DCS & Labeling Worldwide

CX400

DESKTOP PRINTER

SERVICE MANUAL

SATO GROUP OF COMPANIES	
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Warning: This equipment complies with the requirements in Part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and television reception requiring the operator to take whatever steps necessary to correct the interference.

06 Nov 03

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1

INTRODUCTION

This manual is laid out in a manner consistant with the product discussed and provides all of the information required for general printer setup, operation, troubleshooting, and maintenance. For specialized programming, refer to the Programming Manual also provided with the product.

GENERAL DESCRIPTION

SATO CX400 printers are compact desktop printers designed especially for bar code labeling and tagging. The CX uses SATO Command Language, making it simple to integrate with other SATO models.

Designed for convenience, the CX has many advanced features such as larger media capacity, user replaceable print head and platen, a high lift print head carriage that makes it easy to clean and load supplies. The printer is also designed to use eye-mark or gap-label sensing

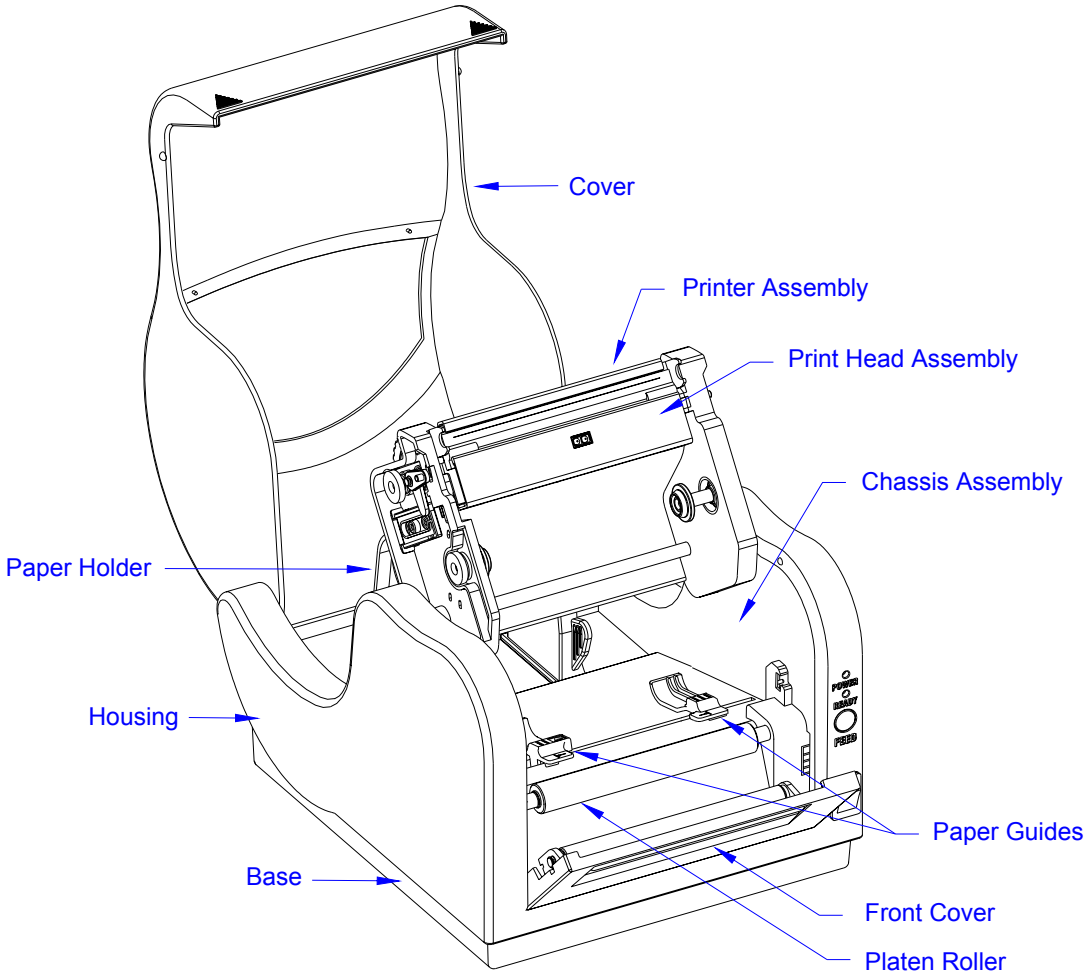
The CX400 uses a single sensor element for both direct thermal and thermal transfer printing. The printing method may be selected by using configuration settings in the software program or by sending the commands directly to the printer. The current setup may be determined by printing a self-test label which identifies all setup parameters.

A slot in the rear of the unit permits external feeding of media for larger rolls with greater linear feet.

THEORY OF OPERATION

When activated, the media and ribbon (where applicable) are fed conjunctively past the print head by an integrated drive train. The drive train is electric motor driven, coupled to a gear configuration located on the left side of the printer chassis. Paper guides within the chassis assembly ensure that the media remains properly positioned during the printing process and is fed unimpeded through the front cover. The exhausted ribbon material is rewound onto a take-up core installed within drive train driven spindles.

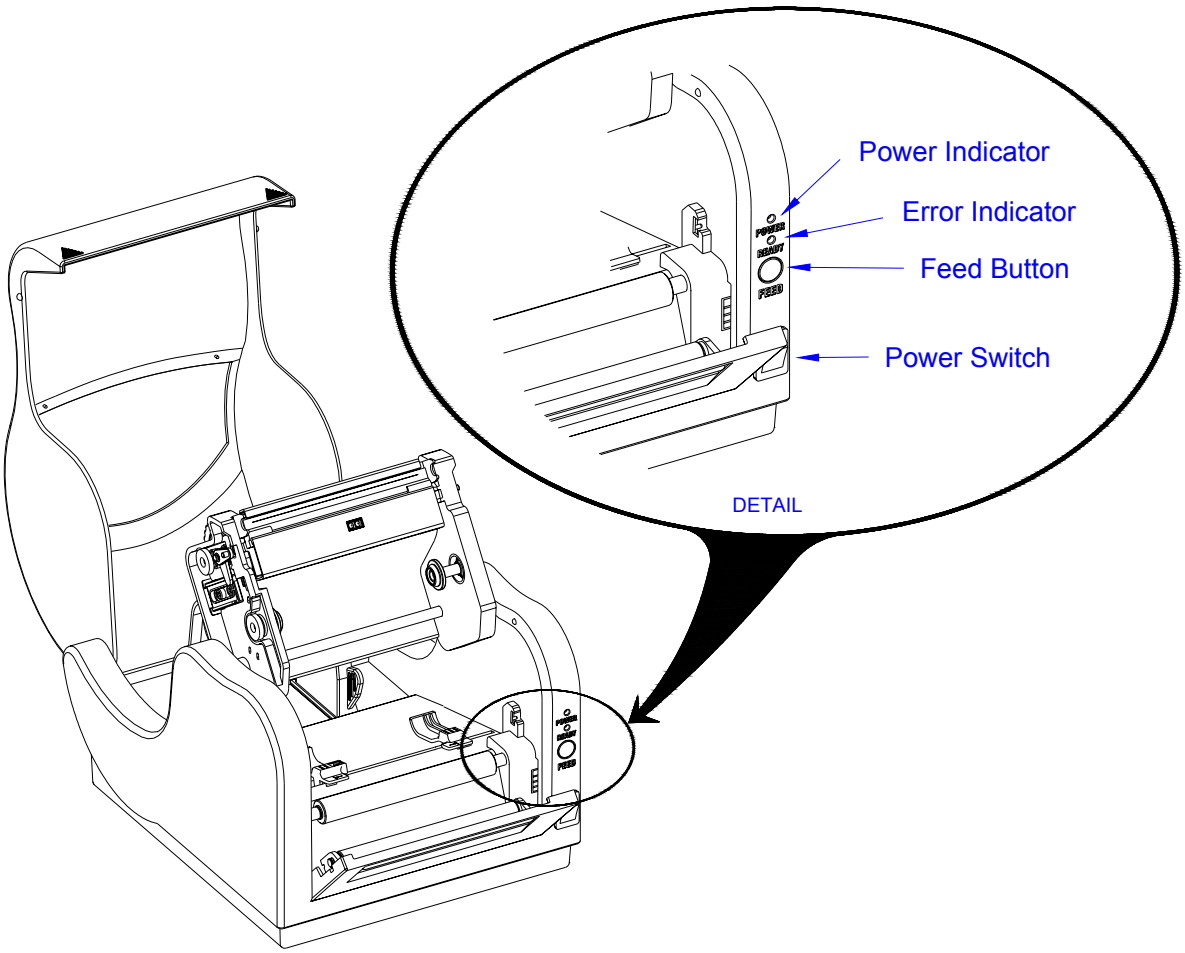
A series of strategically located sensors sends signals to the processing unit. The processing unit in turn sends response signals to the various features based on programmed and recieved data. Correct signals initiates print head activity.



Primary Components, Figure 1-1

SWITCHES & INDICATORS	
Power Switch	A two position switch that controls power to the printer. When the “0” position is pressed, power is removed from the printer. When the “1” position is pressed, power is supplied to the printer.
Feed Key	Press and hold during startup for test label.
	Press during printing to pause.
	Press during pause to feed a blank label or print the duplicate of the prior label.
	Press to reset the printer to the factory settings.
Power Indicator	Continuously illuminated when functional.
	Blinks when a malfunction has occured.

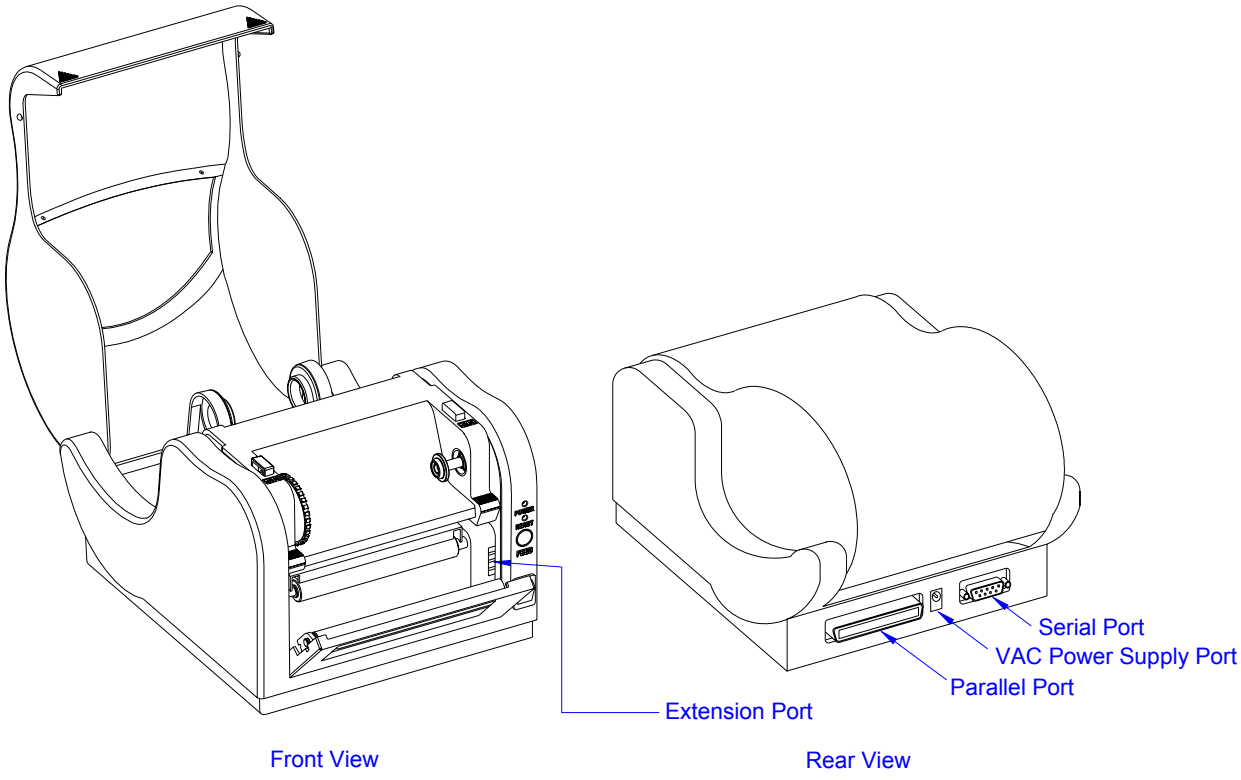
SWITCHES & INDICATORS	
Error Indicator	Not illuminated when the printer is operational.
	Blinks when a malfunction has occured.



Switches and Indicators, Figure 1-2

CONNECTION PORTS	
Parallel Port	Located on the left rear side of the printer. Permits PC connection for advanced programming, control, and operation.
Serial Port	Located on the right rear side of the printer. Converts the serial port signal to/from the micro-controller to RS232 voltage level. Also permits PC connection for advanced programming, control, and operation.
VAC Power Supply Port	Located centrally on the rear of the printer. Permits the connection of the voltage supply transformer.

CONNECTION PORTS	
Extension Connection Port	Accessible from the front of the printer and is located behind the face cover. Permits the connnection of optional extension modules.



Connection Ports, Figure 1-3

MONITORING SYSTEMS	
Media Index Sensor	Determines the print location upon the label by detecting a label gap or eye mark and then stepping the media to the print position.
Ribbon Sensor	Allows the printer to continuously monitor the presence of ribbon when operating in the thermal transfer mode.
Dispenser Sensor	Monitors the presence of a label in the dispenser. When the label is removed from the dispenser, the next label will be prompted
Print Head Open Sensor	Detects when the print assembly is not latched into the print position.

OPERATIONAL SYSTEMS	
MicroController	The SH7034 microcontroller utilizes a 16 bit external and 32 bit internal data bus based on the Hitachi SH1.
Flash Memory	Has 2M bytes of Flash ROM located on the main board for Firmware, character, and bar code font storage. The flash ROM has a total size of 1M x 16 bit.
DRAM	The 2 MB of DRAM is located on the main board. Volatile data such as working buffers and parameters are allocated here.
EEPROM	On board memory is 128 Bytes.
RS232 Transceiver	Converts the serial port signal to and from the microcontroller to the RSR232C voltage levels.
Centronics Interface	The data recieved from the host is transmitted to the micro-controller.
Ouput Ports	The ports control the motor, LED, media sensor, 24 volt relay, and interface fault conditions.
Relay	Removes the 24 volt supply to the thermal print head during the transient period while the power is being switched on. Otherwise the thermal print head may be damaged.
Extension Connection Port	Permits the connnection of all optional extension modules.
Configuration Jumper	Selects the systems configuation.
Boot/Normal	Is a two position switch that when in the normal position, allows the program on the expansion board to be executed only after the power has been reset. When in the boot position, the boot program will be executed first. This permits the CPU to reload a program into the on board Flash ROM after complete corruption. The default setting is in the normal position.

2

ACCESSORIES INSTALLATION

Optional accessories are those hardware and software items that may be purchased and used in conjunction with the basic printer package. Namely, these are the cutter attachment, dispenser attachment, and font module. Since the hardware options affect the method of operational setup, they must be installed prior to any setup activities. If applicable, refer the relative procedure below for specific instructions on accessory installation before proceeding to the Operational Setup unit.

CUTTER ATTACHMENT

The cutter assembly is an attachment for the automated cutting of labels, tags, or tickets. A back feed function is included for retracting the label back to the first print position after cutting. The following procedure provides detailed instructions on cutter assembly installation and assumes that the unit is without additional attachments that may pose an impediment to cutter installation.

> **CAUTION:** Printer electronics are susceptable to static discharge. Ensure appropriate grounding measures are taken before beginning any activity inside the printer.

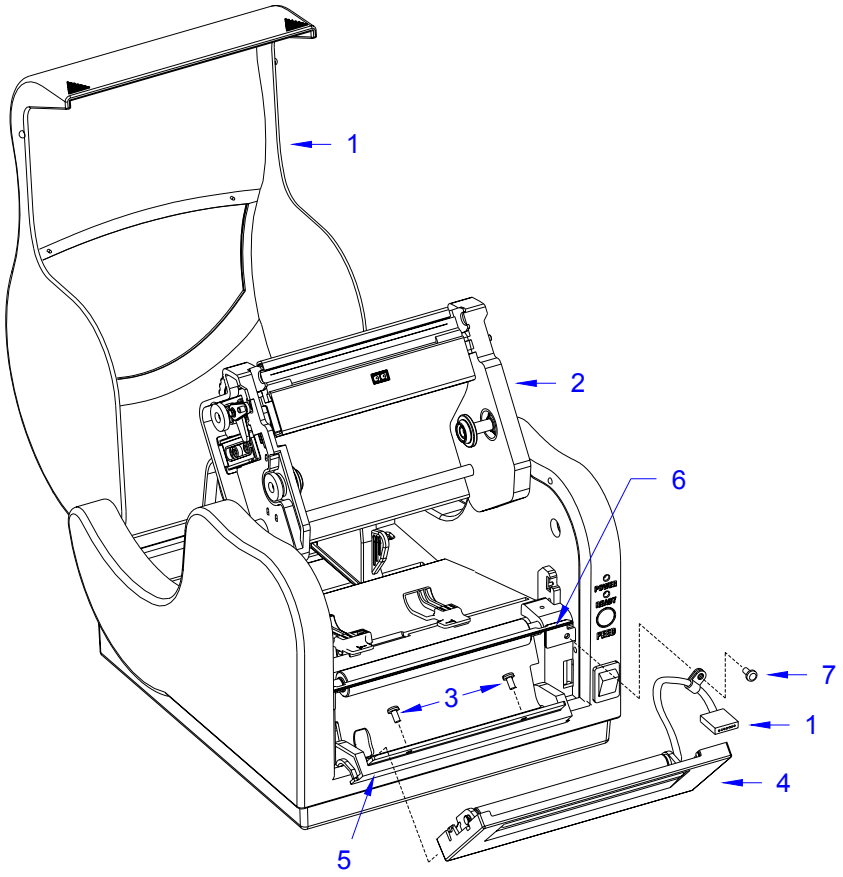
1. Turn off power and disconnect power supply cord.
2. Lift cover (Figure 2-1, 1) to expose print assembly (2).
3. Simultaneously, press the two purple buttons located on the top side of print assembly (2) and pivot upward.
4. Remove the two screws (3) securing front cover (4) to cover hinge (5).
5. If peeler (6) is present, remove screw (7) and manipulate rightward. Lift away peeler (6).
6. Pry power switch (Figure 2-2, 8) from housing (9) and disconnect leads.
7. Remove the two screws (10) securing housing (9) to base assembly (11).
8. Manipulate housing (9) from base assembly (11) and lift away.

> NOTE: Pull the lower front edge of the housing away from the base assembly, then begin manipulating the housing upward.

9. Plug daughter board (not shown) into port JP29 of mother board (12).
10. Direct the two leads of daughter board through the power switch slot of housing (9).
11. Tuck the prior two power switch leads safely away within the housing unconnected.
12. Manipulate housing (9) onto base assembly (11) oriented as was removed.
13. Secure housing (9) to base assembly (11) using two screws (10).
14. Plug power switch (8) into the two leads of daughter board.

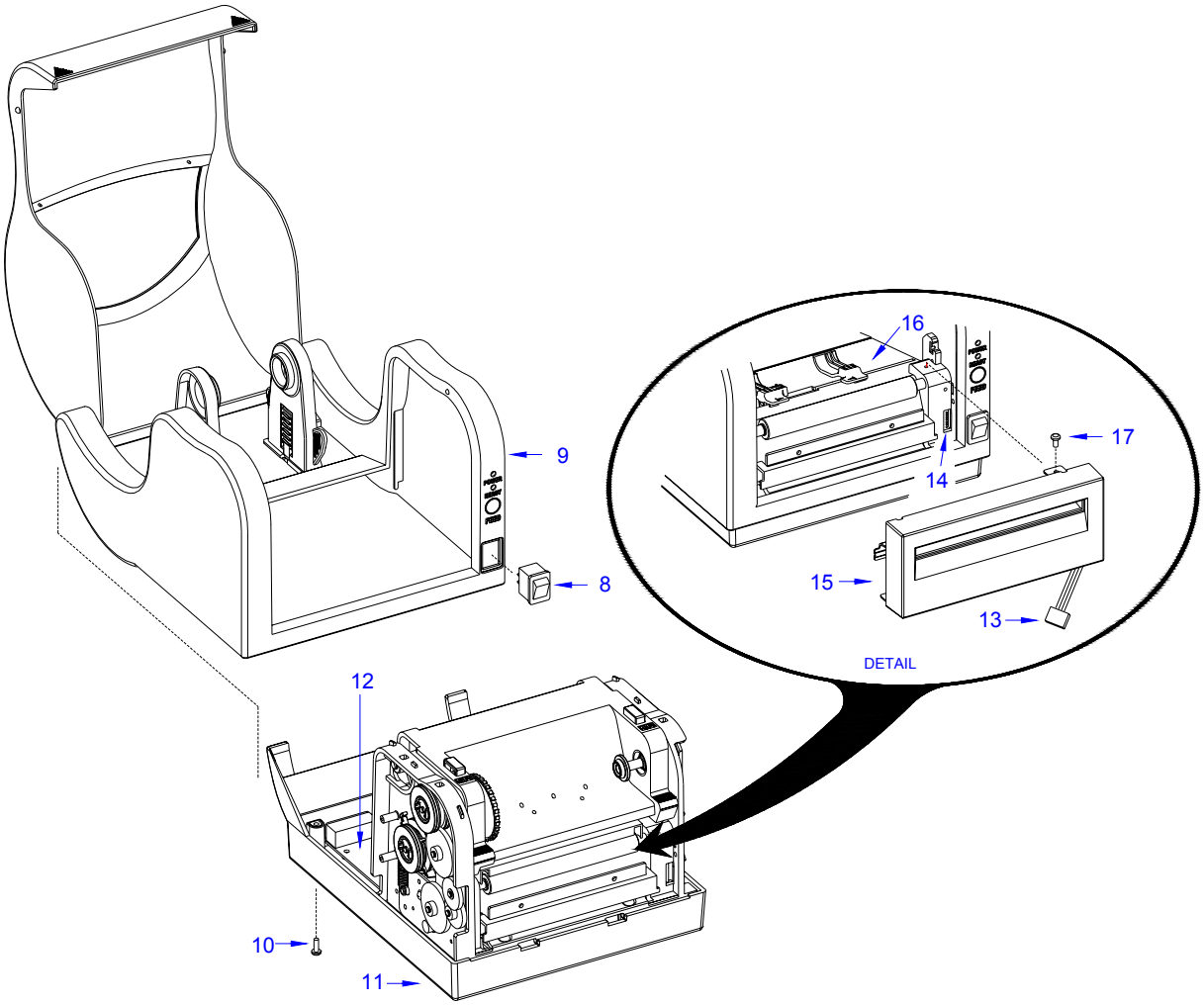
15. Insert power switch (8) into its respective slot of housing (9) oriented with the on position upward.
16. Plug cutter assembly lead (13) into external connector (14).
17. Manipulate cutter assembly (15) into the face of printer chassis (16).
18. Secure cutter assembly (15) to printer chassis (16) by applying screw (17) to their upper right corner.

> NOTE: When properly installed, the tab of the cutter assembly bracket shall insert into the slot of the printer chassis and the cutter will nest there as the peeler cover prior to removal.



Cutter Installation, Figure 2-1

19. Ensure print media and ribbon are properly loaded in the printer.
20. Lower the print assembly and latch in position.
21. Close cover, connect power supply cord, and apply power.
22. Send the following command stream to enable: <ESC>A <ESC>CK1 <ESC>Z.



Cutter Installation, Figure 2-2

DISPENSER ATTACHMENT

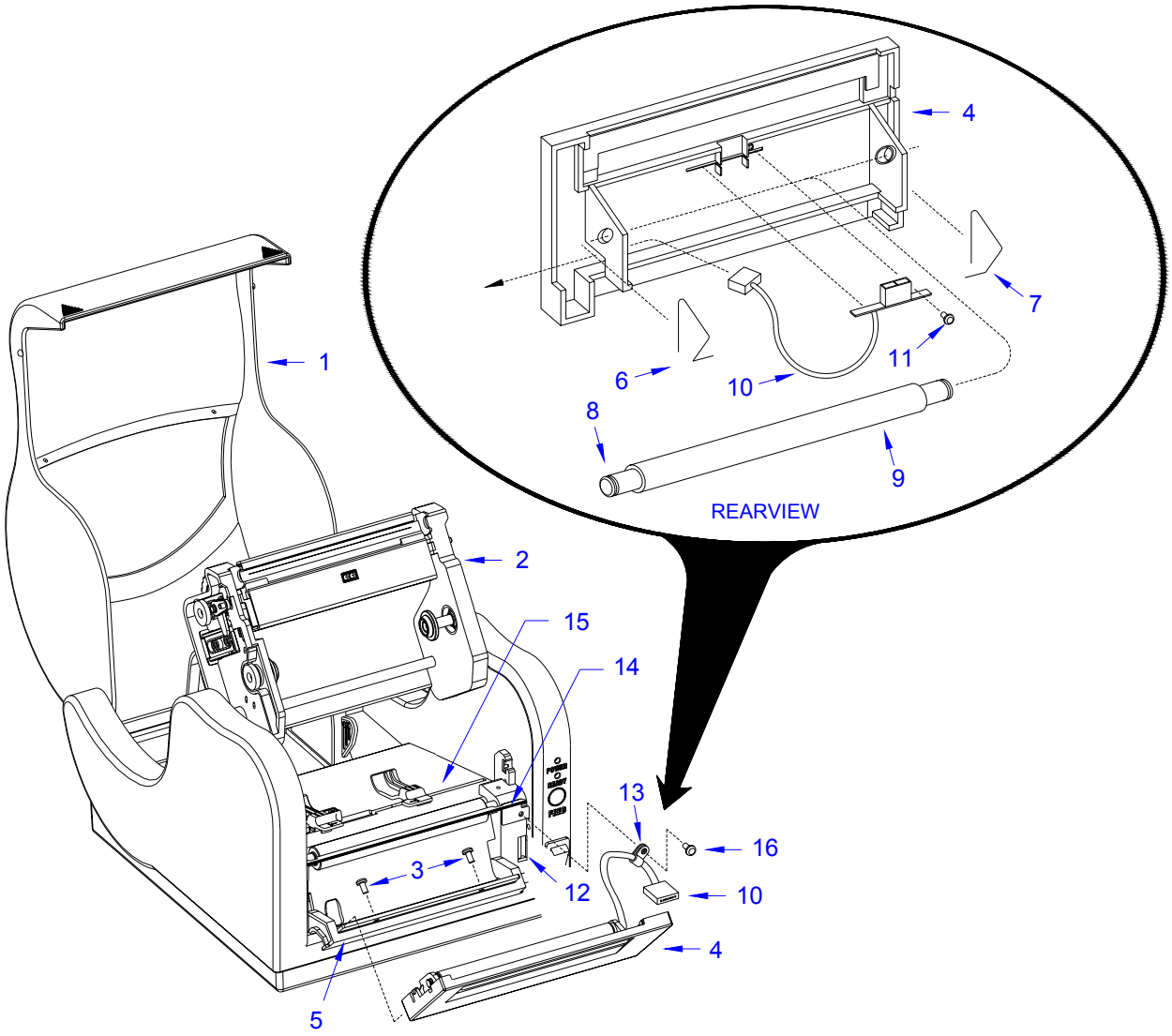
The dispenser assembly incorporates an integrated label sensor as part of the monitoring feature. The sensor identifies the presence of a label and prevents the printing of the next label until it is removed.

The following procedure provides detailed instructions on dispenser and dispenser sensor installation. The procedure assumes that the unit is without additional attachments that may pose an impediment to sensor installation.

> **CAUTION:** Printer electronics are susceptable to static discharge. Ensure appropriate grounding measures are taken before beginning any activity inside the printer.

1. Turn off power and disconnect power supply cord.
2. Lift cover (1) to expose print assembly (2).
3. Simulataneously, press the two purple buttons located on the top side of print assembly (2) and pivot upward.
4. Remove the two screws (3) securing cover (4) to cover hinge (5) and lift away.
5. Remove clips (6) and (7) from the left and right ends of roller shaft (8) respectively.

> NOTE: Before removing the retaining clips from each end of the roller shaft, it is advised that their orientation be observed and noted.



Dispenser Installation, Figure 2-3

6. Manipulate roller shaft (8) with roller (9) from front cover (4).
7. Apply sensor (10) to cover (4) as design dictates and secure using screw (11).
8. Insert the connector end of sensor (10) through the left bracket of cover (4).
9. Insert roller shaft (8) into roller (9) and manipulate into brackets of cover (4).
10. Secure the roller assembly with clips (7) and (6) to the right and left ends of shaft (8) respectively.
11. Reapply cover (4) to cover hinge (5) and secure using screws (3).
10. Observe to ensure that despenser sensor (10) wire is oriented so that it is not being pinched.

> **CAUTION:** Ensure that the left clip does not pinch the sensor wire as it passes through the cover mounting brackets.

11. Plug dispenser sensor (10) into external connection port (12).
12. Apply wire clamp (13) to sensor (10) wire.
13. If not already present, insert dispenser (14) into the mounting slots of printer chassis (15) oriented so that their mounting orifices are aligned.

> NOTE: The dispenser must be inserted into the right side slot first, then manipulated into the left slot. The peeler mounting orifice is located on the front right side of the printer chassis above the external connection port.

14. Secure dispenser (14) and clamp (13) using screw (15).
15. Ensure that print media and ribbon are properly loaded in the printer.
16. Lower and latch print assembly (2) into operational position.
17. Close cover (1), connect power supply cord, and apply power.
18. Set the E2PROM through commands: <ESC>A <ESC>CK0 <ESC>Z.

FONT MODULE

The font module stores special font types and characters. The maximum capacity options of the font module is 2 M or 4 M bytes.

FIRMWARE UPGRADE

The printer's operating systems software may be upgraded or reloaded through the parallel port located on its back side. Connect the parallel interface cable supplied with the printer to the computer LPT1 port and the printer parallel port. Place the Firmware upgrade disk in the computer and follow the instructions in the Readme.TXT file.

1. Load the printer with ribbon and media as required.
2. Turn the printer on and allow 3 seconds to power up.
3. Enter the MS-DOS mode on the computer.
4. Type “X:SATO” (were X is the location fo the Firmware Upgrade file) at the DOS prompt.
5. Allow 5 minutes for the power and error LED’s to begin blinking in synchronicity.
6. Toggle the power switch off and then on again to complete the process.
7. Press and hold the printer feed button until it begins printing a self-testing label.
8. Switch the printer off and then on again to return to operation mode.
9. Examine the self-test label contents to ensure a correct upgrade or reload.
10. Repeat as necessary until the printed check sum is 0000.
11. Disconnect computer from the parallel port.

NOTE: The check sum value should always be 0000. Otherwise, there are error bits in the onboard flash memory. The sum value is the last four characters printed in the upper left row of the self-test label. Refer to Self-Diagnosis in the Troubleshooting section of his manual if still unsure.

3

OPERATIONAL SETUP

This section provides all guidance and instructions necessary for simple printer setup and operation. The CX-400 printer is delivered factory calibrated and should not require calibration upon initial setup.

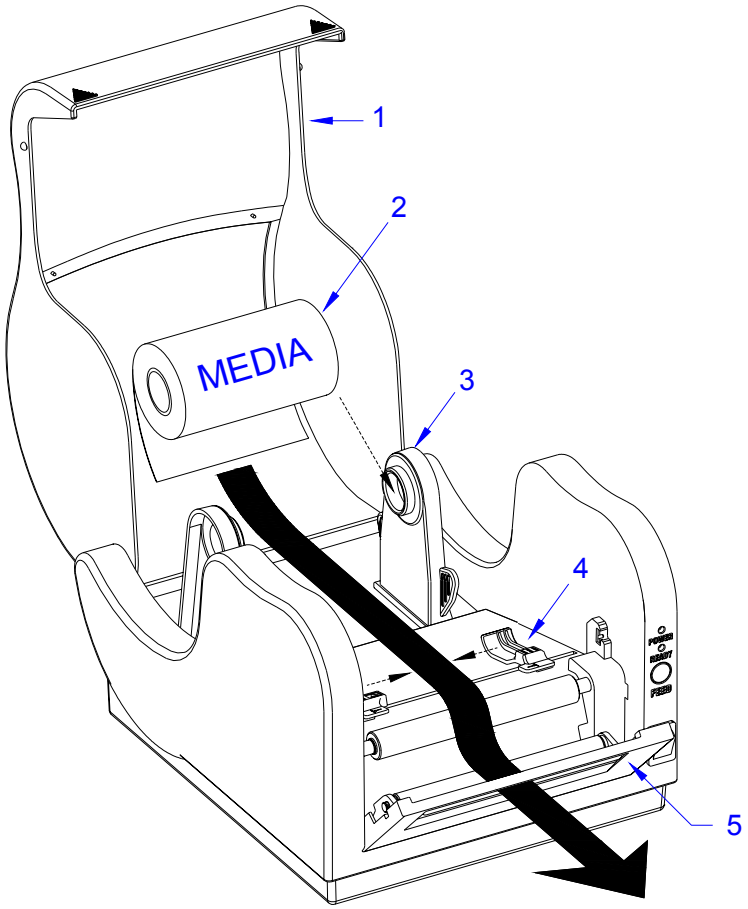
However, the use of off-brand media or ribbon often has an adverse operational effect. Thusly, load the consumables and attempt operation to determine if calibration is necessary.

MEDIA LOADING

Media must be loaded, and in the same manner, regardless of whether direct thermal or thermal transfer printing is to be performed. However, following media installation, ensure that the correct printer program is also loaded

> NOTE: To assist in the instruction of media loading, the print assembly has been removed from the illustration below to provide a better view of more important features. The actual printer will have the print assembly attached. The print assembly is not removable.

1. Lift cover (Figure 3-1, 1) to expose the print assembly.
2. Simultaneously, press the two purple buttons located on the top side of the print assembly and pivot upward.
3. Unwrap the new media (2) and unwind a few labels from the roll.
4. Separate paper roll holder (3) and insert media roll (2) so that it unwinds from the bottom.
5. Lock paper roll holder (3) into position by the downward movement of the purple switch attached.
6. Separate purple paper guides (4) and feed media (2) across chassis between them.
7. Slide paper guides (4) together to make light contact with each side of media (2)
8. Pull media (2) forward and feed it through the discharge slot of cover (5).
9. Lower and press print head assembly into operational position.
10. When the error LED stops blinking, press the feed button to begin printing.



Media Loading, Figure 3-1

RIBBON LOADING

Perform the following procedure only if thermal transfer printing is desired. If thermal transfer printing is desired, program the printer accordingly. Refer to the Programming Manual for guidance.

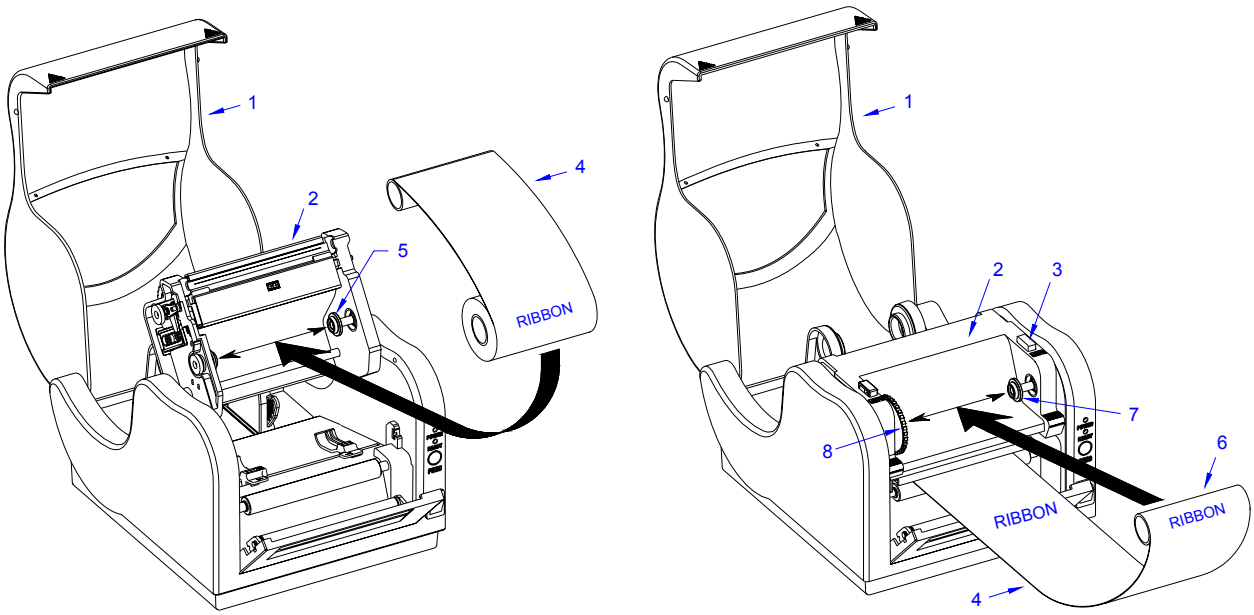
1. Lift cover (Figure 3-2, 1) to expose print assembly (2).
2. Simultaneously, press the two purple buttons (3) located on the top side of print assembly (2) and pivot upward.
3. Place ribbon roll (4) between ribbon supply spindles (5) so that the coated side is oriented outward.

> NOTE: The coated side has the duller sheen. If still unsure, scratch each side to determine which is coated.

> NOTE: The ribbon supply spindle is located on the lower side of the print assembly.

NOTE: The ribbon cores and spindles for supply and take-up are notched. When a core is properly installed, it will nest with its respective spindle.

4. Feed enough of ribbon (4) out so as to insert take-up core (6) onto rewind spindles (7).
5. Advance purple thumbwheel (8) of rewind spindles (7) to take up ribbon slack.



Ribbon Loading, Figure 3-2

INPUT/OUTPUT CONNECTIONS

For typical operation, the voltage power transformer is the only required connection. Its connection port is centrally located on the rear of the printer. Refer to the Introduction unit of this manual for specific identification if necessary.

The parallel and serial ports are required for sending commands and data from the host to the printer. Instructions for their use may be found in the Programming manual. Their locations are also in the rear of the printer.

MEDIA SENSOR CALIBRATION

The media dispenser sensor monitors media presence. When the print media is exhausted, the sensor signals an error condition. If the sensor incorrectly detects the presence of print media available for use, the dispenser sensor may require calibration. Perform the applicable steps below relative to the media type used.

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For Eye-Mark Detection

1. Install both printer ribbon and print media while in the TT mode.
2. Send the following commands to the printer: <ESC>A <ESC>&11 <ESC>Z.
3. Allow 5 seconds for the printer to complete the process.

For Label-Gap Detection

1. Install print media into the printer while.
2. Place the printer in the TT mode by sending <ESC>A <ESC>CP1 <ESC>Z.
3. Send the following commands to the printer: <ESC>A <ESC>&10 <ESC>Z.
4. Allow 5 seconds for the printer to complete the process.

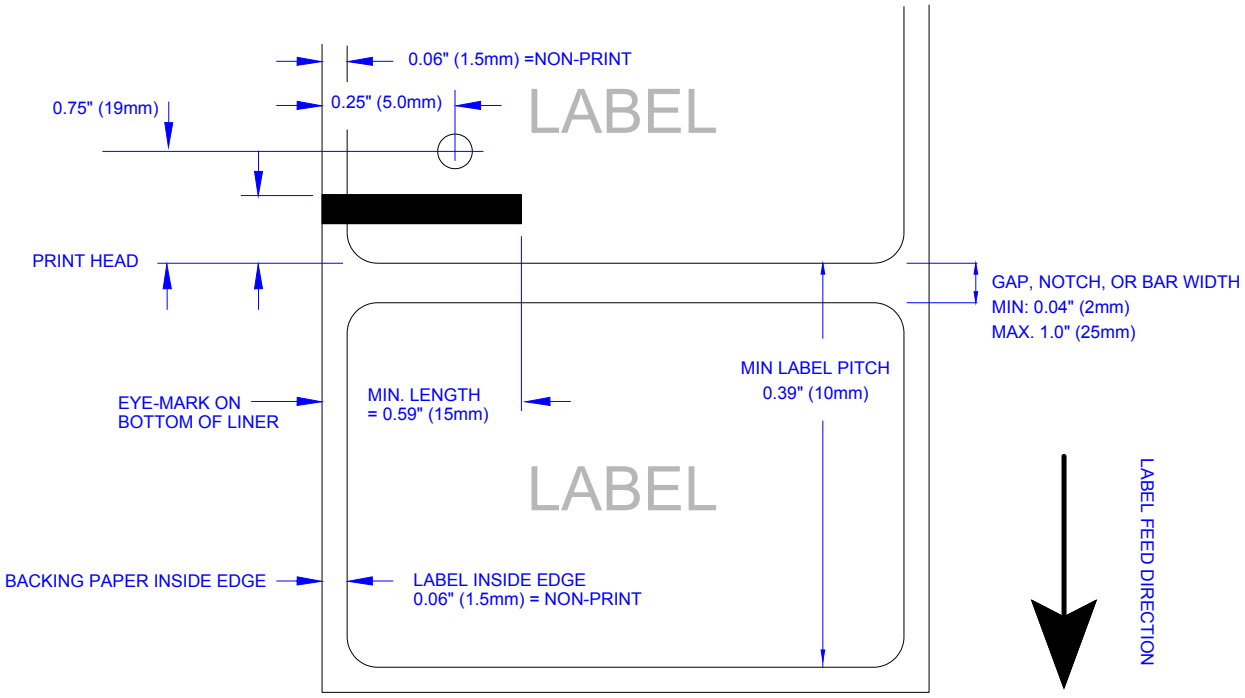


Figure 3-3, Label Stock Diagram

MEDIA INDEX SENSOR CALIBRATION

CX-400 Printers can use an eye-mark (black bar) label gap or label notch sensing. The gap and notch sensor is a transmissive or see-thru type with an infrared light source directed through the label from above and detected by a separate receiving sensor underneath the label liner tag. A reflective sensor is used to detect eye-marks printed on the bottom of the label liner or tag. The eye-mark must not reflect more than 12 % of the light. Since the same receving sensor is used for all three types of sensing, it must be calibrated with the media that will be used. For thermal transfer printing, the ribbon must be installed while the calibration is performed.

Media sensor calibration may also be required if the printer frequently fails to print, has excessive print position variance, or the print image is mis-located. Calibration may be performed by either clicking on the calibration buttons of the Label Gallery Free software, through the Windows Printer Driver, or more directly by sending printer commands to the printer. To signify a successful calibration, the printer will feed 6 linear inches of label upon completion. Perform the applicable steps below relative to the media type used.

For Eye-Mark Detection

1. Install both printer ribbon and print media while in the prper mode (DT or TT).
2. Send these commands to the printer: <ESC>A <ESC>CI1 <ESC>CA <ESC>Z.
3. Allow the printer to feed 6 linear inches of labels to complete the calibration.

For Label-Gap Detection

1. Install the print media while in the TT mode.
2. Send these commands to the printer: <ESC>A <ESC>CI2 <ESC>CA <ESC>Z.
3. Allow the printer to feed 6 linear inches of labels to complete the calibration

DISPENSER SENSOR CALIBRATION

For Thermal Transfer

1. Place a label in the discharge slot over the sensor.
2. Send the following commands to the printer: <ESC>A <ESC>&P1 <ESC>Z.
3. Allow 5 seconds for the printer to complete the process.

For Direct Thermal

1. Place a label in the discharge slot over the sensor.
2. Send the following commands to the printer: <ESC>A <ESC>&P0 <ESC>Z.
3. Allow 5 seconds for the printer to complete the process.

4

TROUBLESHOOTING

The CX400 label printer has integrated systems and performance monitors for instant status output. The red error LED and the green power LED work in conjuction to provide all of the status information required. The following table provides status identification.

Red and green blink together - Media index failure or media out.
• Ensure media is present, correctly loaded, and not jammed.
• Calibrate printer.
• Ensure the media sensor is functioning.

Red and green blinking alternately - Ribbon error.
• Ensure ribbon is present, correctly loaded, and not jammed.
• Calibrate printer.
• Ensure ribbon sensor is functioning.

Green constant and red blinking with long on and short off - Print head is open.
• Close print head.

Red and green blinking at 50% of normal intensity - RS232 error.
• Ensure computer and printer baud rates are comparable.
• Ensure computer and printer data bits are comparable.
• Ensure computer and printer parity bits are comparable.

Red and green lights are not illuminated - Power source is interupted.
• Ensure power switch is in On position.
• Ensure source power.
• Ensure power supply adaptor fuse is not blown.
• Test power switch.
• Inspect wiring harnesses and power supply adaptor.
• Substitute power supply adaptor.
• Replace circuit board.

Label will not feed.
• Ensure media is correctly loaded.
• Ensure the power is on, the error indicator is off, then press the feed button.
• Disconnect the communication cable and press the feed button. If the printer feeds with the cable disconnected, there is either a defect in the host computer or its cable.

Labels feed continuously.
• Ensure media is correctly loaded and that the gap/mark goes through the media sensor.
• Ensure the sensor setup matches the media used. Reprogram as necessary.

Poor print quality:
• Clean the print head.
• Ensure the media is correctly loaded and without lateral movement while being fed.
• Ensure print darkness and print speed settings are sufficient for optimum results.
• Test cycle using a different print media to determine if the media is of inferior quality.
• Ensure the labels are of the correct type for the setup.

Host stops responding or displays “printer not ready” message.
• Ensure the communication cable is connected and not defective.
• If through serial port, ensure that a null modem cable or adaptor is used and that the host and printer share the same protocol settings. Determine by the self-test label.
• If a communication switch is being used, remove the switch and connect directly to the host.
• Ensure a correct software setup. Refer to software instructions for guidance.
• Restart both the printer and the host, run the original software, and try again.

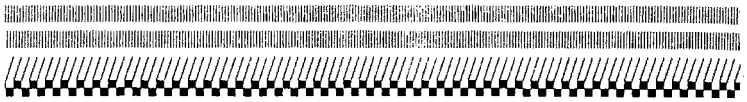
Self-test label will not print.
• Ensure that the correct media has been loaded.
• Disconnect the communication cable, restart printer, attempt to print again.

PRINTER SELF-DIAGNOSIS

A simple self-diagnosis may be initiated by either a series of printer commands or activated via the feed button located on the printer face. Upon activation of the self-diagnosis process, the printer will print a label identifying various parameters and conditions as they exist within the system. The table below defines the parameters and conditions identified on the self-diagnosis label.

SELF-DIAGNOSIS LABEL	
Image Pattern (1):	Used to check the print head, motor, roller, and other mechanical assemblies.
Version Information (2):	Includes the date code, firmware version, and the check sum value.
RS232 Protocols (3):	Contains the baud rate, parity, data bit number, and the number of stop bits.
Darkness (4):	Provides the darkness setting. May be altered through printer commands.
Print Length (5):	On board memory of the total linear length of print activity. This non-resettable feature permits monitoring of component life cycles and warranty validation.
Print Speed (6):	Identifies the print speed setting. The default speed is 3 ips.

Media Sensor Used (7):	Identifies which media sensor type has been selected for use. The correct one must be selected by printer commands or through the application software.
Print Mode (8):	Identifies the print mode setting. TT = Thermal Transfer and DT = Direct Thermal.
Last Label Tear-Off (9):	Indicates whether the back-feed function is utilized for tearing off printed labels.
Control Code Denifition (10):	Displays the control code setting. Control codes affect the commands and special controls.
Pitch Offset (11):	The offset value affects the start print position in relation to the label's leading edge.
Cut Count (12):	On board counter of the total cut sequences. Permits monitoring of component life cycles.
Memory Slot 1 (13):	Provides on board non-volatile flash memory for storing graphics, font characters, etc. 512K bytes.
Memory Slot 2 (14):	Optional on board non-volatile flash memory for storing graphics, font characters, etc. 2M or 4M bytes.



```
03.01.21 V0.98  0000
COMM: 9600,N,8,1
DARKNESS: COARSE=2000 FINE=200
INCHES PRINTED: 00005207
PRINT SPEED: 2 IPS
INDEX: NONE
PRINT MODE: TT
LAST LABEL TEAR-OFF: OFF
STX=02 ETX=03 ESC=1B
NULL=00 OFFLINE=40
PITCH OFFSET: 19 mm
CUT COUNT: 00000
MEM SLOT 1: 524288 BYTES INSTALLED
MEM SLOT 2: 0 BYTES INSTALLED

HEX DUMP MODE ...
CYCLE POWER FOR NORMAL MODE
```

Self-Diagnosis Label, Figure 3-1

5

MAINTENANCE

CLEANING

During general use, atmospheric debris will work its way into the unit. Ribbon and paper debris will also accumulate on its moving parts. Periodic cleaning is manditory to ensure proper function and long life.

Typically, fading of the printed image is the first sign that the unit requires cleaning. As the debris continues to build up, the image will become increasing lighter. It is highly recommended that this be prevented by the initiation of a cleaning schedule if regular or intensive use is forecast.

1. Turn off power switch and disconnect power supply cord.
2. Lift top cover to expose print assembly.
3. Simultaneously, press the two purple buttons located on the top side of print assembly.
4. Pivot printer assembly upward to expose printer chassis.
5. Remove the printer ribbon and print media from the unit.
6. Wipe or vacuum away larger, loose debris.
7. Moisten a cotton swab with isoprophl alcohol and wipe the print head and rollers clean.
8. Dry with a soft, dry material.

CAUTION: Harsh cleaners must not be used. Mediums containing Hexane also must not be used as it will negatively react to plastic.

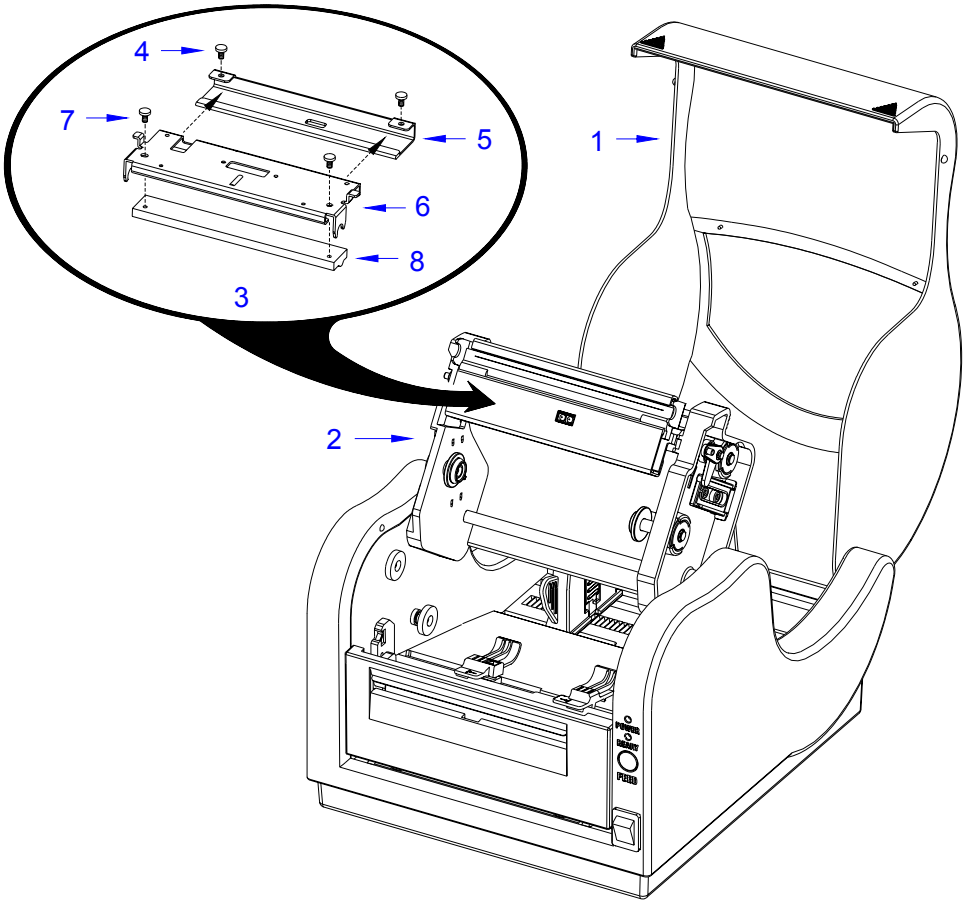
PRINT HEAD REPLACEMENT

The print head is a high wear part. It is advised that a spare be kept on standby to ensure that print production continues unimpeded. The procedure below provides instructions on print head replacement.

CAUTION: Printer electronics are susceptable to static discharge. Ensure appropriate grounding measures are taken before beginning any activity inside the printer.

1. Turn off power and disconnect power supply cord.
2. Lift cover (Figure 5-1, 1) to expose print assembly (2).
3. Simultaneously, press the two purple buttons located on the top side of print assembly (2) and pivot upward.
5. Remove the ribbon from the rewind spool to expose the print head assembly (3).
6. Press downward on the upper right side of the print head assembly (3) and manipulate the unit free.

7. Remove the two screws (4) securing print head bracket (5) to print head cover (6) and separate.
8. Remove the two screws (7) securing print head (8) to print head cover (6).
9. Disconnect the wiring harnesses from print head (8). Lift away print head (8).
10. Prepare to install replacement print head (8).
11. Connect replacement print head (8) to wiring harnesses.
12. Orient replacement print head (8) within cover (6) and secure using screws (5).
13. Apply bracket (5) onto print head cover (6) and secure using two screws (4).
14. Manipulate print head assembly (4) into print assembly (2) with the left side first.
15. Reapply printer ribbon as required and latch print assembly (2) for operation.
16. Close cover (1), connect power supply cord, and switch power on.
17. Test cycle for proper function.



Print Head Replacement, Figure 5-1

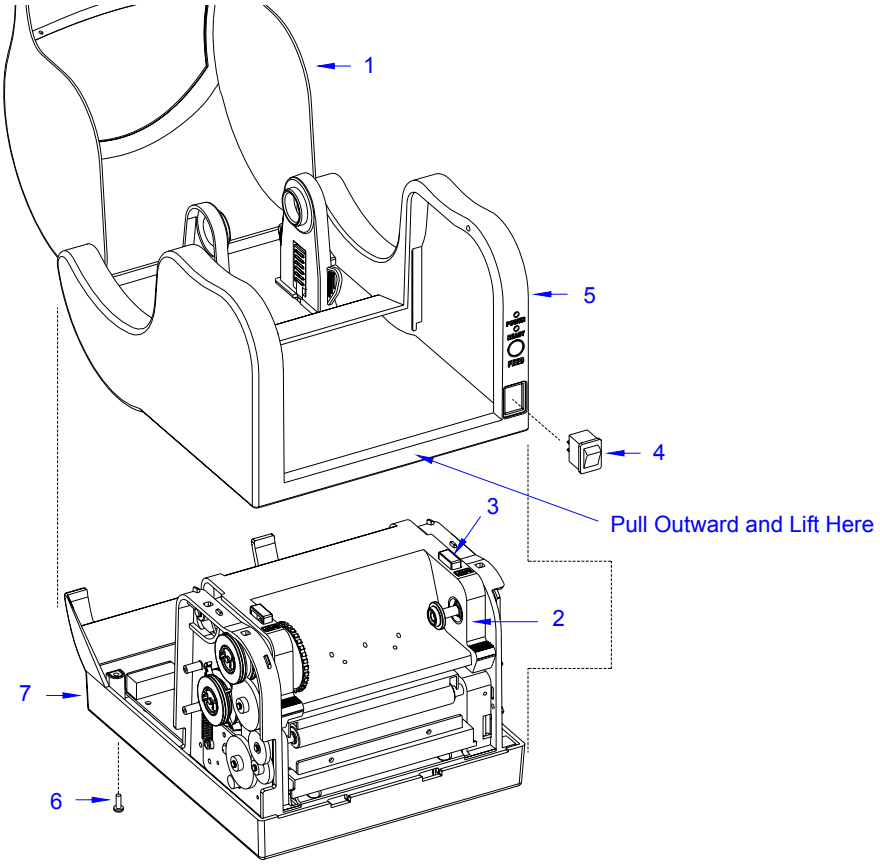
MAIN CIRCUIT BOARD REPLACEMENT

The circuit board should never require replacement except in the event of an electrical failure. Therefore, ensure that the component failure is not sourced elsewhere prior to circuit board removal.

> **CAUTION:** Printer electronics are susceptable to static discharge. Ensure appropriate grounding measures are taken before beginning any activity inside the printer.

1. Turn off power and disconnect power supply cord.
2. Lift cover (Figure 5-2, 1) to expose print assembly (2).
3. Simultaneously, press the two purple buttons (3) located on the top side of print assembly (2) and pivot upward.
4. Remove applicable front cover/attachment.

> NOTE: If the unit has the optional cutter module installed, it may be removed via a single screw located on the top right side of the cover. If the peeler cover is installed, two screws located at the hinge must be removed.

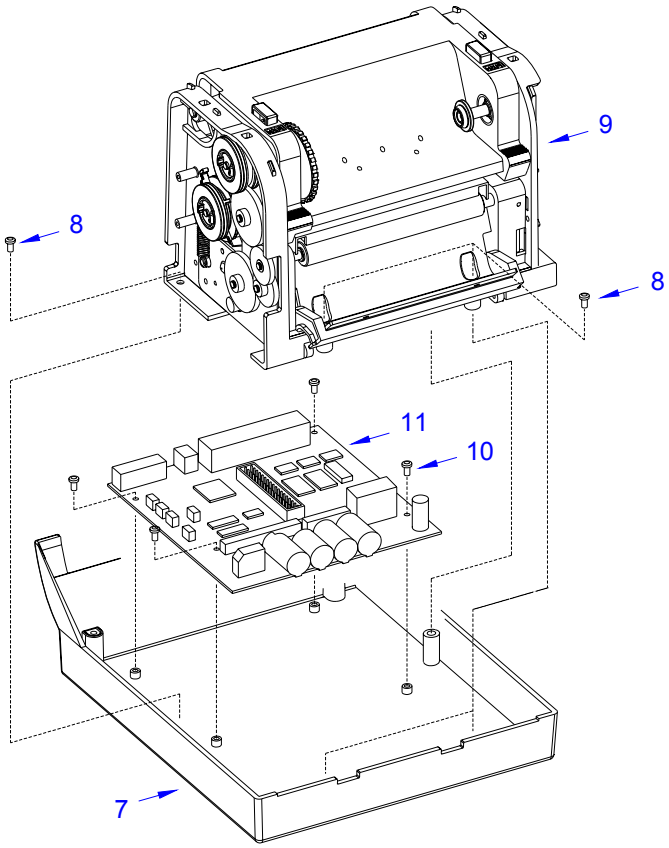


Circuit Board Replacement, Figure 5-2

5. Pry power switch (4) free from housing (5) and disconnect leads.
6. Remove the two screws (6) securing housing (5) to printer base (7).
7. Manipulate housing (5) from base (7) and disconnect wiring harness.

> NOTE: Pull the lower front edge of the housing away from the base assembly, then begin manipulating the housing upward.

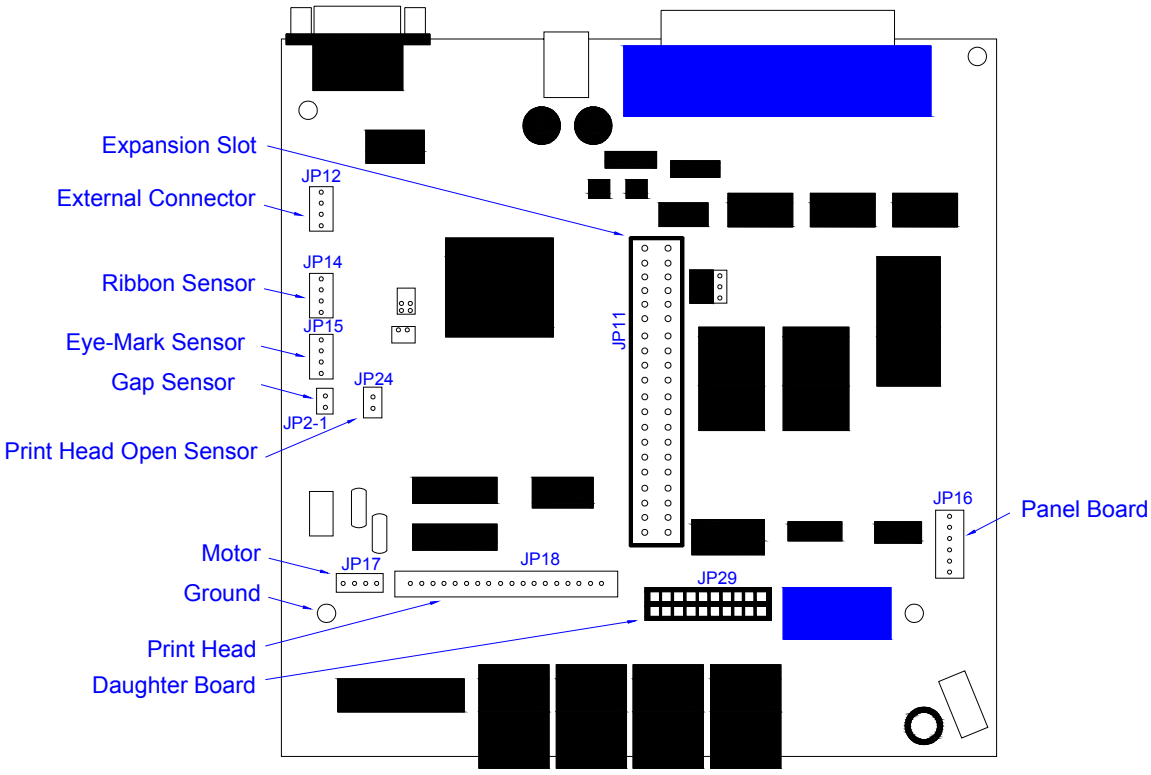
8. Remove the four screws (Figure 5-3, 8) securing printer chassis (9) to printer base (7).
9. Disconnect all wiring harnesses from mother board (11).
10. Remove the four screws (10) securing main circuit board (11) to printer base (7).
11. Prepare to replace main circuit board (11).
12. Place replacement circuit board (11) into base (7) oriented so that mounting holes are aligned and secure using four screws (10).
13. Connect all wiring harnesses to replacement circuit board (11) as was removed.
14. Place printer chassis (9) onto base (7) oriented so that mounting holes are aligned and secure using four screws (8).



Circuit Board Replacement, Figure 5-3

CAUTION: Before securing the printer chassis to the base, ensure that the power switch and light leads are routed to the right of the unit and such that they are not being pinched.

15. Manipulate housing (5) over printer chassis (9) down to rest on printer base (7).
16. Secure housing (5) to printer base (7) using two screws (6) applied from the underside.
17. Reinstall applicable front cover/attachment.
18. Connect power switch (4) to its respective two leads and insert into face of housing (5) oriented with the “I” position up.
19. Lower and latch print assembly (2) into operational position.
20. Close cover (1), connect power supply cord, switch power on, and test cycle.



Circuit Board Replacement, Figure 5-4

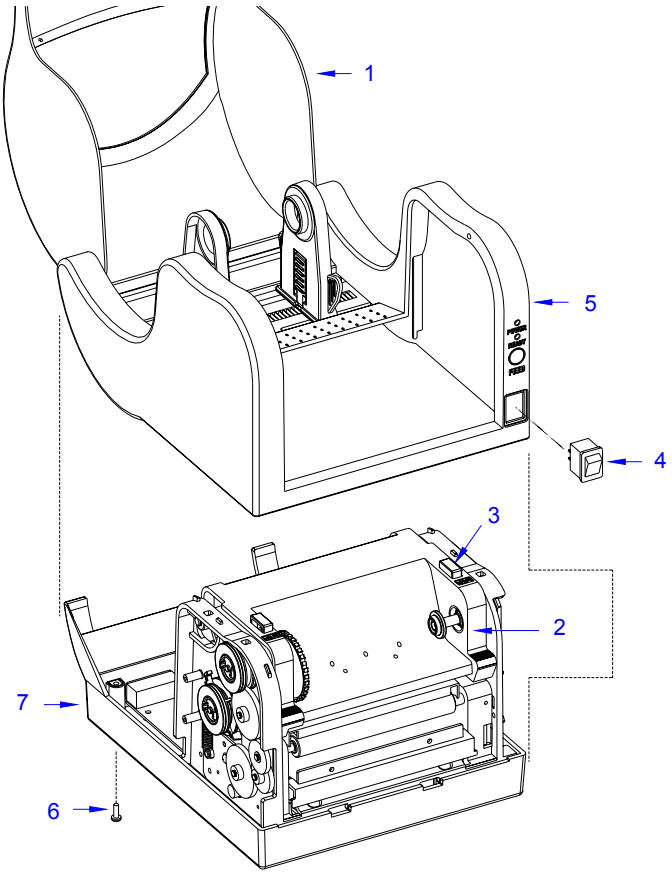
PLATEN ROLLER REPLACEMENT

The platen roller is high a wear part. It is advised that a spare be kept on standby to ensure that print production continues unimpeded. The procedure below provides instructions on platen roller replacement.

> **CAUTION:** Printer electronics are susceptable to static discharge. Ensure appropriate grounding measures are taken before beginning any activity inside the printer.

1. Turn off power and disconnect power supply cord.
2. Lift cover (Figure 5-5, 1) to expose print assembly (2).
3. Simultaneously, press the two purple buttons (3) located on the top side of print assembly (2) and pivot upward.
4. Remove applicable front cover/attachment (not shown).

> NOTE: If the unit has the optional cutter module installed, it may be removed via a single screw located on the top right side of the cover. If the peeler cover is installed, two screws located at the hinge must be removed.



Platen Roller Replacement, Figure 5-5

5. Pry power switch (4) free from housing (5) and disconnect leads.
6. Remove the two screws (6) securing housing (5) to printer base (7).
7. Manipulate housing (5) free from base (7) and lift away.

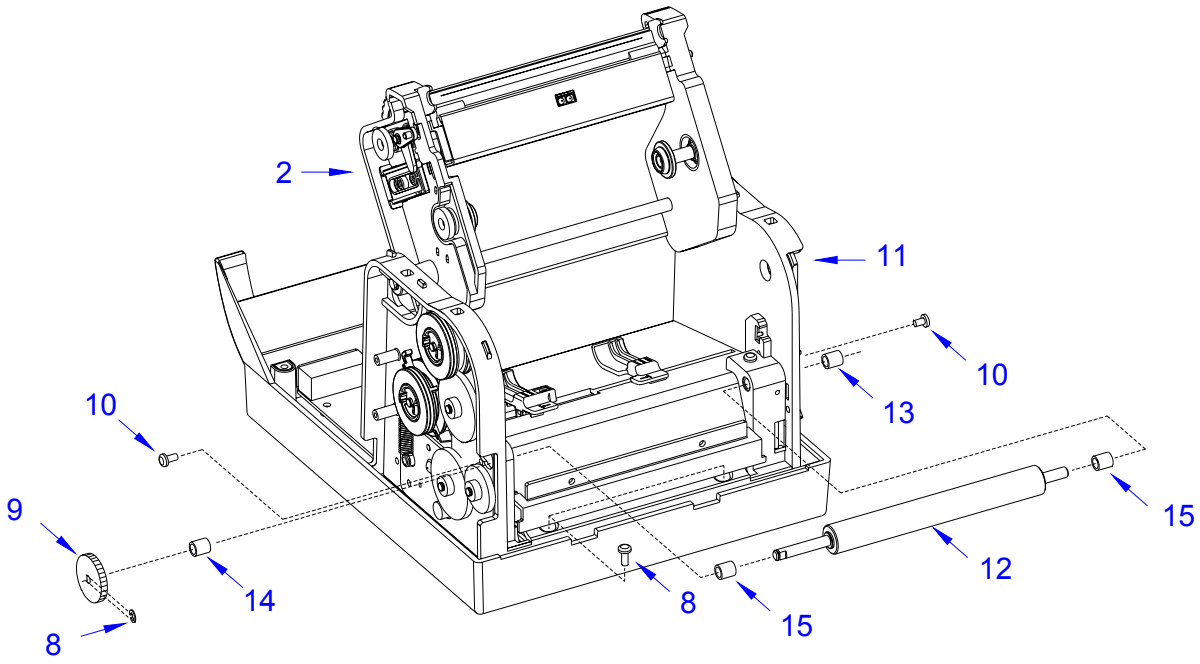
> NOTE: Pull the lower front edge of the middle cover away from the base assembly, then begin manipulating the housing upward.

> **CAUTION:** Take note of the location and orientation of components as they are removed to assist in reassembly.

8. Remove e-clip (Figure 5-6, 8) from the face of gear (9). Withdraw gear (9).
9. Remove screws (10) from printer chassis (11) retaining each end of platen roller (12)

> **CAUTION:** This platen incorporates the use of two different bushing sizes; three of one size and a single bushing of the other. Their size difference is not distinguishable to the eye. If they are mixed, a caliper will be required to identify which is the odd size.

10. Manipulate platen roller (12) fully to the right and withdraw outermost bushing (13) from its right shaft and then fully to the left to remove outermost bushing (14) from its left shaft.
11. Lift out the right end of platen roller (12) and then withdraw the left end from chassis (11).
12. Remove remaining bushings (15) from each end of platen roller (12).
13. Prepare to reassemble the unit.
14. Apply a single bushing (15) to each end of platen roller (12).
15. Insert the longer end of roller (12) fully into the left orifice of chassis (11) and then manipulate the shorter end into the right orifice of the chassis.
16. Apply from the exterior of chassis (11), remaining bushings (14) and (13) to the left and right ends of platen roller (12) respectively.
17. Secure the assembly in place with one screw (10) on each end.
18. Insert gear (9) onto the left shaft of platen roller (12) and secure using e-clip (8).
19. Manipulate housing (Figure 5-5, 5) over printer chassis (9) down to rest on printer base (7).
20. Secure housing (5) to printer base (7) using two screws (6) applied from the underside.
21. Reattach the applicable cover and/or attachment.
22. Connect power switch (4) to its respective leads and insert into face of housing (5) oriented with the on position up.
23. Lower and latch print assembly (2) into operational position.
24. Close cover (1), connect power supply cord, switch power on, and test cycle.



Platen Roller Replacement, Figure 5-6

6

TECHNICAL DATA

All technical data deemed pertinent has been tabulated below for quick reference. Find the relative section header and then locate the specific type of technical data in the left column.

PHYSICAL PROPERTIES	
Dimensions	7.76” (197mm) x 10.2” (257mm) x 6.5” (164mm)
Weight	(3.67kg) Including power module.

ENVIROMENTAL SPECIFICATIONS	
Operating Temperature	(5° to 40° C)
Storage Temperature	(-20° to 60° C)
Operating Humidity	25 to 85 % RH, Non-Condensing
Storage Humidity	25 to 85 % RH, Non-Condensing

POWER REQUIREMENTS	
Source Voltage to Power Module	120 VAC, 60 Hz, 90 W
Supply from Power Module	19 VAC
Operational Power Consumption	70 W
Standby Power Consumption	Less than 2W

PRINTER PERFORMANCE	
Print Speed	1, 2, 3, 4 ips
Resolution	203 Dots per Inch (8 dpmm)
Maximum Print Width	4.1” (104mm)
Maximum Print Length	50” (1270mm)

PRINTER SPECIFICATIONS	
Print Method	Thermal Transfer or Direct Thermal
Onboard CPU	Hitachi SH7034 (16 Bit External, 32 Bit Internal)
Integrated CLock	20M Hz (26 MIPS)
Panel Features	Green Power LED, Red Error LED, Feed Button
DRAM	2MB
Flash ROM	2MB
Additional Memory	2 or 4 MB Flash ROM

PRINTER SPECIFICATIONS	
Onboard Sensors	Media Index - Reflective or Gap/Eye-Mark.
	Ribbon Out Sensor
	Print Head Open
Text Fonts	U, S, M, WB, WL, XU, XS, XM, XB, XL, OCR-A/B.
Text Rotation	0, 90, 180, 270 Degrees, Four direction rotational.
Graphics Formats	SATO Hex/Binary, PCX.
Graphics Rotation	0, 90, 180, 270 Degrees
Bar Code Capabilities	UPC A/E, EAN8/13, EAN128, Code 39, Code 93, Code 128, MSI, I25, M25, Codabar, PDF417, UCC128, Postnet, Bookland, MaxiCode.
Interface Connections	RS-232C Serial Interface Port w/ DB9-S Connector
	IEEE-1284 Compatible Parallel Interface Port
AC Power Module	120 VAC Input, 19 VAC Output. Class 2.
Wall Mounting Brackets	Located on bottom for anchor mounting to wall.

MEDIA SPECIFICATIONS	
Media Type	Direct Thermal - Paper or synthetic label or tag.
	Thermal Transfer - Paper or synthetic label or tag.
Maximum Label Roll Diameter	5” (127mm)
Label Roll Core Diameter	0.75” (19.05mm)
Minimum Inter-label Gap	0.08” (2mm)
Maximum Inter-label Gap	1” (25.4mm)

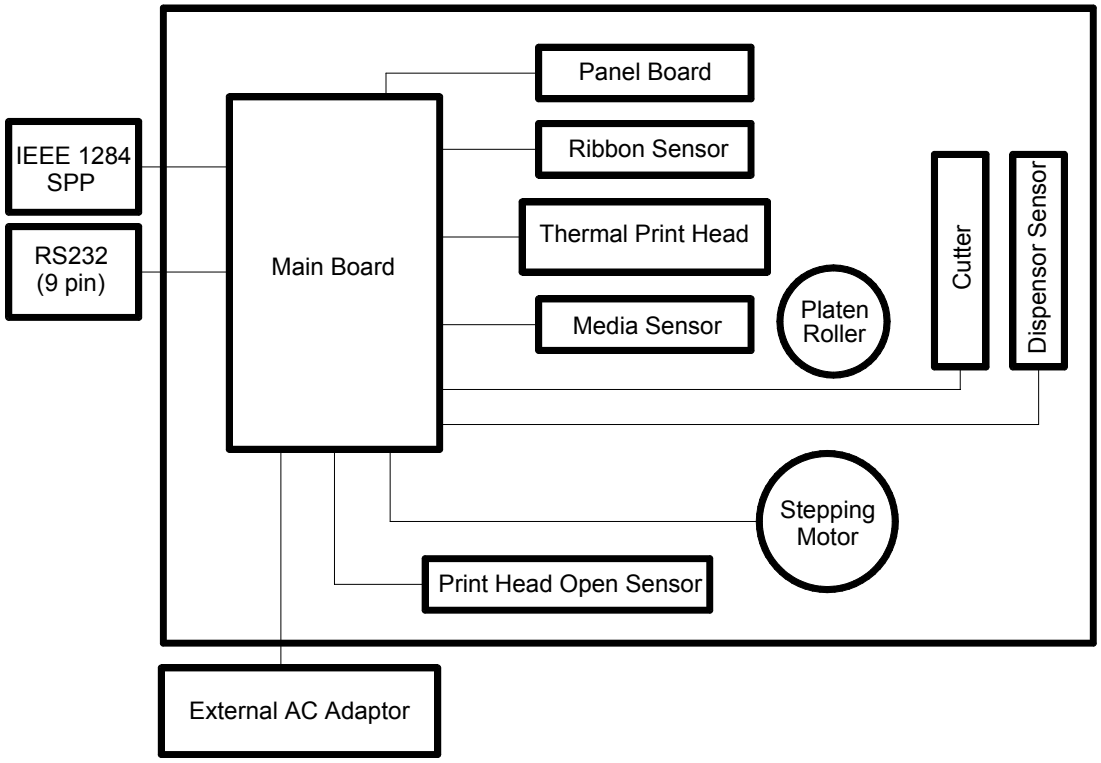
RIBBON SPECIFICATIONS	
Ribbon Material	Wax, resin, or combination.
Maximum Ribbon Roll Diameter	1.50” (38mm)
Maximum Ribbon Length	100m
Ribbon Roll Core Diameter	0.72” (18.4mm)

SERIAL INTERFACE SPECIFICATIONS	
Interface Type	RS-232C Port w/ DB9-S Connector.
Speed	9600, 19200, or 38400 Baud.
Parity	Odd, Even, or None.
Data Bits	7 or 8
Stop Bits	1 or 2
Default Parameters	9600 Bauds, No Parity, 8 Data Bits, 1 Stop Bit.

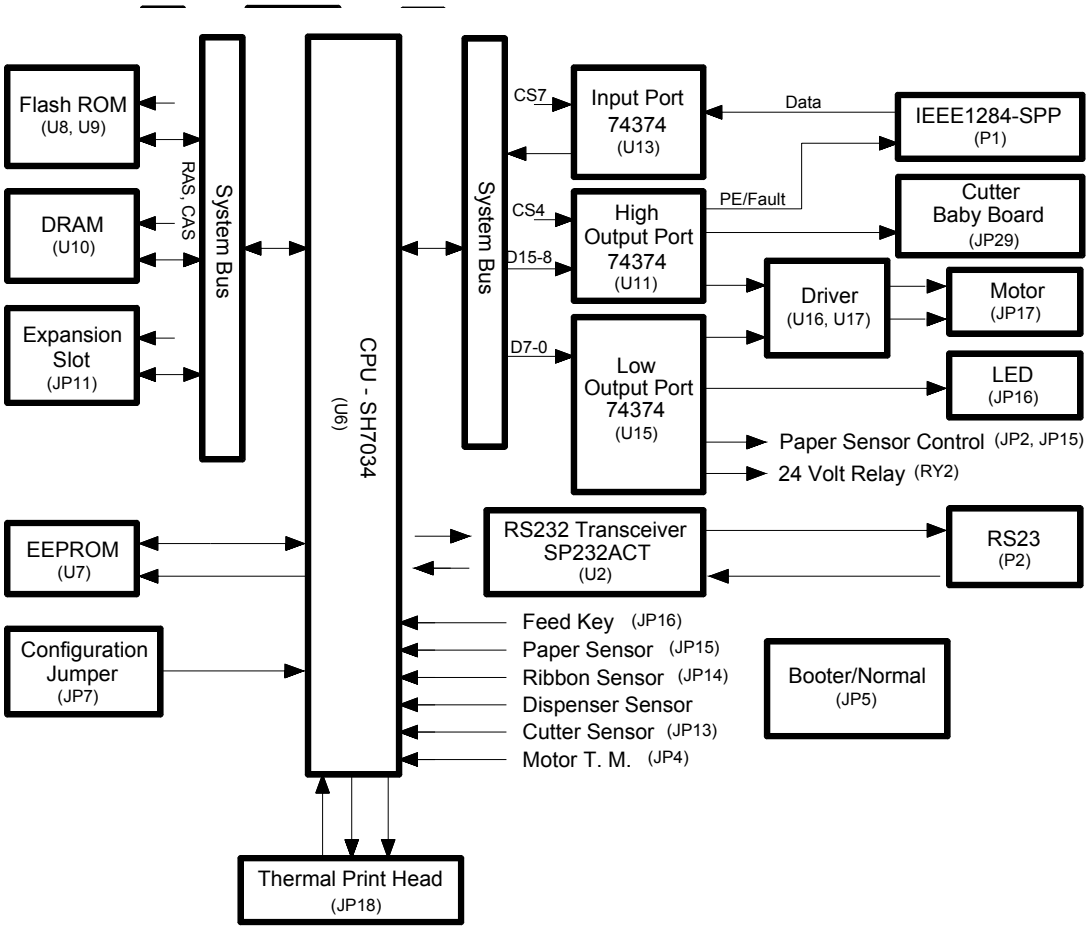
REGULATORY APPROVALS
FCC Class B, CE, TUV, CCC, and UL.

7

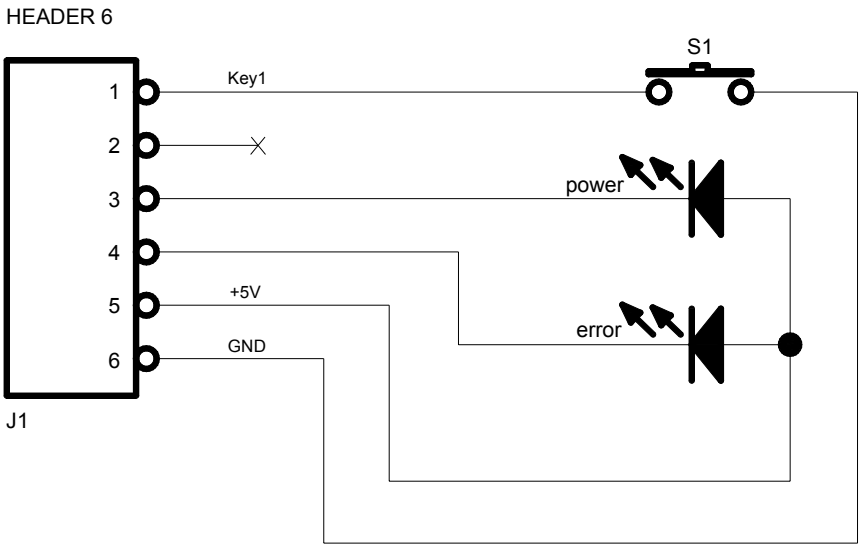
BLOCK DIAGRAMS



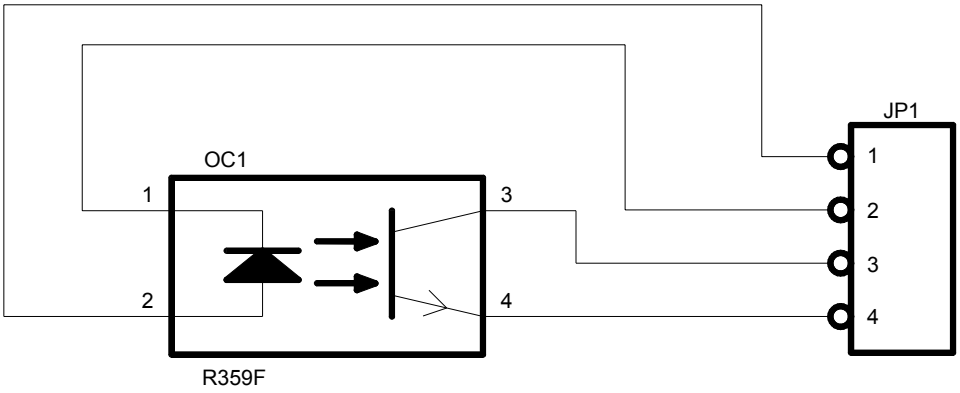
System Block Diagram, Figure 7-1



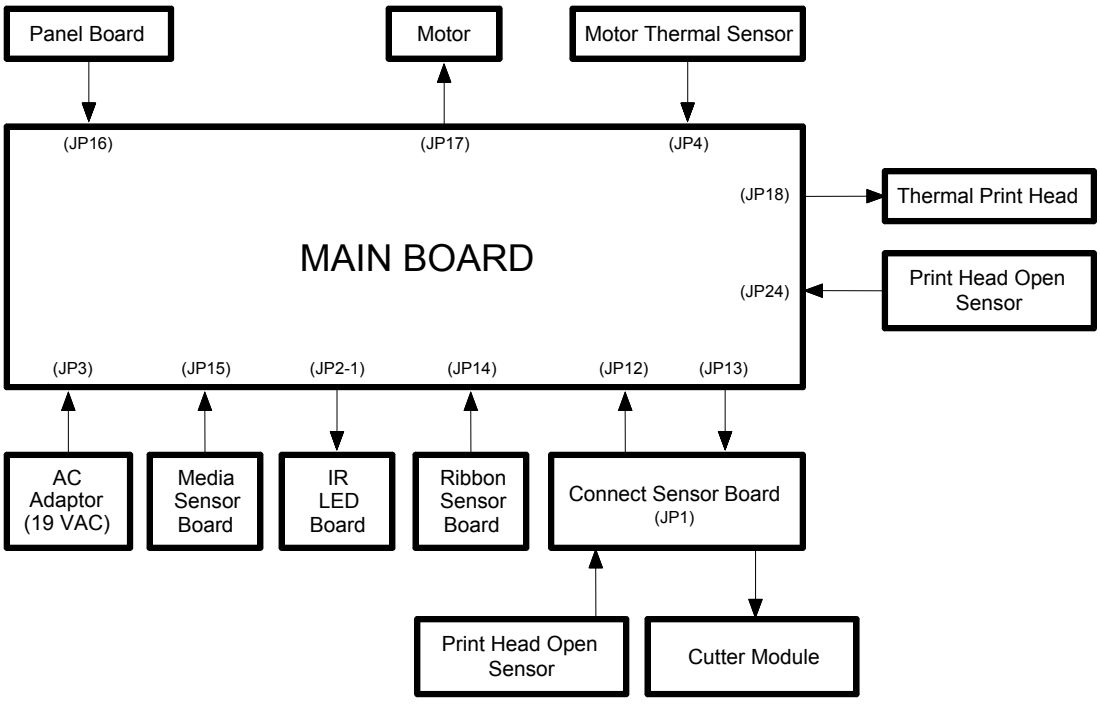
Control Board Block Diagram, Figure 7-2



Panel Board Schematic, Figure 7-3



Sensor Board Schematic, Figure 7-4



Main Board Wiring Diagram, Figure 7-5