menu topic (baud rate, cut count, etc.)

Enters new value / Also saves new values.

Scrolls through choices in individual menu topics.

To access and use the OPERATOR MENU, follow these steps:

1. Flight strip stock should be loaded into the printer. The LCD window displays **2 PA-41**
2. Press both **MENU** and **TEST** switches simultaneously for about three seconds. The LCD window displays **OPERATOR MENU!** .
3. To scroll through the menu topic, use **MENU** stopping on the topic you wish to change.
4. Press **CHOICES** to scroll through choices in the selected topic. **NOTE:** The printer displays a blinking cursor for the values presently stored in the printer.
5. Once you have found the new value you want, press **TEST**. The LCD window displays **EXIT AND SAVE?**. If you wish to save the new value, press **TEST** again.
6. If you do not wish to save the new value, press **MENU**. The LCD window displays **JUST EXIT?**. Press **TEST** to exit the **OPERATOR MENU** without saving new values or press **MENU** to enter back into the **OPERATOR MENU**.

The chart below lists the present menu topics. These topics are subject to change.

OPERATOR MENU!
BAUD RATE?
MINI/MICRO?
PRINT SPEED?
DIAGNOSTIC MODE?
TICKET TYPE?
STATUS ENABLED?
TRANSPARENT MODE
PAPER MODE?
INC CUT1 COUNT?
DEC CUT1 COUNT?
INC CUT2 COUNT?
DEC CUT2 COUNT?
PRINT MODE?
PRINT INTENSITY?
EXIT AND SAVE
JUST EXIT

Figure 19
Control Panel Menu
Options

The following is an overview of what each Menu option does:

BAUD RATE? Controls the serial interface baud rate, parity bit, data bits and stop bits.

Here are the following choices:

1200,N,8,1
1200,E,7,1
2400,N,8,1
2400,E,7,1
4800,N,8,1
4800,E,7,1
9600,N,8,1
9600,E,7,1
19200,N,8,1
19200,E,7,1

(factory default)

MINI/MICRO? Defines the type of printer.

MINI Is for a printer with a Silent Cutter Assembly (SC2) (Mini, Mini Plus, Mini MB, Dual Mini) **(factory default)**

MICRO Is for a printer without a SC2 (Micro, Micro Plus, Micro MB, Dual Micro)

PRINT SPEED? Controls the speed the ticket travels at. Also effects the print quality.

The numbers range from **0 - FASTEST** to **7 - SLOWEST**. **(3 is factory default.)**

DIAGNOSTIC MODE? Please consult your Programming Guide

Your choices are **YES** or **NO**. **NO is factory default.**

TICKET TYPE? Defines how the optos are configured on the paper guide assembly.

NORMAL Both optos are inline with each other (usually mounted on a black bracket)

ATM Feed opto is mounted under the thermal head and cut opto is attached to the cutter assembly. **(factory default)**

LABEL Same as ATM but the cut opto is a see through type.

SPECIAL TICKET This option is for a Micro MB printer

STATUS ENABLED? Enables or disables the X-ON/X-OFF and status response protocols.

Your choices are **YES** (Enabled) or **NO** (Disabled). **YES is factory default.**

TRANSPARENT MODE? Please consult your Programming Guide

Your choices are **YES** (Enabled) or **NO** (Disabled). **NO is factory default.**

PAPER MODE? Is generally used only for test purposes. It may also be used on roll stock with no black marks on the ticket.

Your choices are **YES** (Enabled) or **NO** (Disabled). **NO is factory default.**

INC CUT1 COUNT? Enables the operator to move the cut or tear position to the left (towards the ticket entrance area). Cut counts are increments of .003" for 300dpi and .002" for 200dpi. The count value is changed by depressing **CHOICES**. **16 is factory default.**

DEC CUT1 COUNT? Enables the operator to move the cut or tear position to the right (towards the ticket exit area). Cut counts are decrements of .003" for 300dpi and .002" for 200dpi. The count value is changed by depressing **CHOICES**. **16 is factory default.**

INC CUT2 COUNT? Same as **INC CUT1 COUNT?** but effects path #2 on a dual path printer.

DEC CUT2 COUNT? Same as **DEC CUT1 COUNT?** but effects path #2 on a dual path printer.

PRINT MODE? Defines the automatic ticket length calculation feature.

THERMAL The printer will feed out and then retract a ticket during this measurement. **(factory default)**

RIBBON The printer will feed out one blank ticket. This mode is used for label stock to prevent peeling.

PRINT INTENSITY? Controls the darkness of ticket print out.

Here are the following choices:

LIGHT
MED LIGHT
NORMAL
MED DARK
SHORT HEAD LIFE

(factory default)

EXIT AND SAVE ! Will save any changes made to the above menu options.

If you wish to save the new value then press **TEST**, if not press **MENU**.

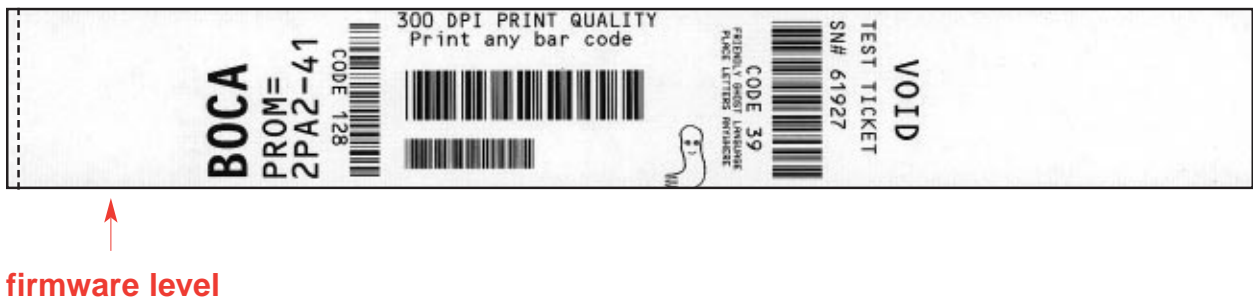
JUST EXIT? Will exit the menu options without saving any changes.

If you wish to exit without saving the new value then press **TEST**, if not press **MENU**.

8.1 Test Strip

A test strip may be printed by first pressing the TEST switch. The test strip can be printed when the printer is either online or offline. The test strip contains text patterns showing a variety of fonts and bar codes. The printer firmware level is shown at the left of the strip.

Figure 14
Test Strip



8.2 Control Panel Indicators

PAPER JAMS and CHECK PAPER conditions are errors that are indicated on the control panel. Paper jams occur when the paper stock fails to properly progress through the printer. This error is reported by the steady illumination of the red PAPER JAM LED. Once the source of the paper jam has been corrected, the printer can be restarted by turning printer off and then on.

A CHECK PAPER condition occurs when the printer no longer detects the presence of paper stock. This condition is indicated by the yellow CHECK PAPER LED. To resume operation, replace the paper stock by feeding the paper into the paper guide from the rear of the printer. Once the printer detects the paper, it starts the paper advance and feeds the paper forward to its normal top-of-form position.

The DATA LED is a diagnostic indicator that turns on while the printer is receiving data from the host computer. The indicator can be used to confirm communications between the host computer and the printer.

When the READY LED is illuminated, it indicates that the printer is ready to receive data from the host computer.

Figure 17 Status Patterns (Flashing). Flashing errors have equal on and off time.

Error No.	Description	READY	DATA	PAPER JAM	CHECK PAPER
1	Flash erase operation incomplete	ON	OFF	OFF	OFF
2	Flash Vpp problem	OFF	ON	OFF	OFF
3	Flash byte erase error	ON	ON	OFF	OFF
4	Flash Sequence error	OFF	OFF	ON	OFF
5	Flash block erase error	ON	OFF	ON	OFF
6	Bad flash	OFF	ON	ON	OFF
7	Flash program operation incomplete	ON	ON	ON	ON
8	Flash byte program error	OFF	OFF	OFF	ON
9	Memory is full	ON	OFF	OFF	ON
10	Need a reclaim	OFF	ON	OFF	ON
11	Soft font download error	ON	ON	OFF	ON
12	Delete file error	OFF	OFF	ON	ON
13	Not assigned	ON	OFF	ON	ON
14	Not assigned	OFF	ON	ON	ON
15	Not assigned	ON	ON	ON	ON

Figure 18 Status Patterns (Flickering). Flickering errors have much longer on time than off time.

Error No.	Description	READY	DATA	PAPER JAM	CHECK PAPER
1	Ribbon problem	ON	OFF	OFF	OFF
2	Processor fault	OFF	ON	OFF	OFF
3	Stepper timeout error	ON	ON	OFF	OFF
4	Paper jam	OFF	OFF	ON	OFF
5	Not assigned	ON	OFF	ON	OFF
6	Not assigned	OFF	ON	ON	OFF
7	Not assigned	ON	ON	ON	ON
8	Not assigned	OFF	OFF	OFF	ON
9	Not assigned	ON	OFF	OFF	ON
10	RAM failure	OFF	ON	OFF	ON
11	ROM failure	ON	ON	OFF	ON
12	Cutter failure	OFF	OFF	ON	ON
13	Check optos	ON	OFF	ON	ON
14	Not assigned	OFF	ON	ON	ON
15	Power-up initialization problems	ON	ON	ON	ON

9.0 Paper Jam Clearing Procedure

To clear a paper jam from the Print Head Module, perform the following steps:

1. Remove the strip stock from the Print Head Module.
2. Set the Power Supply Module AC switch to the Off position. Refer to Figure 2.
3. Remove the Printer Head Module cover by loosening the three 1/4-turn captive screws.
4. Remove the Print Head assembly. Refer to Section 12.9.
5. Remove all jammed flight strips from the Print Head Module.
6. Re-install the Print Head assembly. Refer to Section 12.10.
7. Re-install and secure the Print Head Module cover by tightening the three 1/4-turn captive screws.
8. Set the Power Supply Module AC switch to the On position.
9. Reload flight strip stock into the Print Head Module.

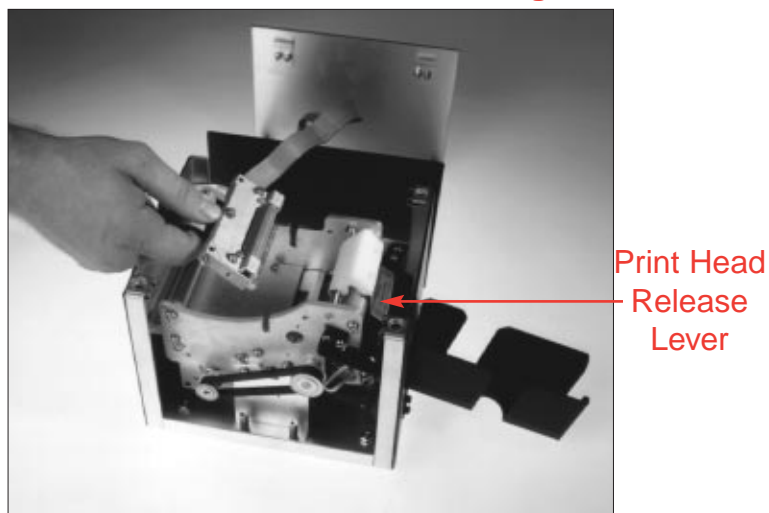
10.0 Thermal Print Head Cleaning

The print head should be cleaned periodically to prevent debris from building up on the print element. The required cleaning interval varies greatly depending on the quality of the ticket stock and the amount of dust entering the print area. Excessive dirt buildup on the print head results in reduced print quality. Continuing to use the print head in a dirty condition reduces life expectancy, as it is unable to diffuse its heat properly. The print head should be cleaned approximately every 100,000 strips.

The thermal print head can be removed for cleaning or replacement as follows:

1. Make sure power is off.
2. Remove the cover and set it next to the Print Head Module as shown. The cover is attached to the Print Head Module via a ribbon cable, so care should be taken.

Figure 20
Removal of Print Head for Cleaning



CAUTION: DO NOT UNPLUG CABLE FROM PRINT HEAD

3. Lift up the Head Release Lever (located above the head mounting block) to remove pressure from the thermal head. See Figure 20.
4. Lift up on the head mounting block/thermal head and remove it from the printer.
5. Clean the thermal print head surface (the side that makes contact with the paper) with isopropyl alcohol.
6. Install the head by reversing steps 2-4.
7. Restore pressure to the head by pushing down on the Print Head release lever.
8. Replace the cover on the Print Head Module.
9. The printer is now ready for operation. If print quality is still poor, the thermal head needs to be replaced. See Section 12.9.

11.0 Adjustments

11.1 Adjusting Cut Position

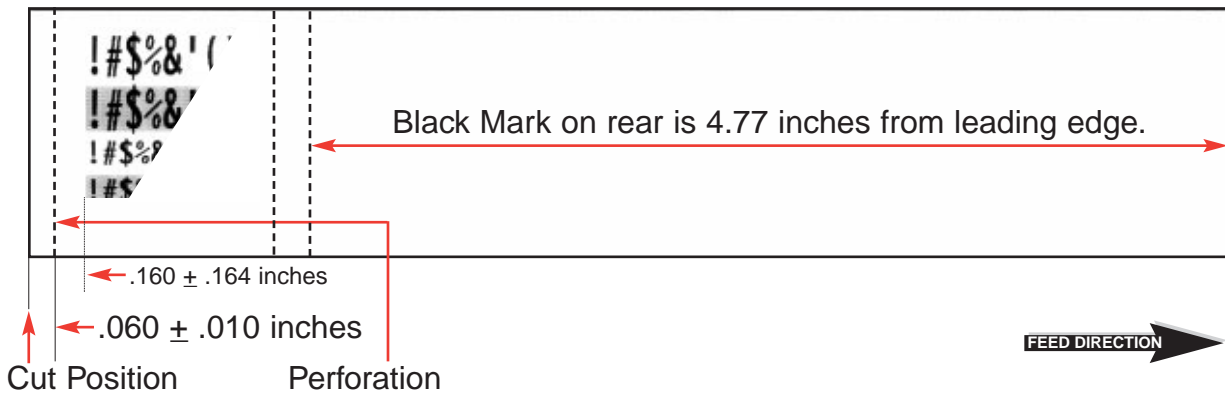
The printer is factory-set to cut the strips at a nominal position of .060 inches behind the perforation. The acceptable variation in cut position is shown in Figure 21.

To adjust the cut position, refer to the operators menu. Section 8.

Increasing cut count (INC cut 1 count) increases the stub after the perforation, and decreasing cut count (DEC cut 1 count) does the opposite. Cut counts are in increments of .003 inches.

Scroll to increase or decrease cut count, depending on the adjustment needed.

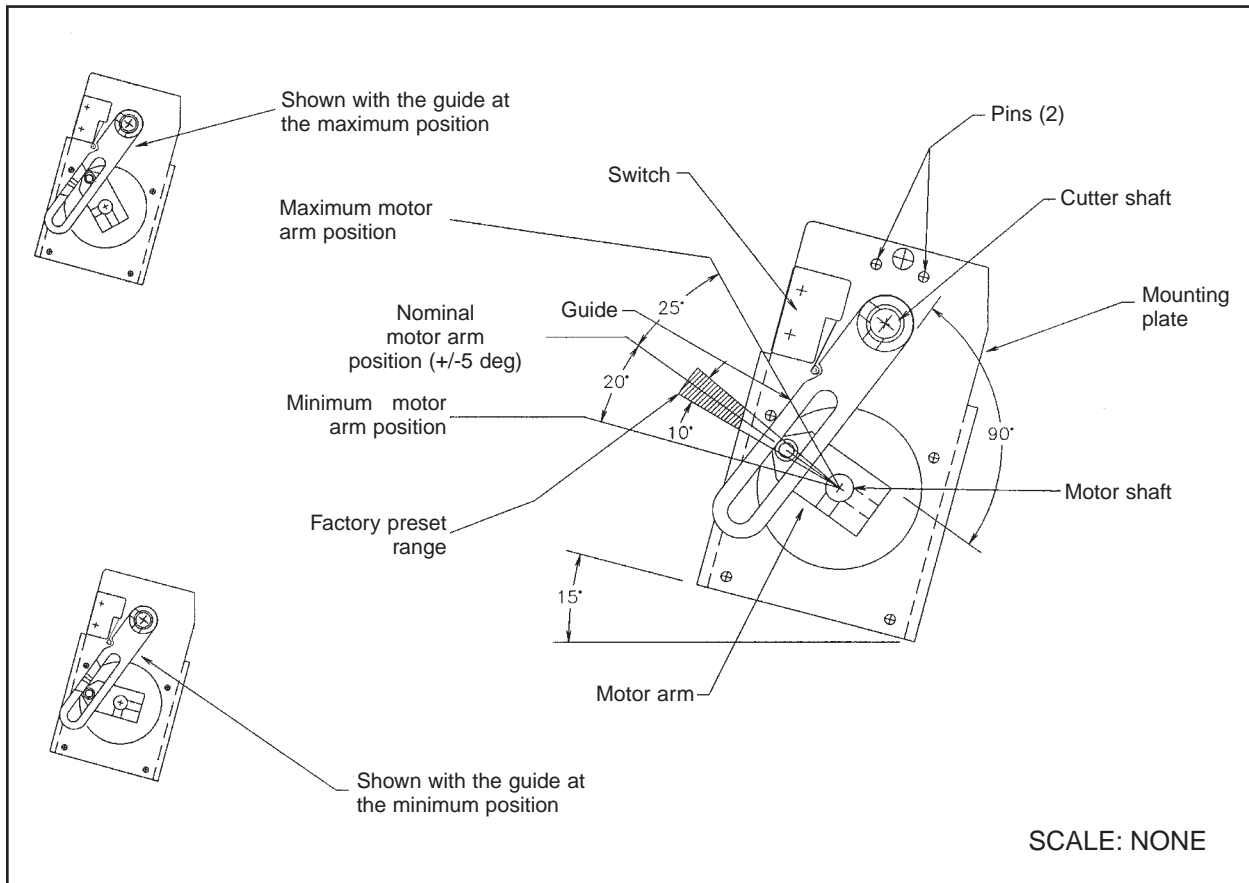
Figure 21
Cut Position on Flight Strip



11.2 Calibration of the Cutter Assembly

Figure 22 shows the factory calibration for the cutter motor arm. This diagram is presented for reference only, since the assembly is calibrated only in the factory.

Figure 22
Factory Calibration of Cutter Motor Arm

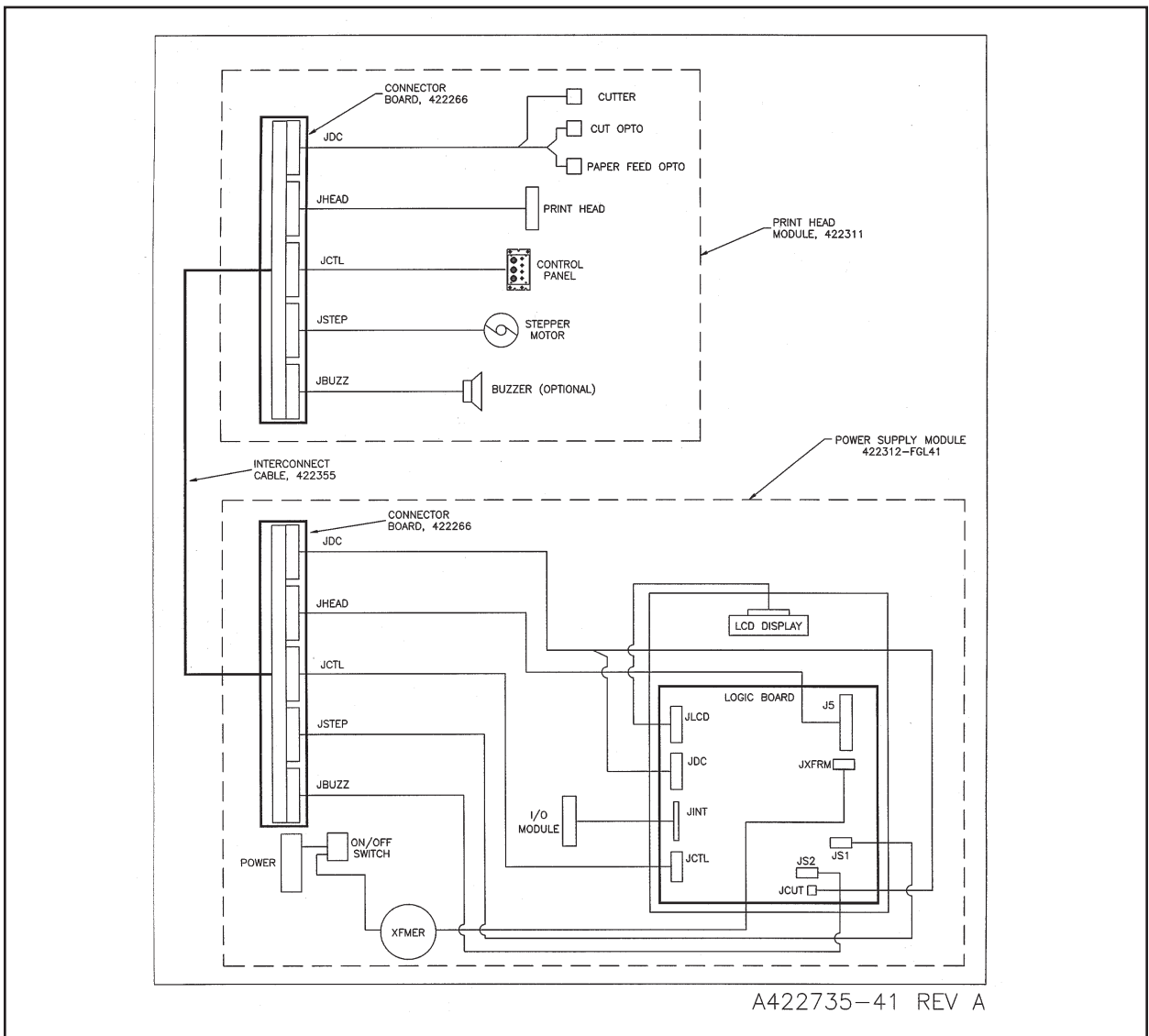


12.0 Printer Maintenance

The FSP 41-300 has been designed using a modular approach that provides for ease of parts replacement. The printed circuit boards used in this product have been manufactured using surface mount technology. The printed circuit boards cannot be effectively repaired in the field and should be returned to the manufacturer if repair is required. This section describes basic troubleshooting, part removal, and proper installation of new modules.

Warning: All repairs should be done with ac power removed from the unit.

Figure 23
Simplified Wiring Diagram



12.1 Logic Board Removal

To remove the logic board, perform the following steps:

1. Remove the Power Supply Module cover.
2. Remove I/O module.
3. Disconnect cables JDC, JINT, JCTL, JCUT, JS1, J5, JXFRM, and JLCD from the logic board. See Figure 11.
4. Remove two mounting screws on heat sink.
5. Use a screwdriver to separate the logic board from the fasteners. See Figure 11.
6. Slide the board out of the unit.

12.2 Logic Board Installation

To install a logic board, perform the following steps:

1. Align the logic board so that the four mounting holes are above the four fasteners. Orient the board so that microprocessor (I960) is under the LCD Display. Refer to Figure 9.
2. Press the logic board down until all fasteners snap.
3. Re-install mounting hardware to heat sink.
4. Attach the ribbon cables into the corresponding connectors.
5. Re-install I/O module
7. Re-install the Power Supply Module cover.

12.3 LCD Display Removal

To remove the LCD display, perform the following steps:

1. Remove the Power Supply Module cover.
2. Remove the four panhead screws that hold the mounting plate to the chassis of the Power Supply Module. See Figures 9 and 10.

3. Remove I/O module for easier access to the underside.
4. Slide and lift the entire assembly from the chassis and turn it over to gain access.
5. Remove the LCD connector from the LCD display.
6. Remove the four panhead screws to remove and replace the LCD display.

12.4 LCD Display Installation

To install an LCD display, perform the following steps:

1. Install the LCD display to the mounting plate.
2. Connect the LCD connector to the LCD display.
3. Slide the mounting plate and position it over the four mounting posts and secure it.
4. Re-install I/O module.
5. Re-install the Power Supply Module cover.

12.5 Toroid Transformer Removal

To remove the toroid transformer, perform the following steps:

1. Remove the Power Supply Module cover.
2. Remove the four panhead screws that hold the mounting plate to the chassis of the Power Supply Module. See Figures 9 and 10.
3. Remove I/O module for easier access to the underside.
4. Slide and lift the entire assembly from the chassis and turn it over to gain access.
5. Dress the wires away to gain access to the toroid transformer.
6. Do not disconnect cables from the logic board.
7. Disconnect the yellow and white cable from the black/orange cable going to the AC ON/OFF SWITCH. See Figure 10.

8. Remove the green/red connector going to JXFRM on the Logic board.
9. Remove the 10-32 panhead screw holding the toroid in place.
10. Remove the washer and rubber insulator and lift the toroid from the unit.

12.6 Toroid Transformer Installation

To install a toroid transformer, perform the following steps:

1. Position the toroid on the mounting post so the wires protrude from the top and are oriented as shown in Figure 10.
2. Rejoin the yellow and white connector to the black and orange connector going to the AC ON/OFF SWITCH.
3. Install the green/red connector to JXFRM on Logic board.
4. Replace the toroid washer, rubber insulator, and 10-32 panhead screw and secure the toroid in place.
5. Dress wires to allow installation of the mounting plate. Position the mounting plate holes above the mounting posts (refer to Figure 10) with the orientation shown in Figure 9, and secure the mounting plate in place.
6. Re-install I/O module.
7. Re-install the Power Supply Module cover.

Figure 24
Factory Calibration of Cutter Deflectors

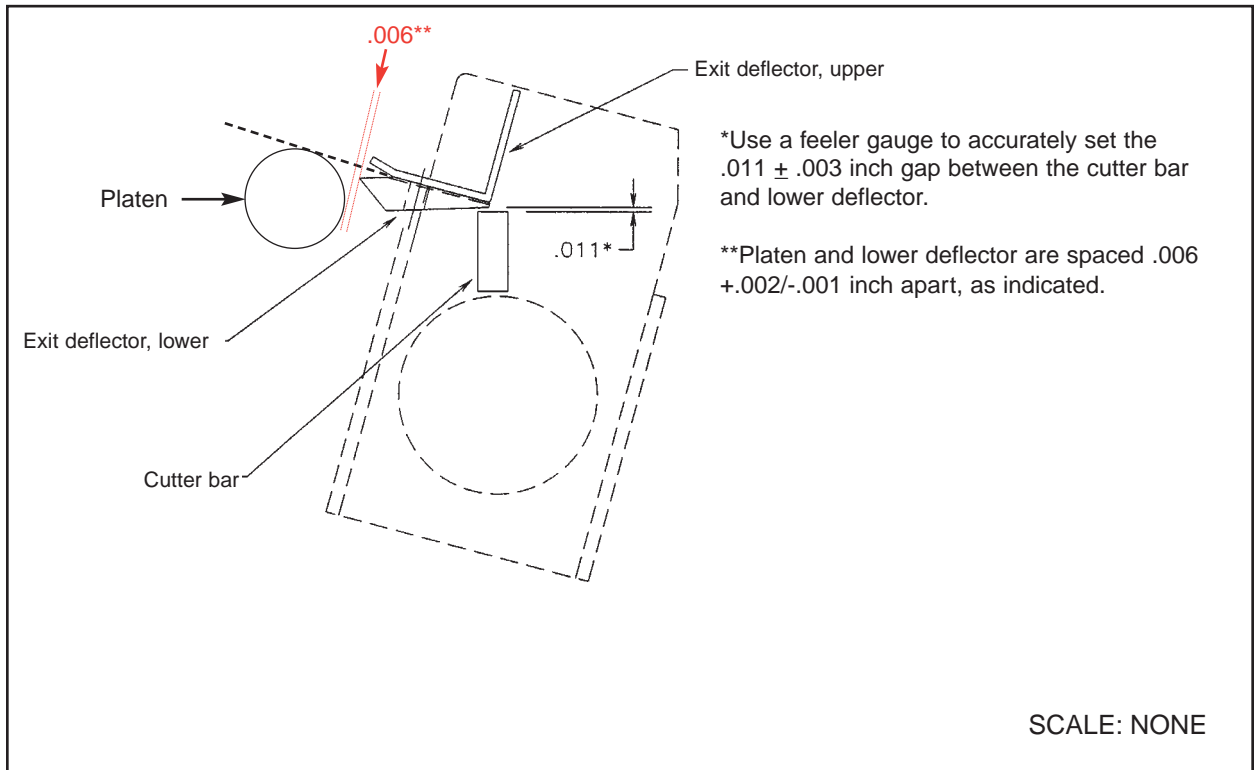
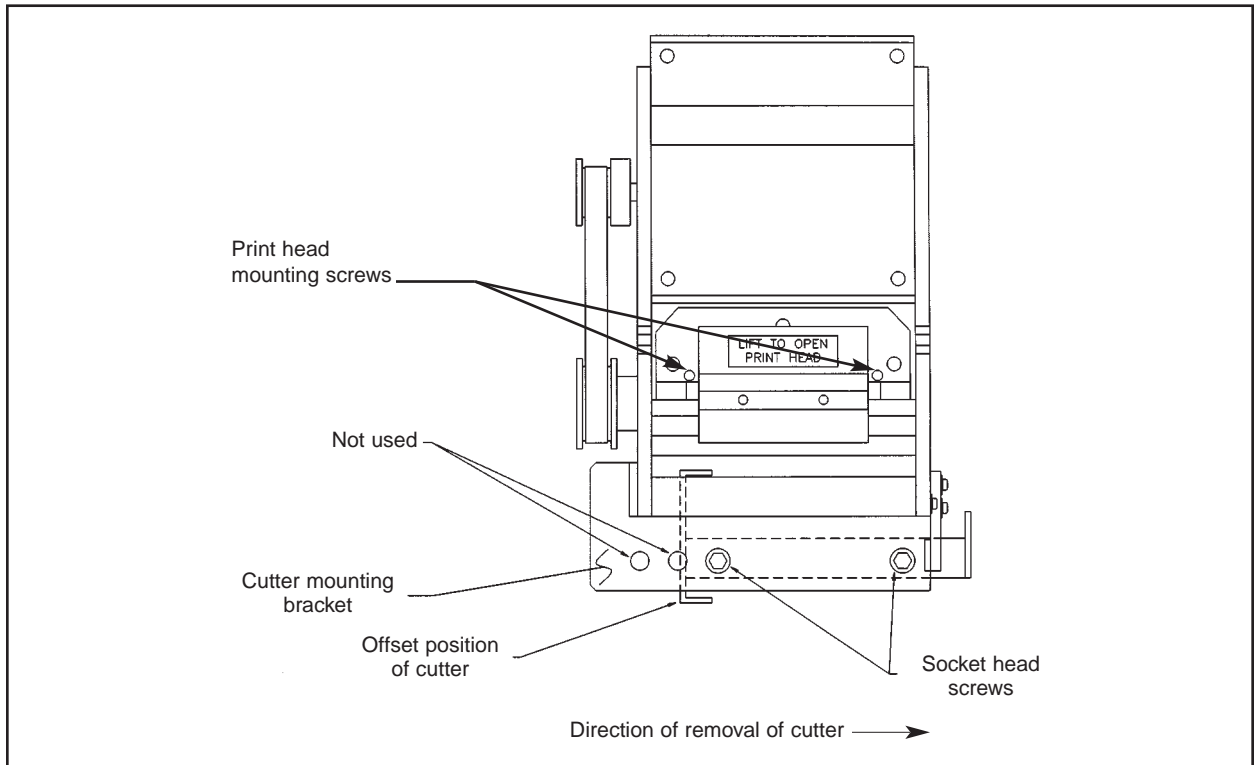


Figure 25
Print Head Module, Top View



12.7 Cutter Assembly Removal

To remove the cutter assembly, perform the following steps:

1. Remove the Print Head Module cover.
2. Locate the two 6/32 panhead screws and remove the hopper. See Figure 6.
3. Locate the two socket-head screws on the cutter mounting bracket and remove them. See Figure 25.
4. Lower the cutter assembly into the base of the unit.
5. Slowly slide the cutter assembly to the side of the unit.
6. Disconnect the cable holding the cutter assembly to the harness and remove the cutter assembly.

12.8 Cutter Assembly Installation

To install a cutter assembly, perform the following steps:

1. Attach the cutter assembly connector.
2. Slide the cutter assembly into position, armature first.
3. Place the cutter assembly under the bracket into an offset position as shown in Figure 25.
4. While tightening hardware, position the cutter assembly left and toward the print head, providing a .006-inch clearance between the platen and the lower exit deflector. Refer to Figure 24.
5. Verify proper alignment by printing test strips and confirming that the cut is parallel to perforations on strips. If not properly aligned, loosen hardware and adjust.
6. Re-install the hopper.
7. Re-install the Print Head Module cover.

12.9 Print Head Removal

To remove the print head, perform the following steps:

1. Remove the Print Head Module cover.
2. Open the print head release lever.
3. Lift the print head assembly from the housing as shown in Figure 6.
4. Unplug the ribbon cable from the rear of the print head.
5. Remove the two print head mounting screws as shown in Figure 6. **DO NOT REMOVE SCREWS MARKED WITH RED PAINT.**

12.10 Print Head Installation

To install a print head, perform the following steps:

1. Mount the print head to the mounting block using the two screws.
2. Insert the ribbon cable into the rear print head.
3. Slide the print head assembly into the housing.
4. Close the print head release lever.
5. Re-install the Print Head Module cover.

12.11 I/O Module Board Removal

To remove the I/O Module, perform the following steps:

1. Remove the Power Supply Module cover.
2. Remove the I/O Module cable connector. See Figure 9.
3. Remove the two standoff screws securing the I/O Module to the Power Supply Module frame.

12.12 I/O Module Installation

To install an I/O Module, perform the following steps:

1. Install and secure the replacement interface board with two standoff screws.
2. Connect the I/O Module cable connector. See Figure 9.
3. Re-install the Power Supply Module cover.

12.13 AC Switch Removal

To remove the ac switch, perform the following steps:

1. Verify that ac power has been removed from the unit.
2. Remove the Power Supply Module cover.
3. Remove the four panhead screws that hold the mounting plate to the chassis of the Power Supply Module. See Figures 9 and 10.
4. Remove the I/O Module for easier access to the underside.
5. Slide and lift the entire assembly from the chassis and turn it over to gain access.
6. Press the tabs on the top and bottom of the ac switch.
7. Push the ac switch out of the unit.

12.14 AC Switch Installation

To install an ac switch, perform the following steps:

1. Install the replacement ac switch by pushing it into the unit and locking it.
2. Slide the mounting plate and position it over the four mounting posts and secure it.
3. Re-install I/O Module to the logic board.
4. Re-install the Power Supply Module cover.

12.15 AC Filter Removal

To remove the ac filter, perform the following steps:

1. Verify that ac power has been removed from the unit.
2. Remove the Power Supply Module cover.
3. Remove the four panhead screws that hold the mounting plate to the chassis of the Power Supply Module. See Figures 9 and 10.
4. Remove I/O module for easier access to the underside.
5. Slide and lift the entire assembly from the chassis and turn it over to gain access.
6. Use a flat-tip screwdriver to pry off the two metal mounting clips from the ac filter.
7. Push the ac filter out of the Power Supply Module.

12.16 AC Filter Installation

To install an ac filter, perform the following steps:

1. Push the ac filter into the Power Supply Module.
2. Secure the ac filter to the frame by using the two metal mounting clips.
3. Slide the mounting plate and position it over the four mounting posts and secure it.
4. Re-install I/O Module to the logic board.
5. Re-install the Power Supply Module cover.

12.17 Cutter Optical Detector Removal

To remove the cutter optical detector, perform the following steps:

1. Remove the Print Head Module cover.
2. Disconnect the control panel connector from the Print Head Module and set the cover aside.
3. Remove the input bezel by taking out the two mounting screws. See Figure 4.

4. Remove the four mounting posts (see Figure 5) and attaching hardware to gain access to the underside of the print cage assembly.
5. Mark the approximate location of the cutter opto board (refer to Figures 7 and 8) on the board bracket.
6. Remove the cutter optical detector board.

12.18 Cutter Optical Detector Installation

To install a cutter optical detector, perform the following steps:

1. Position the cutter optical detector board and secure it in the approximate location of the previous board by friction-tightening the screws.
2. Re-install the print cage assembly into the cover, but do not secure it.
3. Align and re-install the input bezel with the two mounting screws.
4. Align the print cage assembly and secure it to the cover with the four mounting posts and attaching hardware.
5. Re-install the control panel connector to the print head module board.
6. Apply power to the unit.
7. Align the cutter optical board left to right so that the opto is perpendicular to the paper and the strip cut is .060 inches from the perforation (see Figure 21), and secure the cutter optical board in place.
8. Remove power from the unit.
9. Re-install the Print Head Module cover.

12.19 Feed Optical Detector Removal

To remove the feed optical detector, perform the following steps:

1. Remove the Print Head Module cover.
2. Disconnect the control panel connector from the Print Head Module and set the cover aside.

3. Remove the input bezel by taking out the two mounting screws. See Figure 4.
4. Remove the four mounting posts (see Figure 5) and the attaching hardware to gain access to the underside of the print cage assembly.
5. Remove the feed optical bracket mounting screw. Refer to Figure 8 for the feed optical detector location.
6. Disconnect the connector from the feed optical board.
7. Remove the bracket mounting screw from the feed optical board.

12.20 Feed Optical Detector Installation

To install a feed optical detector, perform the following steps:

1. Align the feed optical detector to the mounting bracket by placing the board flush with the mounting bracket edge. Secure the detector in place with the mounting screw.
2. Re-install the connector to the feed optical board.
3. Mount the feed optical bracket and secure it to the print cage assembly.
4. Re-install the print cage assembly into the cover, but do not secure it.
5. Align and re-install the input bezel with the two mounting screws.
6. Align the print cage assembly and secure it to the cover with the four mounting posts and attaching hardware.
7. Re-install the control panel connector to the print head module board.
8. Re-install the Print Head Module cover.

13.0 Troubleshooting

Use this section to assist in diagnosing FSP 41-300 error symptoms.

WARNING

Power must be off to the printer when performing any procedure that requires access to the internal printer components.

13.1 No Operation, Power Indicator Is Out

For this error symptom, perform the following steps:

1. Check the power cord for proper installation at both ends.
2. Check the main fuse and replace if blown (2 amp, 250 volt, SB).
3. Check that there is power at the ac receptacle.
4. If the main fuse keeps blowing, check that the printer's ac voltage board is set for the correct voltage.
5. Check the Power Distribution Unit receptacle output voltage.

13.2 Power Is On but No Operation

For this error symptom, perform the following steps:

1. Check all electrical connections on the printer.
2. If the cutter motor does not rotate after power up, See Section 12.7.
3. Unplug the thermal print head and turn on the printer. If the printer works, replace the thermal head.
4. Replace the Logic board.

13.3 Power Is On but Strip Does Not Load

For this error symptom, perform the following steps:

1. Make sure the print head/cam lock assembly is fully locked in the closed position. Consult the thermal print head information in Section 10.0.
2. Check that the strip stock is loaded correctly.
3. Replace the feed optical detector.
4. Replace the Logic board. See Section 12.19.

13.4 Flight Strips Do Not Load

For this error symptom, perform the following steps:

1. Ensure that the Power Supply Module is plugged in and the ac switch is in the On position.
2. Reseat the cable into the jacks.
3. Ensure that the strip stock is loaded in accordance with Section 6.0.

13.5 Flight Strips Are Not Cutting in the Proper Position

For this error symptom, perform the following step:

1. Adjust the cut position in accordance with Section 11.1.

13.6 Erratic Cut/Print Position

For this error symptom, perform the following steps:

1. Check for defective strip stock. Is the black mark unevenly spaced apart or light in color? Is the strip too wide for the paper path?
2. Clean the optical lenses.
3. Check that the platen is clean.
4. Replace the cutter optical detector.
5. Replace the feed optical detector.
6. Replace the Logic board.

13.7 Cutter Blade Does Not Rotate

For this error symptom, perform the following steps:

1. Check for blockage in the cutter area.
2. Replace the cutter assembly.
3. Replace the Logic board.

13.8 Strip Is Not Cut Completely

For this error symptom, perform the following step:

1. Adjust the cut position in accordance with Section 11.1.

13.9 Flight Strips Are Printing Light

For this error symptom, perform the following steps:

1. Remove the printer cover and ensure that the head release lever is completely locked closed.
2. Clean the thermal print head.
3. Replace thermal print head.
4. Replace the Logic board.

13.10 Printing Blank Flight Strips

For this error symptom, perform the following steps:

1. Ensure that the print head cable is properly seated at both ends.
2. Remove the printer cover and ensure that the head release lever is completely locked closed.
3. Replace the thermal print head.
4. Replace the Logic board.

13.11 Poor Printout (Light Printout)

For this error symptom, perform the following steps:

1. Make sure the print head/cam lock assembly is fully locked in the closed position.
2. Consult the thermal print head information in Section 10.0.
3. Clean the thermal print head.
4. Replace the thermal print head.

13.12 Poor Printout (White Voids in Printout)

For this error symptom, perform the following steps:

- a. Clean the thermal print head.
- b. Consult the thermal print head information in Section 10.0.
- c. Replace the thermal print head.

13.13 Printer Skips Strips

For this error symptom, perform the following steps:

- a. Check all electrical connections on the printer.
- b. Check the position and quality of the black mark on the strip stock.
- c. Clean the optical lenses.
- d. Replace the cutter optical detector.
- e. Replace the feed optical detector.

13.14 Paper Feed Continues

For this error symptom, perform the following steps:

1. Follow the thermal print head cleaning procedures (Section 10.0) to gain access and clean the feed optical detector.
2. Replace the cutter optical detector (see Section 12.17).

13.15 No Communications with the Host System (Test Flight Strips OK)

For this error symptom, perform the following steps:

1. Ensure that the interface cable is properly seated to I/O module on power supply module.
2. Remove the Power Supply Module cover and ensure that the interface connector and Logic board are properly seated at both ends.
4. Replace the I/O module.
5. Replace the Logic board.

13.16 Parity Error

For this error symptom, perform the following step:

1. Set the baud rate in accordance with Section 8.0.

13.17 Paper Jam

For this error symptom, perform the following steps:

1. Ensure that the strips are flat, with no bends except at perforations.
2. Remove all strips from the hopper before loading new paper (see Section 6.0).
3. Inspect the two end tabs of the paper box labeled “Do not remove this tab.”
If the tab is removed, the paper may catch on the edge of the box while feeding and cause a jam.
4. Turn on the printer without paper loaded. Load paper after the unit is turned on.

5. Ensure that the strip stock is loaded in accordance with Section 6.0.
6. Verify the cutter motor arm position (see Figure 22); if not within minimum and maximum position, replace the cutter assembly.
7. Verify the cut position (see Section 11.1).
8. Verify that the cutter is properly aligned in accordance with Figure 24.
9. Check strips in the hopper. The maximum number of strips allowed is 35 (see Section 6.0).

13.18 Paper Jam Entering the Cutter Area

For this error symptom, perform the following steps:

1. Check all electrical connections on the printer.
2. Replace the cutter assembly.

14.0 Parts List

Use this list when ordering replacement parts for the FSP 41-300.

Description	Part Number
AC Filter	P31-1000
AC Switch	P28-1013
Bearing, Platen	P45-1009
Belt, Timing 102T	P50-1003
Cable assembly, Power (ac) 208 V	422354
Cable, Interconnect (Printer to Power Supply)	422355
Connector Board, Interconnect Cable (Power Supply Module)	422266
Connector Board, Interconnect Cable (Print Head Module)	422266-CAP
Control Panel Assembly	422330
Control Panel Cable, Power Supply Module	422559-16F
Control Panel Cable, Print Head Module	422559-16
Cutter Assembly	422241
Data Cable, Power Supply Module	422558-10F
Fuse, 2 A SB	P29-1001
Head Cable, Power Supply Module	422558-16
Head Cable, Print Module	422558-10
Head Release Lever	421734
Hopper (1 x 8)	422240-D
**Interface Board	422190
LCD Display	P38-1003
LCD Display Cable	422589-12
Logic Board	422770
Optical Detector, Cutter	422264-2
Optical Detector, Feed	422264-1
PCB, Touch Panel (3sw)	421671
Platen*	422234
Power Cable	422354
Power Supply Module	422312-B-41
Print Head	BS3002
Print Head Module	422311-D
Pulley, 20T	P51-1007
Pulley, 30T	P51-1011
Stepper Motor	422590
110V Transformer	422808-115
220V Transformer	422808-230

*Order Print Head Module as replacement

**RS422 P/N 422-190-9
 PC Serial P/N 422190-PC
 Serial P/N 422190-SER
 Parallel P/N 422190-PAR