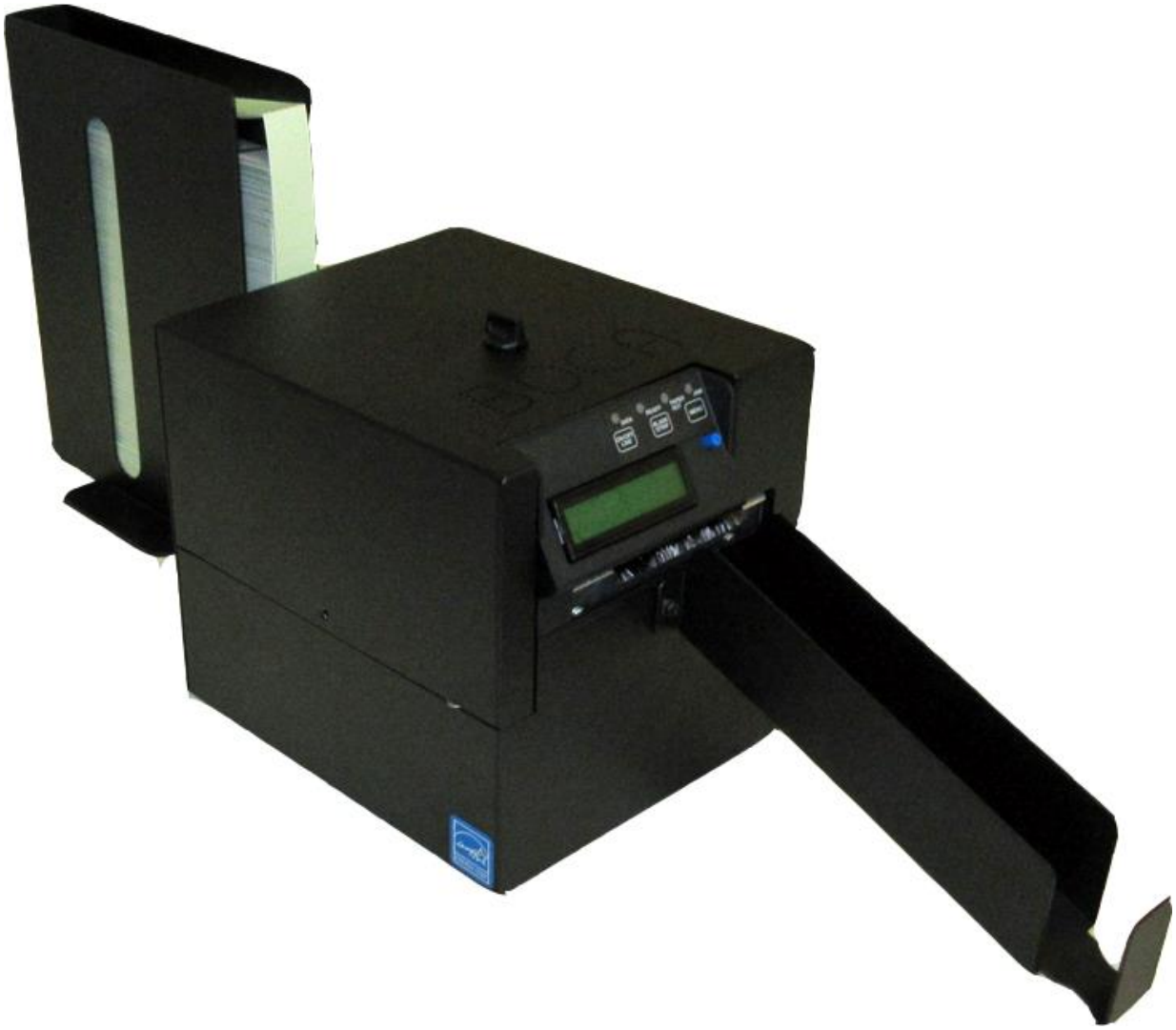
Boca Systems

LEMUR - FDIO FLIGHT STRIP PRINTER

USER MANUAL



July 11, 2018

Revision Listing

Rev	Date	Comments
1.0	1/10/2018	Released for Production
1.1	6/18/2018	Updated photos on pages 4,5,6,12,17,22,29,31,34,40,41 & 43
1.2	7/11/2018	Updated default setting in section 6.0

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Addendum A - Purchased Components - Performance Data / Data Sheets
Addendum B - Mechanical Drawings and Parts List
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FCC NOTICE

NOTE: The equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's expense.

Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.

WARRANTY INFORMATION

BOCA warrants the equipment manufactured and sold by it to be free from defects in material and workmanship under normal use and service for a specified period of time. Parts damaged by negligence or misuse (bad ticket stock, improper operating conditions, etc.) are excluded from this warranty. Warranties for printers are 1 year from date of shipment. All warranty work is to be performed either by BOCA or by an authorized BOCA service center. Shipping charges to the repair center are the customer's responsibility. BOCA will pay for the equipment's return via ground service.

Please go to the link below if you have any reported issues with your new BOCA printer.
www.bocasystems.com/onlinesupportform.html

Equipment damaged in shipping should be reported immediately both to BOCA and to the shipper.

1.0 Introduction

The BOCA Lemur-FDIO is a direct thermal flight strip printer. This device is capable of connecting to the FAA host computer, printing, cutting and stacking Domestic and Oceanic flight strips. This manual will provide the user with general information regarding printer set-up, operational instructions and detailed technical information. Please see the Programming Guide for information related to interface protocol along with special features for the FDIO application.

2.0 Unpacking the Printer

The printer is shipped in a ruggedized container. **Please save packing material for future use.** Remove the printer and accessories from the box and inspect for obvious damage. If damage is noticed, please report it immediately to BOCA. Email: cathy@bocasystems.com Tel: (561) 998-9600 Fax: (561) 998-9609

The following items should be in the box:

a) Lemur- FDIO printer
b) Hopper (output)
c) Hopper (input)
d) AC cable

With top box removed

3.0 Important Safety Information

WARNING: The appearance of this symbol indicates the proximity of an exposed high voltage area. Please follow all directions carefully for your personal safety. You must read the following safety information carefully before working on the printer.

As a safety precaution, all service to the printer should be done by qualified persons with power off and the AC cord unplugged from the printer. Following any procedure requiring the removal of covers and/or doors, please verify that they have been properly attached and fastened prior to operating the printer.

WARNING: Provide an earthing connection before the mains plug is connected to the mains. And, when disconnecting the earthing connection, be sure to disconnect after pulling out the mains plug from the mains.

WARNING: Power Cord Set: This must be approved for the country where it is used:

U.S.A. and Canada

- The cord set must be UL-approved and CSA certified.
- The minimum specification for the flexible cord is:
- No. 18 AWG
- Type SV or SJ
- 3-conductor
- The cord set must have a rated current capacity of at least 10A.
- The attachment plug must be an earth-grounding type with a NEMA 5-15P

(15A, 125V) or NEMA 6-15P (15A, 250V) configuration.

WARNING: The appliance coupler (the connector to the unit and not the wall plug) must have a configuration for mating with an EN60320/IEC320 appliance inlet.

WARNING: The socket outlet must be near to the unit and easily accessible.

4.0 Printer Tour

The following photos are presented for the purpose of familiarizing the user with the Lemur-FDIO Flight Strip Printer.

Figure 1 – Lemur-FDIO Flight Strip Printer and accessories

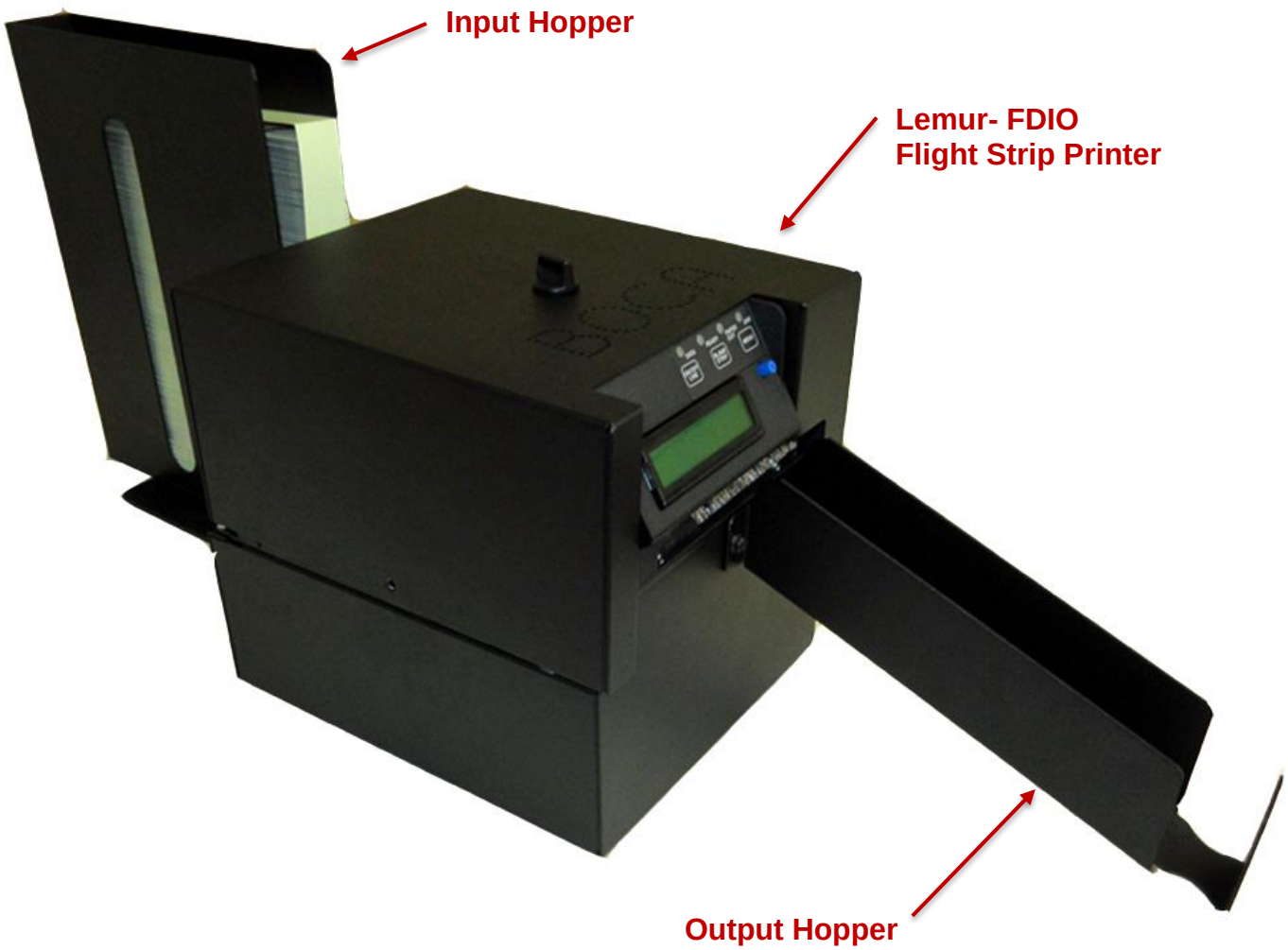


Figure 2 – Front View

Figure 3 – Control Panel

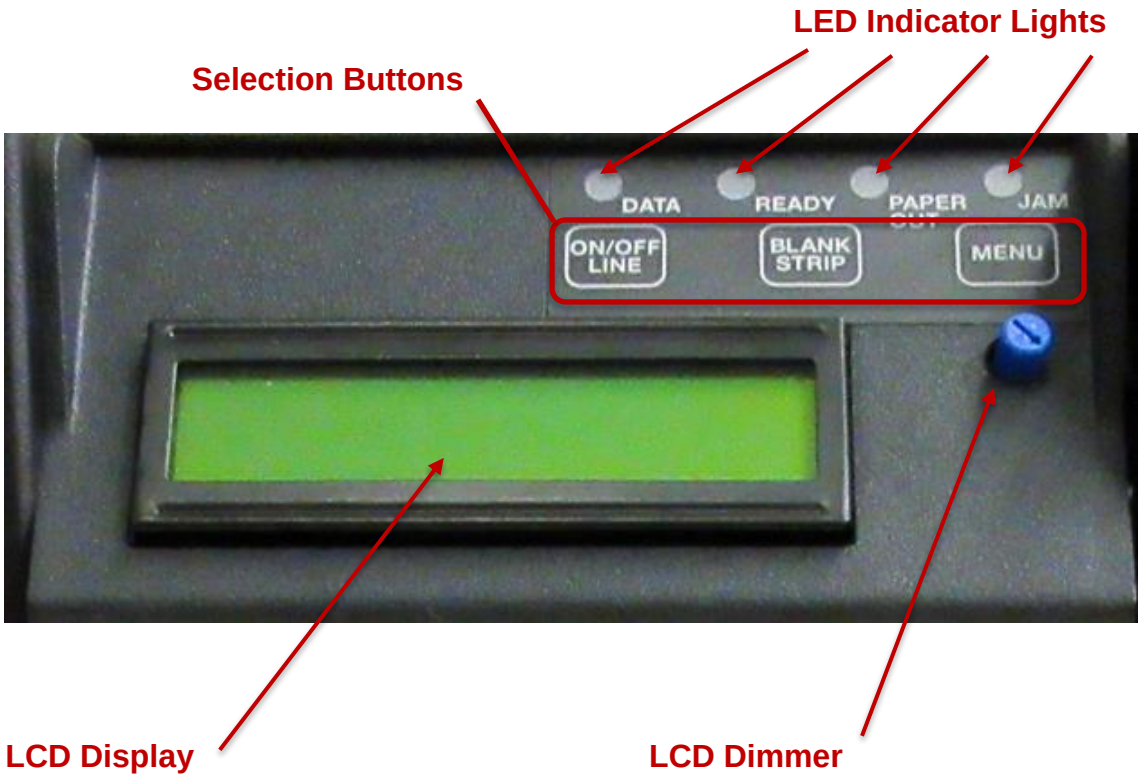


Figure 4 – Rear View

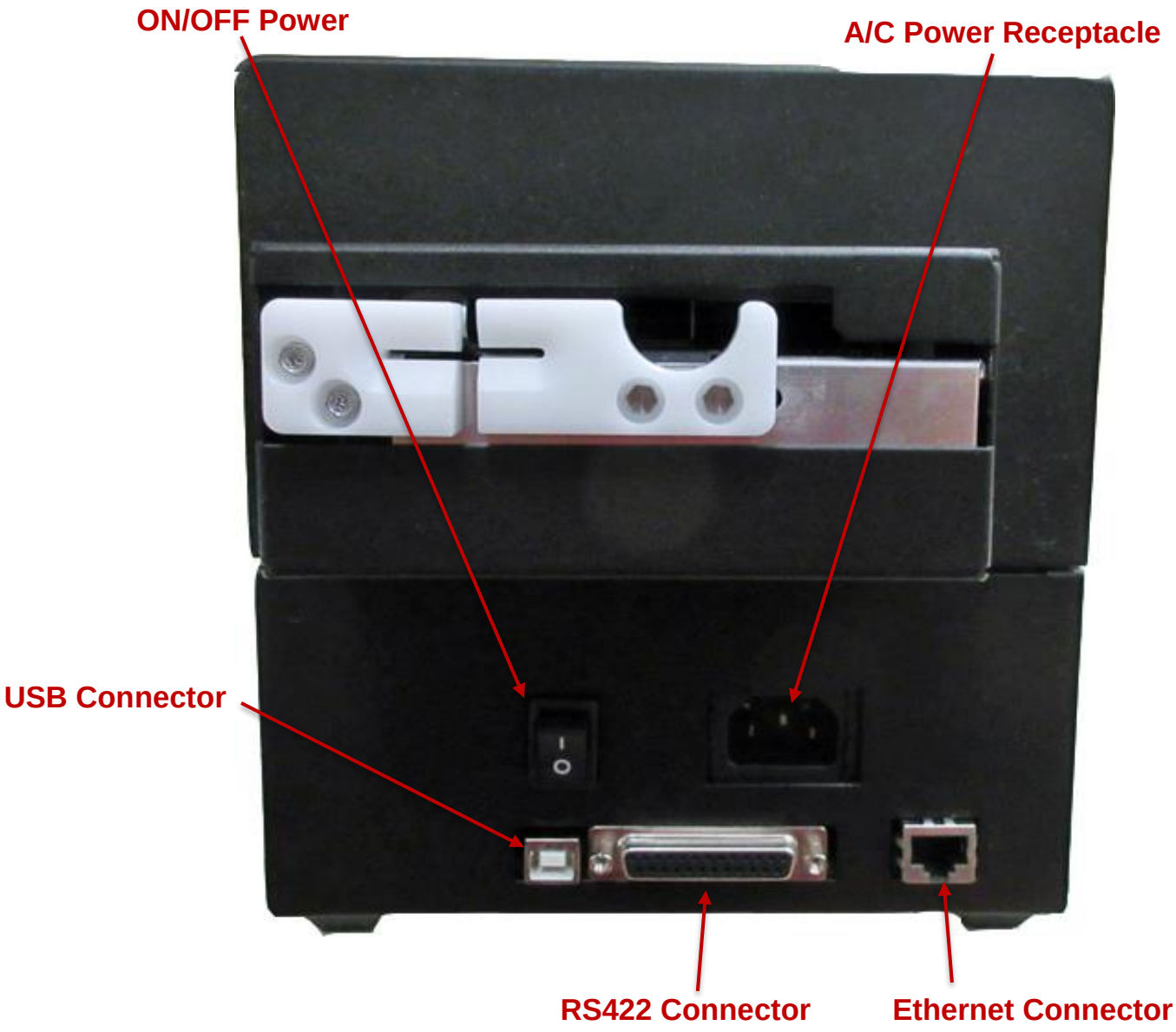


Figure 5 – Top View
Cover Removed

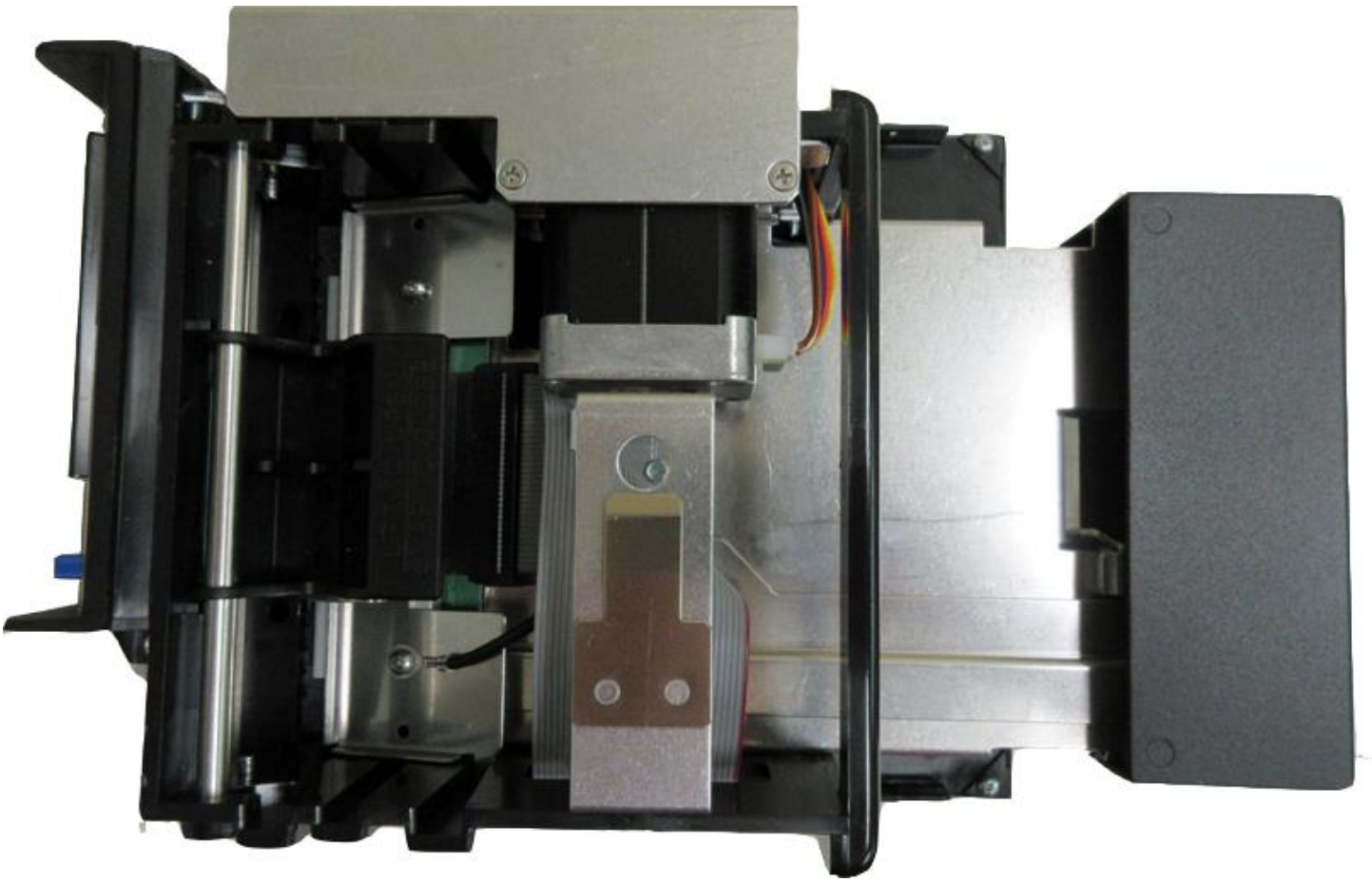
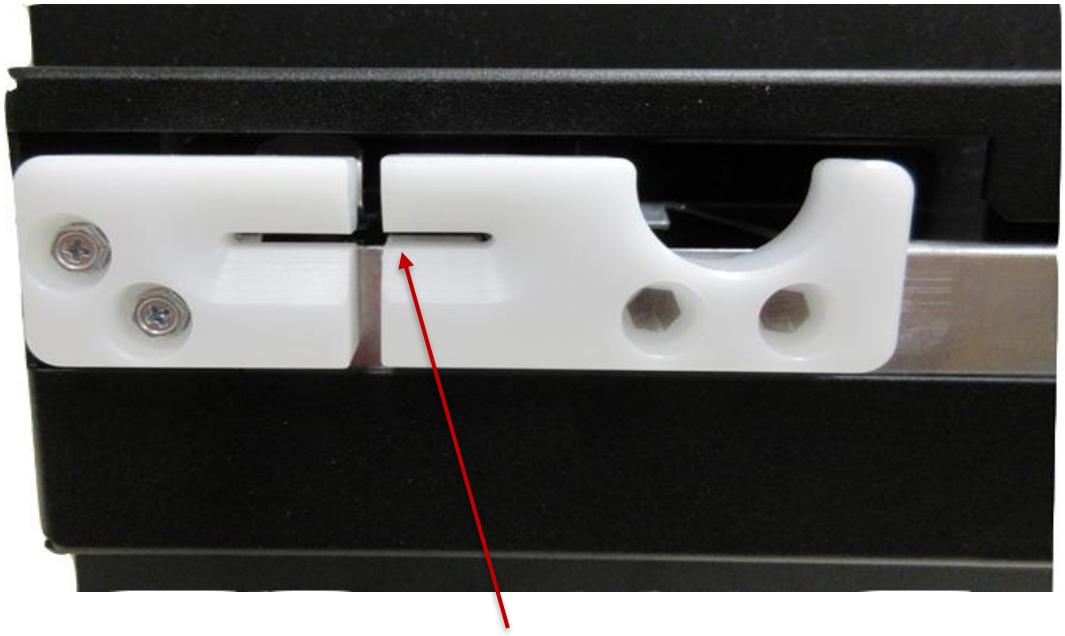


Figure 6 – Entry Paper Guide



5.0 Installation and Flight Strip Loading

The Lemur-FDIO printer is designed to be mounted either on a desktop or shelf. Prior to site preparation, installation and loading of flight strips, the printer should be powered up and run in the following self-test mode:

- Place the printer on a counter top.
- Attach the AC cord and interface cable into the proper connectors.
- Install output hopper to catch the flight strips.
- Turn power on via the switch located on the rear of the unit (see Fig. 4). The LCD will display PAPER OUT and the red PAPER OUT LED will be illuminated.

The Lemur- FDIO has been designed to accept the following FAA flight strip types:

1. Domestic Strip .....1.0 x 8.0 inches.....NSN 7530-01-453-5094
2. Domestic 1/2 Strip.....1.0 x 8.0 inches.....NSN 7530- 01-468-4668
3. Oceanic Strip.....1.317 x 8.0 inches.....NSN 7530-01-435-187

Please note that the Lemur- FDIO has been factory configured for the Domestic strip (1) shown above. Please consult section 6.0 for instructions on re-configuring the unit to a different flight strip format via STRIP SELECTION menu option.

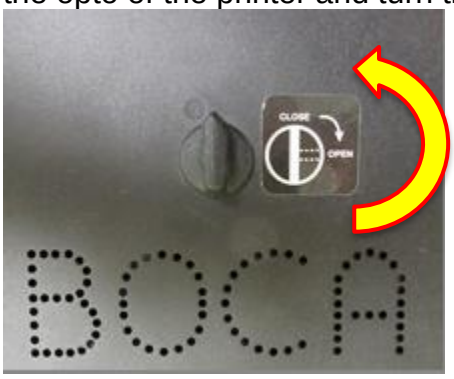
Loading instructions:

Load flight strips into the input hopper and locate the hopper at a distance behind the printer to allow for the smooth feed of strips to the entrance guide on the Lemur-FDIO. Ensure that the stack of strips is loaded into the hopper so that the arrow (on the bottom of the strip), which indicates feed direction, is loaded into the printer accordingly.

Cover Removal / Installation:

The cover may be removed by turning the knob on top to the unlocked position and then lift up on the cover.

To install the cover back in place, make sure the knob is in the unlocked position. Fit the cover onto the opto of the printer and turn the knob to the locked position.

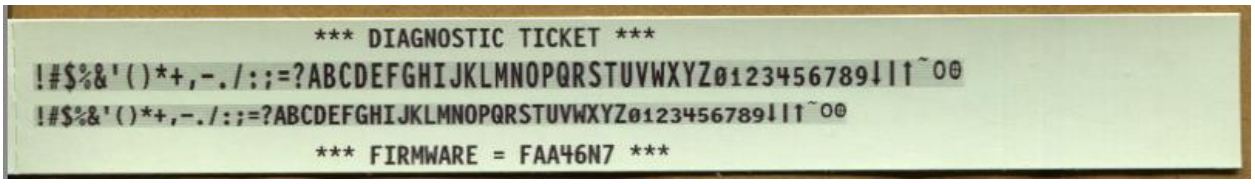


Verify that the printer is configured to use the correct flight strip type. If not, remove the cover of the Lemur-FDIO and adjust the adjustable paper guide by hand (see section 7.1.5) so that the flight strip is guided properly, without making it too tight. You will also need to use the control panel to configure the print format, as described in the Programming Guide. After the printer is properly configured, feed the flight strips into the entry paper guide (see Fig 6) with the green side facing up until the printer automatically positions the strip.

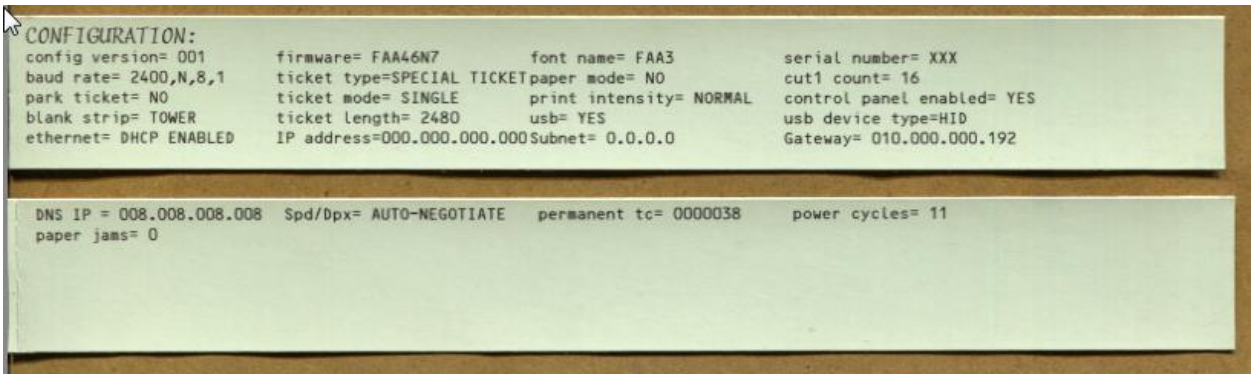
The Lemur- FDIO can print three test strips:

(1) BLANK Strip (by pressing BLANK STRIP)

(2) DIAGNOSTIC Strip (by simultaneously pressing BLANK STRIP and ON/OFF buttons with printer offline)

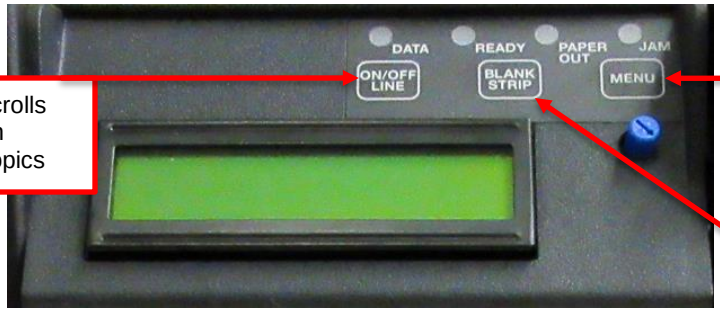


(3) CONFIGURATION Strip (by simultaneously pressing MENU and ON/OFF buttons with printer offline)



6.0 Control Panel Options

The Lemur-FDIO allows the user to adjust various printer options through the front control panel.



ON/OFF LINE: Scrolls through choices in individual menu topics

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

BLANK STRIP: Enters and saves new values

The printer has four LED lights on the control panel. All LEDs will illuminate briefly after power up.

- **DATA** flashes green when the printer is receiving data
- **READY** green when the printer is ready
- **CHECK PAPER** red when the printer is out of paper
- **PAPER JAM** red when there is a paper jam

Single Key Press

- Press the “ON/OFF” LINE button - the printer will toggle between online and offline modes. The current on/off line state is displayed on the LCD display and the “READY” light is illuminated when the printer is online and ready to receive data.
- Press the “BLANK STRIP” button - the currently selected blank flight strip will print.

Multi-Key Press

- Enter factory menu - press and hold the “MENU” button first, and while continuing to keep the “MENU” button depressed, press and hold the “ON/OFF LINE” button for approximately two seconds. Once the printer enters the menu system the LCD will display “FACTORY MENU”.
- Print a diagnostic ticket - press and hold “ON/OFF LINE” button first, and while continuing to keep the “ON/OFF LINE” button depressed, press the “BLANK STRIP” button. A printer diagnostic strip will print which displays a few lines of text using the special flight strip printer fonts. The current printer’s firmware revision is shown at the bottom of the diagnostic strip.
- Print a configuration ticket - press and hold “ON/OFF LINE” button first, and while continuing to keep the “ON/OFF LINE” button depressed, press the “MENU” button. A configuration ticket will print containing the printer’s current configuration settings.

FACTORY MENU Under normal operating conditions an operator can explore all of the menu settings, but any changes to the printer’s parameters will be ignored. Modifying the printer’s configuration settings by issuing the appropriate FGL command is not affected by the state of the menu.

To access and view the FACTORY MENU, follow these steps:

1. Flight strips should be loaded into the printer with the printer powered on.

2. Press and hold the **MENU** button first, and while continuing to keep the **MENU** button depressed, press and hold the **ON/OFF LINE** button for approximately for about 3 seconds. The LCD will display **FACTORY MENU** or start scrolling through different settings. Release the buttons as this time**.**

3. To scroll through the menu topic, use **MENU** button to select the topic you wish to view.

4. Press **ON/OFF LINE** button to scroll through choices in the selected topic. **NOTE:** A blinking cursor next to a choice indicates that choice is currently saved in the printer's memory.

5. Press the **MENU** will enable you to select other topics.

To access and change the FACTORY MENU, follow these steps:

1. Make sure the printer is powered off.

2. Press and hold both the **MENU** and **ON/OFF LINE** buttons. While holding the two buttons power up the printer. Within about 3 seconds the LCD will display **FACTORY MENU** or start scrolling through different topics. Release the buttons as this time**. WARNING: Improper use of the factory menu may disable your printer.**

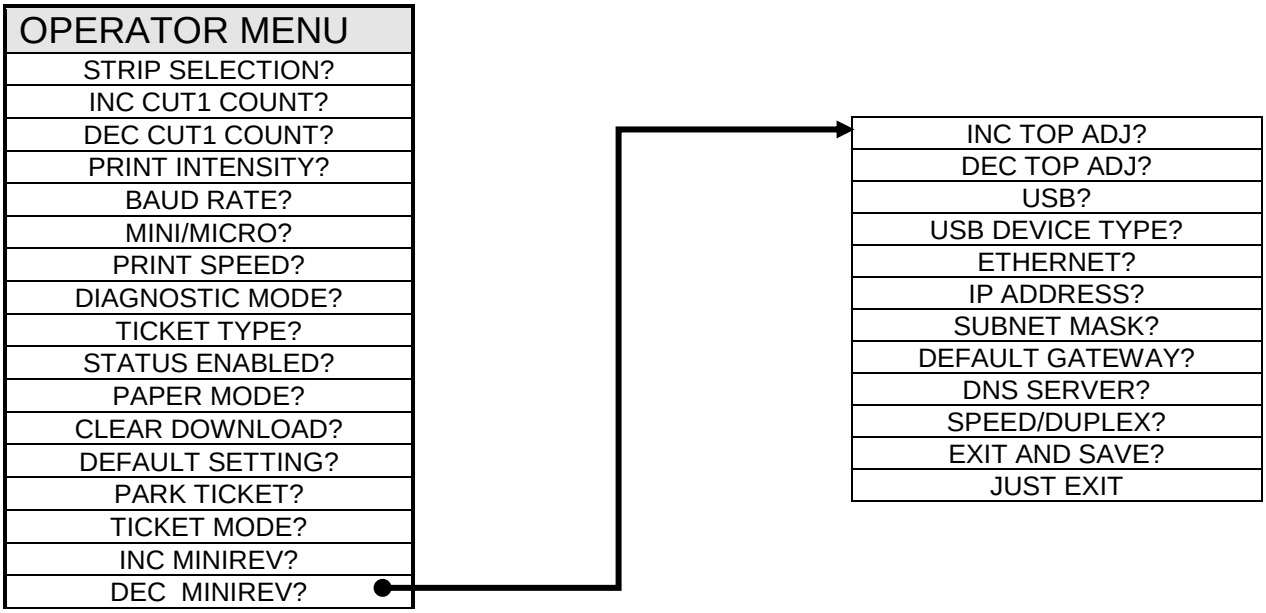
3. To scroll through the menu topic, use **MENU** button to select the topic you wish to change.

4. Press **ON/OFF LINE** button to scroll through choices in the selected topic. **NOTE:** A blinking cursor next to a choice indicates that choice is currently saved in the printer's memory.

5. Once you have found the new value you want, press **BLANK STRIP** button. The LCD window displays **EXIT AND SAVE?** If you wish to save the new value then press **BLANK STRIP** button again.

6. If you do not wish to save the new value then press **MENU**. The LCD window displays **JUST EXIT?** Press **BLANK STRIP** button to exit the FACTORY MENU without saving new values or press **MENU** to enter back into the FACTORY MENU.

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



The following is a brief overview of some representative Menu options:

STRIP SELECTION? Select blank flight strip format to be assigned to blank strip button on the control panel.

DOMESTIC	Domestic Strip - 1.0 x 8.0 inches - NSN 7530-01-453-5094 (**default**) Domestic ½ Strip - 1.0 x 8.0 inches - NSN 7530- 01-468-4668
OCEANIC	Oceantic Strip - 1.317 x 8.0 inches - NSN 7530-01-435-1872

INC CUT1 COUNT? Moves the cut position to the left (towards the ticket entrance area). Cut counts are increments of .003". Depressing CHOICES changes the count value**. 16 is factory default.** For a 300dpi printer the INC value should not exceed 35. Going beyond these values will cause reliability issues.

DEC CUT1 COUNT? Moves the cut/ position to the right (towards the ticket exit area). Cut counts are decrements of .003". Depressing CHOICES changes the count value**. 16 is factory default.**

PRINT INTENSITY? Controls the darkness of printout. Here are the following choices:

LIGHT MED LIGHT **NORMAL** MED DARK SHORT HEAD LIFE	**(factory default)**

BAUD RATE? Controls the serial interface: baud rate, parity bit, data bits and stop bits. Here are the following choices: (**2400,N,8,1 is default**)

1200,N,8,1	4800,N,8,1	19200,N,8,1	38400,E,7,1
1200,E,7,1	4800,E,7,1	19200,E,7,1	57600,N,8,1
1200,O,7,1	4800,O,7,1	19200,0,7,1	57600,E,7,1
2400,N,8,1	9600,N,8,1	28800,N,8,1	115200,N,8,1
2400,E,7,1	9600,E,7,1	28800,E,7,1	115200,E,7,1
2400,O,7,1	9600,0,7,1	38400,N,8,1	

MINI/MICRO? Defines if printer has a cutter. **Factory set do not modify.**

MINI	cutter (**default**)
MICRO	no cutter

PRINT SPEED? Controls the print speed and the print quality. Printer should not be run at a print speed of 0 as it may cause ticket
jams. The numbers range from **0 - FASTEST to 7 - SLOWEST. (3 is factory default).**

DIAGNOSTIC MODE? Your choices are **YES** or **NO**. **NO is factory default. YES** places the printer into a mode where it prints both printable and control characters to assist in isolating data transmission issues. (**NO is default**)

TICKET TYPE? Defines how the optos are configured on the paper guide assembly**.** (**FACTORY PRESET / SHOULD NOT BE CHANGED**)

NORMAL	Both optos are in line with each other (usually mounted on a black bracket)
GAP	A gap opto is installed on the cutter to detect gap in ticket stock.
LABEL	Same as GAP but the cut opto is to detect black mark on stock.
SPECIAL TICKET	This option is for a Micro MB or a printer with a ticket load switch (**default**)

STATUS ENABLED? Sets status response protocols. (**FACTORY PRESET / SHOULD NOT BE CHANGED**)

NONE	Disables the XON/XOFF and status response protocols
SERIAL	Enables the XON/XOFF and status response protocol for the serial port
PARALLEL	Enables bi-directional parallel status responses if printer is configured as bi-directional
SER/PAR	Enables both bi-directional parallel and serial status responses.
USB	Enables USB status responses
USB/SER	Enables USB and serial status responses **(default)**
USB/PAR	Enables USB and bi-directional parallel
USB/SER/PAR	Enables USB, bi-directional parallel and serial status responses

PAPER MODE? It may also be used on roll stock with no black marks on the ticket. (**FACTORY PRESET / SHOULD NOT BE CHANGED**).

YES	Configured for use with media that does not have a black timing mark.
NO	Paper mode disabled (**default**)
RECEIPT	Only for a Lemur-R & Lemur-C receipt model printers.
PARTIAL CUT	Enables both bi-directional parallel and serial status responses.
PARTIAL CUT ###	Only for Lemur-R & Lemur-C receipt model printers set to partial cut mode.
RX MODE	Enables USB and serial status responses

CLEAR DOWNLOAD? Clears those items downloaded by the operator to Flash memory. Your choices are **YES** or **NO**. (**NO is default**)

DEFAULT SETTING? Defaults the printer back to its original factory settings. Your choices are **YES** or **NO**. (**NO is default**)

PARK TICKET? Reverse the ticket to the print position after the last strip in a group has been printed. Your choices are **YES** or **NO**. (**YES is default**) (**FACTORY PRESET / SHOULD NOT BE CHANGED**)

TICKET MODE? Defines how the printer will treat multiple flight strips. Your choices are **SINGLE** or **MULTIPLE. (SINGLE is factory default)**.

INC MINIREV? Allow horizontal positioning of the flight strip data within the printable area of flight strip to be adjusted. This control is primarily used to adjust the print position right at the factory and is not normally needed during normal printer operation. **(0279 is default value)**

DEC MINIREV? Allow horizontal positioning of the flight strip data within the printable area of flight strip to be adjusted. This control is primarily used to adjust the print position left at the factory and is not normally needed during normal printer operation. **(0279 is default value)**

INC TOP ADJ? Allow vertical positioning of the flight strip data within the printable area of flight strip to be adjusted. This control is primarily used to adjust the print position down at the factory and is not normally needed during normal printer operation. **(0001 is default value)**

DEC TOP ADJ? Allow horizontal positioning of the flight strip data within the printable area of flight strip to be adjusted. This control is primarily used to adjust the print position up at the factory and is not normally needed during normal printer operation. **(0001 is default value)**

USB? Activates the USB interface. Your choices are **YES** or **NO**. (**YES is default**) (**FACTORY PRESET / SHOULD NOT BE CHANGED**)

USB DEVICE TYPE? Enables the printer's USB device class to be changed. Your choices are **PRINTER, HID and serial. (Default is HID).**

ETHERNET? Enables the Ethernet port setting to be changed.

NO	Ethernet not enabled
YES	Uses the IP address that has been set in the printer by the customer or manual selection
Diagnostics	This feature should not be used
Valid Packets	This feature should not be used
DHCP Enabled	Automatically attempts to get an IP address from Local Server **(Default)**
DHCP/SUB/GATE	Automatically attempts to get an IP address/Subnet Mask/Gateway from Local Server
DHCP/NR	Automatically attempts to get an IP address from Local Server and then register the name with the local NetBIOS name server usually the WINS Server
DHCP/SUB/GATE/NR	Automatically attempts to get an IP address/Subnet Mask/Gateway from Local Server and then register the name with the local NetBIOS name server usually the WINS Server

IP ADDRESS? Enables the printer's Ethernet IP Address to be manually changed. 000.000.000.192 is default if Ethernet port is not connected to the network.

SUBNET MASK? Enables the printer's Ethernet Subnet Mask value to be changed. 0.0.0.0 is default if Ethernet port is not connected to the network.

DEFAULT GATEWAY? Enables the printer's Ethernet default Gateway value to be changed. 010.000.000.192 if Ethernet port is not connected to the network.

DNS SERVER? Enables the printer's Ethernet default DNS server value to be changed. 000.000.000.192 is default if Ethernet port is not connected to the network.

SPEED/DUPLEX? Enables the printer's Ethernet speed and duplex setting to be changed. Your choices are **AUTO-NEGOTIATE** (default), **100Mbps/FULL**, **100Mbps/HALF**, **10Mbps/FULL** and **10Mbps/HALF**.

EXIT AND SAVE! Will save any changes made to the above menu options. If you wish to save the new value then press **ON/OFF LINE** button, if not press **MENU** button**.**

JUST EXIT? Will exit the menu options without saving any changes. If you wish to exit without saving the new value then press **ON/OFF LINE** button, if not press **MENU** button.

7.0 Maintenance and Adjustments

Your Lemur-FDIO flight strip printer is solidly constructed and has been designed for high volume use. It requires minimal care to provide maximum service.

WARNING: The appearance of this symbol indicates the proximity of an exposed high voltage area. Please follow all directions carefully for your personal safety. You must read the following safety information carefully before working on the printer.

This section provides an overview of printer maintenance, including part alignments, adjustment and replacement.

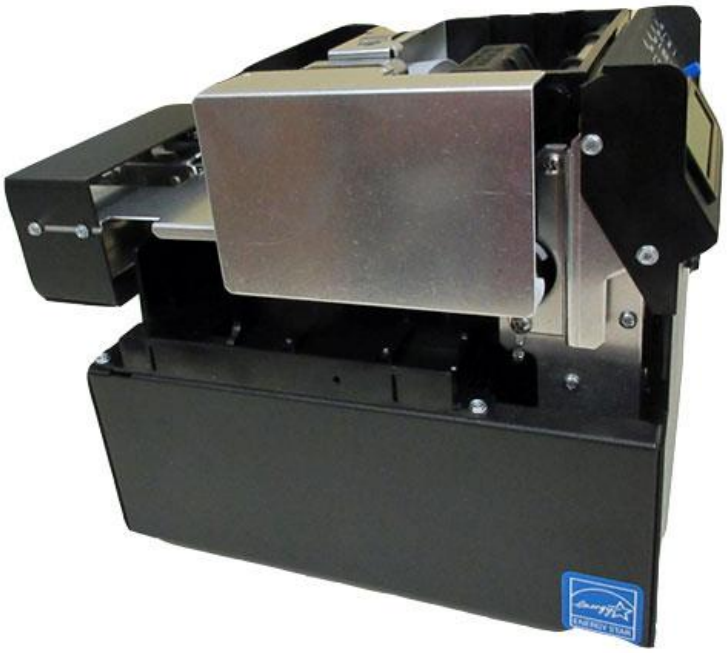
For discussion purposes, the printer consists of three major modules or assemblies:

- Paper guide and print head assembly
- Cutter assembly
- Logic board assembly

As a safety precaution, all service to the printer should be done by qualified persons with power off and the AC cord unplugged from the printer. Following any procedure requiring the removal of covers and/or doors, please verify that they have been properly attached and fastened prior to operating the printer.

7.1 Paper Guide and Print Head Assembly

The principal function of this assembly is to guide the flight strip stock to the thermal print head where thermal printing takes place. Additionally, this assembly houses the drive platen and flight strip positioning sensors. If necessary, the total assembly may be removed from the unit. All replacements and adjustments of the components on this assembly may be done without removing the total assembly. The most common adjustments and replacements regarding this assembly follow:

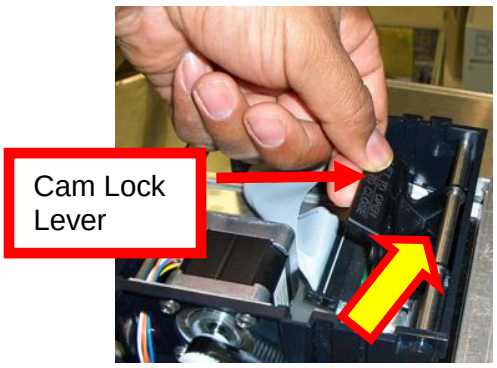


7.1.1 Thermal Print Head (Cleaning & Replacement)

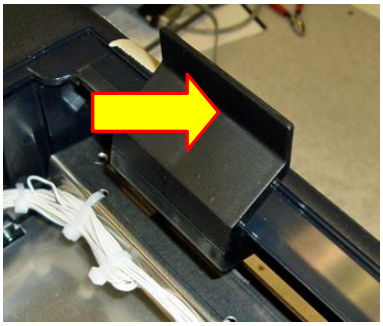
The following needs to be done with the printer powered off and unplugged from the AC source.

1. Remove the cover of the printer to gain access to the print assembly area.

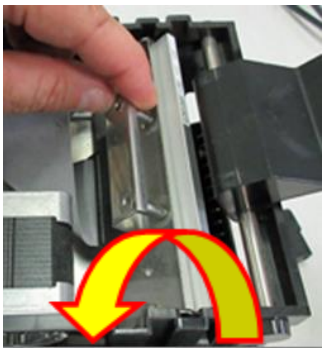
2. Lift up on the cam lock assembly (located above the head mounting plate) to remove pressure from the thermal head.



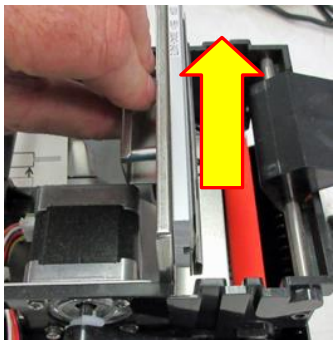
3. Position the cam lock level as far forward as possible.



4. Flip the head back toward the rear of the printer. Denote what slot the print head was taken out of.

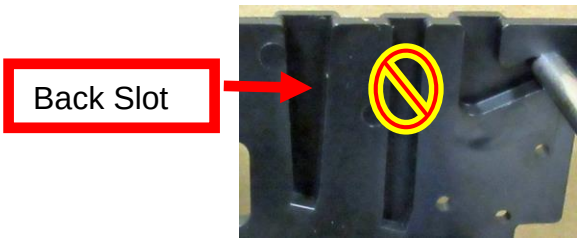


5. Lift the print head mounting plate straight out.



6. Clean the thermal print head surface (the side that makes contact with the paper) with isopropyl alcohol & paper towel.

7. Install the head mounting plate by reversing the above procedures. Make sure the print head mounting plate tabs are in the back slot of the print cage slots.



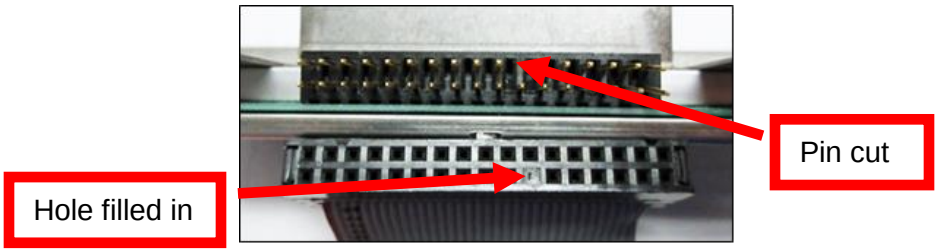
8. Restore pressure to the head by pushing down on the cam lock assembly. The printer is ready for operation.

TO REPLACE PRINT HEAD:

Once the print head mounting plate/thermal head is removed from the printer the printer head may be replaced in the following manner if needed.

1. Loosen the two Philips head screws until the thermal print head disengages from thehead plate. Take care to not lose the lock washer and flat washers.

2. Gently unplug the cable from the old print head and plug it into the new print head. The cables are keyed (see examples below). The keyed position must be lined up while plugging the cable into the print head. **You should not have to use excessive force to do this.**

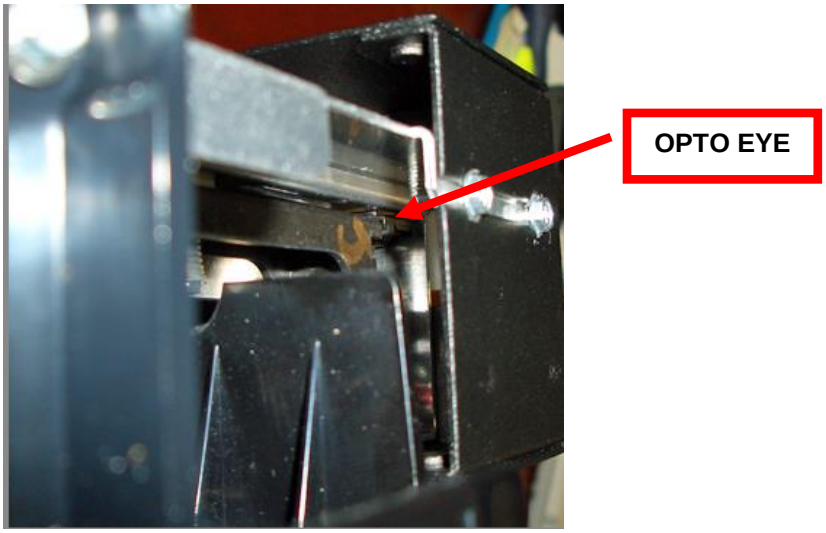


3. Install the print head back onto the print head mounting plate.

4. Install the head mounting plate/ thermal head back into the printer.

7.1.2 Cut Opto Assembly

The purpose of this device is to sense the black mark located on the rear of the flight strip in order to determine a cut position.



The cut position may be adjusted via the control panel (see section 6.0).

If you are not able to get the desired cut position, make sure your ticket stock is being loaded correctly into the printer and BLANK FLIGHTS STRIPS menu setting matches the stock being used.

Once a year the opto eye should be blown off with air. This interval will vary depending upon the environment and the quality of the ticket stock.

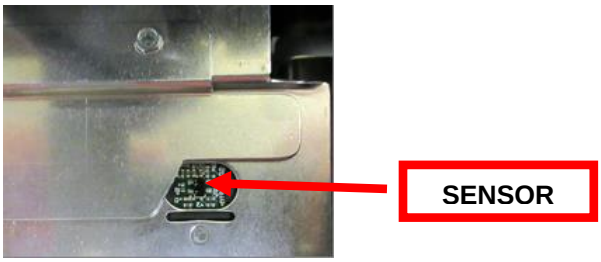
7.1.3 Load SQ Opto

The Load SQ Opto is located on the paper guide assembly. The purpose of this device is to sense the presence of flight strips. No adjustment is required. **Once a year the opto eye should be blown off with air.** This interval will vary depending upon the environment and the quality of the flight strip stock.

The following needs to be done with the printer powered off and unplugged from the AC source.

1. Remove the print head mounting plate from the printer as shown in section 7.1.1.

2. With canned air, blow off the area shown in the below photo.



3. Install the head mounting plate and lock the cam lock lever back in place. Printer is now ready for normal operation.

7.1.4 Platen (Rubber Driver Roller)

The Platen (rubber drive roller) should be cleaned once a year to prevent paper dust from building up on the roller. (NOTE: The platen may require more frequent cleaning in dusty environments or when using inferior flight strip stock.)

The following needs to be done with the printer powered off and unplugged from the AC source

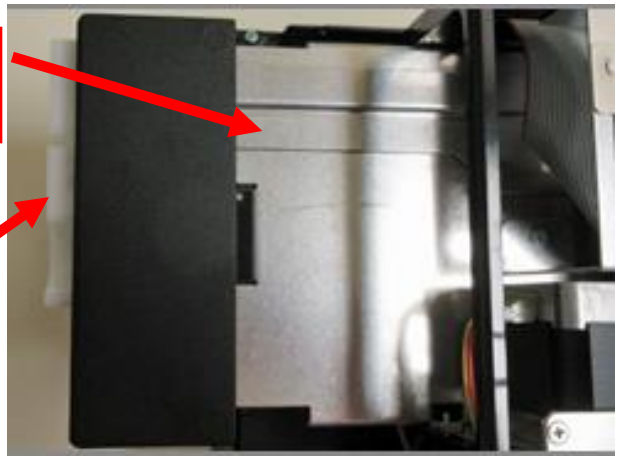
1. Remove the print head mounting plate from the printer as shown in section 7.1.1.
2. Apply a small amount of Isopropyl alcohol onto a lint free cloth to clean the rubber roller.
3. Clean only the part of the rubber roller where the flight strip makes contact with the platen. See yellow highlighted area.
4. Rotate the rubber roller clockwise a little and repeat step 4; continue in the same manner for one full revolution of the rubber roller.
5. Install the head mounting plate and lock the cam lock lever back in place. Printer is now ready for normal operation.

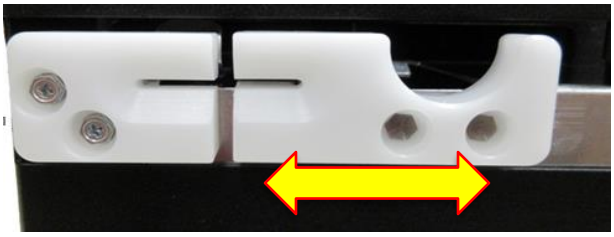
Platen color may vary from what is shown in the photo

7.1.5 Ticket Width Adjustment

To adjust the paper path for use with a different flight strip width, adjust the slider bar to the fully open position. Insert your flight strip stock into the paper guide. Adjust the slider bar down to the proper flight strip width, making sure the bar is not too tight against the flight strip. The flight strip should move freely in the paper guide. **NOTE:** The Lemur- FDIO has been factory configured for the Tower strip. Please consult section 6.0 to change STRIP SELECTION.

Load your stock towards this side and below this metal plate



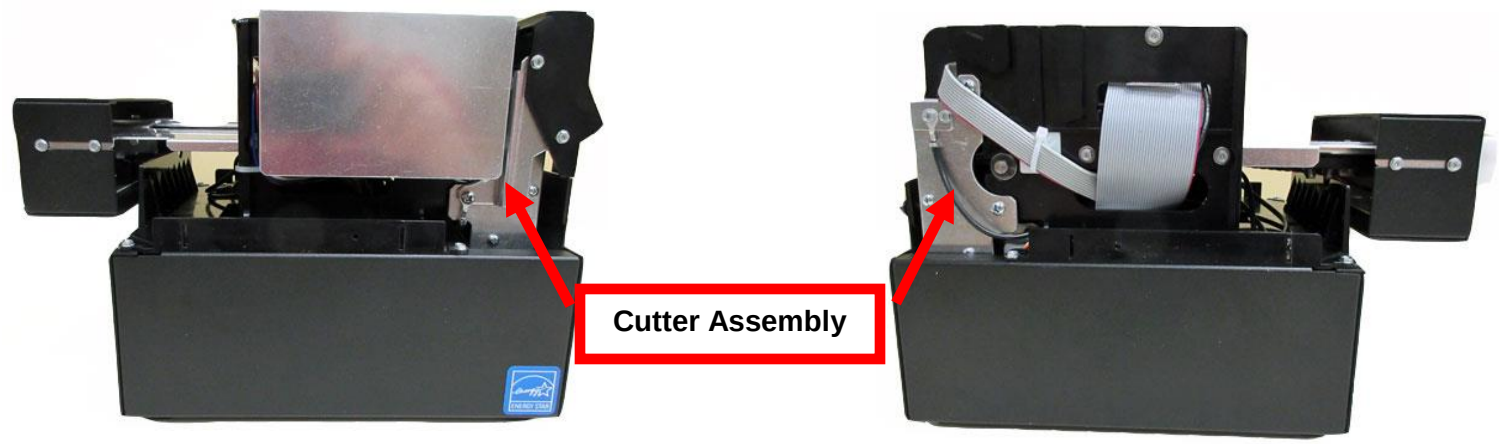


Slider may be adjusted for different width flight strip stock.

7.2 Cutter Assembly

The cutter assembly is a fully integrated cutter knife mechanism powered by a stepper motor. The cutter requires no adjustments and is rated for approximately 750,000 cuts. Please be aware of the following.

The cutter area where the tickets exit the printer should be blown out with air periodically to prevent debris from building up inside the cutter area. The required cleaning interval varies greatly depending on the quality of the ticket stock and the amount of paper dust entering the cutter area.



8.0 Removal & Replacement of Major Assemblies

8.1 Logic Board Removal/Replacement

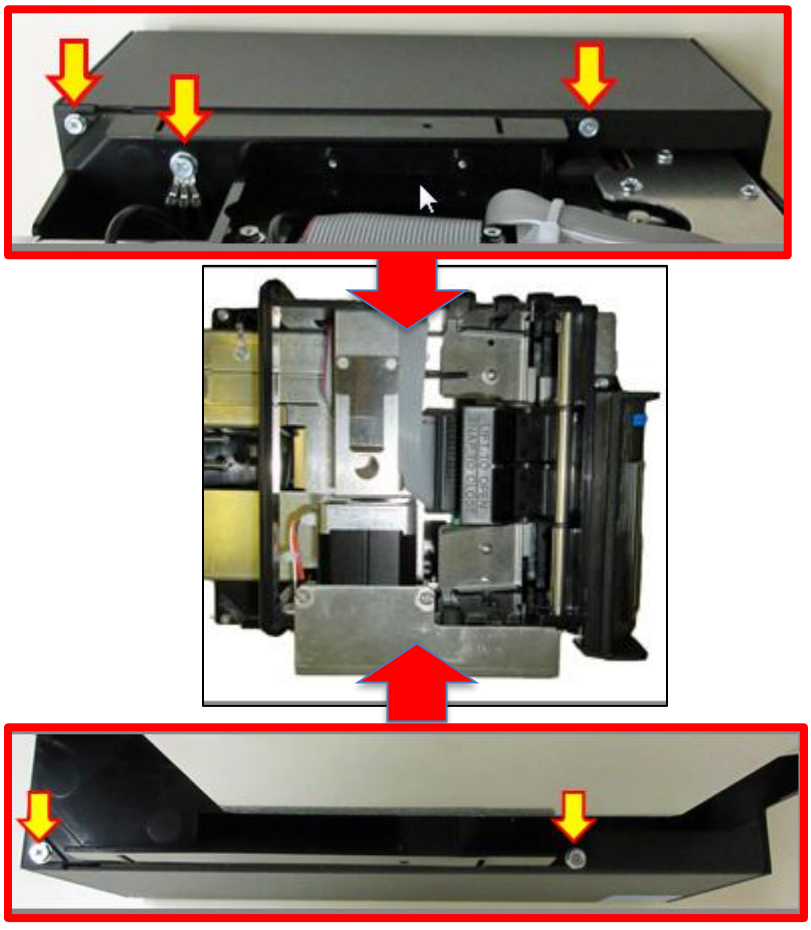
The printed circuit boards used in this product have been manufactured using surface mount technology. These printed circuit boards cannot be effectively repaired in the field.

WARNING: All Service must be done with the printer off and the AC cord unplugged from the printer.

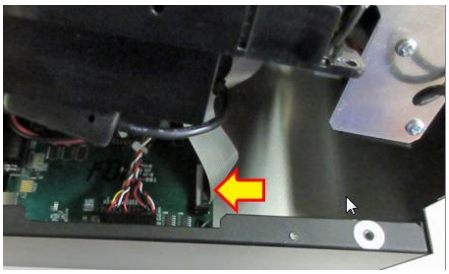
Logic Board Removal

1. Remove the cover from the printer.

2. Gain access to the logic board by removing four 3/16-inch hex head screws and two 1⁄4-inch hex head screw that hold the electronics cover in place. Remove electronics cover.

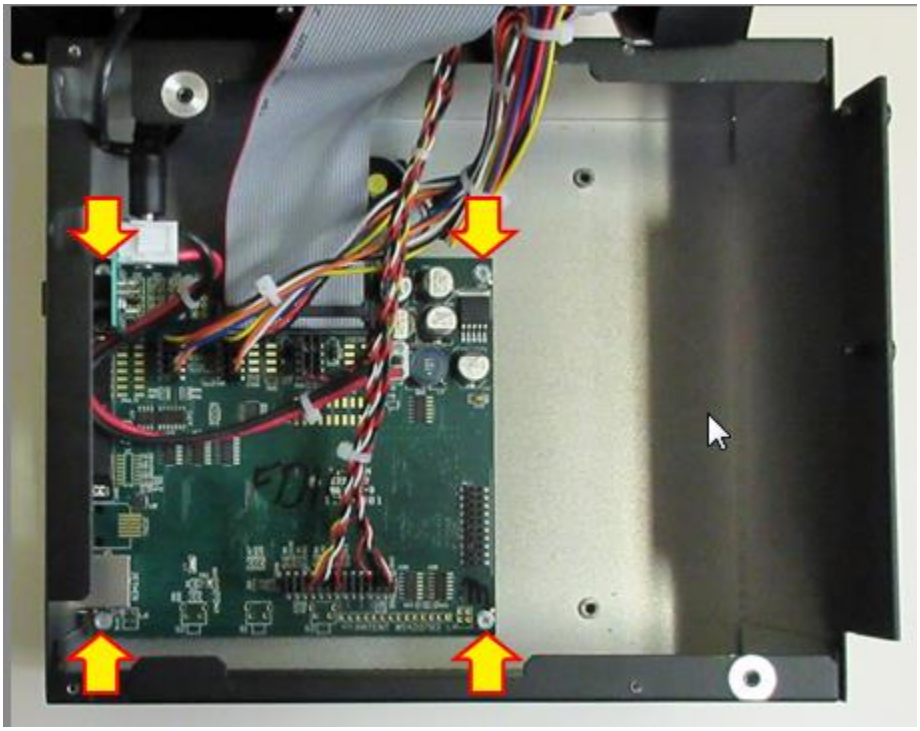


3. Gently lift up the electronics cover a little so you may disconnect the Control panel cable (yellow arrow). Once the cable is unplugged you may fully lift the cover off.



4. Denote where all the cables are plugged into the logic board. Gently unplug the cables from logic board.

5. Remove four 3/16 hex head screws shown in the below photo.



6. Gently remove logic board from cabinet.

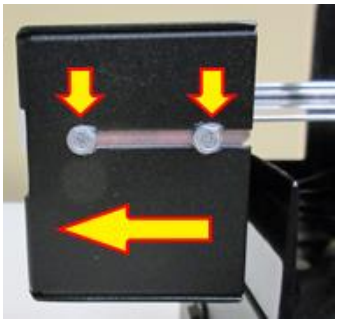
7. Install the board by reversing the above steps.

8.2 Cut Opto Removal/Replacement

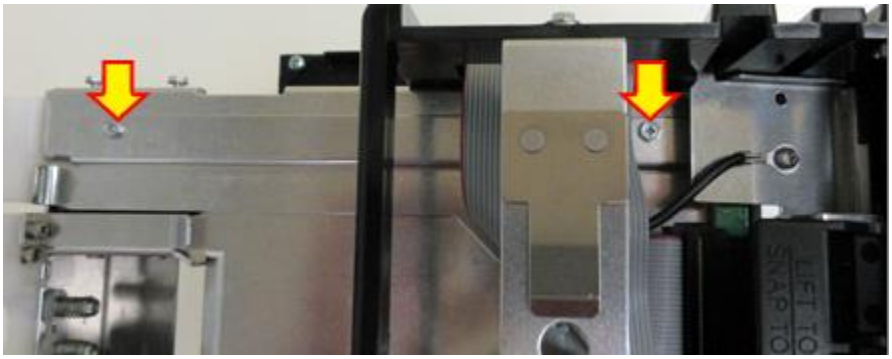
Please make sure the printer is powered off and unplugged from the AC source.

1. Remove the print head mounting plate from the printer. See section 7.1.1.

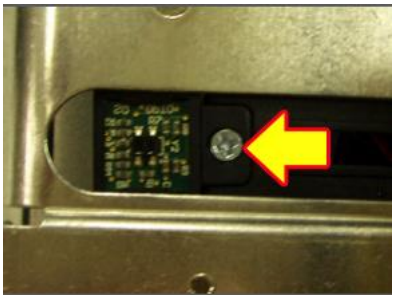
2. Loosen the four 3/16” hex head screws that holds the extended paper guide cover in place and slide the cover off.



3. Remove the two 3/16” hex head screws that hold the upper paper guide upper rail in place.



4. Remove the Phillips head screw that holds the cut opto onto the mounting bracket. Unplug the connector from the opto.



5. Plug the connector into the new replacement opto and install it back onto the mounting bracket.

6. Install the upper rail back in place.

7. Install the extended paper guide cover back in place.

8. The printer is ready to be put back into service.

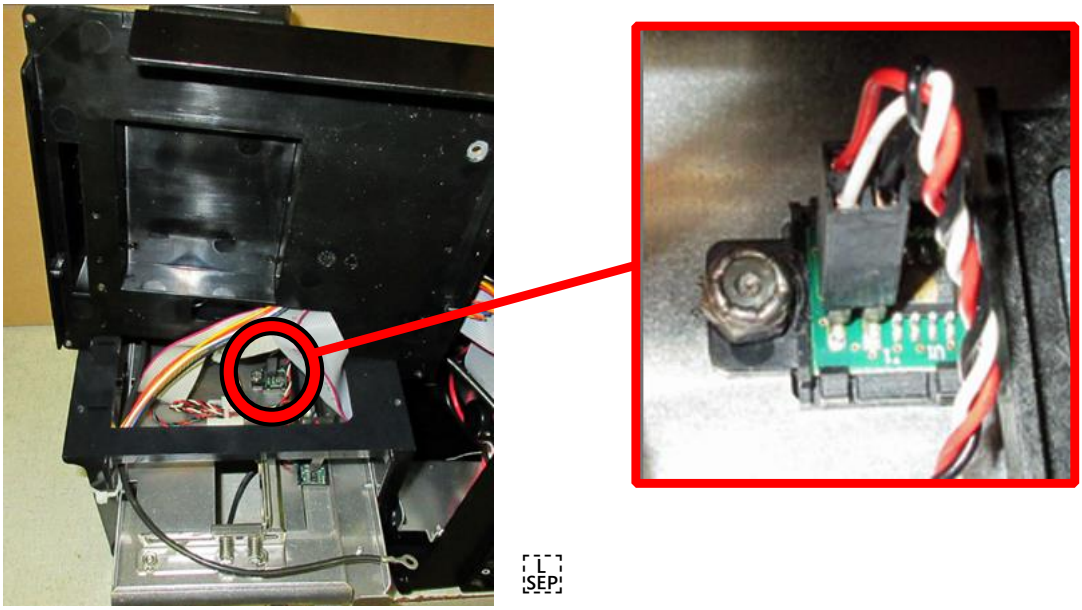
8.3 Load SQ Opto Removal/Replacement

Please make sure the printer is powered off and unplugged from the AC source.

1. Remove the electronics cover from the printer. See section 8.1.

2. Remove the four Phillips head screws that hold the print cage onto the electrical cover.

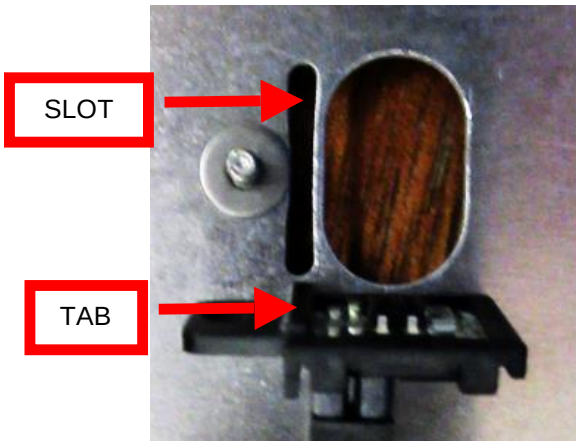
3. Once the screws have been removed the electrical cover may be gently tilted away from the print cage to gain access to the Load SQ Opto.



4. Remove the 1⁄4” nut with either a nut driver or socket.

5. Once the nut and flat washer are removed the black Load SQ Opto mounting bracket may be pulled up so the connector may be unplugged and a new Load SQ Opto (Gold dot on IC) installed.

6. There is a washer just under the black Load SQ Opto mounting bracket that must not be removed. When installing the opto back in place make sure the tab on the black opto mounting bracket lines up with the slot in the paper guide. Installed the flat washer and ¼" nut back in place then tighten.



7. Mount the print cage back onto the electrical cover; take care to make sure wires are not being pinched.

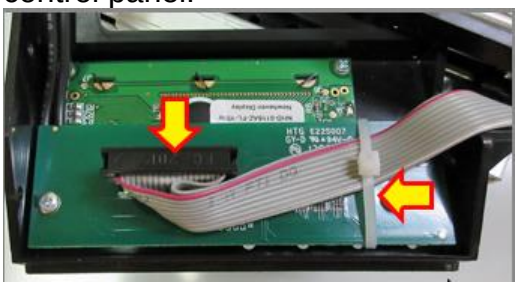
8. Electronics cover may be installed back onto the printer.

8.4 Control Panel Removal/Replacement

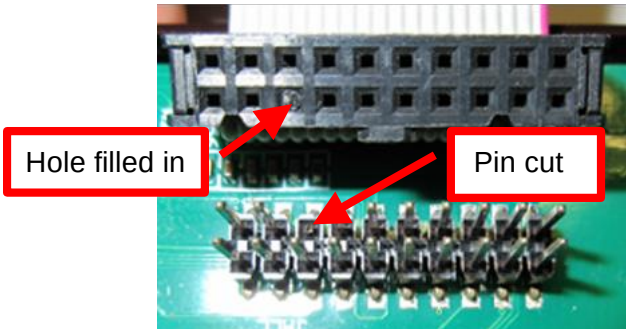
Please make sure the printer is powered off and unplugged from the AC source.

1. Remove the three 3/16” hex head screws that hold the control panel in place.

2. Cut the zip tie holding the cable in place and gently unplug the keyed grey ribbon from the control panel.



3. Plug the grey ribbon cable into the replacement control panel. Take care to make sure the keyed areas of the cable and connector line up.

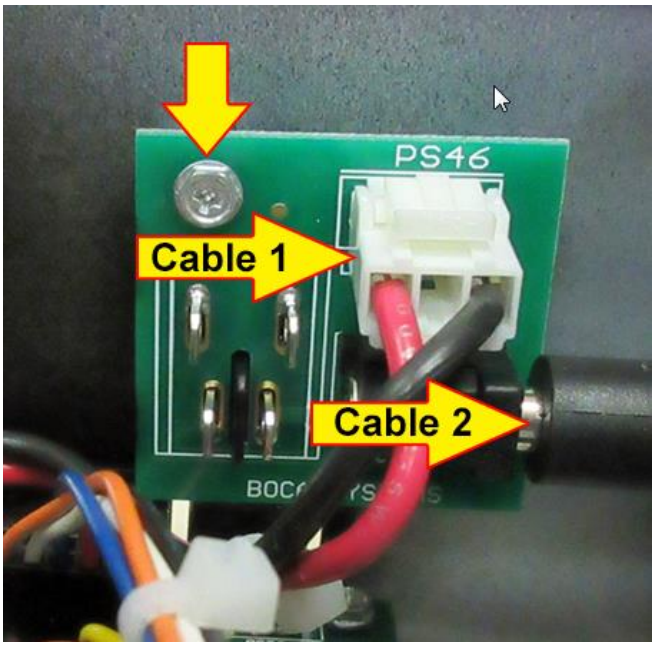


4. Install the control panel back in place by reversing the above steps.

8.5 Power Switch Board Removal/Replacement

Please make sure the printer is powered off and unplugged from the AC source.

1. Remove the cover from the printer.
2. Gain access to the power switch board by removing the electronics cover. See section 8.1.
3. Unplug the two cables that are connected to the power switch board and remove the one 3/16” hex head screw that attaches the board onto the cabinet.



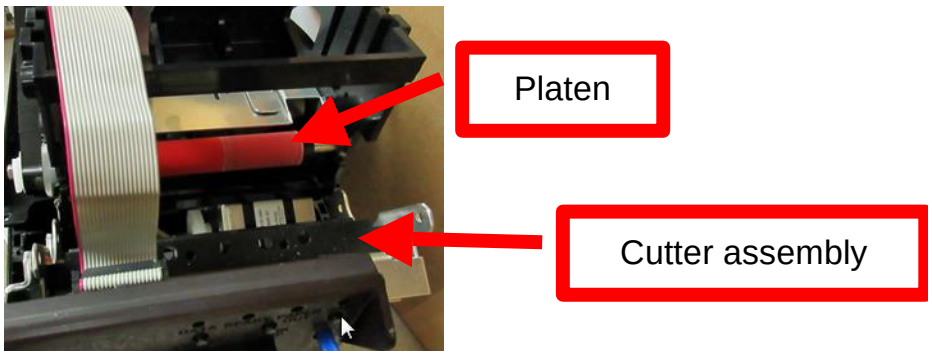
4. Install the replacement switch power board by reversing the above steps.
5. Install the electrical cover back in place.

8.6 Platen Removal/Replacement

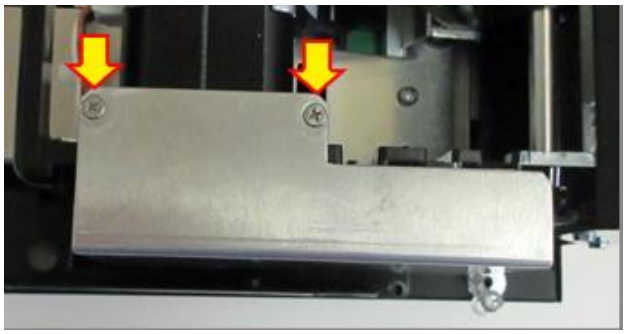
Please make sure the printer is powered off and unplugged from the AC source.

1. Remove the cover from the printer.
2. Remove the printer head mounting plate/ print head from the printer. See section 7.1.1.
3. Loosen the electronics cover by removing the screws that hold it in place. See section 8.1.
4. Remove the four Phillips head screws that hold the cutter assembly in place.

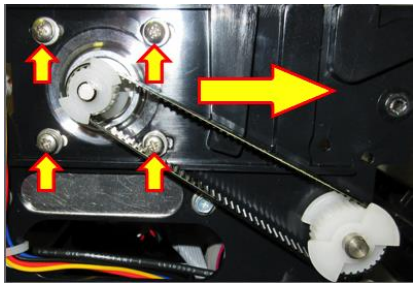
5. The electronics cover may be gently lifted up a little to enable the cutter assembly to separate from the print cage. This will enable you to get access to the platen.



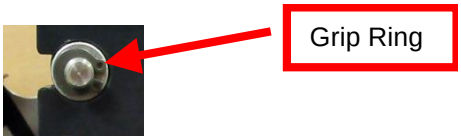
6. Remove the two Philip head screws that hold the drive belt shield in place and remove the shield.



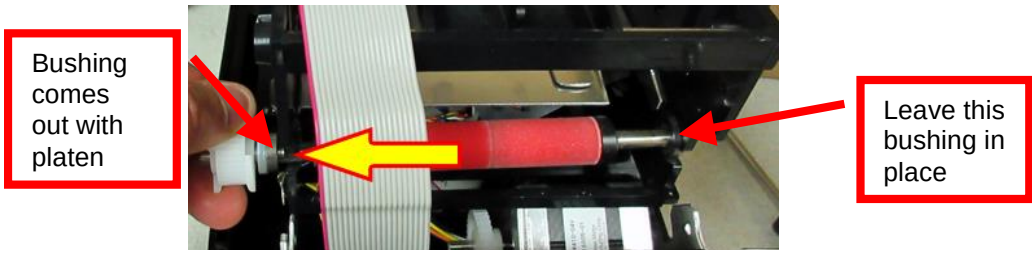
7. Loosen the four Phillips head screws that hold the stepper motor in plate. Move the stepper motor forward to enable the drive belt to be removed.



8. Remove the grip ring from the platen shaft.



9. The platen may be removed by grabbing onto white pulley and sliding it out towards that side. On the pulley side you will want to make sure the bushing comes out of the print cage. The bushing on the other side should be left alone.



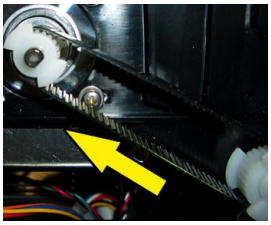
10. Install the new replacement platen in place. Install the grip ring back onto the shaft.

11. Make sure the platen is manually able to spin freely. If it not able to spin freely then the grip ring may be binding too tight and need to be adjusted a little. You also want to make sure the pulley is not rubbing against the cutter assembly.

12. There should also be very little side to side free play too. Adjust the location of the grip ring if needed.

13. Install the drive belt back on the pulleys. Slide the stepper motor back just enough to take up the belt tension and tighten the four Philip head screws.

14. Grab onto the driver belt and turn it a few times. You want to make sure the platen still moves freely. There should be no binding. If there is binding then you may have too much tension on the drive belt. Adjust if needed.



15. Install the cutter assembly back onto the print cage and make sure the ground wire is attached back on as shown in step #4.

16. Install the head plate/ print head back in place and lock the cam lock lever.

17. Install the electronics cover back in place. You will need to make sure that the two wire tabs go back through the 1⁄4” Hex head screw.

18. Install the drive belt shield back in place.

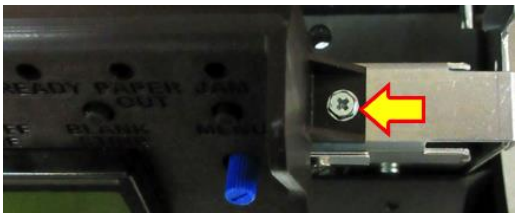
19. The printer may now be put back into service.

8.7 Cutter Assembly Removal/Replacement

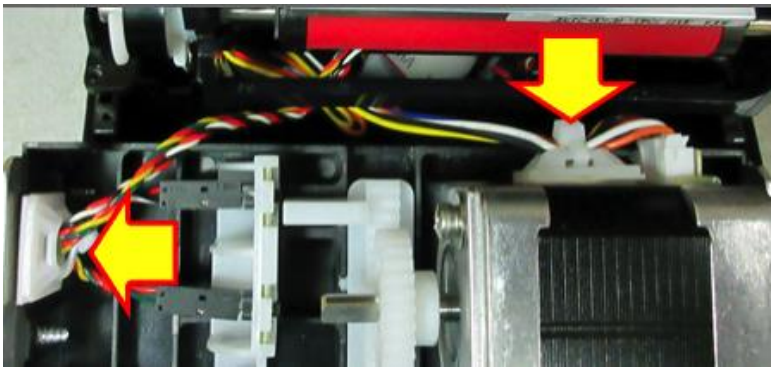
Please make sure the printer is powered off and unplugged from the AC source.

1. Remove the cover from the printer.
2. Loosen the electronics cover by removing the screws that hold it in place. See section 8.1.
3. Remove the four Phillips head screws that hold the cutter assembly in place.

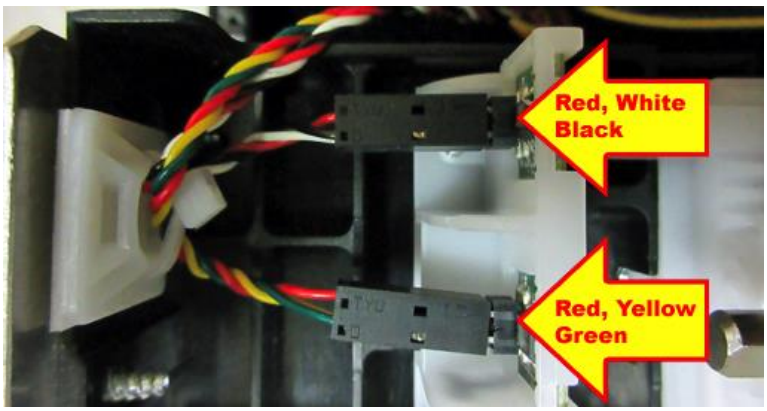
4. Remove the one 3/16” hex head screw that is holding the control panel onto the cutter. Place control panel out of the way.



5. The electronics cover may be gently lifted up a little to enable the cutter assembly to separate from the print cage. This will enable you to get access to wires that connect to the cutter assembly. Cut the zip ties that hold the wires in place and unplug the wires. The cutter assembly can now be removed.



6. Connect the wires to the replacement cutter assembly and zip tie in place. Take care to make sure the wires are properly connected to their respective sensors. See photo below.



7. Secure the control panel back onto the cutter assembly.
8. Install the cutter assembly back onto the print cage and make sure the ground wire is attached back on as shown in step #4.
9. Install the electronics cover back in place.
10. The printer may now be put back into service.

9.0 Specifications

9.1 Interfaces and Pinouts

Please refer to figure 4 for location of interface connectors.

RS 422 (DB25F Connector)

Pin 1.....frame ground

Pin 7.....signal ground

Pin 15.....negative input

Pin 17.....positive input

Pin 19.....negative transmit

Pin 25 .....positive transmit

USB 2.0 Compliant

Pin 1.....VCC (+5V)

Pin 2.....D- (Data -)

Pin 3.....D+ (Data+)

Pin 4.....Ground

Ethernet RJ45

Pin 1.....TX+_D1 (Transmit Data+)

Pin 2.....TX-_D1 (Transmit Data-)

Pin 3.....RX+_D2 (Receive Data+)

Pin 4.....BI+_D3 (Bi-directional+)

Pin 5.....BI-_D3 (Bi-directional-)

Pin 6 .....RX-_D2 (Receive Data-)

Pin 7 .....BI+_D4 (Bi-directional+)

Pin 8 .....BI-_D4 (Bi-directional-)

9.2 General

Print Method: Direct thermal

Print Speed: 8 inches per second (maximum)

Resolution: 300 dpi

Size: 7.82 H x 7.32 W x 8.94 L (not inclusive of input and output hoppers)

Weight: 7.0 pounds

Media type: thermal flight strips (fanfolded)

Media thickness: .007 inch

Media Width: 1.0 to 1.33 inches

Positioning: optical detector sensing black mark

Ticket Separation: integrated cuter with hopper

Interfaces: RS 422, USB, Ethernet

Approvals: FCC/ UL/ CE/ CCC

Power Requirements: 100-240 VAC, 50/60HZ, 65W max

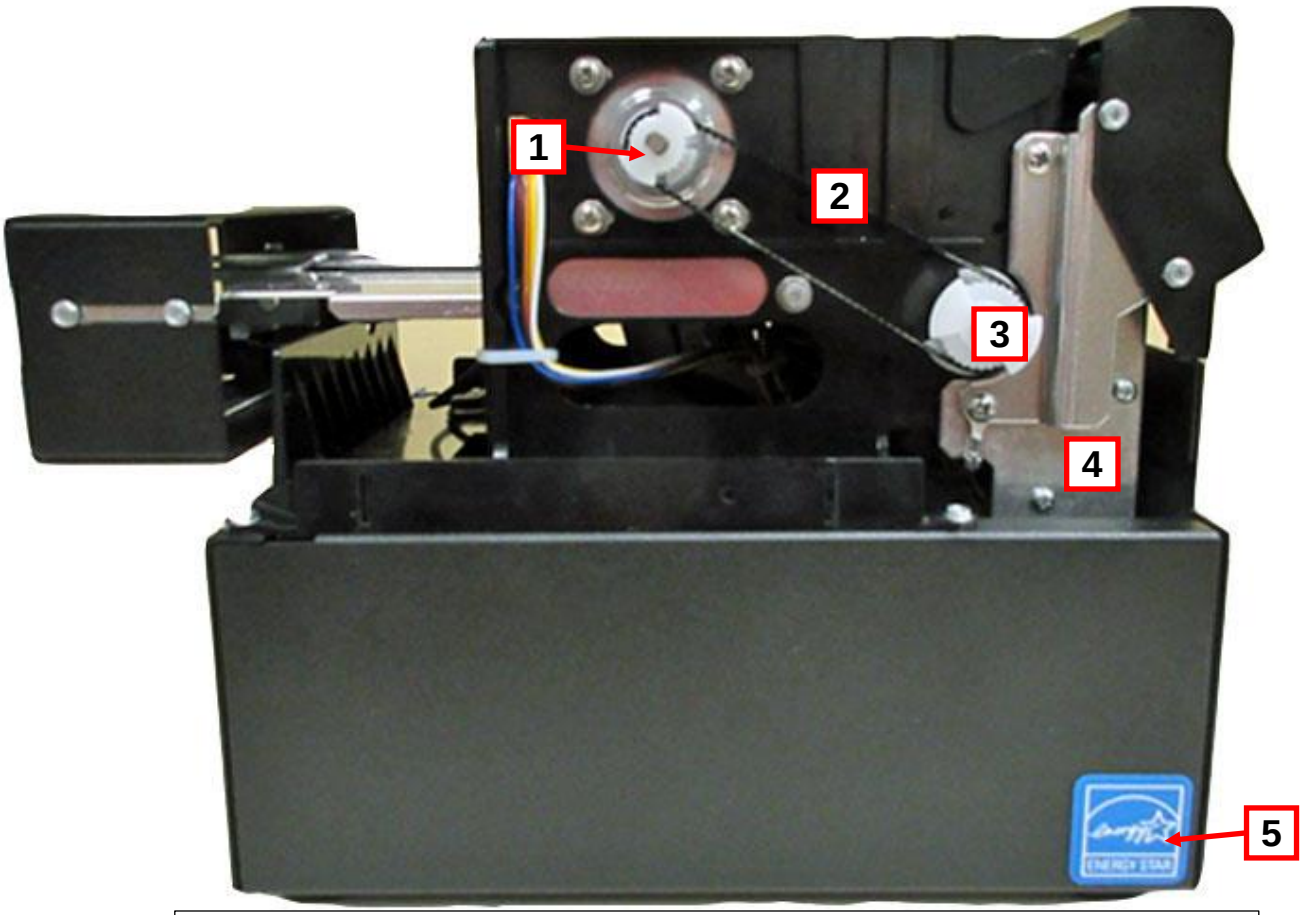
Power Consumption: 2.76 watts (idle) , 22 watts typ (printing)

Projected Life: Cutter (1 million cuts) , Print Head (150 km of paper or 100 million dot activations)

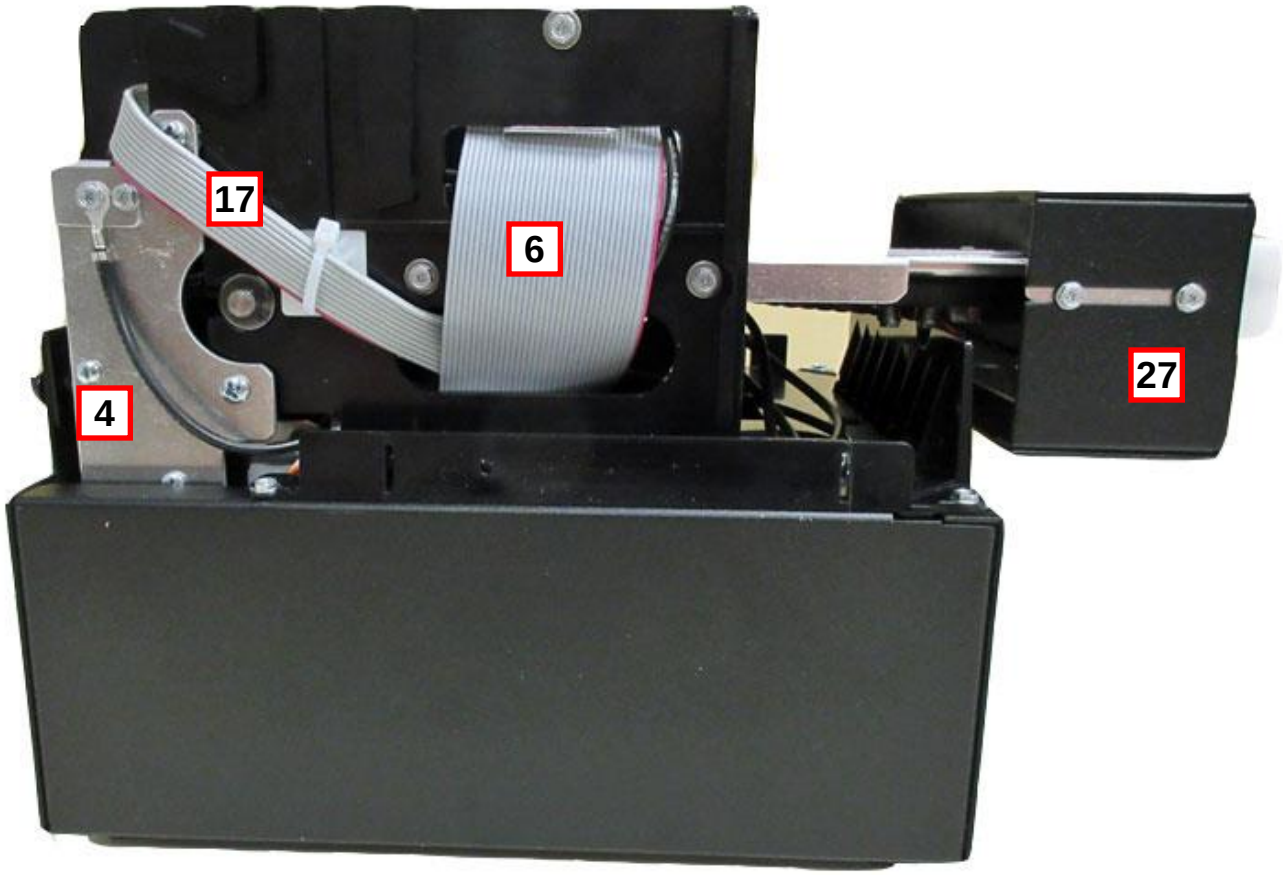
10.0 Spare Parts List with Visual References

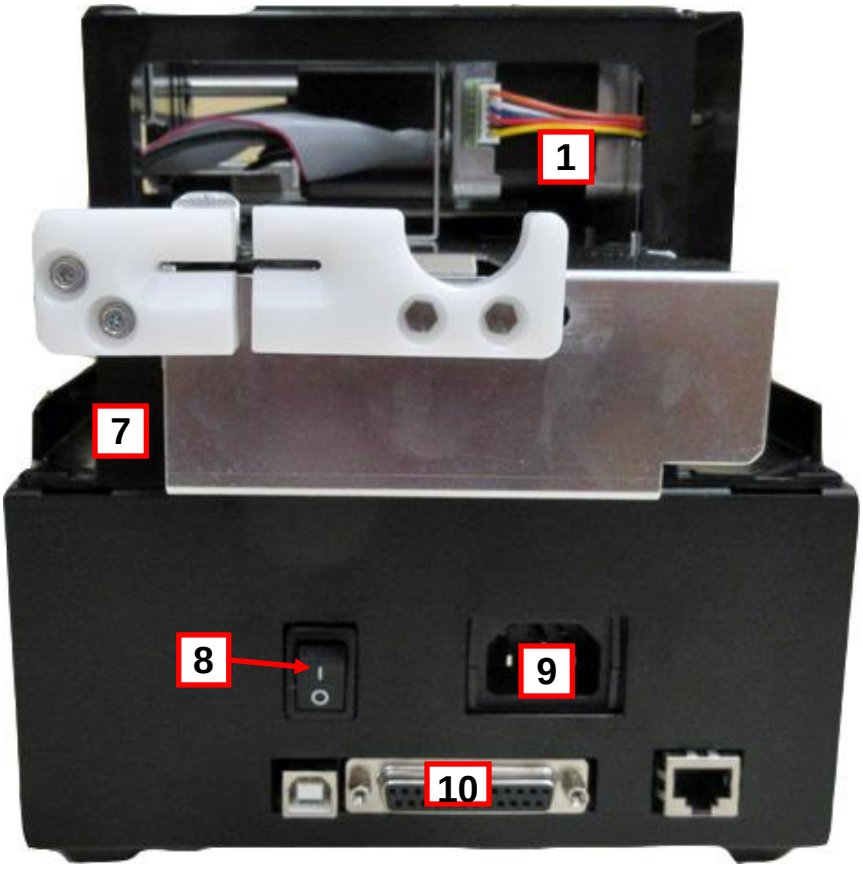
Item #	Part Number	Description
1	422590-C	Stepper Motor & 20 drive pulley
2	P50-1003	Drive Belt, 102T (for 300dpi)
3	423760-FSP-1-C	Platen complete
4	424008-C	Cutter Assembly (BC5) Complete
5	423793	Energy Star Decal
6	422557-25	Cable, Thermal Head
7	423842Z-P1	Electronics Cover,
8	PS46	Switch, For power supply 424009-L
9	424009-L	Power Supply 24VDC (65W)
10	FAA46-FDIO	Main Logic Board (FAA-FDIO)
11	420881P-1A	LCD Cover only
11A	LCD-FAA	LCD Display only
11B*	CPANEL2	Control panel board (LCD is connected to this board)
12	423480C	Upper Exit Deflector ONLY BC5
12A	422718WV	Anti-Static Brush (only)
13	420880P-2-FAA	Cabinet Base, FAA-FDIO
14	423192	Ground Strap
15	423496-5	Head mounting plate
16	423236P	Cam lock lever
17	422589-20	Cable, LCD
18	SQ OPTO-L	SQ Load Opto
19	3003	Print Head
20	424061-FAA	Print Cage Pulley Cover
21	423843-FAA	Power Board Mounting Bracket
22	424052	Buzzer
23	423938	DC Harness, cutter
24	420881Z-FAA	Cover
25	422113Z-FAA	Input hopper
26	422113Z-FSP	Exit Hopper
27	420881Z-FAA-1	Paper Guide Cover
28*	SQ OPTO	SQ Cut Opto
*	423635	Rubber Feet on bottom of printer
*	P19-1000	Cable, AC cord 110VAC (US)

*** Not shown in photos**



Above photo shows the Print Cage Pulley Cover removed

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READY
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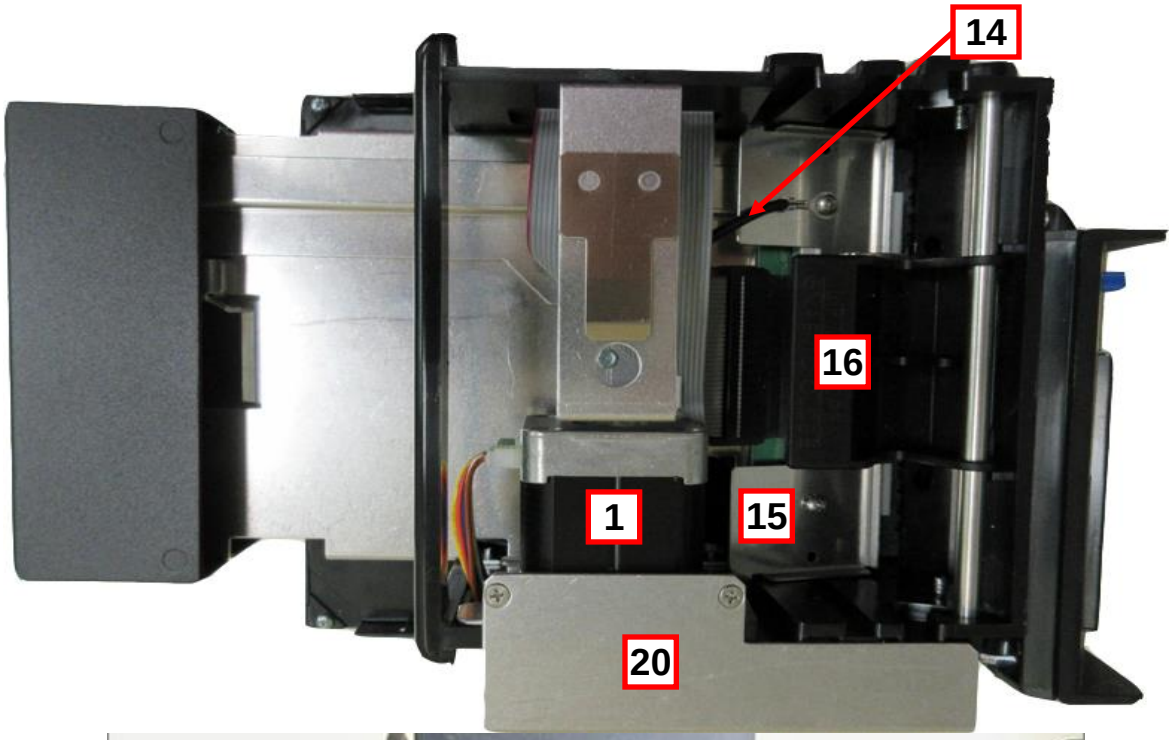
JAM
ON/OFF LINE
BLANK STRIP
MENU
11A
12
12A
13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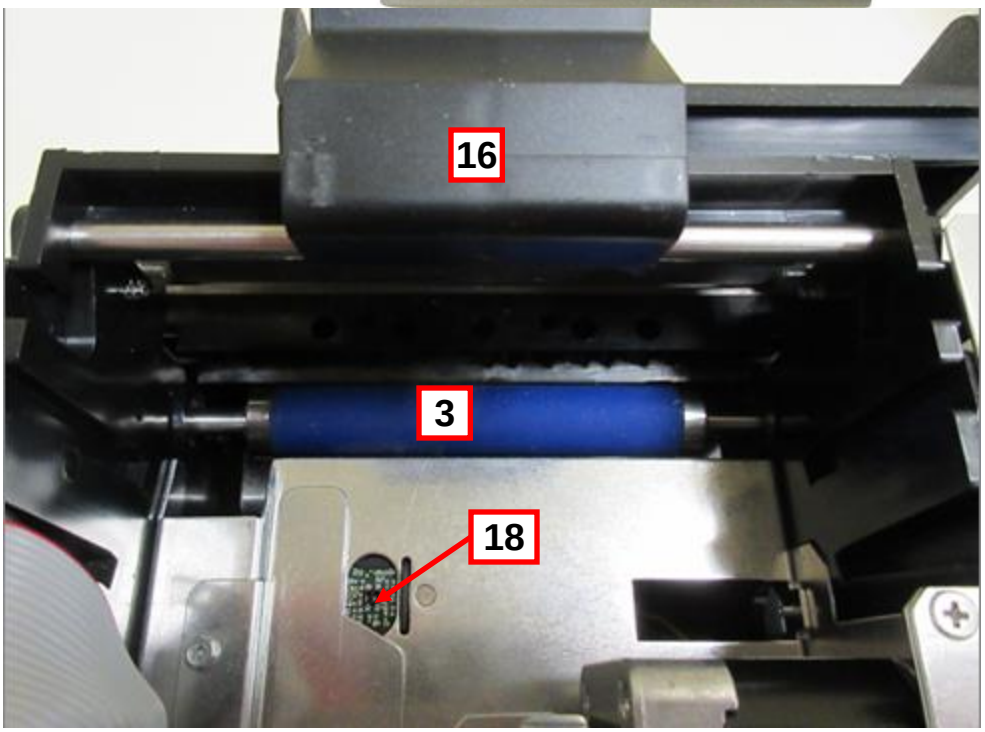
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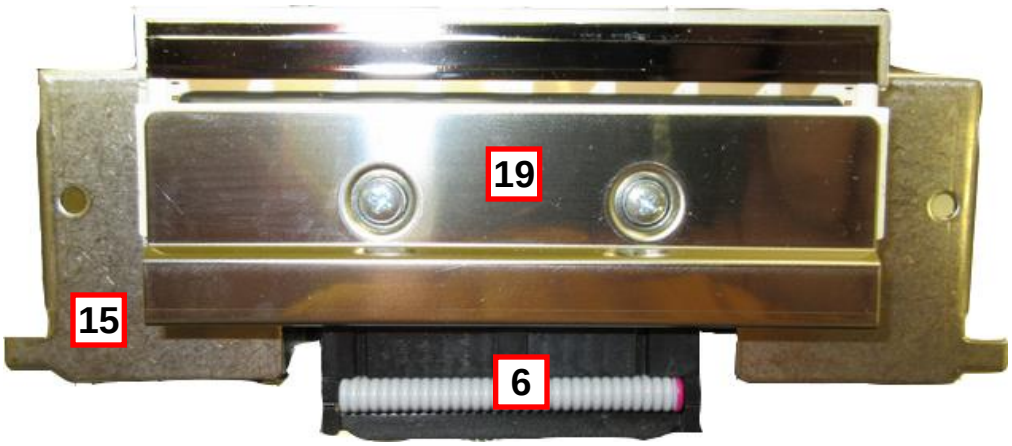
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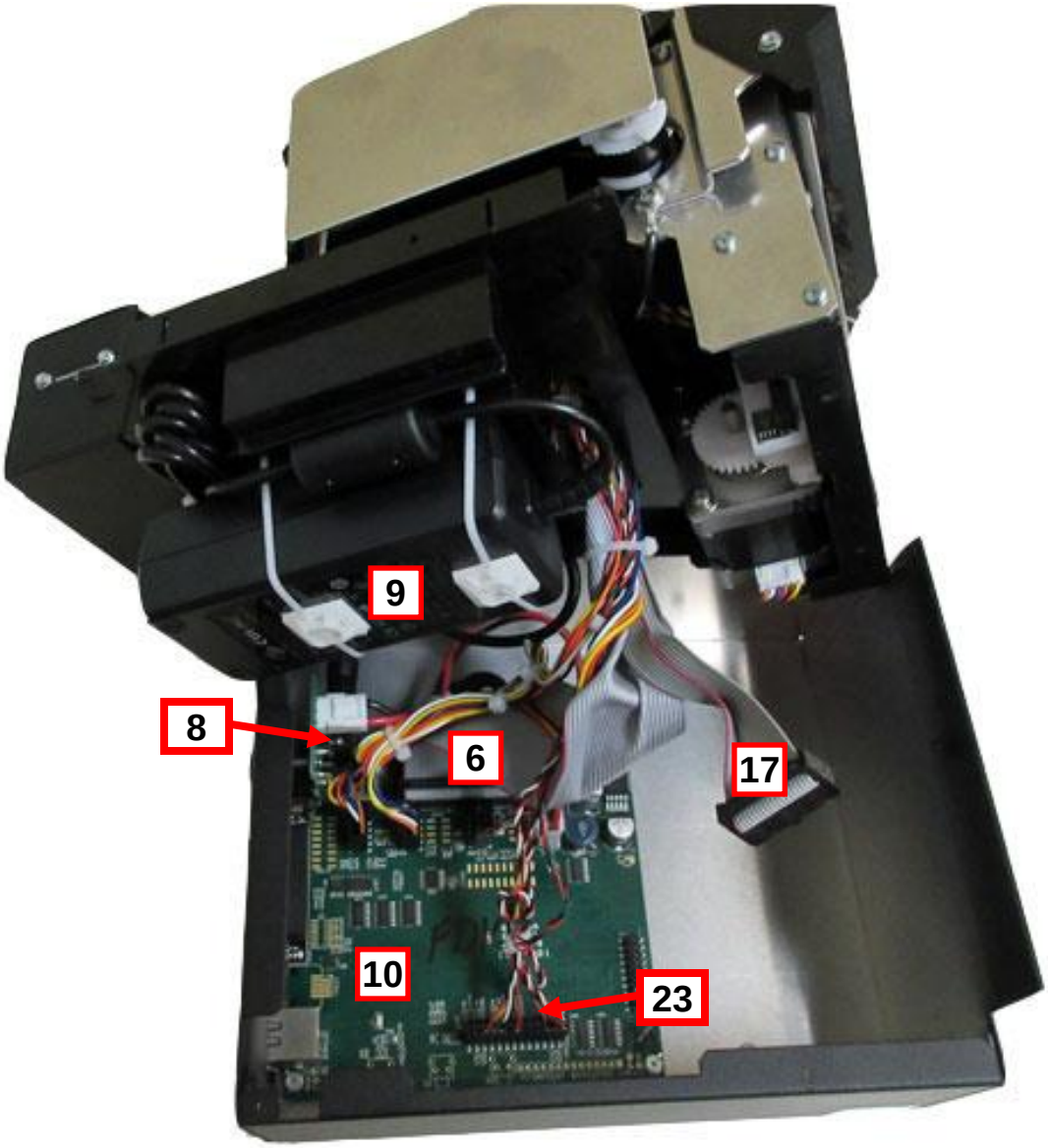
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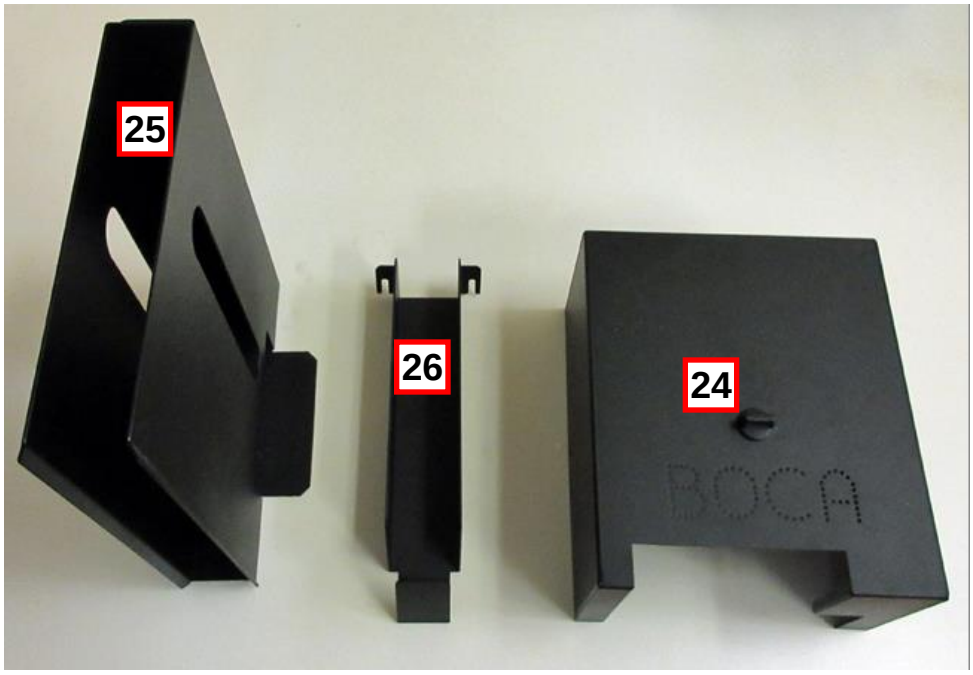
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BOCA

11.0 General Printer Testing Guidelines

The following information is provided for reference only. It is used only by Boca technicians for the configuration and testing of our printers.

1. Before you test the printer, you will need to pull its production folder. The folder contains all information concerning the printer in question. You will need to consult the production list to see if a printer should have an optional Cutter, LCD display or Ethernet interface installed. If you do not find the file, then let your supervisor know. If it is determined the printer is a new build, then a new production folder will need to be created. The technician testing said printer is responsible to make sure a printer setup sheet is completely filled out and a new folder is created.

2. Make sure all five of the criteria below match each other. If any does not match let your supervisor know before testing the printer.
    a. Printer Production list
    b. Printer being tested
    c. Serial number tag
    d. Printer has blue Energy Star decal
    e. Production folder

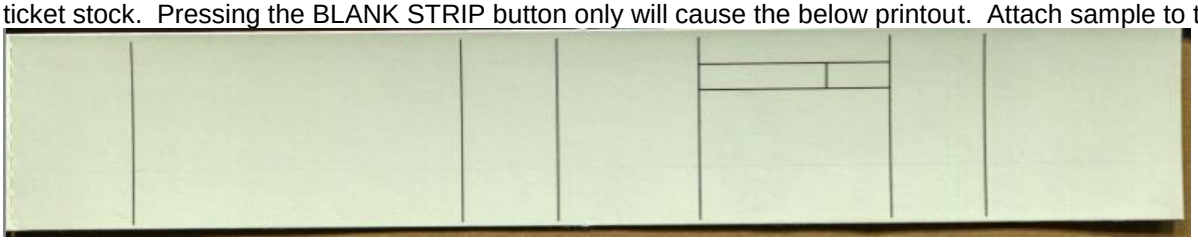
3. The following items need to be done when testing the printer. Please note that the serial number tag should be the last thing that goes onto a printer.
    a. Inspect the printer for any missing hardware or parts. Check cabinet for any damage. Make sure all hardware is tight.
    b. Check for proper drive belt tension.
    c. Make sure the proper firmware and settings are set. These settings can be set via a text file sent by the technician program. There should be no need to make changes via the control panel except a MAG model printer. If you do not have the needed file for a printer let your supervisor know.
    d. Make for proper head pressure setting.
    e. If the printer does not have a cutter, you will need to default the printer first. This is done by holding down the TEST button and then powering up the printer. Keep the TEST button held until the stepper motor moves (about 6 seconds).
    f. Download the latest firmware if needed. Once downloaded, clear the parameter block.
    g. Ensure the correct stock is being used.
    h. Download the needed configuration text file.
    i. Check to make sure the Ticket load sensor is working properly.
    j. Adjust your cut or tear opto to the correct location.
    k. Proper print quality. 200dpi or 300dpi quality stock (as appropriate) should be used to check print quality when testing a printer. Save a sample printout to be stapled to the printer test sheet later.
    l. If needed, adjust the print quality as discussed below:
        - Moving the print head position in reference to the head mounting block.
        - Adding head pressure (up to three turns of pressure)
        - Using the LVE Intensity command. If used then denote what value was used on your printer log sheet.
    m. If you are testing a group of the same printers, then save a print sample so you may use it to compare with the other printers to make sure the print quality and cut position is the same.

n. Printer properly loads and ejects the tickets.
o. Run printer off the host computer. The best way to do this is to run 15 tickets from parallel port, 15 tickets from USB port and 15 tickets from the serial port. When running the serial port, make sure the printer runs out of tickets during the run and you do not lose any tickets when the stock is reloaded. Save a sample printout to be stapled to the printer test sheet later.
p. Print a minimum of 50 tickets. Use the shortest ticket length possible.
q. Ethernet port should be tested after the serial number has been locked into the printer.
r. Load the serial number into the printer. Make sure you load the correct number and downgrade if needed.
s. Make sure the computer test log is properly filled out.
t. Apply serial number tag to printer. Tag should be placed about 1/8" away from the bottom of the printer (see Serial Number Tag Placement, below)
u. Before moving printer to the final inspection table inspect the printer again and make sure everything is in proper order.
v. Denote the printer in your printer log sheet.
w. When you place the printer onto the final test table, plug the printer into the appropriate power source. Turn the printer on, load the stock and print one self-test ticket.

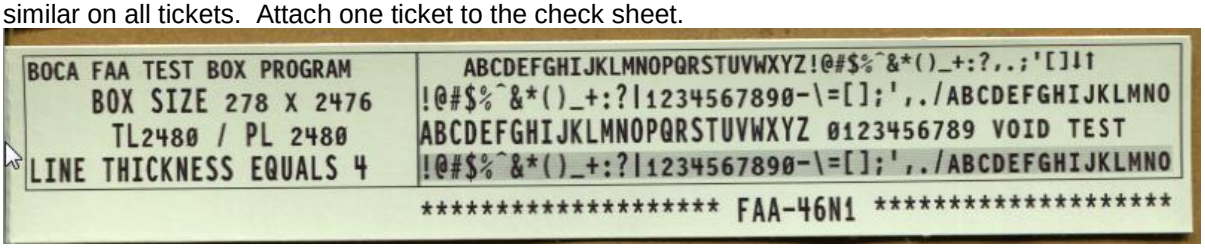
11.1 Lemur-FDIO Flight Strip Printer Setup

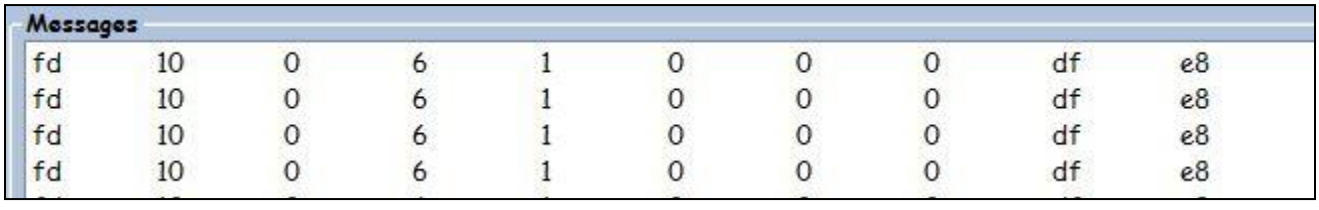
The following information is provided for reference only. It is used only by Boca technicians for the configuration and testing of our printers.

1. Set USB DEVICE TYPE to HID.
2. Connect the printer via the USB interface port.
3. Use OCEANIC ticket stock for initial testing of the printer.
4. Download font file FAA46A3L.fnt to the printer.
5. Downloaded latest FAA firmware (FAA46##.bin) to the printer. The latest version is shown in the FAA-FDIO Test Firmware Release log.
6. Connect to the technical program to the printer via USB-HID and clear the parameter block.
   a. Click on the FAA under Status list.
   b. Click on the FAA to FGL Mode button.
   c. Click on Clear Param Block button.
7. Unplug the USB connector.
8. Connect the printer up to the RS232/RS-485 (RS422) converter. In the technician program Serial Auto Negotiate must be sent to NO and set the baud rate to 2400,N,8,1.
9. Send **<bce><hse><lve2><bcd>** command to the printer:
   a. Click on the FAA to FGL Mode button.
   b. Type above command string in the Enter Text box and click the Send button.
10. With the printer powered off holding down the MENU and ON/OFF LINE buttons. Power up the printer and hold buttons until printer shows FACTORY MENU. Change STRIP SELECTION to OCEANIC. Use the OCEANIC ticket stock. Pressing the BLANK STRIP button only will cause the below printout. Attach sample to test sheet.



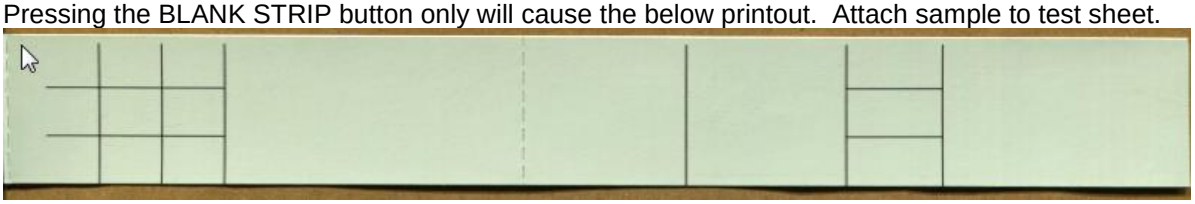
11. Click on the FAA Test Tickets button and go to the FAA2016 folder found in the firmware directory. Send the FAA_Tower20.txt file to the printer. Twenty tickets will printout. The cut position and text alignment should be similar on all tickets. Attach one ticket to the check sheet.





You should see the below in the message window area.

12. With the printer powered off holding down the MENU and ON/OFF LINE buttons. Power up the printer and hold buttons until printer shows FACTORY MENU. Change STRIP SELECTION to DOMESTIC. Use the DOMESTIC. Pressing the BLANK STRIP button only will cause the below printout. Attach sample to test sheet.



13. Click on the FAA Test Tickets button and go to the FAA2016 folder found in the firmware directory. Send the FAA_Tower20.txt file to the printer. Twenty tickets will printout. The cut position and text alignment should be similar on all tickets. Attach one ticket to the check sheet.

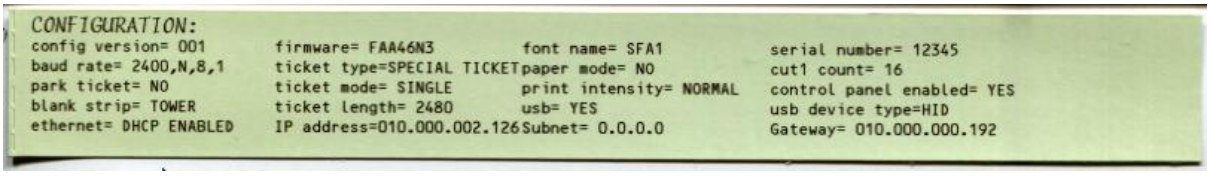
14. With the printer offline. Pressing the ON/OFF LINE & BLANK STRIP buttons simultaneously will cause the below printout. Attach sample to test sheet.

15. Put the printer back online. Sending the FAA_BoxTower.prn file will cause the below printout which should have similar alignment. Attach sample to test sheet.

16. Once the printer has passed the above then move forward with assigning the serial number via the RS422 serial port.
    a. Click on the FAA to FGL Mode button.
    b. Click on Load Serial Number button and load the serial number the way you normally do.

17. Power the printer off. Connect the Ethernet cable to the printer. Power the printer back up

18. Wait about one minute after the printer has powered up. Take the printer offline. Hold down the ON/OFF LINE button and then press the MENU button. A configuration ticket wills printout that will show the IP address. Attach this one ticket to the test sheet.



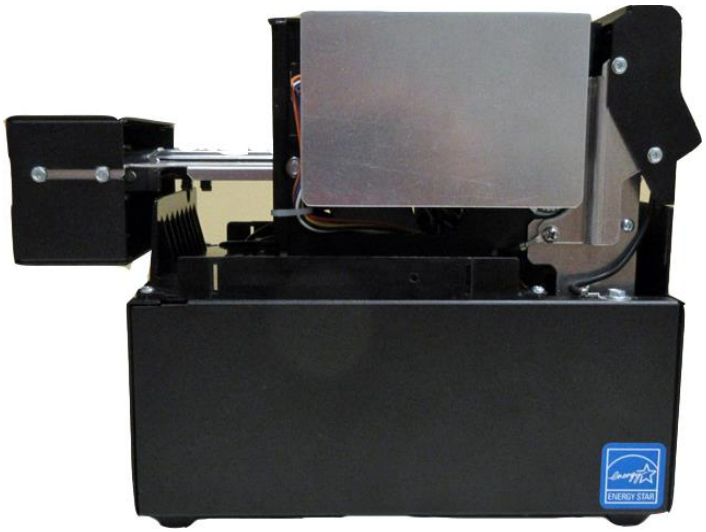
19. Put the printer back online. Connect to the IP address as you normally would.

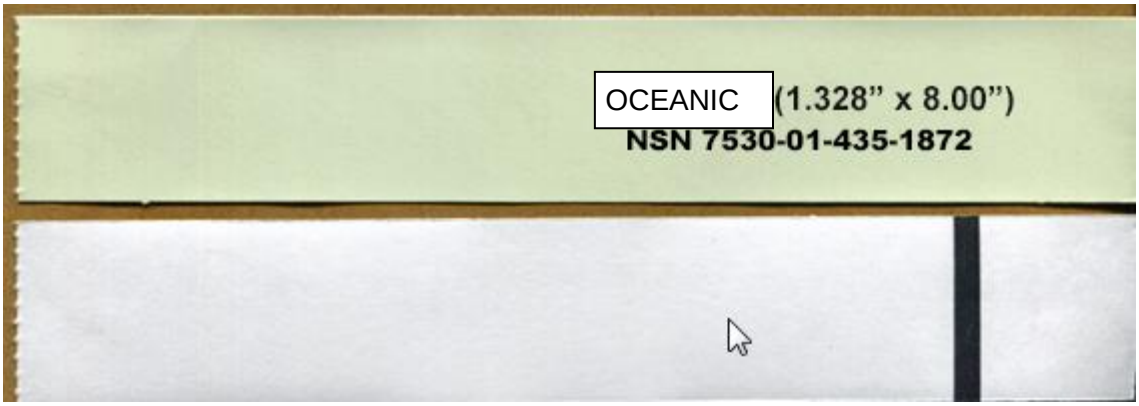
20. Once connected run the same print test you did in step # 15 to confirm the printer prints a ticket.

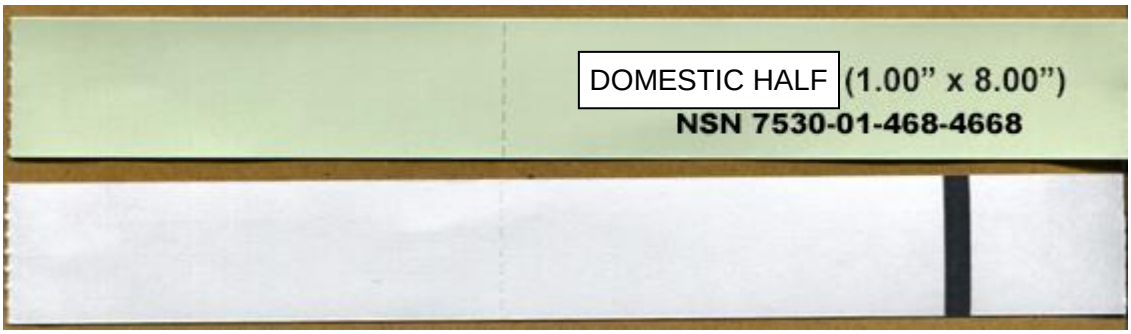
21. Turn the blue dial on the control panel fully clockwise so the LCD back lit display is fully illuminated.

22. You have now completed testing the printer.

23. Affix the two tags onto the bottom of the printer and blue EnergyStar sticker as shown in the below photos.







11.2 Firmware Test Plan

	Pass	Fail	
Statement of Work			
NEW FEATURES			
feature 1			
feature 2			
feature 3			
BASIC OPERATIONS			
ticket load			
test print			print test strips
control panel			scroll, enter, save parameters
			check for protected items
interface tickets			print via interface
			proper handling of corrupt data
last ticket			last strip handled properly
paper jam			simulate paper jam

12.0 Troubleshooting Guide

This troubleshooting guide is intended to assist the user or support person in the fault isolation of typical problems.

As a safety precaution, all service to the printer should be done by qualified persons with power off and the AC cord unplugged from the printer. **Following any procedure requiring the removal of covers and/or doors, please verify that they have been properly attached and fastened prior to operating the printer.** If you need additional help, please visit the link below www.bocasystems.com/onlinesupportform.html

1. NO OPERATION, LED'S DON'T LIGHT UP UPON POWER UP
   a. Power the printer off and wait 30 seconds then power it back on.
   b. Check the power cord for proper installation at both ends.
   c. Check that there is power at the AC outlet.
   d. Replace the AC cord.
   e. Printer needs to be serviced.

2. POWER IS ON BUT NO OPERATION
   a. See if there are any error messages on the LCD display?
      - **Blank Display** – means there is an issue with either the main logic board or power supply.
      - **POWER UP ERROR** – Means the print head is shorting out the main logic board or the logic board is faulty. To see if the issue is with the print head do the following. With the printer powered off, unplug the cables that connect to the thermal print head (See Sect 7.1.1). Turn printer on and if it works then replace the thermal head.
      - **PAPER OUT** – Is a normal message when there are no Flight strips loaded in the printer. If this message is coming up when strips are loaded then see # 3.
      - **PAPER JAM** – See # 12.
   b. Default the printer settings. With the printer powered off hold down the BLANK STRIP button and then power up the printer. Keep the button held down for 10 seconds and release (printer will reset).
   c. If defaulting printer resolved issue then make sure the STRIP SELECTION is set to match the type of flight strip that is being loaded in the printer. Default setting is DOMISTIC.
   d. Printer needs to be serviced.

3. POWER IS ON BUT TICKET WILL NOT LOAD
   a. Check that the ticket stock is being loaded correctly. (See Sect 5.0).
   b. Make sure the print head/cam lock lever is fully locked in the closed position. (See Sect 7.1.1)
   c. Clean the SQ load opto. (See Sect 7.1.3)
   d. Default the printer settings. With the printer powered off hold down the BLANK STRIP button and then power up the printer. Keep the button held down for 10 seconds and release (printer will reset).
   e. If defaulting printer resolved issue then make sure the STRIP SELECTION is set to match the type of flight strip that is being loaded in the printer. Default setting is DOMISTIC.
   f. Replace SQ load opto. (See Sect. 8.3)
   g. Printer needs to be serviced.

4. TICKET CUT IN THE WRONG LOCATION
   a. Make sure the flight strip is being loaded into the printer the correct way. (See Sect 5.0).
   b. Make sure the STRIP SELECTION is set to match the type of flight strip that is being loaded in the printer.
   c. Clean Cut Opto. (See Sect 7.1.2)
   d. Clean Platen. (See Sect 7.1.4)
   e. Default printer settings. With printer powered off hold down the BLANK STRIP button and then power up the printer. Keep the button held down for 10 seconds and release (the printer will reset).
   f. Replace Cut Opto. (See Sect. 8.2)
   g. Printer needs to be serviced.

5. ERRATIC CUT POSITION
   a. Check for defective ticket stock. Is the black mark unevenly spaced apart or light in color? Try a different stack of flight strip stock.
   b. Make sure the paper guild slider bar is properly adjusted for the width flight strip that is being used. (See Sect 7.1.5)
   c. Clean Platen. (See Sect 7.1.4)
   d. Clean Cut Opto. (See Sect 7.1.2)
   e. Default printer settings. With printer powered off hold down the BLANK STRIP button and then power up the printer. Keep the button held down for 10 seconds and release (the printer will reset).
   f. If defaulting printer resolved issue then make sure the STRIP SELECTION is set to match the type of flight strip that is being loaded in the printer. Default setting is DOMISTIC.
   g. Replace Cut Opto. (see Sect. 8.2)
   h. Printer needs to be serviced.

6. ERRACTIC PRINT POSITION
   a. See # 5
   b. Clean Print head. (See Sect 7.1.1)
   c. Printer needs to be serviced.

7. CUTTER FAILURE MESSAGE
   a. With the printer powered off take a look at where the flight strip exits the printer and check for blockage in the cutter area. Remove flight strip that is blocking the cutter area.
   b. With the printer powered off remove the print head and check for blockage where the strips enter the cutter area. Remove flight strip that is block the cutter area.
   c. Default printer settings. With printer powered off hold down the BLANK STRIP button and then power up the printer. Keep the button held down for 10 seconds and release (the printer will reset).
   d. If defaulting printer resolved issue then make sure the STRIP SELECTION is set to match the type of flight strip that is being loaded in the printer. Default setting is DOMISTIC.
   e. Printer needs to be serviced.

8. POOR PRINT OUT (light print out)
   a. Try a different stack of flight strips.
   b. Make sure the cam lock lever is fully locked in the closed position. (See Sect 7.1.1)
   c. Clean print head.
   d. Replace thermal head. (See Sect. 7.1.1)
   e. Printer needs to be serviced.

9. POOR PRINT OUT (white voids in print out)
   a. Clean print head. (See Sect 7.1.1)
   b. Replace thermal head. (See Sect 7.1.1)
   c. Printer needs to be serviced.

10. NO PRINT OUT
   a. Try a different stack flight strips.
   b. Make sure the cam lock lever is fully locked in the closed position. (See Sect 7.1.1)
   c. With the printer powered off make sure both head cables are properly seated into the print head.
   d. Replace the thermal head. (See Sect 7.1.1)
   e. Printer needs to be serviced.

11. PRINTER SKIPS TICKETS WHILE PRINTING
   a. Try a different stack of flight strips.
   b. Make sure the cam lock lever is fully locked in the closed position. (See Sect 7.1.1)
   c. Make sure the paper guild slider bar is properly adjusted. (See Sect 7.1.5)
   d. Clean Cut opto (See Sect 7.1.2) and SQ load opto (See Sect 7.1.3)
   e. Clean platen. (See Sect 7.1.4)
   f. Default printer settings. With printer powered off hold down the BLANK STRIP button and then power up the printer. Keep the button held down for 10 seconds and release (the printer will reset).
   g. If defaulting printer resolved issue then make sure the STRIP SELECTION is set to match the type of flight strip that is being loaded in the printer. Default setting is DOMISTIC.
   h. Replace Cut opto. (See Sect. 8.2).
   i. Printer needs to be serviced.

12. PAPER JAM ERROR MESSAGE
   a. Make sure the flight strip is being loaded into the printer the correct way. (See Sect 5.0)
   b. Clean Platen. (See Sect 7.1.4). Also check for blockage where the strips enter the cutter area.
   c. Remove flight strip that is blocking the cutter area.c Make sure the paper guild slider bar is properly adjusted (See Sect 7.1.5)
   d. Clean Cut opto (See Sect 7.1.2) and SQ load opto (See 7.1.3)
   e. Default printer settings. With printer powered off hold down the BLANK STRIP button and then power up the printer. Keep the button held down for 10 seconds and release (the printer will reset).
   f. If defaulting printer resolved issue then make sure the STRIP SELECTION is set to match the type of flight strip that is being loaded in the printer. Default setting is DOMISTIC.
   g. Printer needs to be serviced.