

# **SATO**

## **DCS & Labeling Worldwide**

# **M84PRO**

## **Thermal Transfer Printer**



# **SERVICE MANUAL**

**SATO America, Inc.**  
**10350A Nations Ford Road**  
**Charlotte, NC 28273**  
**Main Phone: (704)644-1650**  
**Tech Support Hotline: (704)644-1660**  
**Tech Support Fax: (707)644-1661**  
**E-Mail: [satosales@satoamerica.com](mailto:satosales@satoamerica.com)**  
**[www.satoamerica.com](http://www.satoamerica.com)**

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# TABLE OF CONTENTS

## INTRODUCTION

General Description	1-2
Theory Of Operation	1-2
Switches And Indicators	1-4
Connection Ports	1-4

## TECHNICAL DATA

Physical Characteristics	2-1
Power	2-1
Enviromental	2-1
Print	2-1
Media	2-2
Ribbon	2-2
Sensing	2-2
Interface Modules	2-2
Processing	2-3
Character Font Capabilities	2-3
Bar Code Capabilities	2-4
Regulatory Approvals	2-4

## INTERFACE SPECIFICATIONS

Interface Types	3-1
Receive Buffer	3-1
IEEE1284 Parallel Interface	3-3
RS232 Serial Interface	3-4
Universal Serial Bus (Usb) Adapter	3-6
Local Area Network (Lan) Interface	3-6
Bi-Directional Communications	3-6

## ACCESSORIES INSTALLATION

Label Cutter	4-1
Dispenser	4-4
Flash Memory	4-7
PCMCIA Memory Expansion	4-8
Real-time Clock	4-10
Interface Module Upgrade	4-12

## CONFIGURATION

Dip Switch Panels	5-1
RS232 Transmit/receive Setting	5-1
Printer Setup	5-3
Default Settings	5-7
Software Default Settings	5-7
Potentiometer Adjustments	5-8
LCD Panel Printer Configuration	5-9

## TROUBLESHOOTING

Error Signals	6-1
Troubleshooting Table	6-2
Troubleshooting Procedures	6-4

## **REPLACEMENT PROCEDURES**

Main Circuit Board	7-1
Interface Board (Module)	7-3
Daughter Board	7-4
Memory Board (Card)	7-5
Power Board	7-5
Panel Board	7-6
LCD Board	7-7
Fuse	7-8
Motor	7-9
Platen Roller	7-11
Feed Roller	7-12
Timing Belt	7-14
Print Head	7-18
Label-out Sensor Switch	7-20
Label Position Sensor	7-22
Ribbon Sensor	7-23
Cutter Belt	7-25
Cutter Circuit Board	7-27

## **ADJUSTMENT PROCEDURES**

Print Head Position Alignment	8-2
Print Head Balance	8-3
Ribbon Guide Plate	8-5
Feed Roller	8-6
Timing Belt	8-8
Pitch Sensor Setup For Notched Tags	8-9
Print Position	8-10
Label Gap Sensor	8-11
Eye-Mark Sensor	8-13
Offset Label Stop Position	8-14
LCD Display	8-14
Print Darkness	8-15

## **FACTORY RESETS**

Factory Settings/Test Print	9-1
Clear Head Counters	9-2
Clear Dispenser Counter	9-3
Clear Cutter Counter	9-4
Clear EEPROM	9-5

## **DIAGRAMS & SCHEMATICS**

Housing Cover Removal & Installation	10-1
Media Loading	10-2
Ribbon Loading	10-2
Paper Specifications	10-3
Accessories & Sensors Location	10-4
Print Position Reference	10-5
Print Operation Sequence	10-6

## INTRODUCTION

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This manual is laid out consistent with the product discussed and provides all of the information required for general printer configuration, troubleshooting, and maintenance. For specialized programming, refer to the Programming Manual also provided with the product.

Step-by-step maintenance instructions are provided with typical problems and solutions. It is recommended that you become familiar with each section before installing and maintaining the printer.

This manual also incorporates the use of special information boxes. Examples of these boxes and the type of information provided in each, are below.

**WARNING: PROVIDES INFORMATION THAT, IF UNHEEDED MAY RESULT IN PRESONAL INJURY.**

**CAUTION: PROVIDES INFORMATION THAT, IF UNHEEDED MAY RESULT IN EQUIPMENT DAMAGE.**

**NOTE: Provides helpful hints to assist in performing the tasks at hand.**

**LCD DISPLAY: Provides the specific display that should be visible on the LCD at that point.**

A comprehensive Table Of Contents provided at the front of this manual facilitates rapid movement within. The contents identify the different unit sections and their respective sub-sections. Each references the page number of their commencement.

The pages of this manual have embedded headers and footer to assist the user in identifying his or her exact position within the manual. The header provides the section number followed by its name. The footer identifies the product on the left, the manual's part number in the center, and the page number to the right side of the page.

Page enumeration is two-part with each separated by a hyphen. The first character set references the section number and the second identifies the page number. Page numbers begin with the numeral (1) one at the commencement of a new section and ascends sequentially.

## GENERAL DESCRIPTION

The M84Pro printer was designed for continuous industrial and commercial applications as self-evident with its uncompromising all-metal housing, 203 to 609 dpi resolution, and label width capacity up to 5 inches wide.

This printer uses standard SATO programming language with specific values for print resolutions. These values are specified in “dots” and will vary depending upon the printer resolution and the amount of memory available for label imaging.

The M84Pro was designed to be compatible with preceding M-8400 series printers. The main difference is how it receives the command sequence and how it responds to certain commands. Refer to the Operator and Technical Reference Manuals for additional information.

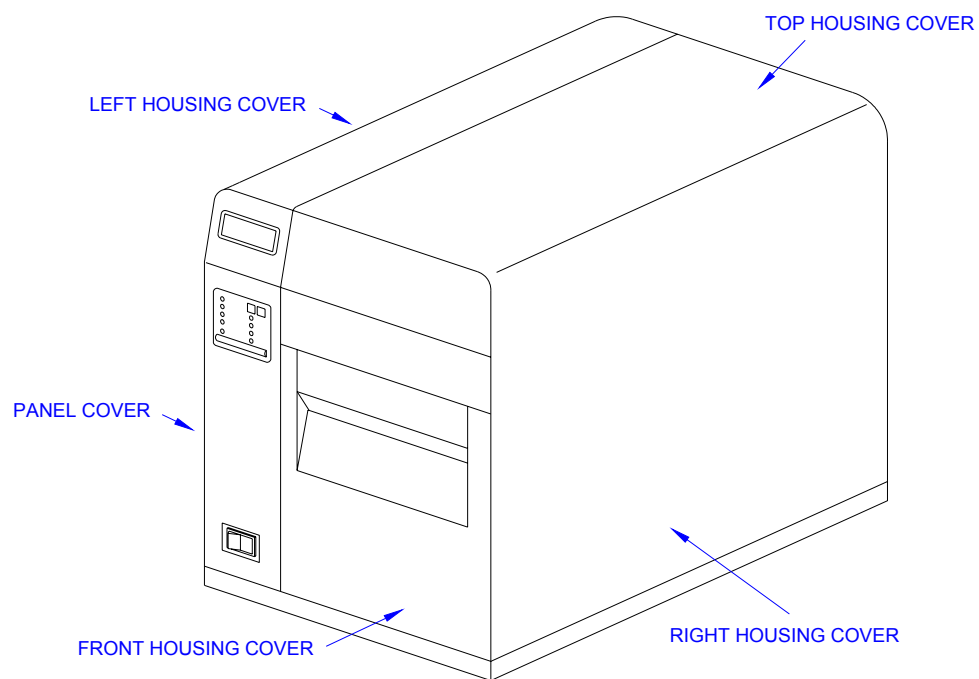


Figure 1-1, Primary Components

## THEORY OF OPERATION

When activated, the media and ribbon (where applicable) are fed in conjunction past the print head by an integrated drive train. The drive train is electric, stepper 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 inserted onto drive-train driven spindles.

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

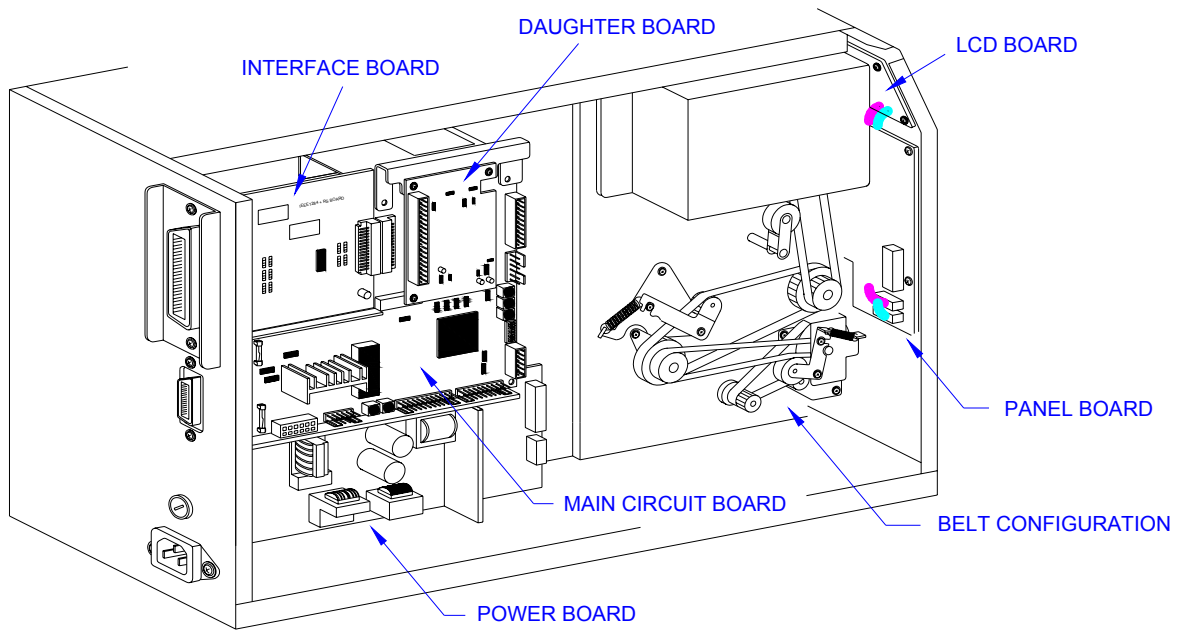


Figure 1-2, Primary Components

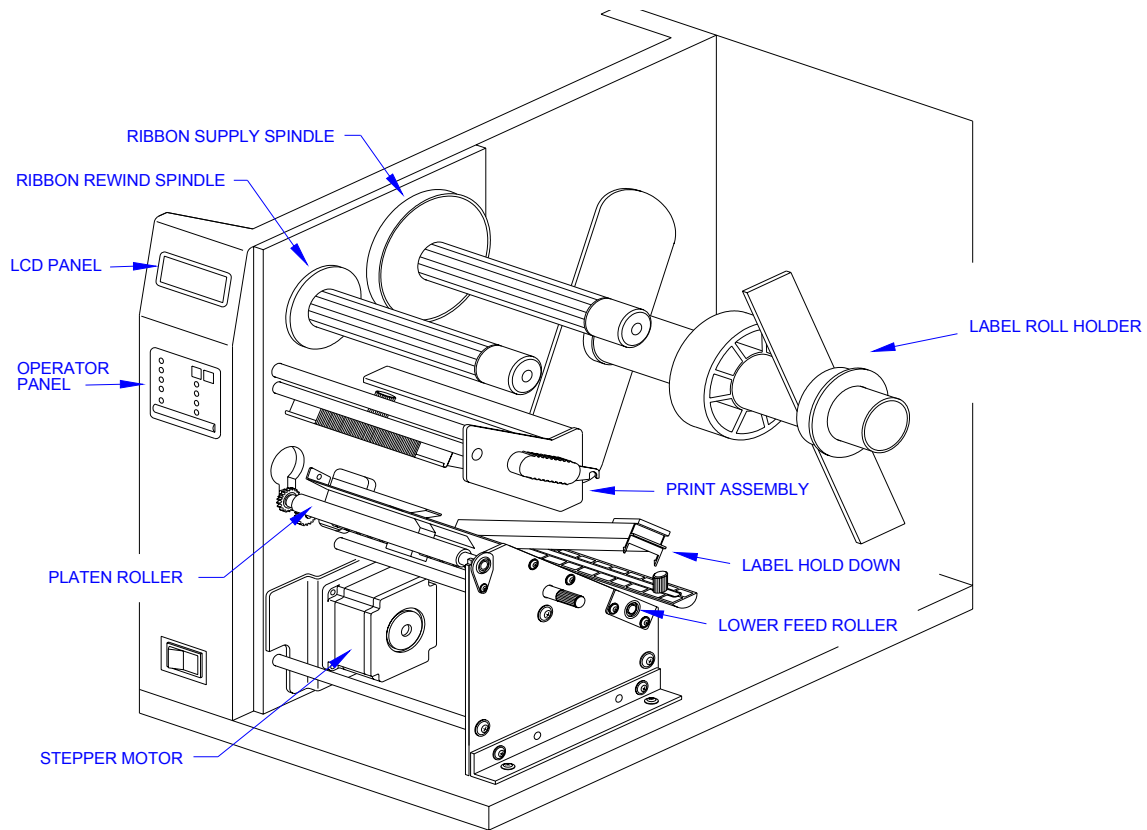


Figure 1-3, Primary Components

## SWITCHES AND INDICATORS

The table below identifies and defines printer switches and indicators for operator interface. The accompanying graphics display their locations and appearance.

<b>SWITCHES</b>	
Power Switch	Two position on/off switch that controls power flow to the system.
Line Key	Toggles the printer between the on-line and off-line modes. When on-line, the printer is ready to receive data from the host. Acts as a pause during print by taking the printer off-line. Also used as a scroll-and-enter interface for printer setup.
Feed Key	Feeds one blank label through the printer when off-line. When the printer is on-line, another copy of the last label will be printed. Also used as a scroll-and-enter interface for printer setup.
<b>INDICATORS</b>	
LCD Display	Dual line x 16 character display. Used for setting operational parameters and displaying error conditions.
Power Indicator	Illuminates when the power switch is activated.
Label	Illuminates when the label supply is depleted.
Ribbon	Illuminates when the ribbon supply is depleted.
Error	Illuminates when there is a system fault.
On-Line	Illuminates when the system is operating.
<b>DIP SWITCHES</b>	
DSW2 & DSW3	Sets operational parameters of printer.
DSW1	Used to configure optional RS232 communication card.

## CONNECTION PORTS

These ports are externally accessible and permit connection of the accessories and attachments necessary for printer programming and operation. Not listed here, are the connection ports of circuit boards not externally accessible.

<b>CONNECTION PORTS</b>	
AC Power Input	Connector permits 115V, 50/60 Hz supply via supplied cord.
Interface Port	Connector for interface harness. Must be connected for the printer to be operational. Acceptable interface types are: <ul style="list-style-type: none"> <li>• RS232C Serial I/F Module, DB-25</li> <li>• IEEE1284 Parallel I/F Module, AMP 57-40360</li> <li>• Universal Serial Bus Adapter</li> <li>• Ethernet 10/100 BaseT I/F Module</li> <li>• RS422/485 I/F Module, DB-9</li> </ul>
Ext. Interface Port	Connector for external control of print cycle. Also supplies power for optional accessories - AMP 57-60140
Memory Card Slot	Slot for the insertion of optional PCMCIA Memory Card
Main Fuse Connection	For input power protection - type 3A/250V



Section 1: Introduction

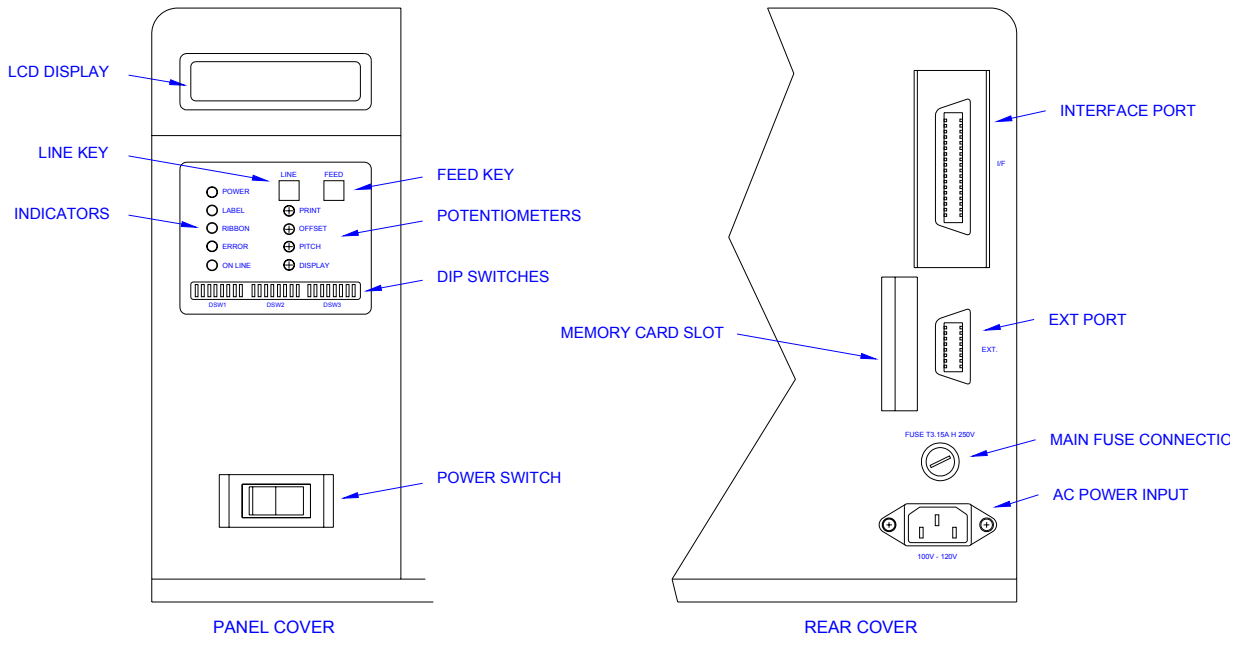


Figure 1-4, Switches, Indicators, and Connection Ports

## 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 CHARACTERISTICS	
Width	10.4 Inches (265 mm)
Height	13.4 Inches (341 mm)
Depth	17.1 Inches (435 mm)
Weight	39.7 Pounds (18.0 mm)

POWER	
Input Voltage	115/220 Volts AC +/- 10%, 50/60 Hertz +/-1%
Power Consumption	130 Watt Operating, 24 Watt Idle

ENVIRONMENTAL	
Operating Temperature	41° to 104°F (5° to 40°C)
Storage Temperature	23° to 140°F (-5° to 60°C)
Storage Humidity	30 to 90% RH Non-Condensing
Operating Humidity	30 to 80% RH Non-Condensing
Electrostatic Discharge	8kV

PRINT	
Method	Direct or Thermal Transfer
Speed (user selectable)	M84PRO-2: 2 to 10 Inches Per Second (50 - 250 mm/s) M84PRO-3: 2 to 8 Inches Per Second (50 - 200 mm/s) M84PRO-6: 2 to 6 inches Per Second (50 - 150 mm/s)
Print Module (dot size)	M84PRO-2: .0049 Inches (.125 mm) M84PRO-3: .0033 Inches (.083 mm) M84PRO-6: .0017 Inches (.081 mm)
Resolution	M84PRO-2: 203 Dots Per Inch (8 d/mm) M84PRO-3: 305 Dots Per Inch (12 d/mm) M84PRO-6: 609 Dots Per Inch (24 d/mm)
Maximum Print Width	4.1 Inches (104 mm)
Maximum Print Length	M84PRO-2: 49.2 Inches (1249 mm) M84PRO-3: 32.8 Inches (835 mm) M84PRO-6: 14.0 Inches (356 mm)

Section 2: Technical Data

<b>MEDIA</b>	
Minimum Width	.87 Inches (22 mm)
Minimum Length	
Continuous	0.24 Inches (6 mm)
Tear-Off	0.63 Inches (16 mm)
Cutter	1.18 Inches (30 mm)
Dispense	1.18 Inches (30 mm)
Maximum Width	5.0 Inches (125 mm)
Type	Die Cut Labels, Fan-Fold, Tag Stock or Continuous
Maximum Caliper	.008 Inches (.21 mm)
Maximum Roll Diameter	8.6 Inches (220 mm), Wound face inward
Minimum Core Diameter	3 Inches (76.2 mm)

<b>RIBBON</b>	
Maximum Width	4.4 Inches (111 mm)
Length	1475 Feet (450 m)
Thickness	4.5 Microns, Wound face inward

<b>SENSING</b>	
See-Through for labels or tags	Movable
Reflective Eye-Mark	Movable
Continuous Form	Sensor not used.

<b>INTERFACE MODULES</b>	
Parallel Port	IEEE 1284 Standard
Serial Port	RS232C (9600 to 57,6000 dps) Standard RS422/485 (9600 to 57600 bps) Optional Ready/Busy or X-On/X-Off Flow Control Bi-Directional Status
Universal Serial Bus	USB Adapter
Ethernet	10/100 Base T, 802.116 Wireless Wi-Fi
Data Transmission	ASCII Format

<b>PROCESSING</b>	
CPU	32 Bit RISC
Flash ROM	2 Mega-Bytes
SDRAM	16 Mega-Bytes
Receive Buffer	2.95 Mega-Bytes
Memory Expansion	See Options and Accessories

<b>CHARACTER FONT CAPABILITIES</b>	
<b>MATRIX FONTS</b>	
U Font	5 dots W x 9 dots H
S Font	8 dots W x 15 dots H
M Font	13 dots W x 20 dots H
XU Font	5 dots W x 9 dots H (Helvetica)
XS Font	17 dots W x 17 dots H (Univers Condensed Bold)
XM Font	24 dots W x 24 dots H (Univers Condensed Bold)
OA Font (OCR-A)	M84PRO-2: 15 dots W x 22 dots H M84PRO-3: 22 dots W x 33 dots H M84PRO-6: 44 dots W x 66 dots H
OB Font (OCR-B)	M84PRO-2: 30 dots W x 36 dots H M84PRO-3: 30 dots W x 36 dots H M84PRO-6: 60 dots W x 72 dots H
<b>AUTO SMOOTHING FONTS</b>	
WB	18 dots W x 30 dots H
WL	28 dots W x 52 dots H
XB	48 dots W x 48 dots H (Univers Condensed Bold)
XL	48 dots W x 48 dots H (Sans Serif)
<b>VECTOR FONT</b>	
	Proportional or Fixed Spacing Font Size 50 x 50 dots to 999 x 999 dots Helvetica, 10 Font Variations
<b>AGFA RASTER FONTS</b>	
A Font	CG Times, 8 to 72 pt.
B Font	CG Triumvirate, 8 to 72 pt.
<b>DOWNLAODABLE FONTS</b>	
	Bit Mapped True Type Fonts with Utility Program
<b>CHARACTER CONTROL</b>	
	Expansion up to 12 x in either the X or Y coordinates. Charcter Pitch Control Line Space Control Journal Print facility 0, 90, 180, and 270 Degree Rotation

<b>BAR CODE CAPABILITIES</b>	
Linear Bar Codes	Bookland (UPC/EAN Supplemental EAN-8, EAN-13 CODABAR Code 39 Code 93 Code 128 Interleaved 2 of 5 Industrial 2 of 5 Matrix 2 of 5 MSI POSTNET UCC/EAN-128 UPC-A and UPC-E
Two Dimensional	Data Matriix Maxicode PDF417 Micro PDF Truncated PDF QR Code RSS-14 Composite Code
Ratios	1:2, 1:3, 2:5, User definable bar widths
Bar Height	4 to 999 dots, User progammable
Rotation	0, 90, 180, and 270 Degrees
Sequential Numbering	Sequential numbering of both numerics and bar codes
Custom Characters	RAM storage for special characters
Graphics	Full dot addressable graphics, SATO Hex/Binary, .BMP or .PCX formats
Form Overlay	Form overlay for high-speed editing of complex formats

<b>REGULATORY APPROVALS</b>	
Safety	VCCI (Class B), UL, CUL, CE, FCC (Class B)
RFI/EMI	FCC (Class B)

## INTERFACE SPECIFICATIONS

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This section presents the interface specifications and include detailed information on how to properly interface the printer with the host system.

### INTERFACE TYPES

The parallel interface is a high speed, bi-directional interface that conforms to the IEEE1284 specification (ECP mode on some computers). The interface is also compatible with the older Centronics parallel interface standard. If it does not detect the correct IEEE1284 signals in the interface connection, it will automatically operate in the standard Centronics mode which is much slower. To use the IEEE1284 parallel interface to its fullest capability requires that the host also have an IEEE1284 compatible interface and that the two be connected with a cable that meets the IEEE1284 specification. If either of these two are not present, the data rate is reduced.

In order to provide flexibility in communicating with a variety of host computer systems all printers use a Plug-In Interface Module. The IEEE1284 Interface module is shipped with the printer unless another interface type is specified at the time of the order. The other interfaces available is a high speed serial interface, an Ethernet interface, wireless Ethernet, or an optional Universal Serial Bus (USB) Adapter.

The Parallel interface will probably be the most useful in communicating with IBM PCs and compatibles. The RS232C Serial interface allows connectivity to a number of other hosts. The USB interface allows the printer to be connected to a computer that supports peripherals attached to a USB bus. Up to 127 peripherals can be connected to a single USB port.

**WARNING: NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE HOST OR THE PRINTER. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY IN THE PRINTER/HOST AND IS NOT COVERED BY WARRANTY.**

### RECEIVE BUFFER

The printer may be configured to receive a data stream from a singular or multiple print jobs. The single job print buffer is generally used by software programs that wish to maintain control of the job print queue so that it can move a high priority job in front of ones of lesser importance. The multiple job buffer, on the other hand prints all jobs in the order they are received by the printer, and the order of printing cannot be changed.

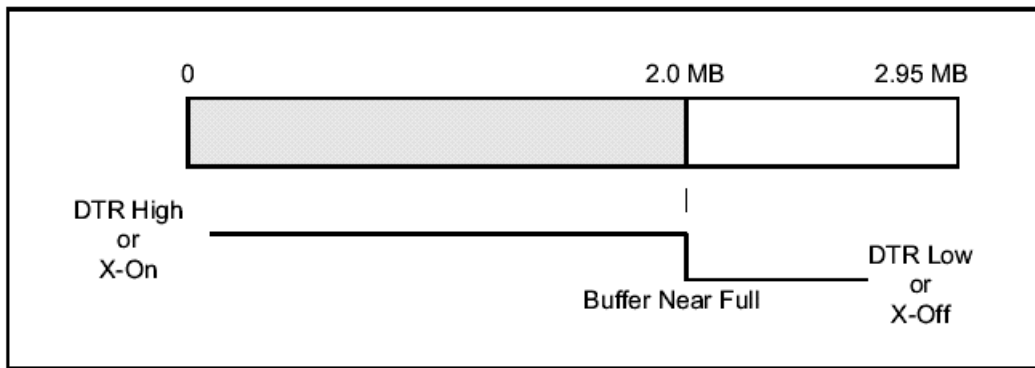
### SINGLE JOB BUFFER

The printer receives and prints one job at a time. Each job must not exceed 2.95 MB.

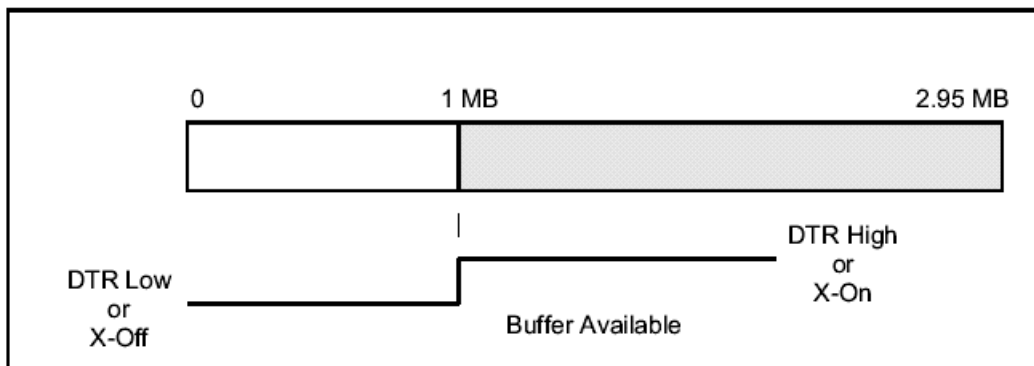
**MULTIPLE JOB BUFFER**

The printer is able to continuously receive print jobs while compiling and printing other jobs at the same time. It acts much like a “print buffer” to maximize the performance of the host and the printer. When using the RS232C Serial interface, the multiple job buffer uses either the Ready/Busy with DTR (pin 20) or X-On/X-Off flow control protocols. See these sections for more details.

With an empty receiving buffer, the status of DTR is “high” (in X-On status if using X-On/X-Off) meaning the printer is ready to receive data. When the receive buffer is holding 2.0 MB of data (1 MB from being full), DTR will go “low” (an X-Off is sent) indicating the printer can no longer receive data. This condition is called “Buffer Near Full.”



The receiving buffer will not be able to receive more data again until a “Buffer Available” condition occurs. This takes place when the receiving buffer has emptied so that only 1 MB bytes of data are being held (2.0 MB bytes from being full). At this time, **DTR** will go “high” or an X-On is sent to tell the host that it can again receive data.



All printer error conditions (i.e., label out, ribbon out) will cause the printer to go busy (DTR “low” or X-Off) until the problem is corrected and the printer is placed on-line. The printer will also be busy if taken off-line from the front panel.

**IEEE1284 PARALLEL INTERFACE**

The parallel interface for the M-84PRO printers is a Plug-In Interface Module that can be installed by the user. It conforms to the IEEE1284 specification. It will automatically detect the IEEE1284 signals and operate in the high speed mode. If it does not detect the IEEE1284 signals, it will operate in the standard Centronics mode, which is significantly slower. For this reason, an interface cable and host interface conforming to the IEEE1284 specification must be present to fully utilize the speed capabilities. This interface also operates bi-directionally and can report the status of the printer back to the host.

SPECIFICATIONS	
Printer Connector	AMP 57-40360 DDK (or equivalent)
Cable Connector	AMP 57-30360 DDK (or equivalent)
Cable	IEEE1284 Parallel, 10 ft. (3 m) or less
Signal Level	High = +2.4V to +5.0V, Low = 0V to -0.4V
Data Stream	<ESC>A . . Job#1 . . <ESC>Z<ESC>A . . Job#n . . <ESC>Z

NOTE: Pin assignments begin with one (1) in the upper right corner and descend to eighteen (18) in the upper left corner. Pin number nineteen (19) picks up in the lower right corner and descends to thirty-six (36) in the lower left.

IEEE 1284 PARALLEL INTERFACE PIN ASSIGNMENTS					
PIN	SIGNAL	DIRECTION	PIN	SIGNAL	DIRECTION
1	Strobe	To Printer	19	Strobe Return	Reference
2	Data 1	To Printer	20	Data 1 Return	Reference
3	Data 2	To Printer	21	Data 2 Return	Reference
4	Data 3	To Printer	22	Data 3 Return	Reference
5	Data 4	To Printer	23	Data 4 Return	Reference
6	Data 5	To Printer	24	Data 5 Return	Reference
7	Data 6	To Printer	25	Data 6 Return	Reference
8	Data 7	To Printer	26	Data 7 Return	Reference
9	Data 8	To Printer	27	Data 8 Return	Reference
10	ACK	To Host	28	ACK Return	Reference
11	Busy	To Host	29	Busy Return	Reference
12	Ptr Error	To Host	30	PE Return	Reference
13	Select	To Host	31	INIT	From Host
14	AutoFD <sub>1</sub>	To Host	32	Fault	To Host
15	Not Used		33	Not Used	
16	Logic Gnd		34	Not Used	
17	FG	Frame Gnd	35	Not Used	
18	+5V (z=24k ohm)	To Host	36	SelectIn <sub>1</sub>	From Host

*1 Signals required for ieee 1284 mode.*



### RS232 SERIAL INTERFACE

The High Speed Serial Interface is a Plug-In Interface Module that can be installed in the printer by the user.

SPECIFICATIONS	
Asynchronous ASCII	Half-duplex communication Ready/Busy Hardware Flow Control Pin 20, DTR Control Pin 4, RTS Error Condition X-On/X-Off Software Flow Control Bi-Directional Communication
Data Transmission Rate	9600, 19200, 38400, 57600 bps
Character Format	1 Start Bit (fixed) 7 or 8 data bits (selectable) Odd, Even or No Parity (selectable) 1 or 2 Stop bits (selectable)
Connector	DB-25S (Female)
Cable	DB-25P (Male), 50 ft. maximum length. For cable configuration, refer to Cable Requirements appropriate to the RS232C protocol chosen.
Signal Levels	High = +5V to +12V, Low = -5V to -12V

NOTE: Pin assignments begin with one (1) in the upper right corner and descend to thirteen (13) in the upper left corner. Pin number fourteen (14) picks up in the lower right corner and descends to twenty-five (25) in the lower left.

RS232C SERIAL INTERFACE SIGNALS		
PIN	DIRECTION	SIGNAL DEFINITION
1	Reference	FG (Frame Ground)
2	To Host	TD (Transmit Data) - Data from the printer to the host computer. Sends X-On/X-Off characters or status data (bi-directional protocols).
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
4	To Host	RTS (Request to Send) - Used with Ready/Busy flow control to indicate an error condition. RTS is high and remains high unless the print head is open (in this case, RTS would return to the high state after the print head is closed and the printer is placed back on-line) or an error condition occurs during printing (e.g., ribbon out, label out).
5	To Printer	CTS (Clear to Send) - When this line is high, the printer assumes that data is ready to be transmitted. The printer will not receive data when this line is low. If this line is not being used, it should be tied high (to pin 4).
6	To Printer	DSR (Data Set Ready) - When this line is high, the printer will be ready to receive data. This line must be high before data is transmitted. If this line is not being used, it should be tied high (to pin 20).
7	Reference	SG (Signal Ground)

RS232C SERIAL INTERFACE SIGNALS		
PIN	DIRECTION	SIGNAL DEFINITION
20	To Host	DTR (Data Terminally Ready) - This signal applies to Ready/Busy flow control. The printer is ready to receive data when this pin is high. It goes low when the printer is off-line, either manually or due to an error condition, and while printing in the single job buffer mode. It will also go low when the data in the buffer reaches the buffer near full level.

CABLE REQUIREMENTS					
DB9	DB25	HOST	INTERCONNECTION	DB25	PRINTER
1	1	FG	<-----	1	FG (Frame Ground)
2	3	RD	----->	2	TD (Transmit Data)
3	2	TD	<----->	3	RD (Receive Data)
8	5	CTS	-----	4	RTS (Request to Send)
7	4	RTS	-----	5	CTS (Clear to Send)
4	20	DTR	-----	6	DSR (Data Set Ready)
6	6	DSR*	<-----	20	DTR (Data Terminal Ready)
5	7	SG	<----->	7	SG (Signal Ground)

\* This connection at the host side of the interface would depend upon the pin that is being used as the Ready/Busy signal by the driving software. Typically, on a PC, it would be either CTS (pin5) or DSR (pin 6) on a DB-25 connector.

#### READY/BUSY FLOW CONTROL

Ready/Busy is the hardware flow control method for the serial interface on the M-84PRO printers. By raising/lowering the voltage level on Pin 20 of the RS232C port, the printer notifies the host when it is ready to receive data. Pin 4 (RTS) and pin 20 (DTR) are the important signals on the printer for this method of flow control. The host must be capable of supporting this flow control method for it to function properly.

#### X-ON/X-OFF FLOW CONTROL

X-On/X-Off flow control is used whenever hardware (Ready/Busy) flow control is not available or desirable. Instead of a voltage going high/low at pin 20, control characters representing "Printer Ready" (X-On = 11 hexadecimal) or "Printer Busy" (X-Off = 13 hexadecimal) are transmitted by the printer on pin 2 (Transmit Data) to the host. In order for this method of flow control to function correctly, the host must be capable of supporting it. X-On/X-Off operates in a manner similar to the function of pin 20 (DTR) as previously explained. When the printer is first powered on it sends an X-Off when the "Buffer Near Full" level is reached and a X-On when the data level of the buffer drops below the "Buffer Available" mark. When the printer is taken off-line manually, it transmits an X-Off indicating it cannot accept data. When it is placed back on line manually, it sends an X-On, indicating it is again available for receipt of data. If an error occurs during printing (paper out, ribbon out), the printer sends an X-Off as soon as an error condition is detected. When the error is cleared and the printer is placed back on-line, it transmits an X-On indicating it is again ready to accept data. Upon power up if no error conditions are present, the printer will continually send X-On characters at five millisecond intervals until it receives a transmission from the host.

**DATA STREAMS**

The data streams for X-On/X-Off and Ready/Busy flow control are constructed in the same way as they are for Ready/Busy flow control (<ESC>A . . Job#1 . . <ESC>Z<ESC>A . . Job#n . . <ESC>Z). An example of this would be: <ESC>A . . Job#1 . . <ESC>Z. All characters are in ASCII.

**UNIVERSAL SERIAL BUS (USB) ADAPTER**

The Universal Serial Bus (USB) interface is a Plug-In Interface Module that can be installed by the user. It requires a driver (shipped with each printer that has the interface installed) that must be loaded on your PC and the PC must be configured to support USB peripherals using Windows 98 or above. Details for loading the USB driver are contained in the USB Interface Manual that is shipped with each printer with a USB Optional interface installed. Up to 127 devices may be connected to a USB port using powered hubs.

SPECIFICATIONS	
Printer Connector	USB Type B Plug
Cable	10 feet (3 m) maximum
Host	Windows 98 or above with USB Port
Power Supply	BUS Power through cable
Power Consumption	+5 V at 80 ma

**LOCAL AREA NETWORK (LAN) INTERFACE**

A Local Area Network (LAN) interface is an optional Plug-In Interface Module that can be installed by the user. It requires a driver shipped with each printer that has the interface installed. The driver that must be loaded on your PC and the PC must be configured to run one of the supported network protocols using a 10/100BaseT LAN connection. Details for loading the LAN driver are contained in the LAN Interface Manual that is shipped with each printer with a LAN Optional interface installed.

SPECIFICATIONS	
Connector	RJ-45 Receptacle
Cable	10/100BaseT Category 5
Power Supply	Powered from printer

**BI-DIRECTIONAL COMMUNICATIONS**

This is a two-way communications protocol between the host computer and the printer, thus enabling the host to check printer status. When Bi-Com 4 communications is selected, there is no busy signal from the printer. The host must request the complete status from the printer, including ready/busy. The host may request status in two different ways.

**ENQUIRE/ACK/NAK**

In the Bi-Com 4 mode, the host transmits an ENQ (05 hexadecimal) to the printer and the printer will respond with its status within five milliseconds. If printing, it will respond upon finishing the current label, then resume printing. In order for this protocol to work properly with an RS232C

Optional Interface, pin 6 (DTR) and pin 5 (CTS) must be held high by the host. One way to ensure these pins are always in the correct state is to tie pin 20 (DTR) to pin 6 (DSR) and pin 4 (RTS) to pin 5 (CTS) at the printer end of the cable.

**ENQUIRE (ENQ)**

Upon receipt of an ENQ command, the printer responds with 25 bytes of status information bounded by an STX/ETX pair. The Bi-Com protocol works only in the multiple job buffer mode. The status information is defined as follows:

<STX>{ 2 Byte ID}{1 Status Byte}{6 Byte Label Remaining}{16 Byte Job Name}<ETX>

<b>STREAM IDENTIFICATION</b>	
ID	Is a two byte number identifying the current print job ID. The print job ID is defined using the <ESC>ID Job ID command transmitted with the print job (see Job ID Store in the command listing for more information on how to use this command). The range is from 00 to 99.
Status	A single byte defining the current status of the printer (see the Status Byte Definition table).
Label Remaining	Six bytes defining the number of labels remaining in the current print job. The range is from 000000 to 999999 labels.
Job Name	16 bytes of ASCII characters identifying the name assigned to the job by the <ESC>WK Job Name command. If the Job Name is less than 16 characters, the field will be padded with leading zeroes.  If an ENQ is received after the print job specified in the ID bytes has been completed, or there is no data in the buffer, the printer will respond with two “space” characters (20 hexadecimal) for the ID number, six “zero” characters (30 hexadecimal) in the Remaining Labels bytes and the 16 byte Job Name.

**CANCEL (CAN)**

If a CAN (18 hexadecimal) command is received, it will stop the print job and clear all data from the receive and print buffers. A delay of five milliseconds or more is required before any new data can be downloaded. The CAN command is effective immediately upon receipt, even if the printer is off-line or in an error condition. The printer will return an ACK (06 hexadecimal) if there is no printer error condition and a NAK (15 hexadecimal) if an error condition exists.

**PRINT JOB**

Upon receipt of a valid print job (<ESC>A . . . <ESC>Z), an ACK (06 hexadecimal) will be returned by the printer if there are no errors and a NAK (16 hexadecimal) if a printer error exists.

**PRINT STOP (DLE)**

If a DLE (10 hexadecimal) is received by the printer, the print process is stopped and an ACK (06 hexadecimal) is returned if there are no errors and a NAK (16 hexadecimal) if a printer error exists.

**PRINT START (DC1)**

If the printer has been stopped by receipt of a DLE (10 hexadecimal) command, it can be restarted by sending a DC1 (hexadecimal 11) command. Upon receipt of this command an ACK (06 hexadecimal) is returned if there are no errors and a NAK (16 hexadecimal) if a printer error exists.

Note: To provide compatibility with older SATO printers, the RS232C interface can be configured to use an earlier Bi-Com 3 ENQ/ACK/NAK protocol selected via DSW2-8 and DSW1-7/8 (on the RS232 Interface module). The earlier protocol did not have provisions for the Job Name and did not respond to the DLE or DCI commands. Also, there are additional Response Codes in the Status Byte Definition. It is recommended that you use the current protocol rather than the earlier version unless it is necessary for compatibility with existing software.

# 4

## ACCESSORIES INSTALLATION

The following procedures provide in-depth instructions on the installation of all optional accessories. Each accessory is a purchase option that may not apply to your setup. Refer to the list below to determine if any are applicable and their installation is required. If not, disregard this section of the manual and proceed to the next.

Label Cutter Kit

Label dispenser

PCMCIA Memory Expansion

Flash Memory Expansion

Real Time Clock

Interface Module Upgrade

### LABEL CUTTER INSTALLATION

This procedure only covers the physical installation of cutter assembly hardware. Refer to other procedures for configuration, etc.

NOTE: Additional relative information may also be found in Figure 10-5, Accessories & Sensors Location; Figure 10-6, Print Position Reference Diagram; and Figures 10-12 through 10-15, Operation & Timing Charts of the Diagrams & Schematics section.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

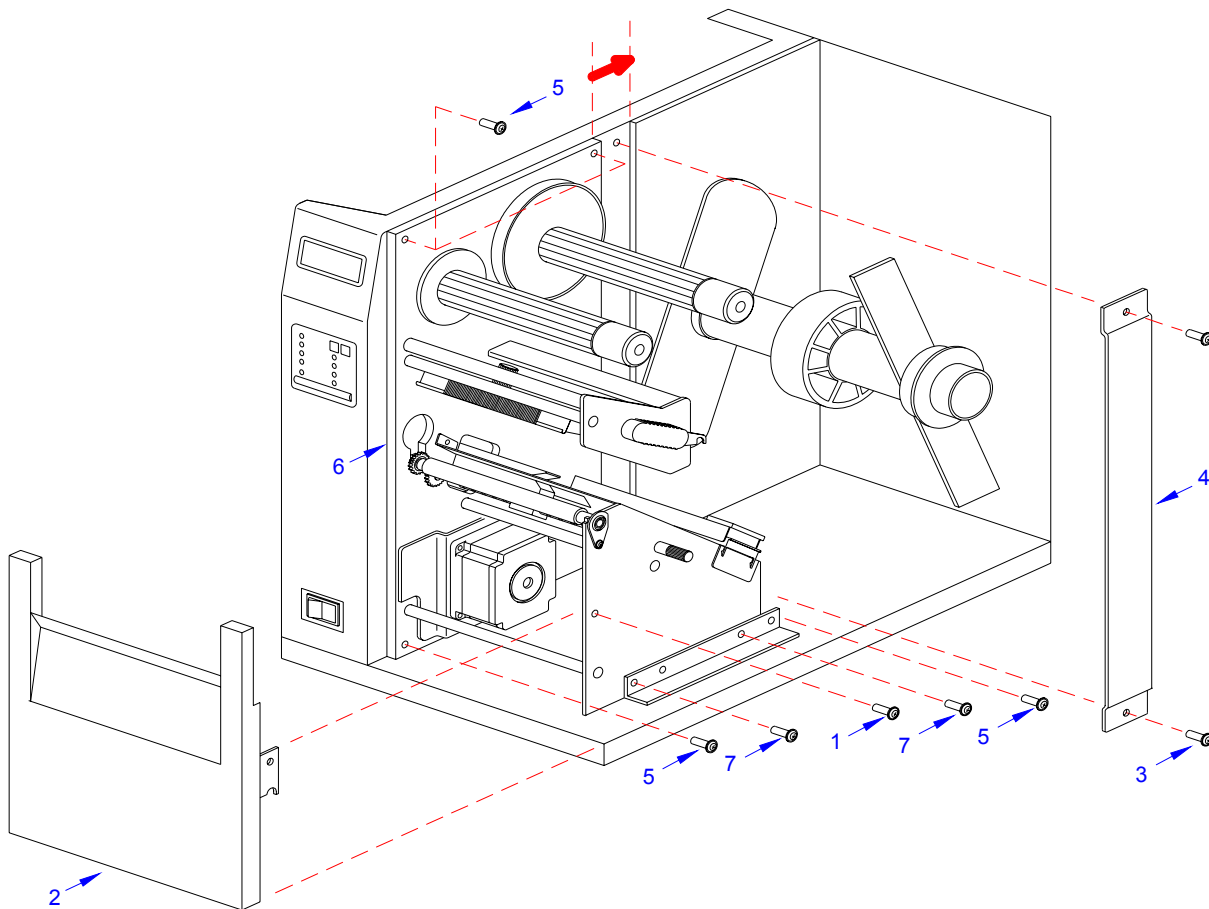
NOTE: Figures 10-1, 10-2, and 10-3 in the Diagrams & Schematics section provide guidance on housing cover, media, and ribbon removal respectively.

- 3 Remove the ribbon and label stock if applicable and leave the print head open.
- 4 Remove screw (1, Figure 4-1a) securing front cover (2) to the printer frame. Lift away front cover (2).

NOTE: The screw is accessible at the rear of the cover on the right side. Manipulate the cover upward and outward to remove.

- 5 Remove two screws (3) to detach spacer panel (4). Lift away spacer panel (4).
- 6 Remove four screws (5) from back panel (6) and two screws (7) from side frame bracket (8) to release the entire print mechanism.

NOTE: The print mechanism will be all that is stainless steel or aluminum. The print mechanism back plate is vertically arranged and reaches from the very top down to the base.



**Figure 4-1a, Label Cutter Installation**

- 7 Slide entire print mechanism fully toward the rear.

**CAUTION:** ENSURE WIRING HARNESSSES ARE NOT PINCHED WHEN ADJUSTING THE PRINT MECHANISM. THE PRINT MECHANISM WHEN ADJUSTED, WILL COVER THE VOID LEFT BY THE REMOVAL OF THE SPACER PANEL.

- 8 Reapply two screws (7) to side frame bracket (8) and four screws (5) to back panel (6) to secure print mechanism.
- 9 Attach two hinge halves (9, Figure 4-1b) to the front base of the printer using two screws (10) for each.

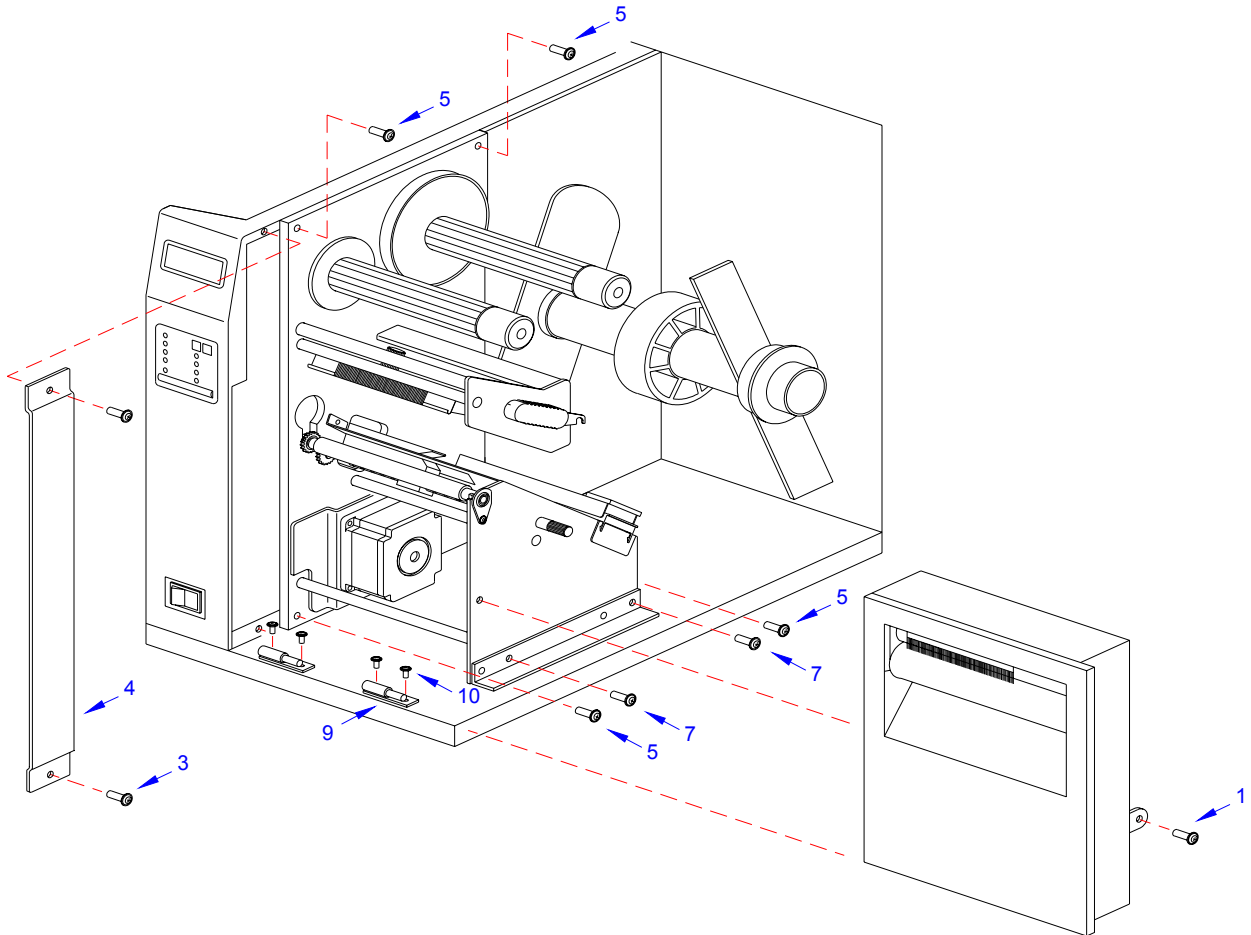
**NOTE:** Before tightening the hinge screws, pull the hinges forward to align them.

- 10 Install spacer panel (4) into the void left in front of print mechanism and secure using two screws (3).

## Section 4: Accessories Installation

- 11 Route the single connector end of cutter wiring harness (11, Figure 4-1c) through the printer side wall from the electric side to the mechanical side.

**CAUTION:** WHEN ROUTING THE WIRING HARNESS, ENSURE THAT IS IS ROUTED IN A MANNER SO AS TO PREVENT PINCHING OR INTANGLEMENTS.



**Figure 4-1b, Label Cutter Installation**

- 12 Connect wiring harness (11) to cutter assembly (12), main circuit board board (13), and power board (14).

**NOTE:** There is one small connector on the wiring harness that will remain unconnected for cutter installation. Ensure the connectors are properly oriented when mating. Equipment damage may occur otherwise.

- 13 Attach cutter assembly (11) to the printer base by connecting their respective hinge halves.
- 14 Remove two screws (15) securing cable shield (16).
- 15 Encase cutter wiring harness (11) with the power cable in cable shield (16) and secure using two screws (15).



## Section 4: Accessories Installation

- 16 Place DSW3-1 in the up position and the DSW3-2 in the down position.
- 17 Load the printer with ribbon and media stock and close/install all housing covers.

NOTE: Refer to Figures 10-1, 10-2, and 10-3 in the Diagrams & Schematics section for housing cover, media, and ribbon installation respectively.

- 18 Restore power and test cycle.

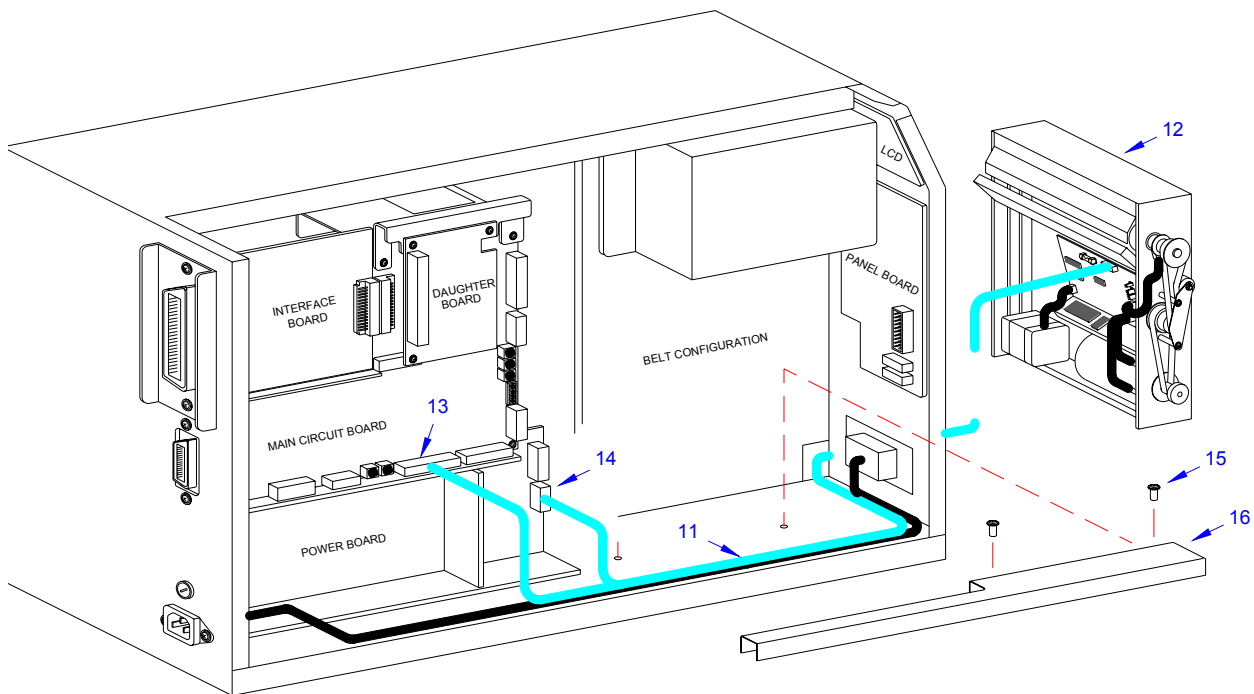


Figure 4-1c, Label Cutter Installation

### DISPENSER INSTALLATION

Installation of the optional label dispenser into the printer adds the convenience of automatic label dispensing. Each label is printed, then peeled from the backing paper and presented at the front of the printer for removal by the operator. A photo-electric sensor detects the presence of a completed label and signals the printer to automatically backfeed the label stock for correct alignment of the next print cycle.

NOTE: Refer to Figure 10-5, Accessories & Sensors Location in the Diagrams & Schematics section if assistance is needed.

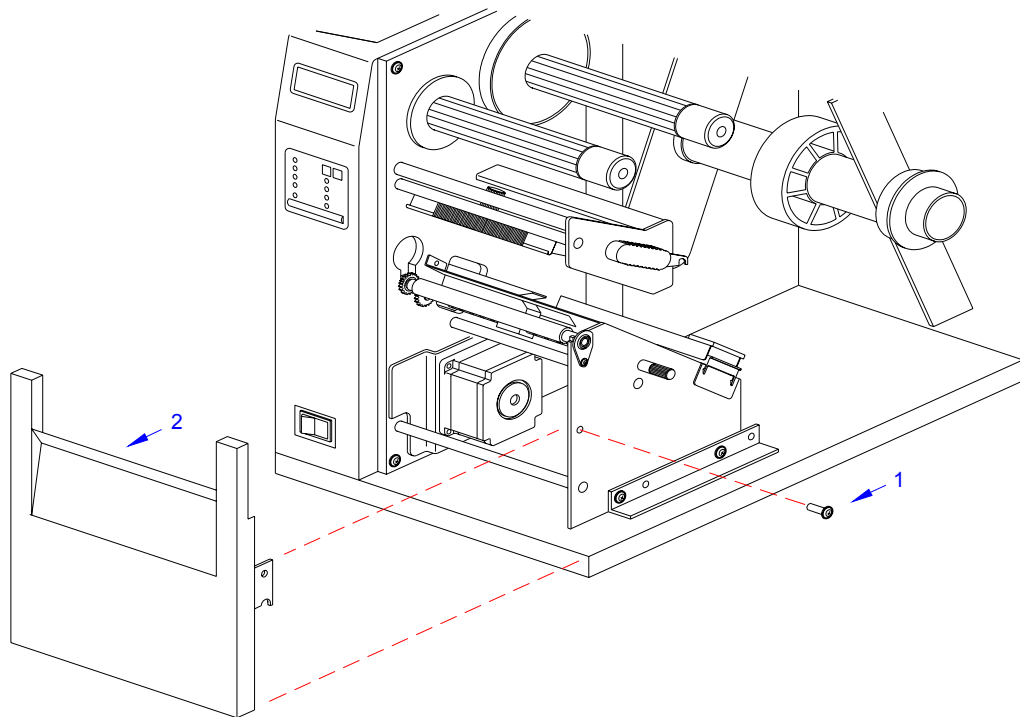
- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

## Section 4: Accessories Installation

**NOTE:** Figures 10-1, 10-2, and 10-3 in the Diagrams & Schematics section provide guidance on housing cover, media, and ribbon removal respectively.

- 3 Remove the ribbon and label stock if applicable and leave the print head open.
- 4 Remove screw (1, Figure 4-2a) securing front cover (2) to the printer frame. Lift away front cover (2).

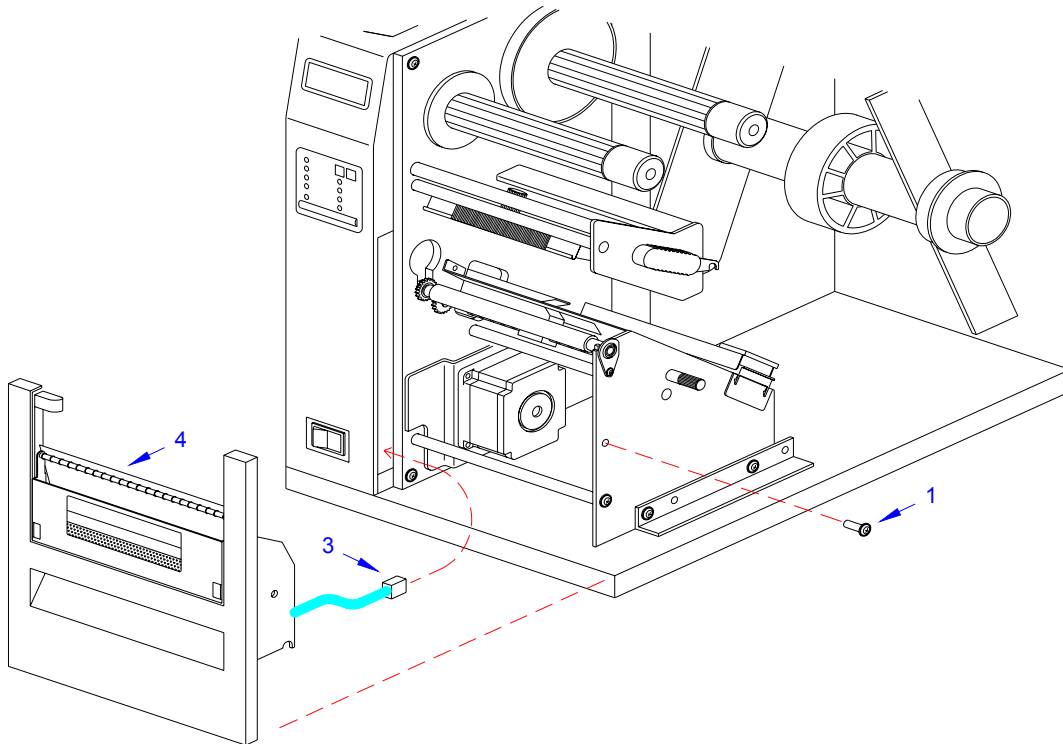
**NOTE:** The screws are accessible at the rear of the cover on the right side. Manipulate the cover upward and outward to remove.



**Figure 4-2a, Dispenser Installation**

- 5 Route dispenser wiring harness (3) through the slot in the printer side wall.

**CAUTION:** WHEN ROUTING THE WIRING HARNESS, ENSURE THAT ITS ROUTED IN A MANNER SO AS TO PREVENT PINCHING OR INTANGLEMENTS.



**Figure 4-2b, Dispenser Installation**

- 6 Insert dispenser (4, Figure 4-2b) in place of removed front cover (2) and secure using screw (1).

**NOTE:** Dispenser installation will only require a single screw. Discard the remaining screw from front cover removal.

- 7 Connect dispenser wiring harness (3, Figure 4-2c) with free end of wiring harness connected to CN10 port (5) of main circuit board.

**CAUTION:** ENSURE THE CONNECTORS ARE PROPERLY ORIENTED WHEN MATING. EQUIPMENT DAMAGE MAY OCCUR OTHERWISE.

- 8 Remove two screws (6) securing cable shield (7).
- 9 Encase cutter wiring harness (3) along with the power cable, in cable shield (7) and secure using two screws (6).
- 10 Place the DSW3-1 and the DSW3-2 dip switches in the up position.
- 11 Load the printer with ribbon and media stock and close/install all housing covers.

NOTE: Figures 10-1, 10-2, and 10-3 in the Diagrams & Schematics section provide guidance on housing cover, media, and ribbon installation.

- 12 Restore power and test cycle.

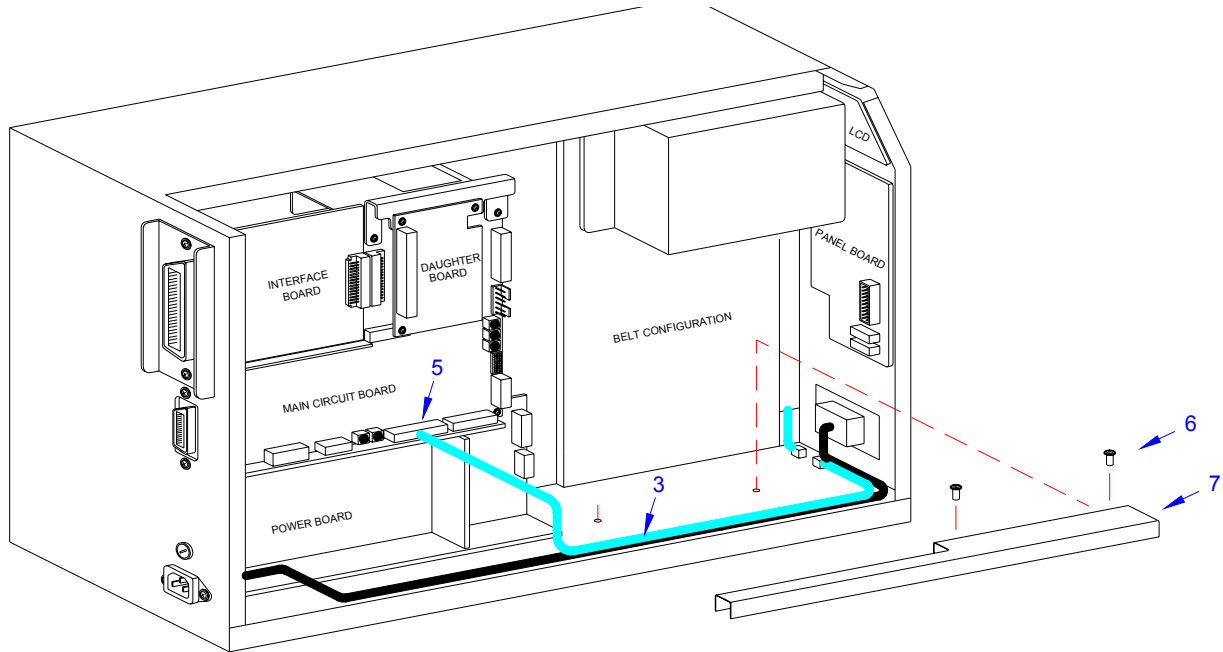


Figure 4-2c, Dispenser Installation

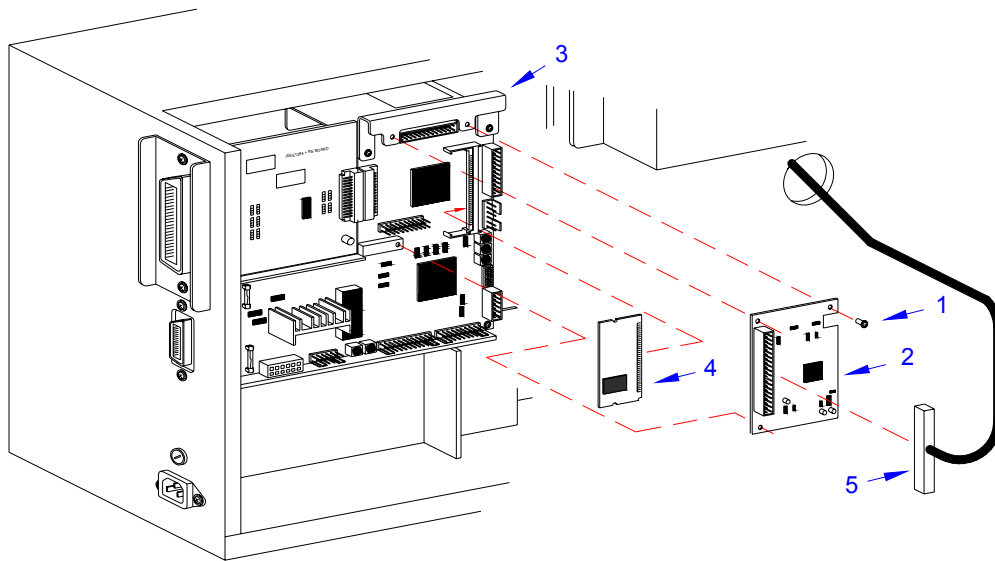
### FLASH MEMORY INSTALLATION

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover removal.

- 3 Remove three screws (1, Figure 4-3) securing daughter board (2) to main circuit board (3).
- 4 Disconnect daughter board (2) from circuit board (3).
- 5 Insert flash card (4) into its reserved brackets on main circuit board (3).

NOTE: The flash card will properly insert into the connector bracket in a single orientation. Ensure that the contactor side is goes first then press inward to index the notched areas.



**Figure 4-3, Flash Card Installation**

- 6 Apply and connect daughter board (2) to main circuit board (3) and secure using three screws (1).
- 7 Ensure power supply wiring harness (5) is fully connected to daughter board (2).
- 8 Factory Reset as directed in the Factory Reset section of this manual.
- 9 Restore power, test cycle, and replace covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover installation.

### PCMCIA MEMORY EXPANSION INSTALLATION

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover removal.

- 3 Remove two screws (1, Figure 4-4a) securing interface board (2) to the rear printer housing.
- 4 Withdraw interface board (2) from printer.
- 5 Remove two screws (3) securing main circuit board (4) to the rear printer housing.
- 6 Remove three screws (5) securing main circuit board (4) to the printer frame.
- 7 Manipulate main circuit board (4) from printer.

NOTE: It is advised that all wiring harnesses remain connected during expansion board installation to prevent the possibility of incorrect connections.

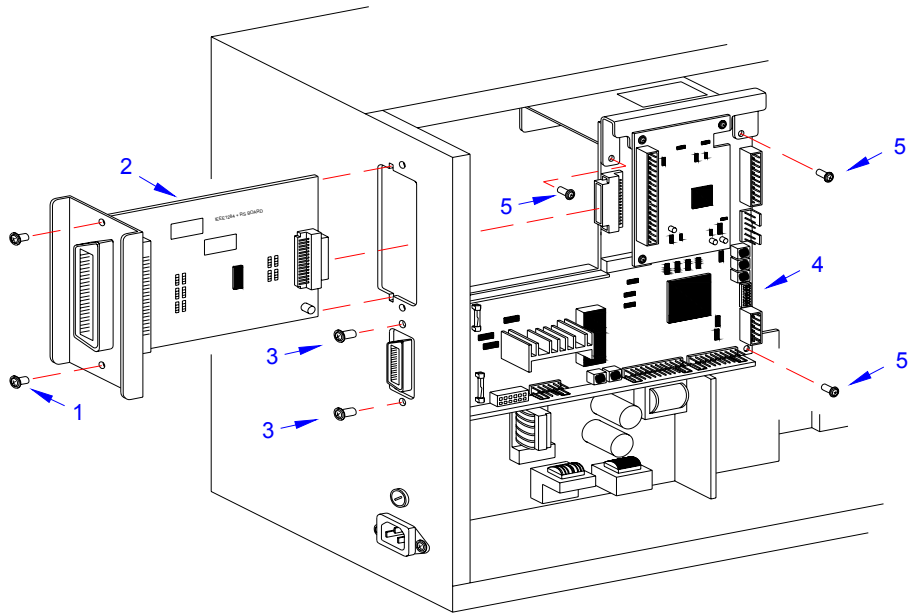


Figure 4-4a, Memory Expansion

8 Insert two long screws (6, Figure 4-4b) into main circuit board (4) from the front.

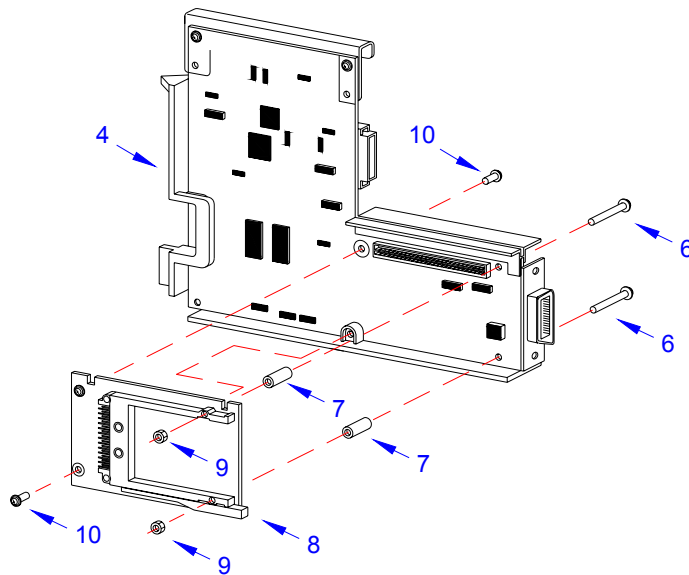


Figure 4-4b, Memory Expansion

## Section 4: Accessories Installation

- 9 Insert a standoff (7) onto each screw (6) from the back side of main circuit board (4).
- 10 Connect expansion board (8) to the back side of main circuit board (4).
- 11 Apply a nut (9) to the end of each screw (6). Tighten securely.
- 12 Apply a screw (10) into the lower left corner of expansion board (8). Tighten securely.
- 13 Apply a screw (10) into the front of main circuit board (4) to secure the upper left corner of expansion board (8). Tighten securely.
- 14 Insert main circuit board (4, Figure 4-4a) into the printer and secure using three screws (5) and two screws (3).
- 15 Insert interface board (2) into its respective slot to connect with main circuit board (4) and secure using two screws (1).
- 16 Restore power, test cycle, and install housing covers.

**NOTE:** Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover installation.

### REAL-TIME CLOCK INSTALLATION

The real time clock chip allows the date and time to be maintained in the local printer rather than using the system clock. It consists of a special clock chip that replaces the EEPROM chip on the main circuit board.

1. Switch the printer off and disconnect the power supply cord.
- 2 Remove the left side housing cover to gain access to the main circuit board.
- 3 Locate and withdraw the EEPROM chip (1, Figure 4-5) from main circuit board (2).

**CAUTION:** IF USING A TOOL TO REMOVE THE EEPROM CHIP, ENSURE THAT IT IS NOT BEING INSERTED BETWEEN THE RECEPTACLE BOARD AND THE CIRCUIT BOARD. DESTRUCTION IN THE CIRCUIT BOARD WILL OCCUR. INSERT THE TOOL BETWEEN THE TWO PIECES OF BLACK PHENOLIC MATERIAL TO PRY THE CHIP FREE.

- 4 Insert clock chip (3) into the vacant connection receptacle (4).
- 5 Connect the power supply cord.
- 6 Factory Reset as directed in the Factory Reset section of this manual.
- 7 Press and hold the LINE key while simultaneously switching the power on.
- 8 When the printer emits one long beep, release the LINE key.

LCD DISPLAY:           INITIALING ROM V00.00.00.00  
LCD DISPLAY:           ADVANCED MODE

- 9 Press the FEED key 11 times to display the prompt to set the calendar.

Section 4: Accessories Installation

LCD DISPLAY:            SET CALENDER  
                                 YES      NO

- 10 Press the LINE key to move the cursor under the yes option, then press FEED to select.

LCD DISPLAY:            CALENDER 00/00/00    00:00

- 11 Enter all of the date data required for calender operation.

NOTE: Press the LINE key to scroll through the numeral options and the FEED key to move the cursor laterally for each date entry.

- 12 Verify proper operation and replace housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover installation.

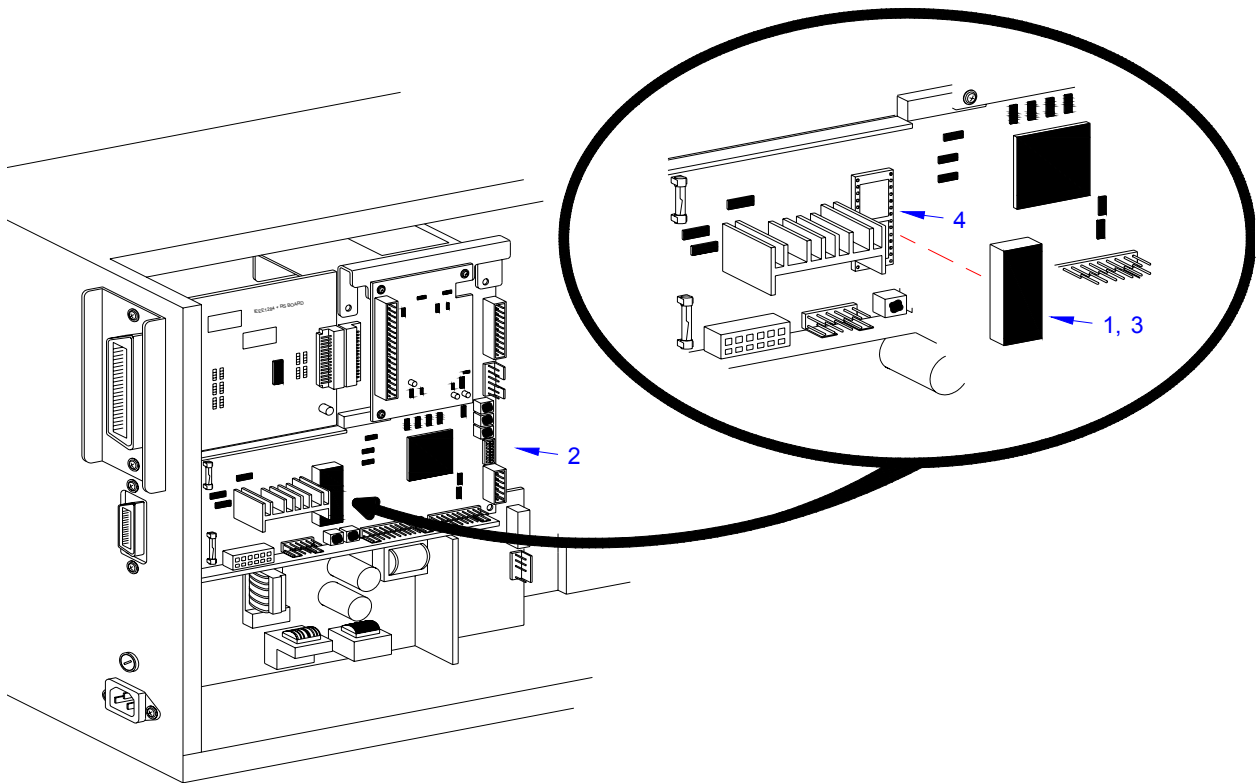


Figure 4-5, Real-Time Clock Installation



### **INTERFACE MODULE UPGRADE**

The printer is typically ordered with a high-speed parallel interface card installed. However, interface requirements sometimes change and an upgrade is desired. All of the interface cards are installed within the same slot located in the rear of the printer with little or no difference in installation methodology. Refer to the Interface Board procedure of the Replacement Procedures section for specific directions for this upgrade.

# 5

## PRINTER CONFIGURATION

This section provides configuration instructions. Figures 10-7 through 10-19 in the Diagrams & Schematics section provides diagrams and charts on print operation sequence.

### DIP SWITCH PANELS

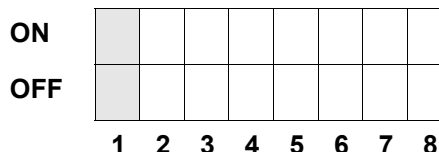
There are two DIP switches (DSW2 and DSW3) located on the front panel under a protective cover. A third DIP switch is located on the RS232C Serial Adapter card and is used to set the RS232C transmit/receive parameters. Each switch is an eight section on/off toggle type switch. The ON position is always oriented upward and consequently, the off is always downward. Switch settings are read by the printer electronics during the power up sequence and will not become effective until the power is cycled.

### RS232 TRANSMIT/RECEIVE SETTING

**Data Bit Selection (DSW1-1):** Sets the printer to receive either 7 or 8 data bits for each byte transmitted.

DSW1-1	SETTING
Off	8 Data Bits
On	7 Data Bits

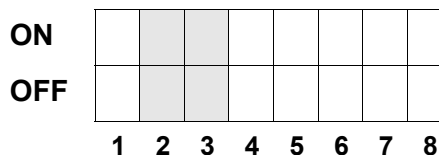
#### DSW1



**Parity Selection (DSW1-2, DSW1-3):** Selects the type of parity used for error detection.

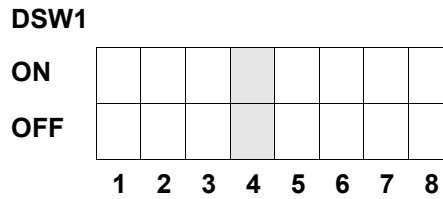
DSW1-1	DSW1-3	SETTING
Off	Off	No Parity
Off	On	Even
On	Off	Odd
On	On	Not Used

#### DSW1



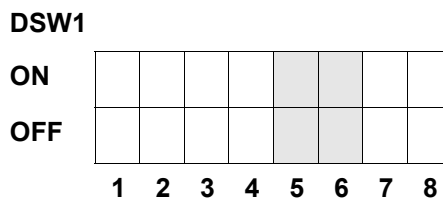
**Stop Bit Selection (DSW1-4):** Selects the number of stop bits to end each byte transmission.

DSW1-4	SETTING
Off	1 Stop Bit
On	2 Stop Bits



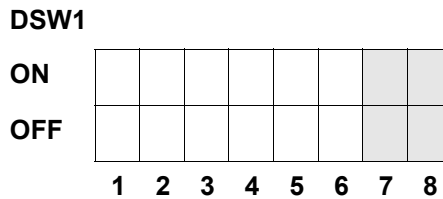
**Baud Rate Selection (DSW1-5, DSW1-6):** Selects the data rate (bps) for the RS232 port.

DSW1-5	DSW1-6	SETTING
Off	Off	9600
Off	On	19200
On	Off	38400
On	On	57600



**Protocol Selection (DSW1-7, DSW1-8):** Selects the flow control and status reporting protocols. Refer to the Interface Specifications section in this manual for more information. (\* Will select the Status 2 protocol if DSW2-8 is ON).

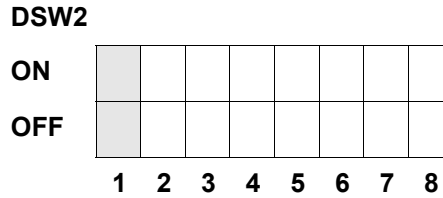
DSW1-7	DSW1-8	SETTING
Off	Off	Rdy/Bsy
Off	On	Xon/Xoff
On	Off	Bi-Com 3
On	On	Bi-Com 4



**PRINTER SET UP**

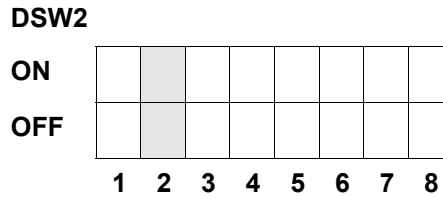
**Print Mode Selection (DSW2-1):** Selects between direct thermal printing and thermal transfer printing.

DSW2-1	SETTING
Off	Therm Xfr
On	Direct Therm



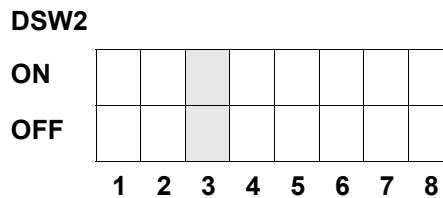
**Sensor Type Selection (DSW2-2):** Selects between the use of a transmissive label gap or a reflective eye-mark sensor.

DSW2-2	SETTING
Off	Gap
On	Eye-Mark



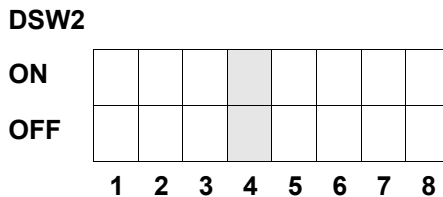
**Head Check Selection (DSW2-3):** When selected, the printer will check for head elements that are electrically malfunctioning.

DSW2-3	SETTING
Off	Disabled
On	Enabled



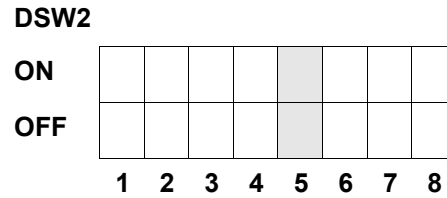
**Hex Dump Selection (DSW2-4):** Selects Hex Dump mode.

DSW2-4	SETTING
Off	Disabled
On	Enabled



**Receive Buffer Selection(DSW2-5):** Selects the operating mode of the receive buffer. Refer to the Interface Specifications section of this manual for more information.

DSW2-5	SETTING
Off	Single Job
On	Multi Job

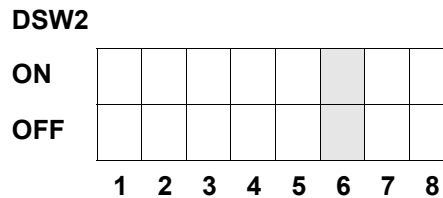


If a 10/100BaseT LAN card is installed, DS2-5 has the following definitions:

DSW2-5	SETTING
Off	ENQ Response
On	Periodic Response

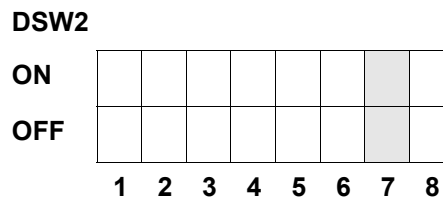
**Firmware Download (DSW2-6):** Places the printer in the Firmware Download mode for downloading new firmware into flash ROM.

DSW2-6	SETTING
Off	Disabled
On	Enabled



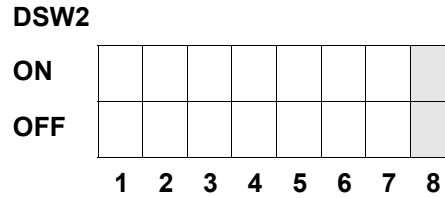
**Protocol Code Selection (DSW2-7):** Selects the command codes used for protocol control. Refer to the Selecting Protocol Control Codes section of the Technical Reference manual for additional information.

DSW2-7	SETTING
Off	Standard
On	Non-Std



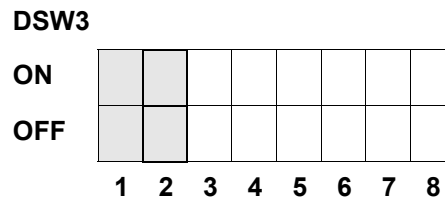
**Status Select(DSW2-8):** For emulating earlier series software commands. Should be used only if problems are encountered when using existing software. This switch will also affect the settings selected by DSW1-7 and DSW1-8.

DSW2-8	SETTING
Off	Status 3 & 4 Enabled
On	Status 2 & 3 Enabled



**Backfeed Sequence (DSW3-1, DSW3-2):** Backfeed is used to correctly position the label for application and then retract the next label to the proper print position. This operation can be performed immediately after a label is printed and used, or immediately prior to the printing of the next label.

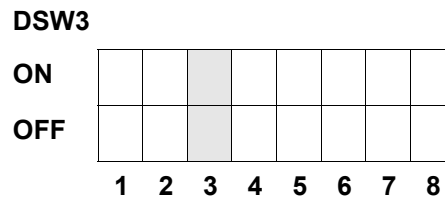
DSW3-1		SETTING
Off	Off	Continuous
Off	On	Tear-Off
On	Off	Cutter*
On	On	Dispenser



*\* Defaults to Continuous if cutter not installed*

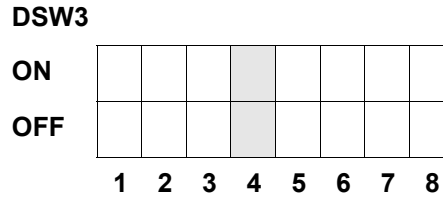
**Label Sensor Selection (DSW3-3):** Enables or disables the Label Sensor. If the Sensor is enabled, it will detect the edge of the label and position it automatically. If it is disabled, the positioning must be under software control using Line Feed commands.

DSW3-3	SETTING
Off	Sensor Used
On	Not Used



**Back-Feed Selection (DSW3-4):** When Back-Feed is enabled, the printer will position the last printed label for dispensing and retract it before printing the next label. The amount of backfeed offset is adjustable.

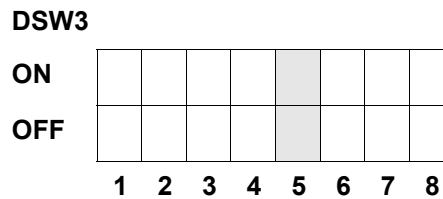
DSW3-4	SETTING
Off	Enabled
On	Disabled



**External Signal Interface:** Refer to the Interface Specifications section for information on External Signals.

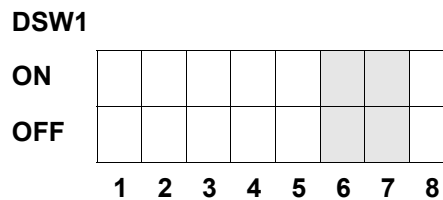
**EXT Print Start Signal Selection (DSW3-5):** Allows an external device to initiate a label print for synchronization with the applicator or other external device. When DSW3-5 is On, the unit is in the Continuous print mode, Backfeed is disabled and External Signals are ignored.

DSW3-5	SETTING
Off	Disabled
On	Enabled



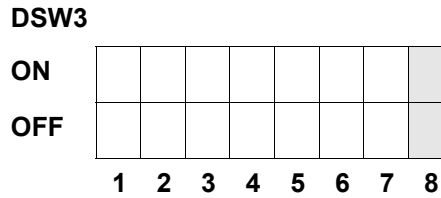
**External Signal Type Selection (DSW3-6, DSW3-7):** Both the polarity and signal type (level or pulse) of the external print synchronizing signal can be selected.

DSW3-6	DSW3-7	SETTING
Off	Off	Type 4
Off	On	Type 3
On	Off	Type 2
On	On	Type 1



**Repeat Print via External Signal (DSW3-8):** Allows the applicator or other external device to reprint the current label in the print buffer.

DSW3-8	SETTING
Off	Disabled
On	Enabled



### DEFAULT SETTINGS

All switches are placed in the Off default position for shipping. This will result in the following operating configuration:

DEFAULT SETTINGS	
Communications	8 data bits, no parity, 1 Stop bit, 9600 Baud
Protocol:	Ready/Busy
Sensor	Gap Sensor
Receive Buffer	Multi Job
Mode	Batch/continuous
Label Sensor	Sensor Used
Backfeed	Enabled
External Signals	Enabled

### SOFTWARE DEFAULT SETTINGS

The printer stores the software settings upon receipt and uses them until they are again changed by receipt of a command containing a new setting. These settings are stored in non-volatile memory and are not affected by powering the printer off. The printer may be reset to use the default software settings by depressing the LINE and FEED keys simultaneously while powering the printer on. This will result in the following default configuration.

SOFTWARE DEFAULT SETTINGS	
Print Darkness	3
Print Speed	6 Inches Per Second (3 for M84Pro-6)
Print Reference	Vertical = 0000, Horizontal = 0000
Print Offset	+0
Zero	No Slash
Ignore CR/LF	Disabled
Character Pitch	Proportional
Auto On Line	Enabled
Feed on Error	Enabled



<b>SOFTWARE DEFAULT SETTINGS</b>	
Feed Reprint	Disabled
Priority	Command
Language	English
CC1 Mem Select	Card
Eurocode	D5 <sub>H</sub>

Once the default operation is complete, a DEFAULT COMPLETED message will be displayed on the LCD panel. The printer should be powered off while this message is being displayed (or after the beep is heard). This saves the default settings in the non-volatile memory where they will be automatically loaded the next time the printer is powered on.

**DEFAULT COMPLETED**

## POTENTIOMETER ADJUSTMENTS

### PITCH

After the pitch has been set with the LCD Control Panel, it is sometimes desirable to make minor adjustments. This can be done using the PITCH potentiometer on the top panel. This potentiometer is set at the factory so that it has a range of +/- 3.75 mm. The midpoint setting should have no effect on the pitch. Turning the potentiometer all the way clockwise should move the print position 3.75 mm up towards the top edge of the label. Turning it all the way counterclockwise should move the print position down 3.75 mm.

NOTE: Adjusting the PITCH potentiometer will affect the stop position of the label.

1. Press and hold the FEED key while switching the power switch on.
2. Release the FEED key upon hearing a beep from the printer.

NOTE: The LCD display will inquire what type of test label is desired.

3. Use the Cursor keys to step to the desired option and press the ENTER key to select.
4. Use the Cursor keys to step to the test label size and press the ENTER key to select.
5. Standby for the printer to begin printing test labels continuously.
6. Adjust the PITCH potentiometer until the first print position is at the desired location on the label.

NOTE: If the potentiometer does not have enough range, it will be necessary to change the pitch setting using the front panel display.

7. Press the FEED key to cease printing when complete.
8. Power the printer off and then back on, to exit the test label mode.

### **BACKFEED OFFSET**

When a label is printed it must be correctly positioned for dispensing and application. Thusly, the printer advances the label stock sufficiently for the printed label to be dispensed. After the label has been removed for application, the label stock must be withdrawn back into label printing position. The backfeed function repositions the label stock for printing.

The Backfeed function is enabled if DSW3-4 is in the Off position. When enabled, placing DSW3-1 in the Off position will cause the backfeed operation to be performed immediately before each label is printed. If DSW3-1 is in the On position, the backfeed operation is performed as soon as the dispensed label has been printed and taken from the printer.

The amount of backfeed is controlled by the OFFSET potentiometer on the DIP Switch Panel inside the cover. The full adjustment range is +/- 3.75 inches from nominal. The backfeed adjustment procedure is as follows:

1. Turn the printer on.
2. Press the LINE key to place the printer in the Off-Line status.
3. Press the FEED key to feed out a blank label while observing the dispense position.
4. Adjust the OFFSET potentiometer on the front control panel as deemed necessary.
5. Repeat steps 4 and 5 until a label is fully released from the liner.

### **DISPLAY**

This potentiometer is used to adjust the contrast of the LCD display for optimum viewing under various lighting conditions.

### **PRINT**

The PRINT potentiometer is used to adjust the amount of heat (i.e., power) applied to the head for printing. It provides a continuous range of adjustment. Maximum print darkness is obtained by turning the potentiometer all the way clockwise and a maximum counterclockwise setting will give the lightest print.

<p>NOTE: Adjustment of the PRINT potentiometer will affect the darkness in all of the command code, speed, and darkness ranges.</p>
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### **LCD PANEL PRINTER CONFIGURATION**

The LCD Panel allows the printer to communicate with the operator. The operator communicates with the printer largely through the use of the LINE and FEED keys. Many settings may also be controlled via software commands. Where software commands and control panel settings conflict, the printer will always use the last valid setting.

There are seven modes of operation. To enter the desired mode, the KEY SEQUENCE combination listed in the table below must be performed. The initial LCD display message is shown for each mode.

<b>CONFIGURATION MODES</b>		
<b>MODE</b>	<b>KEY SEQUENCE</b>	<b>INITIAL DISPLAY</b>
Normal	POWER	ONLINE QTY:000000
Advanced	LINE + POWER	ADVANCED MODE
Test Print	FEED + POWER	TEST PRINT MODE CONFIGURATION
Default Setting	LINE + FEED + POWER	DEFAULT SETTING YES NO
Clear Non-Standard Protocol	DSW2-7 ON + LINE + FEED + POWER	ALT. PROTOCOL
Protocol Code Download	DSW2-7 ON + POWER + LINE	USER DOWNLOAD
Hex Dump	DSW2-4 ON + POWER	ONLINE QTY: 000000

<b>NORMAL MODE</b>	
The printer initially powers on in the ONLINE mode. The user can access the User Settings using the following procedures.	
<b>LCD DISPLAY</b>	<b>DEFINITION</b>
<b>V 05.00.03.00 INITIALIZING</b>	Displays the firmware during the initialization.
<b>ONLINE QTY:000000</b>	The LCD will display the ONLINE status on the top line and the label quantity (QTY) status on the bottom. The message will be changed to OFFLINE whenever the printer is switched offline by pressing the LINE key. When a print job is received, the quantity line will indicate the number of labels to be printed. As the label job prints, the display will indicate the number of labels in the print job that remains to be printed.
<b>OFFLINE 000000</b>	Press the LINE key once. When the display changes to OFFLINE, press the FEED and LINE keys simultaneously for more than one second and release.
<b>PRINT DARKNESS 1 2 3 4 5</b>	The LCD now displays the Print Darkness selections. The current setting is indicated by a cursor over one of the range settings. There are 5 possible selections. The lowest setting represents the lightest print and the highest setting the darkest print.  1. Press the Cursor keys to step the cursor to the desired option. 2. Press the ENTER key to select the option and advance to the next display
<b>PRINT SPEED 2 4 6 8 10</b>	The current setting is indicated by the cursor.  1. Use the Cursor keys to step the cursor to the desired option. 2. Press the ENTER key to select the option and advance to the next display

LCD DISPLAY	DEFINITION
<b>PITCH OFFSET</b> <b>+ 00mm</b>	<p>The label Pitch is the distance from the leading edge (the edge that comes out of the printer first) of a label and the leading edge of the next label. The leading edge position of the label can be adjusted relative to the print head +/- 49 mm in increments of 1mm. Once the position is set, it can be fine adjusted +/- 3.75 mm using the PITCH potentiometer.</p> <ol style="list-style-type: none"> <li>1. The cursor will initially be positioned over the Pitch Direction setting. Use the LINE key to step to the positive (+) or negative (-) selection. A positive selection moves the leading edge of the label forward (away from the print head) while a negative selection moves the leading edge of the label back into the mechanism.</li> <li>2. Press the FEED key to select the option and advance the cursor to the Offset selection.</li> <li>3. Use the CURSOR keys to step the first digit of the counter to the desired option. The display will increment one step each time the Cursor keys are pressed. The maximum setting is 5.</li> <li>4. Press the FEED key to select the option and advance the cursor to the second digit. Again use the CURSOR keys to step to the desired option.</li> <li>5. Press the FEED key to select the option and advance to the next display</li> <li>6. Print a test label after completing the adjustments to ensure they are correct.</li> </ol>
<b>CANCEL PRINT JOB</b> <b>YES NO</b>	<p>Selecting the YES option will cause all print jobs to be cleared and not recovered. The default option is NO.</p> <ol style="list-style-type: none"> <li>1. Use the Cursor keys to step the cursor to either the YES or NO option.</li> <li>2. Press the ENTER key to select the option and advance to the next display</li> </ol>
<b>CANCEL PRINT JOB</b> <b>COMPLETED</b>	<p>The printer will beep 3 times and the display will appear for 3 seconds before returning to the initial On-Line Normal Mode after the print jobs are cleared. The printer must be taken off-line and the user settings must be re-entered to change any of the settings.</p>

<b>ADVANCED MODE</b>	
<p>An Advanced Mode is provided to make adjustments that require only occasional changes. Since they affect the basic operation of the printer, the procedure for entering this mode is designed to prevent someone from accidentally changing the settings.</p>	
LCD DISPLAY	DEFINITION
<b>V 05.00.03.00</b> <b>INITIALIZING</b>	<p>Displays the firmware during the initialization.</p>
<b>ADVANCED MODE</b>	<p>Press and hold the LINE key while switching the power switch On. Release the LINE key when the printer emits one long beep. Press FEED.</p>
<b>DARKNESS RANGE</b> <b>A B</b>	<p>This setting allows the selection of darkness ranges. Option B is the darker image of the two. Use the LINE key to move the cursor to the desired option and press the FEED key to select.</p>

LCD DISPLAY	DEFINITION
<b>ZERO SLASH</b> <b>YES      NO</b>	<p>This setting determines if a zero is printed with or without a slash. This setting can also be controlled via software commands. When YES is selected, the printer internal fonts will have a slash through the center of the zero character.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to either the YES or NO option.</li> <li>2. Press the FEED key to select the option and advance to the Auto Online display.</li> </ol>
<b>AUTO ONLINE</b> <b>YES      NO</b>	<p>This setting determines the mode in which the printer powers up. If YES is selected, the printer powers up in the ON-LINE mode and is ready to print. If NO is selected, the printer powers up in the OFF-LINE mode and must be manually placed in the ON-LINE mode by pressing the LINE key before it is ready to print.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to either the YES or NO option.</li> <li>2. Press the FEED key to select the option and advance to the Print Offset display.</li> </ol>
<b>PRINT OFFSET</b> <b>V:+0000      H:+0000</b>	<p>Vertical Offset is the distance down from the leading edge (the edge of the label that comes out of the printer first) to the first vertical print position. A positive setting moves the label edge out of the printer while making it negative moves it back into the printer. Horizontal Offset is the distance that the label image is shifted either to the right or left on the label. The image is shifted to the left (towards the inside edge of the label) for a positive setting and it is shifted to the right (towards the outside edge of the label) for a negative setting. This setting changes the base reference point for all subsequent label jobs. It's effect is identical to the &lt;ESC&gt;A3 Base Reference point command. Since the printer moves the label in discrete steps equal to the size of the print dot, the units of measure for Vertical and Horizontal Offset distance is dots. The maximum values that can be set is 3600 for vertical offset and 3199 for horizontal. If the allowable limit is exceeded, the printer will not accept the selection.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to the desired option. The display will increment one step for each time a LINE key is pressed.</li> <li>2. Press the FEED key to select the option and advance to the next display</li> <li>3. Repeat step 1 and 2 for character requirement.</li> <li>4. Press the ENTER key to select the option and advance to the next display</li> </ol> <p><i>Note: This setting can be overridden by the Base Reference Point Command.</i></p>
<b>SET CALENDAR</b> <b>YES      NO</b>	<p>The Calendar is a optional feature in the M10e printer allowing the date and time to be set manually using the LCD Display or via the &lt;ESC&gt;WT Calendar Set command. This screen will not be displayed if the Calendar Option is not installed. The last setting (manual or software command) received by the printer will be the value used. The format of the display is YY/MM/DD hh:mm (Year/Month/Day/hours:minutes). The date format is fixed and cannot be changed. This display will only appear if the Calendar Option has been installed.</p> <ol style="list-style-type: none"> <li>1. Press the LINE key to step the cursor to either the YES or NO option. The YES option will enable the Calendar feature and NO will disable.</li> <li>2. Press the FEED key to select the option and advance to the next display</li> </ol>

LCD DISPLAY	DEFINITION
<b>CALENDAR</b> <b>00/00/00 00:00</b>	<ol style="list-style-type: none"> <li>1. Year - Press the LINE key to increase and the FEED key to decrease the character value to the desired option. The first display shown will have the cursor over the two digit year selection. Press the Enter key to select the option and advance to the Month position.</li> <li>2. Month - Press the LINE key to increase and the FEED key to decrease the character value to the desired option. Press the Enter key to select the option and advance to the Day position.</li> <li>3. Day - Press the LINE key to increase and the FEED key to decrease the character value to the desired option. Press the Enter key to select the option and advance to the Hour position.</li> <li>4. Hour - Press the LINE key to increase and the FEED key to decrease the character value to the desired option. The entry must coorespond with a 24 hour day. Press the Enter key to select the option and advance to the Hour position.</li> <li>5. Minute - Press the LINE key to increase and the FEED key to decrease the character value to the desired option. Press the Enter key to select the option and advance to the Ignore CR/LF display.</li> </ol>
<b>IGNORE CR/LF</b> <b>YES NO</b>	<p>This selection tells the printer to strip out all carriage return/line feed pairs (CR/LF ) from the data stream, including graphics and 2D bar codes. It is used primrily to maintain compatibility with earlier models of SATO printers.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to either the YES or NO option.</li> <li>2. Press the FEED key to select the option and advance to the Character Pitch display.</li> </ol>
<b>CHARACTER PITCH</b> <b>PROP FIXED</b>	<p>This selection allows the default character pitch to either be set for fixed character spacing or proportional character spacing.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to the desired option.</li> <li>2. Press the FEED key to select the option and advance to the Advanced Mode display.</li> </ol>
<b>ADVANCED MODE</b>	<p>To exit the Advanced mode, power the printer off and then back on.</p>

<b>CARD MODE</b>	
<p>The Card Mode is entered from the Advanced Mode display. The Card Mode allows the operator to manage the Expanded Memory (PCMCIA Card or Internal Expanded Flash ROM).</p>	
LCD DISPLAY	DEFINITION
<b>V 05.00.03.00</b> <b>INITIALIZING</b>	<p>Displays the firmware during the initialization.</p>
<b>ADVANCED MODE</b>	<p>The Card Mode is entered from the Advanced Mode display by pressing the right LINE key once.</p>
<b>CARD MODE</b>	<p>The Card Mode display indicates that the printer is in the Card Mode. To advance to the first selection, press the FEED key.</p>

LCD DISPLAY	DEFINITION
<b>MEM SELECT (CC1) CARD MEMORY</b>	<p>This selection determines which type of optional expanded memory will be addressed as "CC1" in the command streams. The CARD selection specifies the optional PCMCIA card as CC1 and the optional Expanded Flash ROM as CC2. The Memory selection specifies the optional Expanded Flash ROM as CC1 and the optional PCMCIA card as CC2.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to the desired option.</li> <li>2. Press the FEED key to select the option and advance to the next display</li> </ol>
<b>CARD-&gt;MEMORYCOPY TRUETYPEFONT Y/N</b>	<p>This selection allows TrueType fonts to be copied from the PCMCIA Memory card installed in the Memory Card slot.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the Card to Memory SATO Font Copy mode.</li> </ol>
<b>COPY START YES NO</b>	<ol style="list-style-type: none"> <li>2. Confirm the selection by stepping the cursor to the Yes option. If No is selected, the display will return to the previous selection.</li> </ol>
<b>TRUETYPEFONTCOPY COPYING</b>	<ol style="list-style-type: none"> <li>3. Press the FEED key to select the option. If Yes was selected the copy process will begin.</li> </ol>
<b>TRUETYPE FONTCOPY COMPLETED</b>	<ol style="list-style-type: none"> <li>4. Once the copy process is completed, press the FEED key to step the display.</li> </ol>
<b>CARD COPY/FORMAT XXXXXXX ERROR</b>	<ol style="list-style-type: none"> <li>5. If an error is encountered in the copy process, one of the following messages will be displayed on the second line: <ul style="list-style-type: none"> <li>R/W Error Indicates a Read/Write error occurred</li> <li>No Card Error Indicates no card was recognized</li> <li>Mem Full Error Indicates that there is insufficient memory available.</li> </ul> </li> </ol>
<b>CARD-&gt;MEMORYCOPY SATOFONT Y/N</b>	<p>This selection allows SATO fonts to be copied from the PCMCIA Memory card installed in the Memory Card slot.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the Card to Memory Copy All mode.</li> </ol>
<b>COPY START YES NO</b>	<ol style="list-style-type: none"> <li>2. Confirm the selection by stepping the cursor to the Yes option. If No is selected, the display will return to the previous selection.</li> </ol>
<b>SATO FONT COPY COPYING</b>	<ol style="list-style-type: none"> <li>3. Press the FEED key to select the option. If Yes was selected the copy process will begin.</li> </ol>
<b>SATO FONT COPY COMPLETED</b>	<ol style="list-style-type: none"> <li>4. Press the FEED key to advance to next display.</li> </ol>
<b>CARD COPY/FORMAT XXXXXXX ERROR</b>	<ol style="list-style-type: none"> <li>5. If an error is encountered in the copy process, one of the following messages will be displayed on the second line: <ul style="list-style-type: none"> <li>R/W Error Indicates a Read/Write error occurred</li> <li>No Card Error Indicates no card was recognized</li> <li>Mem Full Error Indicates that there is insufficient memory available.</li> </ul> </li> </ol>

LCD DISPLAY	DEFINITION
<b>MEMORY-&gt;CARDCOPY ALL &lt;0MB&gt; Y/N</b>	This selection allows the entire contents from the optional Expanded Memory to be copied to the PCMCIA Memory card installed in the Memory Card slot.  1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the Card to Memory Copy All mode.
<b>COPY START YES NO</b>	2. Confirm by stepping the cursor to the Yes option. If No is selected, the display will return to the previous selection.
<b>CARD-&gt;MEMORY COPY COPYING</b>	3. Press the FEED key to select the option. If Yes was selected the copy process will start.
<b>CARD-&gt;MEMORYCOPY COMPLETED</b>	4. Press the FEED key to advance to the next display.
<b>CARD COPY/FORMAT XXXXXXX ERROR</b>	5. If an error is encountered in the copy process, one of the following messages will be displayed on the second line:  R/W Error Indicates a Read/Write error occurred  No Card Error Indicates no card was recognized  Mem Full Error Indicates that there is insufficient memory available.
<b>MEMORY-&gt;CARDCOPY ALL &lt;0MB&gt; Y/N</b>	This selection allows the entire contents of the optional Expanded Memory to be copied to the PCMCIA Memory card installed in the Memory Card slot.  1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the Card to Memory Copy All mode display.
<b>COPY START YES NO</b>	2. Confirm the selection by stepping the cursor to the Yes selection. If No is selected, the display will return to the previous selection.
<b>MEMORY-&gt;CARDCOPY COPYING</b>	3. Press the FEED key to select the option. If Yes was selected the copy process will begin.
<b>MEMORY-&gt;CARDCOPY COMPLETED</b>	4. Once the copy process is completed, press the FEED key to step the display.
<b>CARD COPY/FORMAT XXXXXXX ERROR</b>	5. If an error is encountered in the copy process, one of the following messages will be displayed on the second line:  R/W Error Indicates a Read/Write error occurred  No Card Error Indicates no card was recognized  Mem Full Error Indicates that there is insufficient memory available.
<b>CARD-&gt;MEMORYCOPY PROGRAM Y/N</b>	This selection allows the printer firmware to be copied from the PCMCIA Memory Card to the printer.  1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the mode display.
<b>COPY START YES NO</b>	2. Confirm the selection by stepping the cursor to the Yes option. If No is selected, the display will return to the previous selection.
<b>CARD-&gt;MEMORY COPY COPYING</b>	3. Press the FEED key to select the option. If Yes was selected the copy process will begin.



LCD DISPLAY	DEFINITION
<b>CARD-&gt;MEMORYCOPY COMPLETED</b>	4. Press the FEED key to advance to the next display when the copy process is complete.
<b>CARD COPY/FORMAT XXXXXXX ERROR</b>	5. If an error is encountered in the copy process, one of the following messages will be displayed on the second line:  R/W Error        Indicates a Read/Write error occurred No Card Error   Indicates no card was recognized Mem Full Error   Indicates that there is insufficient memory available.
<b>MEMORY-&gt;CARDCOPY PROGRAM    Y/N</b>	This selection allows the current firmware installed in the printer to be copied to a PCMCIA Memory Card.  1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the mode display.
<b>COPY START YES            NO</b>	2. Press the FEED key to select the option. If Yes is selected the copy process will begin. If No is selected, the display will return to the previous selection.
<b>MEMORY-&gt;CARDCOPY COMPLETED</b>	3. Press the FEED key to advance to the next display when the copy process is complete.
<b>CARD COPY/FORMAT XXXXXXX ERROR</b>	4. If an error is encountered in the copy process, one of the following messages will be displayed on the second line:  R/W Error        Indicates a Read/Write error occurred No Card Error   Indicates no card was recognized Mem Full Error   Indicates that there is insufficient memory available.
<b>CARD FORMAT YES            NO</b>	Before a PCMCIA card can be used, it must be formatted. <i>Note: Formatting a card destroys all data currently stored on the card.</i>  1. Use the CURSOR keys to step the cursor to desired option. If Yes is selected, the printer will enter the Card Format mode. If No is selected, the display will advance to the mode display.  2. Press the ENTER key to select the option and advance to the next display
<b>MEMORY FORMAT YES            NO</b>	Before the internal Expanded Memory can be used, it must be formatted. <i>Note: Formatting the Memory will destroy any stored data.</i>  1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will enter the Memory Format mode. If No is selected, the display will advance to the mode display.  2. Press the FEED key to select the option and advance to the next display
<b>CARD MODE</b>	To exit the Card Mode, power the printer off and then back on.

<b>SERVICE MODE</b>	
The Service Mode is entered from the Card Mode through the Advanced Mode. The Service Mode allows the operator to set up the basic operation parameters of the printer.	
<b>LCD DISPLAY</b>	<b>DEFINITION</b>
<b>V 05.00.03.00 INITIALIZING</b>	Displays the firmware during the initialization.
<b>ADVANCED MODE</b>	The Service Mode is entered from the Advanced Mode display by pressing the right LINE key twice.
<b>SERVICE MODE</b>	The Service Mode display indicates that the printer is in the Card Mode. To advance to the first selection, press the FEED key.
<b>GAP INPUT</b> <b>[X.XXV]                          [X.XV]</b>	The printer determines the location of the leading edge of the label by measuring the difference between light levels when it sees either a label edge or a black "EYE" mark. This adjustment allows the threshold voltage level to be manually set between the maximum and minimum light levels. DIP switch DSW2-2 selects the sensor type. If DSW2-2 is in the OFF position, the setting will be for a See-Thru (or Gap) sensor and the LCD will display "GAP" on the top line along with the current setting. If DSW2-2 is in the ON position, the LCD will display "EYE" on the top line with its current setting. If the value entered for the bottom line setting is "0.0V", then the printer will automatically calculate the setting when the first label is fed after the printer is powered on or the head is closed. There are some instances where the automatically calculated value must be adjusted to ensure reliable label feeding, such as when the backing opacity or the reflectance of the EYE mark varies significantly within a roll of labels or between label rolls. In these instances the value should be set using the following procedures.

LCD DISPLAY	DEFINITION
<p><b>GAP INPUT</b>      [X.XXV]                          [X.XV]</p>	<p>GAP - When setting the “gap” threshold, the voltage shown on the top line of the display must be measured with nothing but the backing in the sensor and then again with a label still attached to the backing. The formula to be used for setting the threshold is:</p> <p>(High Voltage Level + Low Voltage Level) x 0.5 = Start Value</p> <ol style="list-style-type: none"> <li>1. Insert a label still attached to the backing into the sensor and close the Label Hold-Down. Record the voltage shown on the top line of the LCD panel. This line should have the message “GAP” on the top line (DIP switch DSW2-2 = OFF). Ensure the label is fully under the sensor.</li> <li>2. Strip the label from the backing and insert the backing strip under the sensor and close the Label Lid. Record the voltage shown on the top line of the LCD panel. The voltage ranges measured should be within the following ranges:                      Backing with label = 2.0V to 3.5V                      Backing without label = Less than 1.0V                      If the measured values are outside this range, it may be difficult finding a value that will work properly under all conditions. If this is the case, a higher quality label may be needed to get adequate performance.</li> <li>3. Calculate the starting point voltage using the formula.</li> <li>4. Use the LINE and FEED keys to step the counter to the desired setting. The reading will advance to a setting of 4.9 (the maximum voltage). If a value of “0.0” is set, the printer will automatically set the level each time the printer is powered on with labels loaded and the head is closed.</li> <li>5. Once the setting is correct, pressing the ENTER key will accept the setting and advance the next display.</li> </ol>

LCD DISPLAY	DEFINITION
<b>EYE INPUT</b> <b>[X.XXV]</b> <b>[X.XV]</b>	<p>EYE - When setting the “eye” threshold, the voltage must be measured with nothing but the label under the sensor and then again with the printed “eye” mark under the sensor. The formula for this is:</p> $(High\ Voltage\ Level + Low\ Voltage\ Level) \times 0.5 = Start\ Value$ <ol style="list-style-type: none"> <li>1. Insert a label into the sensor and close the label holder. Make sure the printed “eye” mark is not under the sensor. Record the voltage shown on the top line of the LCD panel. This line should have the message “EYE” on the top line (DIP switch DSW2-2 = ON).</li> <li>2. Pull the label forward until the “eye” mark is positioned under the sensor (the voltage reading should be at its highest point). Record the voltage shown on the top line of the LCD panel. The voltage ranges measured should be within the following ranges:  Eye-Mark = 2.5V to 3.5V  Label Only = Less than 1.0V</li> </ol> <p>If the measured values are outside this range, it may be difficult finding a value that will work properly under all conditions. If this is the case, a higher quality label may be needed to get adequate performance.</p> <ol style="list-style-type: none"> <li>3. Calculate the starting point voltage using the formula.</li> <li>4. Use the LINE and FEED keys to step the counter to the desired setting. The reading will advance to a setting of 4.9 (the maximum voltage). If a value of “0.0” is set, the printer will automatically set the level each time the printer is powered on with labels loaded or the head is closed.</li> <li>5. Once the setting is correct, pressing the ENTER key will accept the setting and advance to the next display.</li> </ol>
<b>AUTO ONLINE FEED</b> <b>YES      NO</b>	<p>This selection specifies whether or not the printer will feed a label when it is placed in the On-Line mode.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will feed a blank label anytime it enters the Online mode.</li> <li>2. Press the FEED key to select the option and advance to the next display.</li> </ol>
<b>FEED ON ERROR</b> <b>YES      NO</b>	<p>This selection specifies whether or not the printer will feed a label when an error condition is cleared.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will feed a blank label anytime an error condition is cleared.</li> <li>2. Press the FEED key to select the option and advance to the next display.</li> </ol>
<b>REPRINT W/FEED</b> <b>YES      NO</b>	<p>Specifies whether or not the printer will print the last printed label stored in memory when the FEED key is pressed in the Normal Online mode.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to desired option. If Yes is selected, the printer will reprint the last label when the FEED key is pressed. If the printer is off-line, pressing the FEED key will feed a blank label.</li> <li>2. Press the FEED key to select the option and advance to the next display</li> </ol>
<b>FORWARD/BACKFEED DISTANCE</b> <b>DEFAULT</b>	<p>This display will only appear if Backfeed is enabled (DSW3-4 = OFF). The maximum backfeed distance is 255 mm.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to select either the Default or the Manual option.</li> <li>2. Press the FEED key to select the option and advance to the next display</li> </ol>

LCD DISPLAY	DEFINITION
<b>FORWARD/BACKFEED DISTANCE   XXXmm</b>	<p>3. If Manual option is selected, use the Cursor keys to advance the distance to the desired setting. Each time the CURSOR key is pressed, the distance will advance 1 mm. The maximum distance is 255 mm.</p> <p>4. Press the FEED key to select the option and advance to the next display</p>
<b>EXT PIN 9 SELECT MODE1   MODE2</b>	<p>Allows selection of the conditions that cause the signal on Pin 9 of the EXT connector to be true. If Mode1 is selected, pin 9 will be true when the printer is ready to print, i.e. it is on-line and has a print job loaded (a quantity of labels to be printed on the display). If Mode 2 is selected, pin 9 will be true if the printer is on-line.</p> <p>1. Use the LINE key to step the cursor to the desired option.</p> <p>2. Press the FEED key to select the option and advance to the next display</p>
<b>EURO CODE D5</b>	<p>Allows the dexadecimal code to be specified for the character replaced with the Euro Character. The default is D5H.</p> <p>1. Use the LINE key to step to the desired option of the first character.</p> <p>2. Press the FEED key to select the option and advance the cursor to the second character of the desired hexadecimal code.</p> <p>3. Repeat steps 1 and 2 for each character.</p> <p>4. Press the FEED key to select the option and advance to the next display</p>
<b>SELECT LANGUAGE ENGLISH</b>	<p>Allows the selection of the character set used by the printer. The options are English, French, German, Spanish, Italian and Portuguese.</p> <p>1. Use the LINE key to advance to the desired language option.</p> <p>2. Press the FEED key to select the option and advance to the next display</p>
<b>IGNORE CAN/DLE YES           NO</b>	<p>If the printer is placed in the Multi-Item Buffer Mode (DSW2-5 = ON), the user can choose to ignore CAN (18H) and DLE (10H) commands used in bi-directional communications (refer to section: Interface Specifications). If the Single Item Buffer Mode is chosen (DSW2-5 = OFF), this display will be skipped.</p>
<b>PRIORITY SETTING COMMAND    LCD</b>	<p>Allows the assignment of a priority for Print Darkness, Print Speed, and Print Offset setting methods. If LCD is selected, the setting established via the LCD display/menu system will be used for an incoming label job, regardless of any different command settings. If Command is selected, any commands in the label job will take precedence and be used for printing the job.</p> <p>1. Use the LINE key to step to the desired priority option.</p> <p>2. Press the FEED key to select the option and advance to the next display</p>
<b>LABEL RE-DETECT ENABLE      DISABLE</b>	<p>Allows disabling the feeding of a blank label upon power up. If Enable is selected, the printer will automatically feed a label until it detects a label image. This will correctly position the next printed label under the print head. If Disable is selected, the printer will not attempt detection and the operator is responsible for ensuring a correctly positioned label before printing.</p> <p>1. Use the LINE key to step to the desired option.</p> <p>2. Press the FEED key to select the option and advance to the next display</p>

LCD DISPLAY	DEFINITION
<b>IEEE1284 ACK SIGNAL</b> <b>00.5</b>	<p>If the printer is placed in the Single Item Buffer Mode (DSW2-5 = ON), this selection allows the width of the IEEE1284 ACK pulse to be set. In the Multi-Item Buffer Mode, this display will be skipped. The range is 0.5 <math>\mu</math>sec to 10 <math>\mu</math>sec.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the display to the desired option. The setting will advance in increments of 0.1 <math>\mu</math>sec each time the CURSOR key is pressed until the setting reaches 10.0 <math>\mu</math>sec when it will wrap around to the 0.5 <math>\mu</math>sec setting.</li> <li>2. Press the FEED key to select the option and advance to the next display</li> </ol>
<b>SERVICE MODE</b>	<p>The Service mode is exited by powering the printer off and then back on.</p>

COUNTERS MODE	
<p>The Counters Mode is provided to allow the user to access the internal printer cousters.</p>	
LCD DISPLAY	DEFINITION
<b>ADVANCED MODE</b>	<p>The Counter Mode is accessed from the Advanced Mode. Press the CURSOR keys to step to the Counter Mode.</p>
<b>COUNTERS MODE</b>	<p>Press the FEED key to advance the display to the counter selections.</p>
<b>COUNTERS HD      CUT      LIFE</b>	<p>The counters are identified in the display as:</p> <p>HD: Head Counter (should be reset when print head is replaced)</p> <p>CUT: Cutter Counter</p> <p>LIFE: Life Counter (cannot be reset)</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step the cursor to the desired counter; Head (HD) counter or the LIFE counter. The default position is the Head Counter.</li> </ol>
<b>HEAD COUNTER</b> <b>0.5M</b>	<ol style="list-style-type: none"> <li>2. Press the FEED key to select the desired option. The current value (in meters) stored in the counter will be displayed. The maximum number of digits displayed is 8.</li> <li>3. Press the FEED key again to advance the counter to the Clear mode. All counters with the exception of the LIFE counter will be cleared.</li> </ol>
<b>HEAD COUNT CLEAR</b> <b>YES      NO</b>	<ol style="list-style-type: none"> <li>4. Use the LINE key to select the desired option. If wanting to read the counter value only, select NO. If wanting to read the counter and reset it to 0.0, select YES.</li> <li>5. Press the FEED key to return to the Counters Mode display.</li> </ol>
<b>COUNTERS MODE</b>	<ol style="list-style-type: none"> <li>6. To exit the Counters Mode, turn power to the printer off and then back on.</li> </ol>

<b>TEST PRINT MODE</b>	
<p>The Test Print Mode offers 4 different status labels for troubleshooting. If DSW3-5 is in the OFF position, the Test Print cycle must be initiated with a Print Start signal on the EXT connector You enter the Test Print Mode by pressing the FEED key while powering the printer on.</p>	
<b>LCD DISPLAY</b>	<b>DEFINITION</b>
<b>V 05.00.03.00 INITIALIZING</b>	Displays the firmware during the initialization.
<b>TEST PRINT MODE CONFIGURATION</b>	<p>This option allows printing of a test label. It is recommended that a test label be printed after the settings in the Advanced Mode have been changed. The test label provides verification that the correct changes were entered.</p> <ol style="list-style-type: none"> <li>1. Press the FEED key while switching on the power switch to access the Test Print Mode.</li> <li>2. Release the FEED key when the printer beeps.</li> <li>3. Use the CURSOR keys to step the cursor to the test label type option desired. They are:                      CONFIGURATION                      BARCODE                      HEADCHECK                      MEMORY                      FACTORY</li> <li>4. Press the FEED key to select the desired option.</li> </ol>
<b>TEST PRINT SIZE 10 CM</b>	<p><i>Note: This screen will not be displayed for the Memory Test Label.</i></p> <p>This display allows label width selection.</p> <ol style="list-style-type: none"> <li>1. Use the LINE key to step to the desired label width option.</li> </ol>
<b>PRESS FEED KEY TO STOP PRINTING</b>	<ol style="list-style-type: none"> <li>2. Press the FEED key to select the option.</li> <li>3. Press the FEED key to start printing test labels continuously.</li> <li>4. Press the FEED key to stop the printer.</li> <li>5. To exit the Test Print Mode, power the printer off and then back on.</li> </ol>

<b>DEFAULT SETTINGS MODE</b>	
<p>Occasionally it is desirable to reset all printer configuration settings to their original default conditions. This allows the operator to start reconfiguration of the printer starting from a know set of conditions.</p>	
<b>LCD DISPLAY</b>	<b>DEFINITION</b>
<b>V 05.00.03.00 INITIALIZING</b>	Displays the firmware during the initialization.
<b>DEFAULT SETTING YES      NO</b>	<p>Allows the reset of original printer default settings. Enter the Default Setting Mode by:</p> <ol style="list-style-type: none"> <li>1. Press and hold the LINE and FEED keys while switching on power.</li> <li>1. Release the LINE and FEED key when the printer emits one long beep.</li> <li>1. Use the LINE key to step to either the YES or NO option.</li> <li>2. Press the FEED key to select the desired option.</li> </ol>

LCD DISPLAY	DEFINITION
<b>DEFAULT SETTING COMPLETED</b>	When the printer has completed the reset process it will beep 3 times and the Default Setting Completed display will appear. At this time the printer is in the default configuration. To exit the Default Setting Mode, power the printer off and then back on.

MAINTENANCE/FACTORY MODE	
This function is used to clear counters and reset the printer's firmware. It is also used after upgrading the flash firmware or installing a new memory module.	
LCD DISPLAY	DEFINITION
<b>MAINTENANCE MODE DIPSW2-4 ON&gt;OFF</b>	Record all dip switch positions and place all in the OFF position. 1. Place DSW2-4 switch in the ON position. 2. Press and hold the LINE and FEED keys while switching on the power. 3. Release the LINE and FEED keys when the printer beeps.
<b>FACTORY MODE</b>	4. Place the DSW2-4 switch in the OFF position. 5. Press the FEED key to advance to the next display.
<b>COUNTER CLEAR NONE</b>	6. Use the LINE key to step the cursor to the desired option. 7. Press the FEED key to select the option and advance to the next display.
<b>PRINT SIZE SMALL LARGE</b>	8. Use the LINE key to step to the desired option (128 mm or 266 mm). 9. Press the FEED key to select the option and initiate test printing.
<b>PRESS ENTER KEY TO STOP PRINTING</b>	The FEED key may be pressed and repressed to start and stop printing at will.

ALL CLEAR MODE	
This function is used to clear counters and reset the printer's firmware. It is also used after upgrading the flash firmware or installing a new memory module.	
LCD DISPLAY	DEFINITION
<b>MAINTENANCE MODE DIPSW2-4 ON&gt;OFF</b>	Record all dip switch positions and place all in the OFF position. 1. Place DSW2-4 switch in the ON position. 2. Press and hold the LINE and FEED keys while switching on the power. 3. Release the LINE and FEED keys when the printer beeps.
<b>FACTORY MODE</b>	4. Place the DSW2-4 switch in the OFF position. 5. Press the FEED key to advance to the next display.
<b>ALL CLEAR MODE</b>	6. Press the FEED key to ENTER THE ALL CLEAR COUNTER EEPROM Mode.
<b>ALL CLEAR COUNTER EEPROM</b>	7. Use the LINE key to step to the desired option (COUNTER). 8. Press the FEED key to select the option and display the current value.
<b>XXXXXXXALL CLEAR YES NO</b>	9. Use the LINE key to step to the desired option (YES) and ENTER to select the option.
<b>XXXXXXXALL CLEAR COMPLETED</b>	



<b>CLEAR NON-STANDARD PROTOCOL</b>	
<p>The standard protocol codes used by the printer can be modified to accommodate the requirements of different host systems. However, if the printer is to be used with a system that does not use the custom protocol codes, they can be cleared and the default protocol codes reactivated. The default values are: STX = 7BH, ETX = 7DH, ESC = 5EH, ENQ = 40H, NULL = 7EH, CAN = 21H and OFFLINE = 5DH.</p>	
<b>LCD DISPLAY</b>	<b>DEFINITION</b>
<b>V 05.00.03.00 INITIALIZING</b>	Displays the firmware during the initialization.
<b>ALT.PROTOCOL DEFAULT COMPLETE</b>	<p>To Clear Non-Standard protocol codes:</p> <ol style="list-style-type: none"> <li>1. Place DSW2-7 in the On position.</li> <li>2. Press and hold the LINE and FEED keys while switching on the printer.</li> <li>3. Release the LINE and FEED keys when the printer emits one long beep.</li> <li>4. Standby for the printer to replace the Alternate protocol codes with the default values.</li> </ol> <p>The printer will emit two short beeps when the process is complete. To exit the mode, power the printer off and then back on.</p>

<b>DOWNLOAD USER DEFINED PROTOCOL CODES</b>	
<p>The user can define a set of custom protocol codes and download them to the printer using the &lt;ESC&gt;LD command.</p>	
<b>LCD DISPLAY</b>	<b>DEFINITION</b>
<b>V 05.00.03.00 INITIALIZING</b>	Displays the firmware during the initialization.
<b>USER DOWNLOAD PRESS THE LINE KEY</b>	<p>Allows the replacement of the Standard Protocol Codes or the Alternate set of Protocol Codes. To enter the User Download mode:</p> <ol style="list-style-type: none"> <li>1. Place DSW2-7 in the on position.</li> <li>2. Press and hold the LINE and FEED keys while switching on the power.</li> <li>3. Release the LINE and FEED keys when the printer emits one long beep.</li> </ol>
<b>USER DOWNLOAD WAITING</b>	<ol style="list-style-type: none"> <li>4. Press the LINE key. The printer is now waiting for the data to be sent.</li> <li>5. Transmit the download data command stream to the printer.</li> </ol> <p>After the data has been received, the printer will beep and print a status label. If it does not beep and print a status label, the printer did not accept the data. If the printer did not beep and print a status label, turn the printer off and check your data stream for errors and start the download process over. If the custom codes are correct, press the FEED key to accept them and terminate the download process. If they are incorrect, turn the printer off without pressing the ENTER key and begin the process again.</p>

<b>HEX DUMP MODE</b>	
In addition to the Test Print Labels, the printer can print the contents of the receive buffer in a hexadecimal format to allow the data stream to be examined for errors and troubleshooting.	
<b>LCD DISPLAY</b>	<b>DEFINITION</b>
<b>V 05.00.03.00 INITIALIZING</b>	Displays the firmware during the initialization.
<b>ONLINE QTY:000000</b>	<p>The Hex Dump Mode is entered by placing DSW2-4 in the On position and powering the printer on.</p> <ol style="list-style-type: none"> <li>1. The printer is now ready to receive data.</li> <li>2. Send the data stream to the printer.</li> <li>3. The received data will be printed in a hexadecimal format.</li> <li>4. To return the printer to normal operation, place DSW2-4 in the off position and power the printer off and then back on.</li> </ol>

# 6

## TROUBLESHOOTING

### ERROR SIGNALS

The LED display, Front Panel LED Indicators and Buzzer provide a visual and audio indication of the type of error encountered. Find the correct symptom in the table below to reference the correct response.

LED	LCD MESSAGE	BEEP	ERROR CONDITION	TO CLEAR
Error on	Machine error	1 long	Machine Error	Cycle power on/off.
Error on	EEPROM error	1 long	EEPROM read/write error	Cycle power on/off.
Error on	Head error	1 long	Print Head is damaged	Replace print head. Cycle power.
Error on	Sensor error	3 short	Sensor	Cycle power on/off.
Error blinks	Card r/w error	1 long	Memory card read/write	Format card and cycle power.
Error blinks	Card low Battery	1 long	Memory card battery low	Replace battery and cycle power.
Error blinks	Head Open	3 short	Head open	Latch print head.
Error on Line blinks	Parity Error	3 short	RS232 parity error	Match parity to system.
Error on Line blinks	Overrun Error	3 short	RS232 overrun error	Verify RS232 settings.
Error on Line blinks	Framing Error	3 short	RS232 framing error	Verify RS232 settings
Error on Line blinks	Buffer Over	3 short	Buffer overflow	Verify RS232 settings.
Error on Line blinks	Paper End	3 short	Media end or misselected media type.	Replenish media, select correct media, open/close head lever, open/close media hold down
Error blinks Ribbon on	Ribbon End	3 short	Ribbon end or ribbon broken.	Replace ribbon. Open/Close Head Lever. Open/Close Media Hold Down
Error blinks, Label blinks	Media Error	3 short	Media error	Open/Close head lever.
Ribbon blinks		None	Ribbon near end.	Replace ribbon with full roll.
Line blinks		None	Buffer near full	Slow down transmission rate.

**TROUBLESHOOTING TABLE**

Use the tables below to isolate problems based on their symptoms. Refer to their relative procedures as applicable to correct the problem. The troubleshooting table below includes the following general symptom descriptions:

Image Voids	No Ribbon Movement	Power LED Not Illuminated
Ribbon Wrinkle	No Label Movement	Error LED Illuminated
Light Print Images	No Printed Image	On Line Led not Illuminated
Smearred Print Images	Display Problem	No Label Drive

<b>IMAGE VOIDS</b>	
Poor label quality.	Use thermal transfer compatible stock.
Poor ribbon quality.	Use genuine SATO ribbons.
Ribbon not matched to label stock.	Consult with media supplier.
Damaged electronics.	Replace circuit board.
Damaged platen.	Replace platen.
<b>RIBBON WRINKLING</b>	
Poor head alignment.	Adjust head balance, ribbon roller, and head alignment.
Poor ribbon tension.	Adjust tension as required.
Worn platen.	Replace as necessary.
Foreign material on head or platen.	Clean as required.
Foreign material no labels.	Use high quality label stock.
Damaged print head.	Replace print head as required.
<b>LIGHT PRINT IMAGES</b>	
Poor label quality.	Use thermal transfer compatible stock.
Poor quality ribbons.	Use genuine SATO ribbons.
Low print head energy/darkness.	Adjust darkness control. Refer to Operators Manual.
Low print head pressure.	Adjust head balance.
Ribbon not matched to label stock.	Use Premier II ribbon with a "1C" thermal transfer ribbon stock or equivalent for optimum results.
Low ribbon and drive torque or no ribbon movement.	Adjust ribbon drive clutch.
Foreign material on print head.	Clean print head and platen roller.
Poor head alignment.	Align print head as required.
Excessive print speed.	Reduce print speed setting.

<b>SMEARED PRINT IMAGES</b>	
Poor label quality.	Use high quality label stock.
Poor ribbon quality.	Use genuine SATO ribbons.
Foreign material on print head and platen roller.	Clean print head and platen roller.
Foreign material on labels.	Use high quality label stock.
Excessive print head energy.	Adjust darkness control.
Excessive print speed.	Adjust as speed as required.
Excessive head pressure or incorrect carbon tension.	Adjust head balance.
<b>NO RIBBON MOVEMENT</b>	
Incorrect ribbon core size.	Use genuine SATO ribbons.
Loose drive clutch.	Adjust drive clutch tension.
Loose platen drive belt.	Adjust or replace drive belt as necessary.
No +24 volt output.	Test power supply and replace as necessary.
Damaged electronics.	Replace circuit board.
<b>NO LABEL MOVEMENT</b>	
Loose or broken platen drive belt.	Adjust or replace platen drive belt as required.
Incorrect label pitch sensor selected.	Select the correct label sensor type (DSW2-2).
No +24 volt output.	Replace fuse on main circuit board. Test power supply and replace as required.
Loose set screw on platen pulley/stepper motor.	Tighten set screws.
<b>NO PRINTED IMAGE</b>	
Print head is disconnected.	Ensure that print head wiring harness is connected on each end.
Ribbon is installed upside down.	Ensure a correct ribbon installation.
No +24 volt output.	Test power supply and replace as necessary.
Damaged print head.	Replace print head.
Damaged electronics.	Replace circuit board.
<b>LED FIELD ILLUMINATED BUT WITHOUT WORDS OR NO DISPLAY AT ALL</b>	
Ribbon sensor cable disconnected.	Ensure a proper connection.
Incorrectly positioned display potentiometer.	Adjust as required.
<b>POWER LED NOT ILLUMINATED</b>	
AC power cable disconnected.	Ensure the cable is connected at each end.

<b>POWER LED NOT ILLUMINATED</b>	
Main power fuse defective.	Replace fuse.
Defective power supply.	Test with meter and replace as required.
<b>ERROR LED ILLUMINATED</b>	
Print head not latched into position.	Ensure print head assembly is latched.
<b>LABEL LED IS ILLUMINATED</b>	
Label supply roll is empty.	Replenish label supply.
Label stock is not routed through sensor.	Ensure label roll is correctly installed.
Label sensor incorrectly positioned.	Adjust sensor position.
Label sensor is blocked.	Clean label sensor.
Incorrect label sensor threshold setting.	Adjust label sensor threshold.
Platen drive malfunction.	Perform drive train analysis.
<b>RIBBON LED ILLUMINATED</b>	
Ribbon supply roll is empty.	Replenish ribbon supply.
Ribbon supply is misaligned.	Realign ribbon sensor.
Ribbon sensor is blocked.	Clean ribbon sensor.
Ribbon rewind is without core.	Install cardboard core.

## TROUBLESHOOTING PROCEDURES

The procedures below provide in depth instructions on symptom analysis of specific components. If it is suspected that the problem lies within one of these components, refer to the relative instructions.

### RS232 SERIAL INTERFACE

- Ensure the serial cable is thoroughly connected to the PC and the printer.

**CAUTION:** NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE PRINTER OR THE HOST. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY AND IS NOT COVERED BY WARRANTY.

- Ensure the serial cable is not defective. The minimum requirements is that a Null Modem Cable or correct Pin Outs be used and that it be manufactured to specifications. Refer to the Interface Specifications section of this manual.
- Ensure the RS232 Interface Module is installed. Different module types will have an impact on transmission speed.
- Ensure the data stream is correct, all letters of command codes are in upper case, and without spaces. Carriage Returns are also not acceptable in line fields.

- Ensure the Baud rate, Parity, Data Bits, and Stop Bits are consistent with that of computer. Print a Configuration Test Label to determine the RS232 settings.
- Ensure the printer is receiving from the computer using a Receive Buffer Hex Dump. Refer to the Hex Dump procedure in this manual for instructions. The printer will print (only once) a hexadecimal dump of everything it has received from the host computer. Each hexadecimal character represents a character the printer received. Analyze and troubleshoot the data stream.

NOTE: A small label may produce a large amount of data when printed in Hex Dump.

While checking the hex dump printout, look for OD<sub>H</sub> OA<sub>H</sub> (carriage return and line feed) characters throughout. The command string should be continuous. CR or LF characters are not allowed between the start command (<ESC>A) and the stop command (<ESC>Z). If Basic is being used, it may be adding these characters automatically as the line wraps. Adding a width statement to your program can help suppress these extra OD<sub>H</sub> OA<sub>H</sub> characters by expanding the line length up to 255 characters.

If not programming in BASIC, check to see if the equivalent statement in the language exists to suppress extra carriage returns and line feeds from data being sent to the printer. The data stream must be one complete line going to the printer.

#### **UNIVERSAL SERIAL BUS (USB) INTERFACE**

If nothing prints when during a test print, verify that the device drivers have been successively installed by performing the following:

1. Click on Start, Settings, and then Control Panel.
2. Click on System within the new window.
3. Click on the Device Manager tab.
4. Ensure that the View Device By Type is checked.
5. Scroll down to SATO-USB Device and ensure that errors do not exist. Reinstall as required.
6. Reboot the PC and the printer.
7. Contact Microsoft technical support for further assistance as required.

#### **PARALLEL INTERFACE**

- Ensure the printer cable is thoroughly connected to the PC and the printer.
- Ensure the printer cable is connected to the correct ports on each end.
- Ensure the printer cable (IEEE1284) meets specifications. The computer may not be able to communicate correctly otherwise.
- Ensure the Interface Module is installed.

- Ensure the data stream is correct, all letters of command codes are in upper case, and without spaces.
- Ensure protocol codes are set for standard or non-standard and that they are consistent with the data stream.
- Ensure the printer is receiving from the computer using a Receive Buffer Hex Dump. Refer to that procedure for instructions. The printer will print (only once) a hexadecimal dump of everything it has received from the host computer. Each hexadecimal character represents a character the printer received. Analyze and troubleshoot the data stream.

NOTE: A small label may produce a large amount of data when printed in Hex Dump.

While checking the hex dump printout, look for OD<sub>H</sub> OA<sub>H</sub> (carriage return and line feed) characters throughout. The command string should be continuous. CR or LF characters are not allowed between the start command (<ESC>A) and the stop command (<ESC>Z). If Basic is being used, it may be adding these characters automatically as the line wraps. Adding a width statement to your program can help suppress these extra OD<sub>H</sub> OA<sub>H</sub> characters by expanding the line length up to 255 characters.

If not programming in BASIC, check to see if the equivalent statement in language exists to suppress extra carriage returns and line feeds from data being sent to the printer. The data stream must be one complete line going to the printer.

#### LAN ETHERNET INTERFACE

- **If the printer does not come up ready:** Ensure the printer is powered on, all cables are connected, and the printer is on-line. If possible, connect a terminal to the serial port and observe for a boot prompt indicating the print server firmware has not been loaded properly. If reloading does not correct the problem, try pressing switch 1 for more than 10 seconds. If the problem persists, the product may be defective.
- **If the printer comes up ready but will not print:** There is a problem with the interface between the server and the printer, network connection or cabling, or a queue setup flaw. The queue setup flaw could be the result of a faulty print server setup or other protocol-related scenarios. Systematically perform checks and tests to isolate the cause.

The interface between the printer and server may be checked by waiting approximately two minutes after the printer is powered on and then run a self-test label. If a self-test label does not print, there could be a hardware problem. Double check the cable connections. In some rare cases, disabling NBUF with the command SET PORT P1 NBUF DISABLED will solve the problem.

If connecting to a 10baseT network, verify that the OK LED is illuminated. If the appropriate LED's are not on, there is a possibility of a defective cable or connector. Try connecting a different cable, port, or device to observe the results.

If using a repeater or hub, ensure that SQE is turned off at the hub (this is the default setting for most hubs). Also, test the hub or repeater by trying the print server on a different port.



If using a bridge or router located between the print server and the host computer, ensure that the device is setup to allow the print server to send and receive data from the host. For example, a bridge can only be set up allow certain types of Ethernet addresses to pass through (a process known as filtering). Such a bridge must be configured to allow print server addresses. Likewise, a router can be set up to only pass certain protocols. Ensure that the desired protocol can be passed through to the print server. In the case of routers, also ensure that the protocol is routable (LAT, NetBEUI, and DLC/LLC are not routable).

Ensure that you are not attempting to perform an illegal operation such as printing a label I larger than the printer can handle.

Check the protocol troubleshooting sections provided with the Ethernet Interface Module for additional causes of intermittent printer problems.

- Experiencing intermittent printing problems: Excessive NetWare polling may be a big cause of intermittent problems. Ensure that only the needed NetWare file servers have been enabled (do a SHOW NETWARE command from the print server console to see the enabled file servers). If V3.21 or earlier versions of firmware is in use, ensure that NetWare polling is disabled by using the console command SET NETWARE RANGE 0. If Netware is not in use, disable NETWare entirely with the command SET NETWARE DISABLED.

Check the individual troubleshooting sections provided with the Ethernet Plug-In Interface Module for additional causes of intermittent printer problems.

#### **TP TEST MODULE USAGE**

The SATO TP Test Module is a purchase option specially designed and sold by SATO America to assist in troubleshooting SATO Printers. The use of this device will facilitate the identification and isolation of problem circuitry and for voltage adjustment.

- 1 Remove applicable housing covers as directed in Figure 10-1 of the Diagrams section.
- 2 Connect the harness from Test Module (1, Figure 6-1) to main circuit board connector (2).
- 3 Connect the multimeter ground probe to the pin identified as GND (3) on Test Module (1).
- 4 Connect the multimeter positive probe to the pin identified as SIG (4) on Test Module (1).

NOTE: The ground and positive probes of the multimeter may also be connected to the Test Module by inserting the probes into their respective connection ports (6) arranged vertically along the right front side of the Test Module. If this method is used, the dial should be set at (0) zero. Refer to Figure 6-2 for connection port identification.

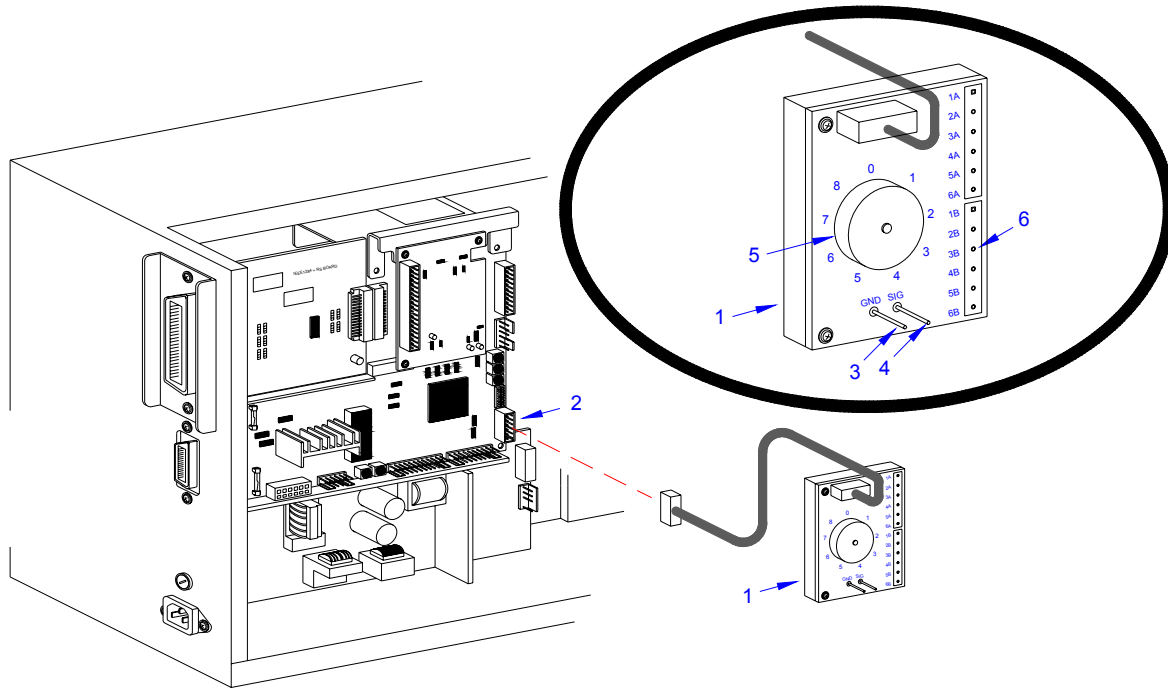
- 5 Turn on the printer and rotate Test Module dial (5) to the required position.

NOTE: Refer to Figure 6-2 for the correct Test Module position.

- 6 Record the multimeter values and confirm they are within specified tolerances.

**NOTE:** Voltage readings must be +/- 10% of specification for proper operation.

7 Troubleshoot and/or replace components as directed in their respective procedures.



**Figure 6-1, TP Test Module Usage**

DIAL	APPLICATION DESCRIPTION
0 through 3	Used to determine voltage. Refer to the specifications section of this manual to determine a component's required voltage level. Set the dial to that voltage requirement and the millimeter reading should be in the same range if properly performing.
4	Used for testing and adjustment of the VR5 potentiometer when Eye-Mark printing.
5	Used for testing and adjustment of the VR4 potentiometer when GAP printing.
6	Used for testing and adjustment of the VR2 potentiometer when printing with dispencer. The potentiometer should be turned fully clock-wise for this operation.
7	Used for testing and adjustment of the VR3 potentiometer for ribbon end sensing.

## RIBBON SENSOR OPERATION VERIFICATION

Verification that the ribbon sensor is operational may be achieved using the Operator Panel located on the front housing cover.

- 1 Access the dip switches located on the Operator Panel.
- 2 Record all dip switch positions.
- 3 Place DSW2-1 dip switch in the off position, then switch off the printer.
- 4 Remove ribbon from the printer as applicable and latch down print head.
- 5 Switch on the printer.

LCD DISPLAY:	INITIALIZING ROM V00.00.00.00
--------------	----------------------------------

LCD DISPLAY:	ONLINE QTY:000000
--------------	----------------------

- 6 Press the LINE key to place the printer off-line.
- 7 Press the FEED key and wait for the printer to beep.

LCD DISPLAY:	RIBBON END
--------------	------------

NOTE:	The ribbon end display is confirmation that the sensor is functioning.
-------	--

- 8 Switch off the printer, install ribbon, and switch the printer on again.

LCD DISPLAY:	INITIALIZING ROM V00.00.00.00
--------------	----------------------------------

- 9 Press the LINE key to place the printer off-line.
- 10 Press the FEED key to generate a blank label and confirm that the ribbon has been properly installed.



# 7

## REPLACEMENT PROCEDURES

The M84PRO Printer contains replaceable components and sub-assemblies. This section contains step-by-step instructions for the removal and replacement of those primary components and sub-assemblies that are subject to wear or damage.

### MAIN CIRCUIT BOARD REPLACEMENT

The main circuit board contains the control electronics for the printer and is located behind the left side cover. The interface board must be removed prior to the main circuit board. The daughter board and optional memory card should also be removed to prevent possible damage during circuit board removal.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove applicable housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Disconnect all wiring harnesses attached to main circuit board (1, Figure 7-1) or daughter board (2).

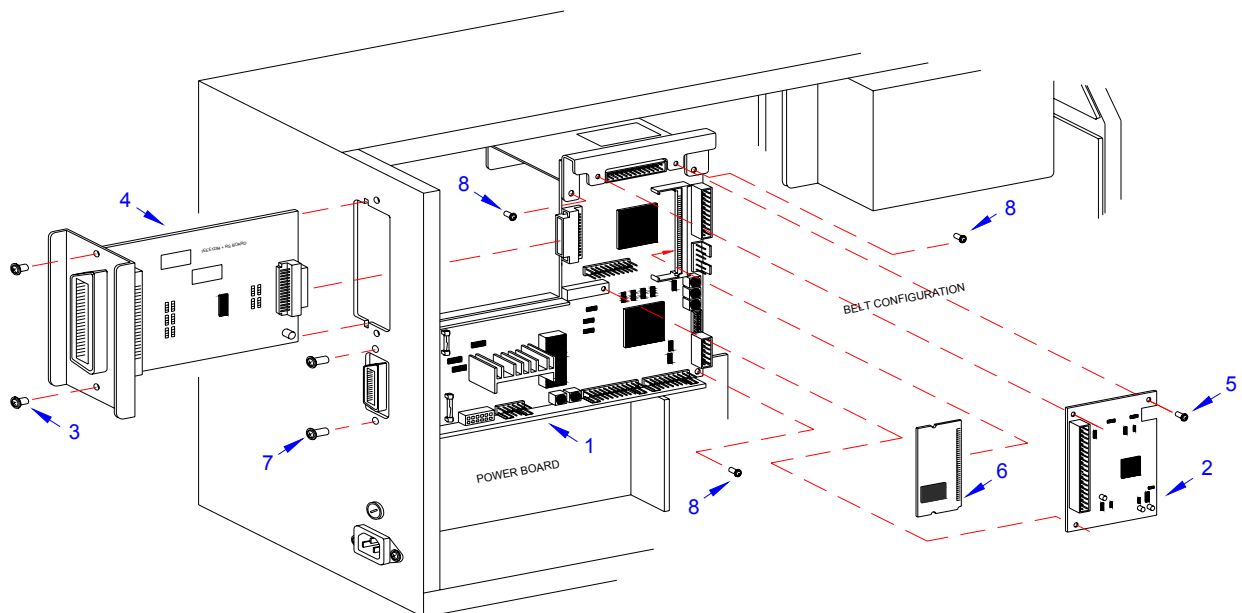
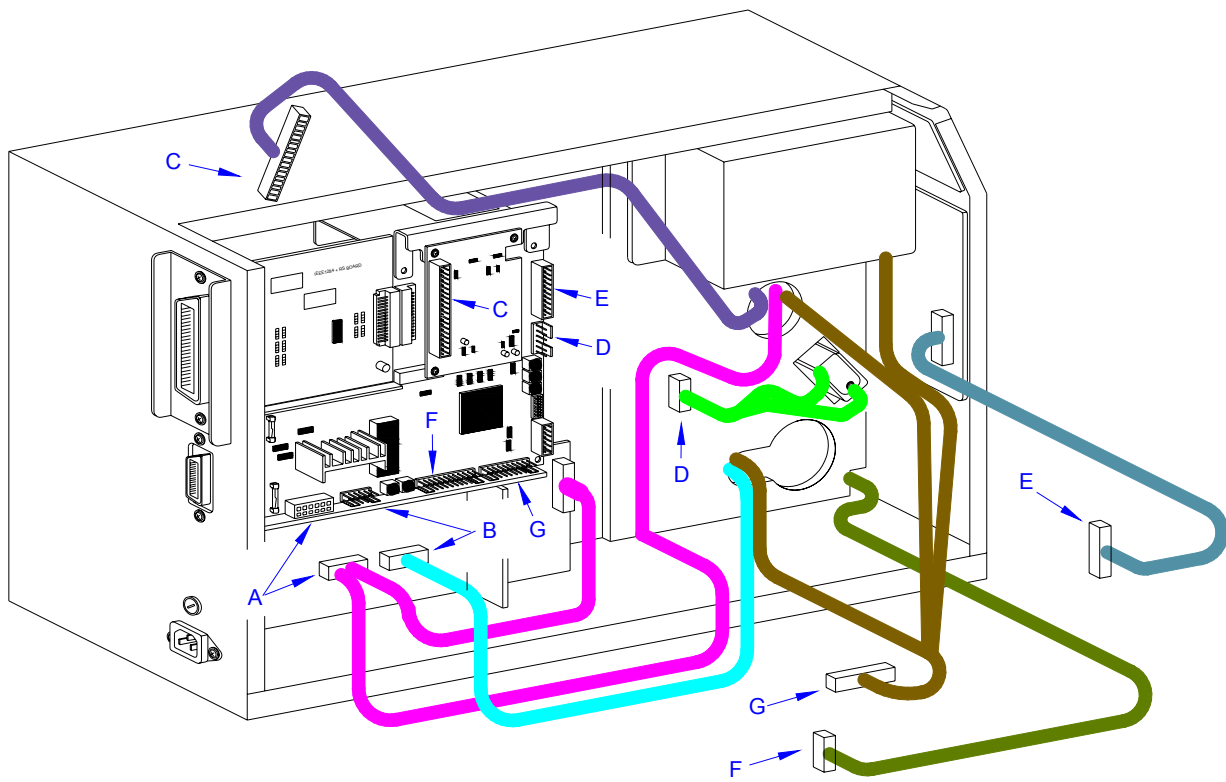


Figure 7-1, Circuit Board Replacement

## Section 7: Replacement Procedures

- 4 Remove two screws (3) securing interface board (4) to printer housing.
- 5 Withdraw interface board (4) from its connection with main circuit board (1).
- 6 Remove three screws (5) securing daughter board (2) to main circuit board (1).
- 7 Withdraw daughter board (2) from its connection with main circuit board (1).
- 8 Detach optional memory card (6) from its connection with main circuit board (1).
- 9 Remove two exterior screws (7) securing main circuit board (1) to the housing.
- 10 Remove three interior screws (8) securing main circuit board (1) to the printer frame.
- 11 Withdraw main circuit board (1) from within the printer.
- 12 Prepare to replace main circuit board (1).
- 13 Install main circuit board (1) into mounting position and secure to the printer frame using three screws (8).
- 14 Secure the exterior of main circuit board (1) using two screws (7).
- 15 Connect optional memory card (6) to main circuit board (1) as applicable.
- 16 Connect and attach daughter board (2) to main circuit board (1) using three screws (5).
- 17 Connect interface board (4) to main circuit board (1) and secure to housing using two screws (3).
- 18 Reconnect all wiring harnesses (Figure 7-2).
- 19 Reconnect power supply cord, test cycle, and reattach housing covers.



**Figure 7-2, Circuit Board Replacement**

## INTERFACE BOARD REPLACEMENT

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Remove two screws (1, Figure 7-3) securing interface board (2) on the exterior back side of printer.
- 4 Carefully withdraw interface board (2) from its connection with main circuit board (3).
- 5 Insert replacement interface board (2) through the housing slot to connect with main circuit board (3).
- 6 Secure interface board (2) to printer housing using two screws (1).
- 7 Reconnect power supply cord, test cycle, and reattach left side cover.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover installation.

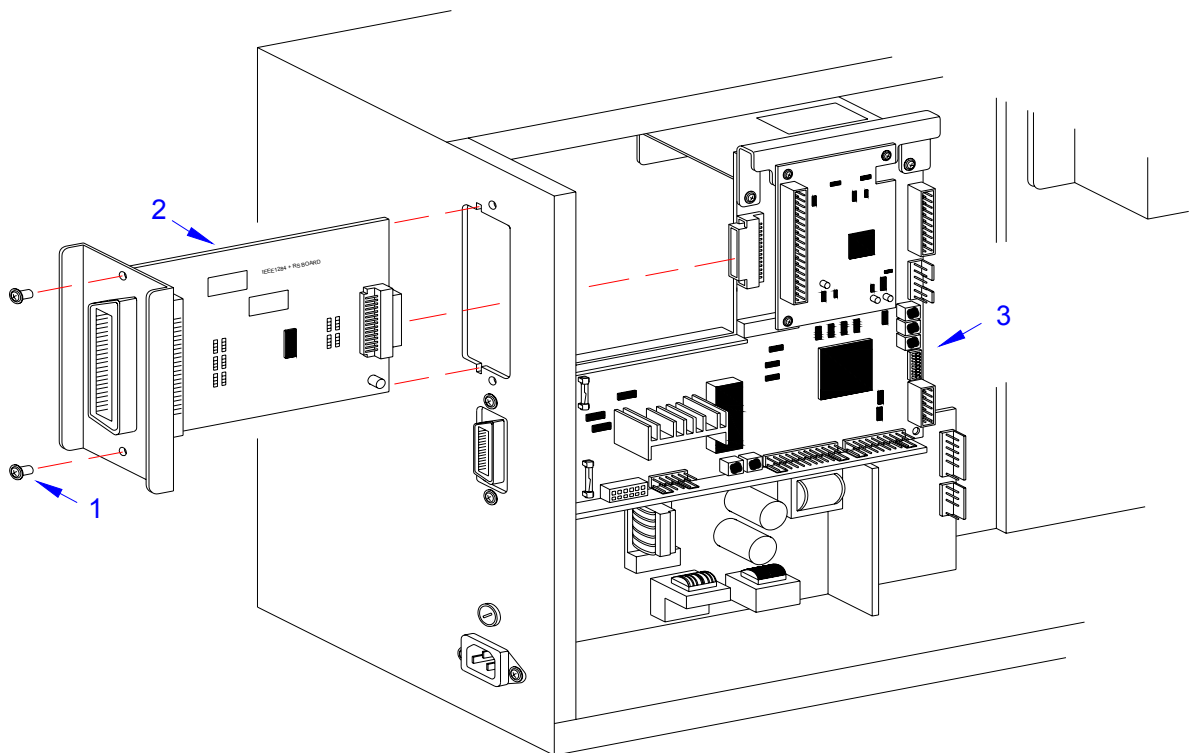


Figure 7-3, Interface Board Replacement

## DAUGHTER BOARD REPLACEMENT

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Disconnect the print head wiring harness (1, Figure 7-4) from daughter board (2).
- 4 Remove the three screws (3) securing daughter board (2) to main circuit board (4).
- 5 Disconnect daughter board (2) from main circuit board (4).
- 6 Connect replacement daughter board (2) to main circuit board (4) and secure using three screws (3).
- 7 Reconnect power supply cord, test cycle, and reattach housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover installation.

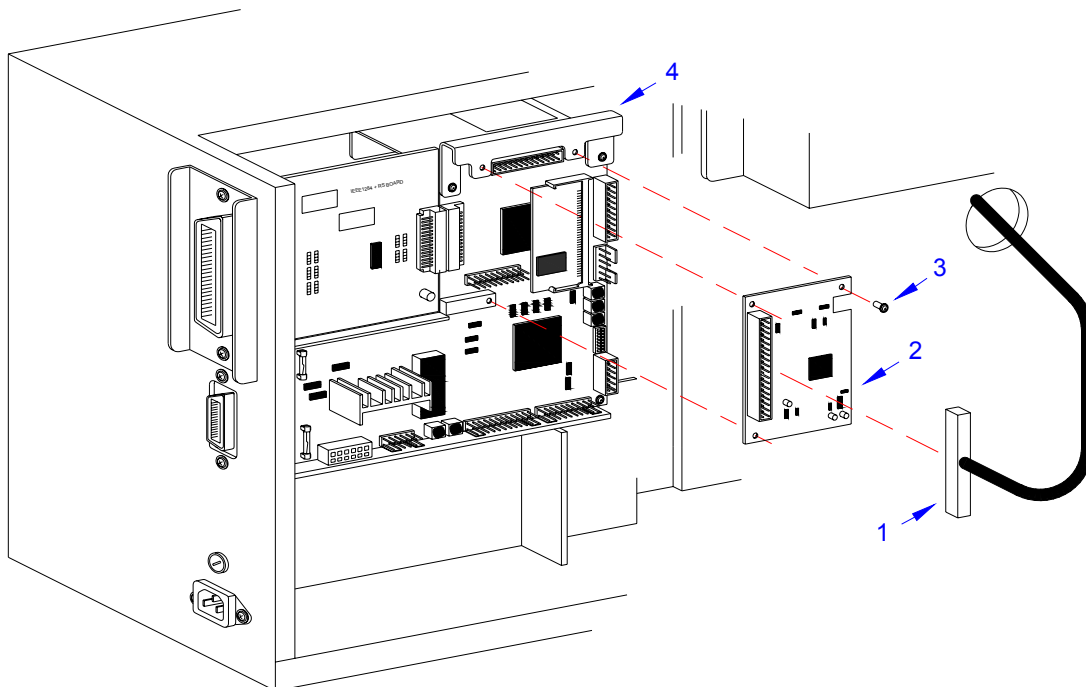


Figure 7-4, Daughter Board Replacement



## MEMORY CARD REPLACEMENT

The optional memory card is direct connected to the main circuit board behind the daughter board. To replace the memory card, follow the daughter board replacement procedures for card access. Then pull the mounting brackets away from the memory card while pivoting the card outward.

To insert a new memory card, insert the contact side of the card into its mounting bracket first followed by the remainder of the card. The optional memory card is designed so that it will only mount if properly oriented.

## POWER BOARD REPLACEMENT

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Locate power board (1, Figure 7-5) in the lower left corner of the printer.
- 4 Disconnect circuit board wiring harness (A) from power board (1).
- 5 Disconnect cutter harness (B) from power board (1) if applicable.
- 6 Remove two screws (2) securing cable guard (3) to printer base.
- 7 Lift away cable guard (3) and disconnect power supply harness (C).
- 8 Remove two screws (4) from the exterior back side of printer.
- 9 Remove one screw (5) from the interior securing power board (1) to the printer housing.
- 10 Manipulate power board (1) from within the printer.
- 11 Insert replacement power board (1) into printer housing oriented so that the power receptacle protrudes from the rear.
- 12 Secure power board (1) to the printer using screw (5) and two screws (4).
- 13 Connect power supply harness (C) and cover with cable guard (3).
- 14 Secure cable guard (3) to the printer using two screws (2).
- 15 Connect cutter harness (B) to power board (1) if applicable.
- 16 Connect circuit board harness (A) to power board (1).
- 17 Reconnect power supply cord, test cycle, and reattach housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover installation.

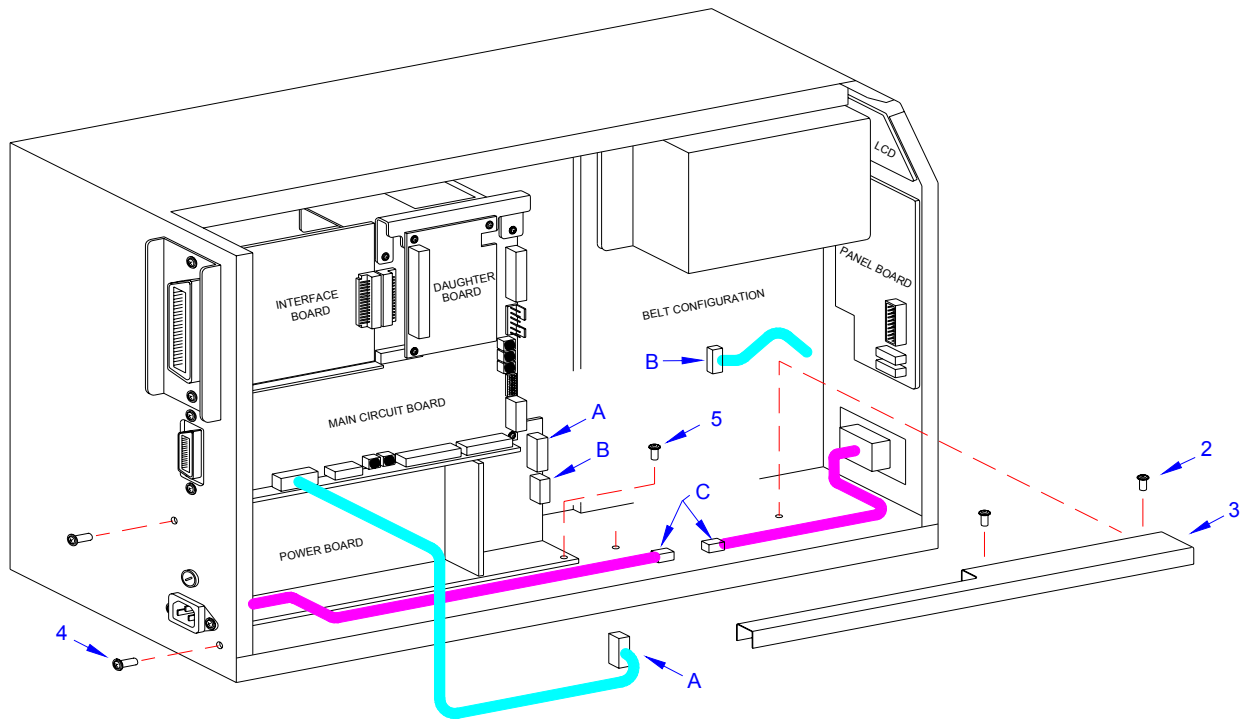


Figure 7-5, Power Board Replacement

### PANEL BOARD REPLACEMENT

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Locate panel board (1, Figure 7-6) mounted to the interior of the front cover.
- 4 Disconnect wiring harnesses (A), (B), and (C).
- 5 Remove two screws (2) securing panel board (1) to the printer.
- 6 Manipulate panel board (1) laterally from within the printer.
- 7 Insert replacement panel board (1) behind the face cover so that the boards buttons are aligned with their respective slots in the cover.
- 8 Connect harnesses (C), (B), and (A).
- 9 Reconnect power supply cord, test cycle, and reattach housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover installation.

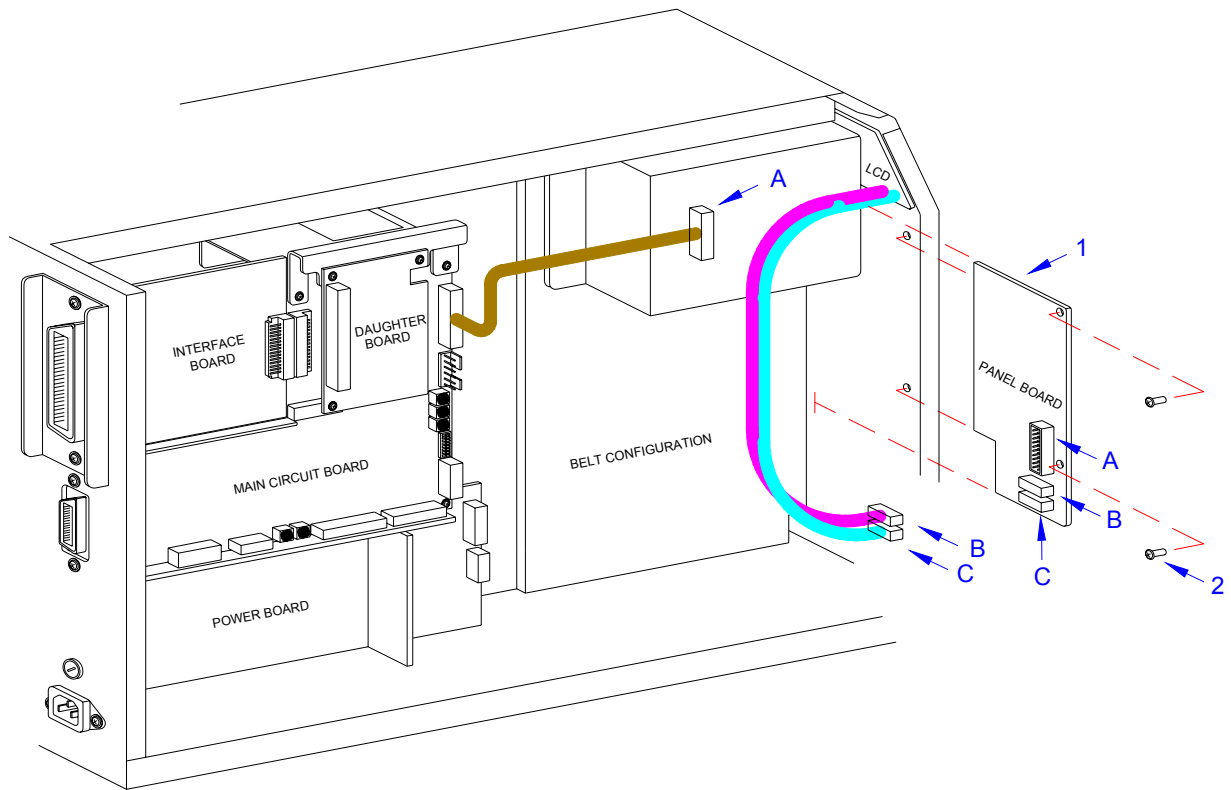


Figure 7-6, Panel Board Replacement

### LCD BOARD REPLACEMENT

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Locate LCD board (1, Figure 7-7) mounted to the interior of the front cover.
- 4 Disconnect wiring harnesses (A) and (B) from panel board (2).
- 5 Remove two screws (3) and one plastic washer (4) securing LCD board (1) to the printer.
- 6 Manipulate LCD board (1) laterally from within the printer.
- 7 Insert replacement LCD board (1) behind the face cover so that the LCD is aligned with its respective slot in the cover.
- 8 Apply screw (3) into the upper mounting orifice and screw (3) with washer (4) to the lower.
- 9 Tighten screws (3) securely.
- 10 Connect LCD wiring harnesses (B) and (A) to panel board (2).
- 11 Reconnect power supply cord, test cycle, and reattach housing covers.

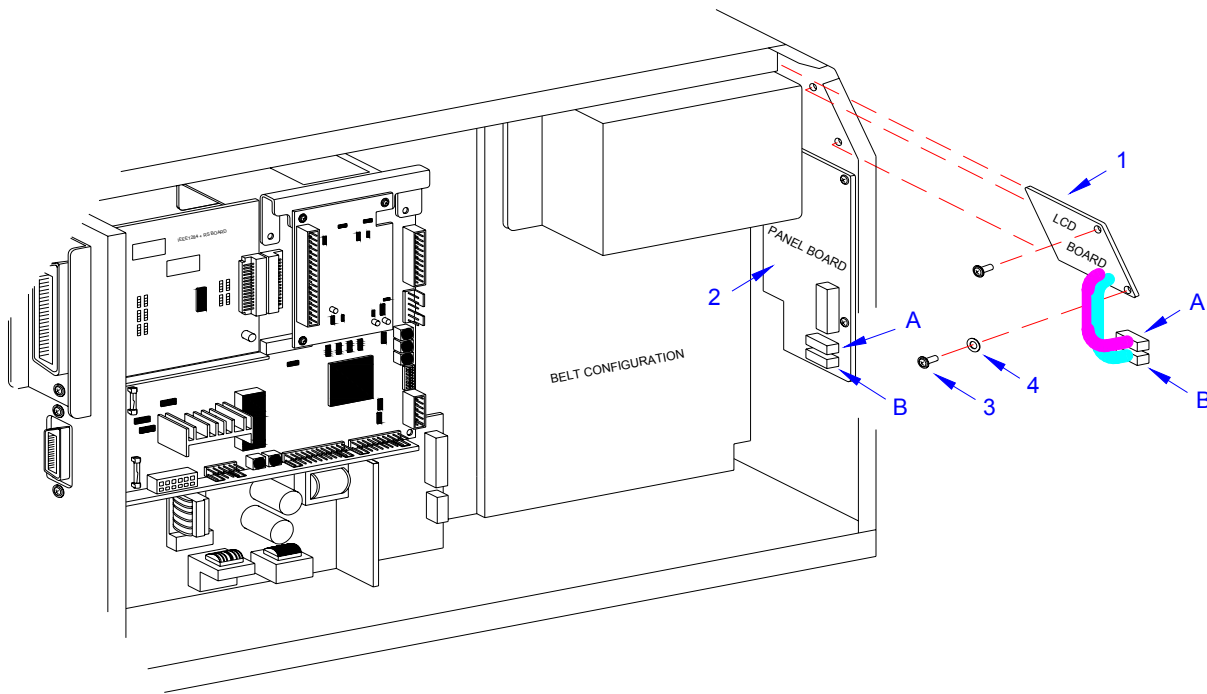


Figure 7-7, LCD Board Replacement

## FUSE REPLACEMENT

The M84Pro Printer has three fuses; one is externally accessible and is wired to the power supply while the other two are located internally and directly connected to the main circuit board. There is an additional fuse integrated into the optional cutter assembly which is easily accessible by opening the cutter attachment.

This procedure will address only the power supply and circuit board fuses.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Unscrew and remove fuse cap (1, Figure 7-8) and fuse (2) located on the rear printer panel.
- 3 Remove fuse (2) from fuse cap (1) and determine its condition. Replace as required.
- 4 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 5 Locate fuses (3) located on main circuit board (4).
- 6 Manipulate fuses (3) for their contact clips (5) and determine their condition. Replace as required.
- 7 Reconnect power supply cord, test cycle, and reattach housing covers.

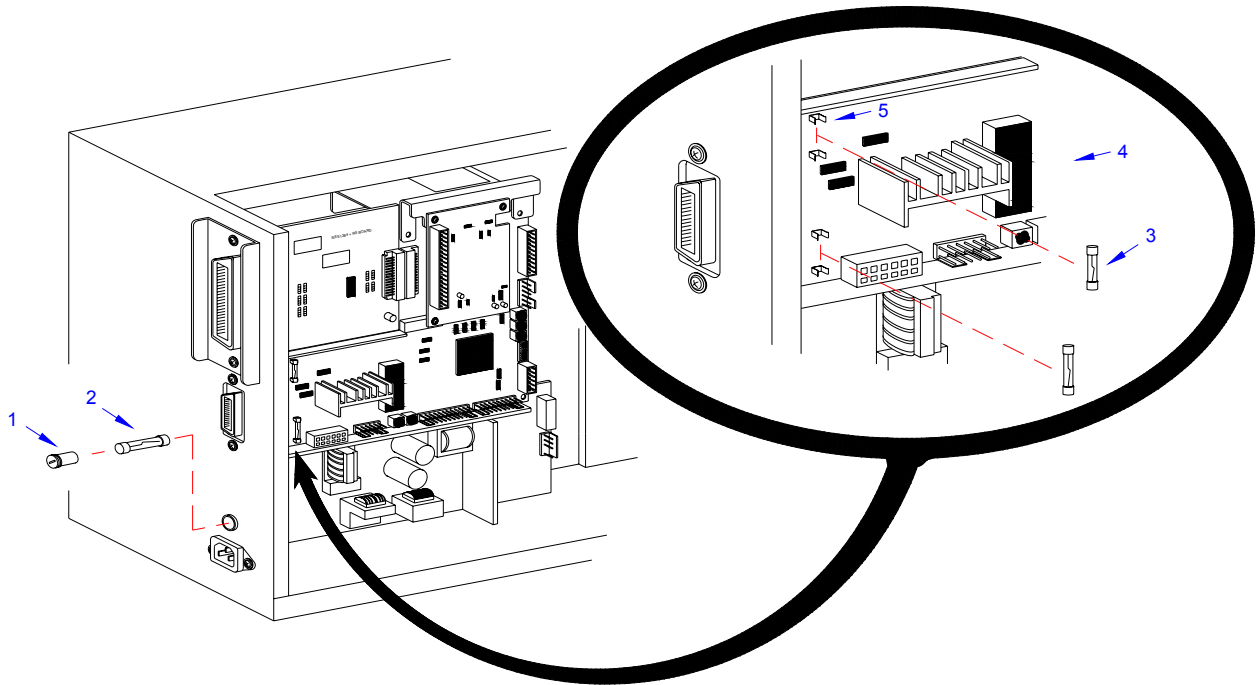


Figure 7-8, Fuse Replacement

### MOTOR REPLACEMENT

The stepper motor transmits motion to the print mechanism for precise print positioning. The energized motor provides torque to the label feed roller, the platen roller, the ribbon feed roller, and the ribbon rewind spindle via a series of toothed timing belts and gears.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the front, top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Locate motor (1, Figure 7-9) position from the left side of the printer.

NOTE: The left side of the printer contains the circuit board, power board, and gear configuration. The motor is located on the lower side of the gear configuration and the motor's mounting screws are oriented diagonally from each other on the upper and lower sides of the motor spindle.

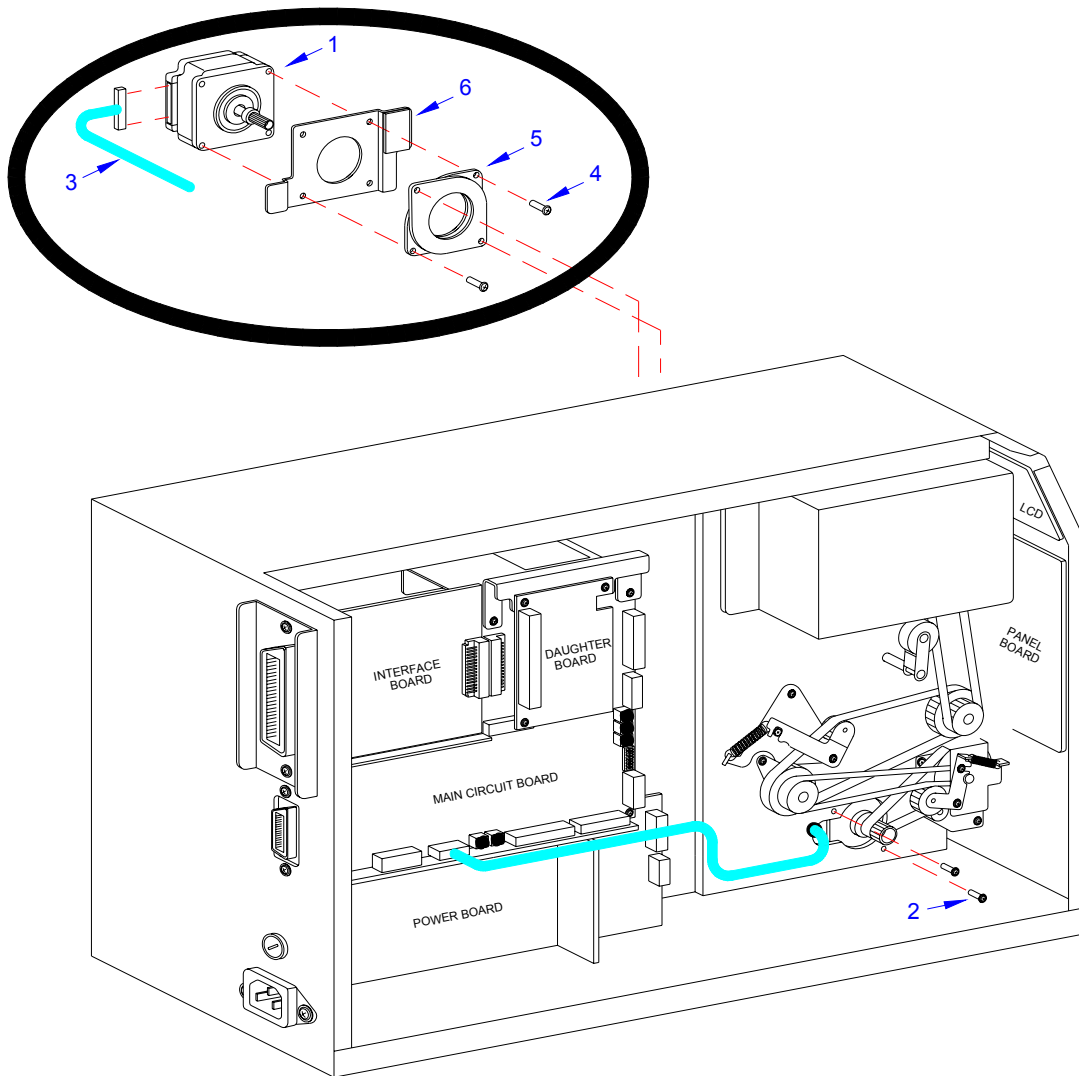
- 4 Remove two screws (2) securing motor (1) to the printer frame.

## Section 7: Replacement Procedures

- 5 Remove belt from the motor shaft and withdraw motor (1) to the media side of the printer.
- 6 Disconnect wiring harness (3) from motor (1).
- 7 Remove two screws (4) securing damper (5) and heat plate (6) to motor (1).
- 8 Lift away damper (5), heat sink (6) and withdraw motor (1) from within the printer frame.

**NOTE:** The damper and heat plate must be removed from the motor for the motor to be withdrawn from within the printer frame. Likewise, the damper and heat plate must be mounted to the replacement motor with the motor positioned within the frame.

- 9 Insert the replacement motor (1) within the printer frame under the label ramp.



**Figure 7-9, Motor Replacement**

- 10 Secure heat plate (6) and damper (5) respectively to motor (1) using two screws (4).

NOTE: The damper and heat sink require mounting in specific orientation. Regard Figure 6-9 carefully for the correct orientation.

- 11 Reconnect wiring harness (3) to motor (1).
- 12 Apply motor (1) against the printer frame oriented so that their mounting orifices are aligned.
- 13 Apply drive belt to motor spindle and secure to frame using two screws (2).
- 14 Adjust belt tension on motor (1) as required in accordance with its relative procedure.
- 15 Reconnect power supply cord, test cycle, and reattach/close all covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover installation.

## PLATEN ROLLER REPLACEMENT

The platen roller is considered to be a high wear component due to its treading against the print media. This treading contact will eventually wear grooves into the rubber material and negatively effect print output.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open or remove the front, top, right, and left housing covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provide guidance on housing cover, media, and ribbon removal.

- 3 Remove ribbon and media to provide free access to platen roller (1, Figure 7-10).
- 4 Loosen or remove screw (2) securing clamp (3) to right roller spindle.
- 5 Remove e-clip (4) and the outer belt (not shown) from the left roller spindle and pulley (5).
- 6 Withdraw pulley (5) from left platen roller spindle and inner belt (not shown).
- 7 Loosen screw and clamp (not shown) on the left end of roller spindle.
- 8 Withdraw platen roller (1) along with left and right bushings (6) and gear (7) from the printer.
- 9 Assemble replacement roller as required with gear (7) and bushings (6).

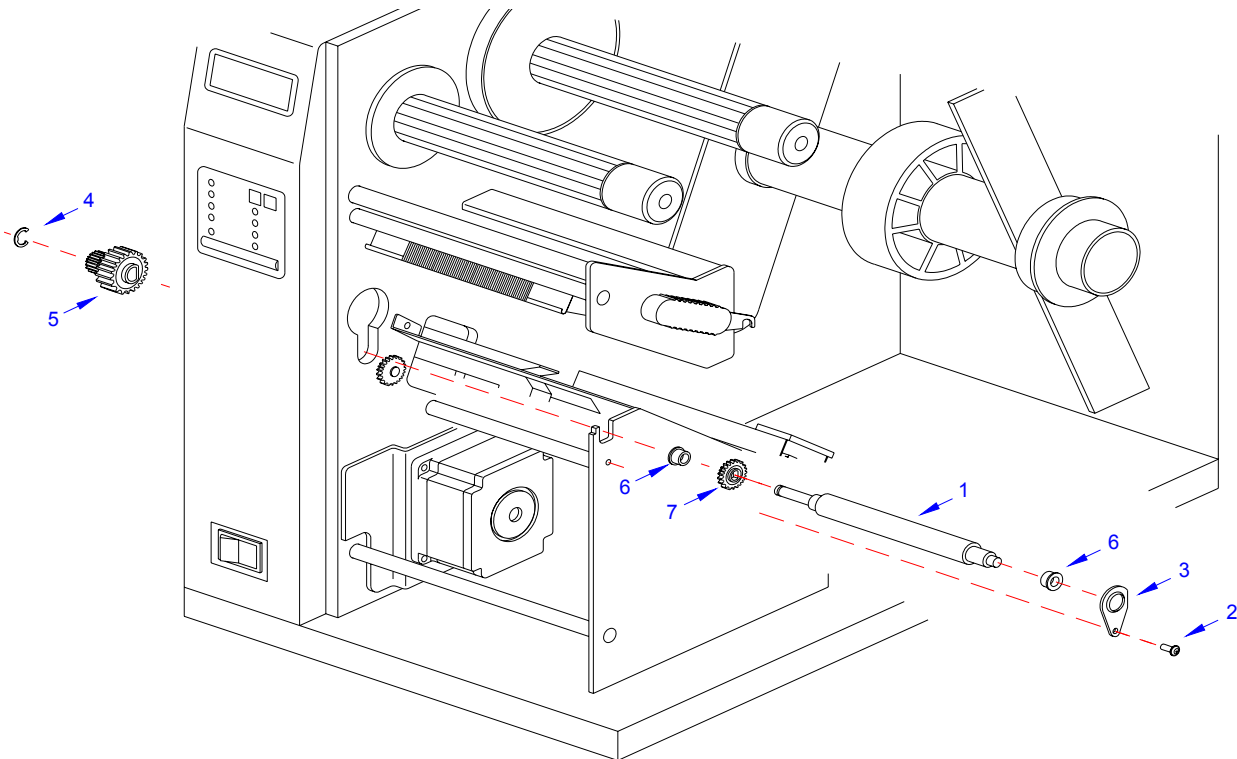
NOTE: The bushings must be installed onto the ends of platen roller with their flanged sides oriented outward. The cog must be installed so its wider sleeve is oriented outward.

- 10 Insert the long spindle of platen roller (1) into housing frame so that it protrudes to the drive side.
- 11 Allow platen roller (1) to be suspended with its bushings (6) nested on the printer frame.

## Section 7: Replacement Procedures

- 12 Secure each end of platen roller (1) with clamps (3) and screws (2).
- 13 Insert pulley (5) onto the left spindle and apply inner belt (not shown).
- 14 Apply outer belt (not shown) to gear (5) and e-clip (4) to left roller spindle.
- 15 Adjust belt tension as required in accordance with its relative procedure.
- 16 Reconnect power supply cord, test cycle, and reattach/close all covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon installation.



**Figure 7-10, Platen Roller Replacement**

### FEED ROLLER REPLACEMENT

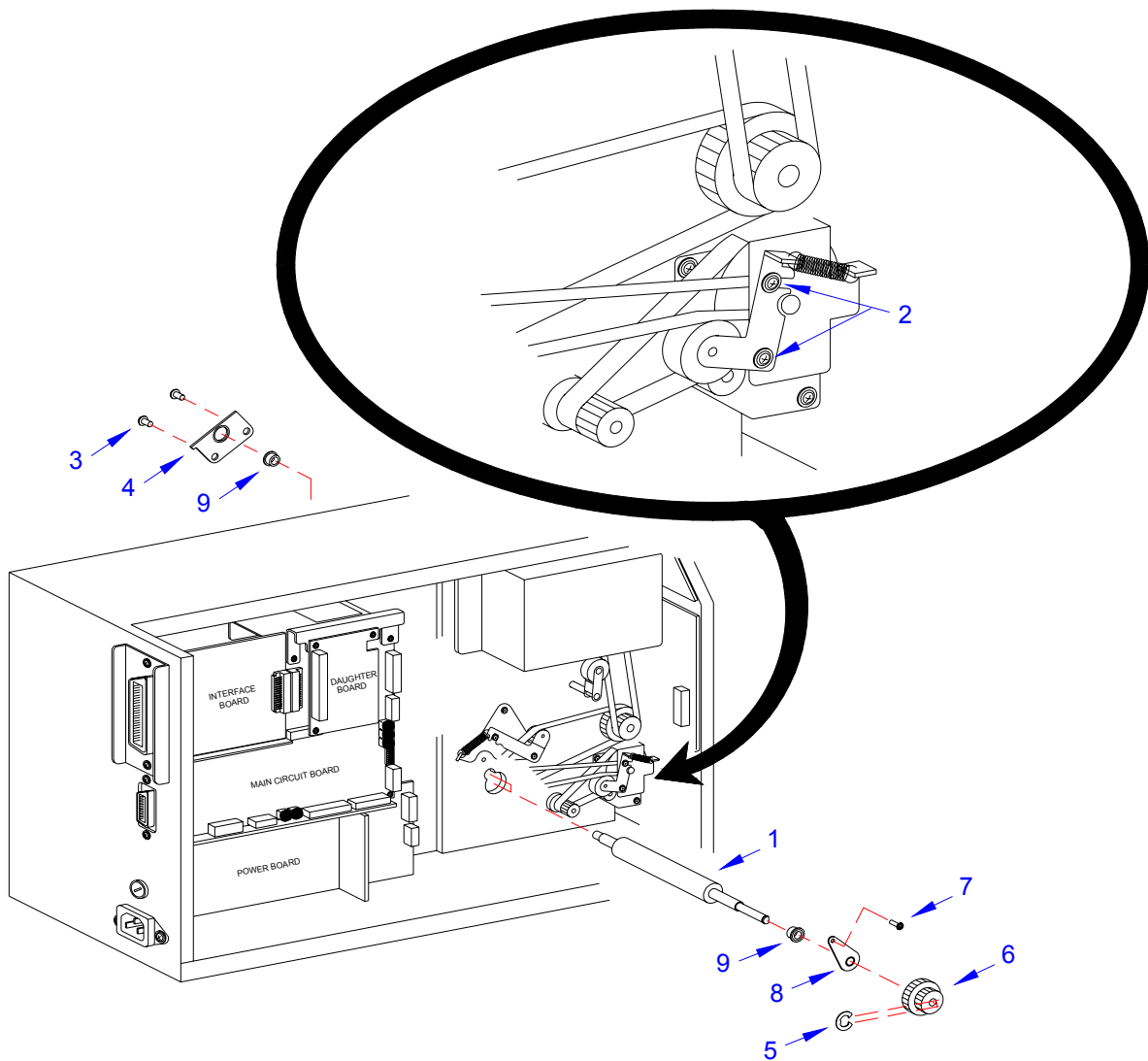
The feed roller is considered to be a high wear component due to its treading against the print media. This treading contact will eventually wear grooves into the rubber material and negatively effect print output.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open or remove the top, right, and left housing covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provide guidance on housing cover, media, and ribbon removal.

- 3 Remove ribbon and media to provide free access to drive roller (1, Figure 7-11).





**Figure 7-11, Feed Roller Replacement**

- 4 Loosen two screws (2) to release belt tension on drive roller (1).
- 5 Loosen or remove two screws (3) securing clamp (4) to the right end of drive roller (1).
- 6 Remove e-clip (5) and the outer belt (not shown) from the left end of drive roller (1) and pulley (6).
- 7 Withdraw pulley (6) from left drive roller spindle and inner belt (not shown).
- 8 Loosen screw (7) and clamp (8) on the left end of drive roller (1).
- 9 Withdraw drive roller (1) along with left and right bushings (9) from the printer.
- 10 Assemble replacement roller as required with bushings (9).

**NOTE:** The bushings must be installed onto the ends of drive roller with their flanged sides oriented outward. The pulley must be installed so its wider sleeve is oriented outward.

## Section 7: Replacement Procedures

- 11 Insert the short spindle of drive roller (1) into housing frame so that it rests on the far side of the label ramp secure using clamp (4) and two screws (3).
- 12 Insert clamp (8) onto the left end of drive roller (1) and secure to the frame using screw (7).
- 13 Insert pulley (6) onto the left end of drive roller (1) and apply inner belt (not shown).
- 14 Apply outer belt (not shown) to pulley (6) and e-clip (5) to left roller spindle.
- 15 Adjust belt tension in accordance with its relative procedure in the Adjustment Procedures section of this manual.
- 16 Reconnect power supply cord, test cycle, and reattach/close all covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon installation.

### TIMING BELT REPLACEMENT

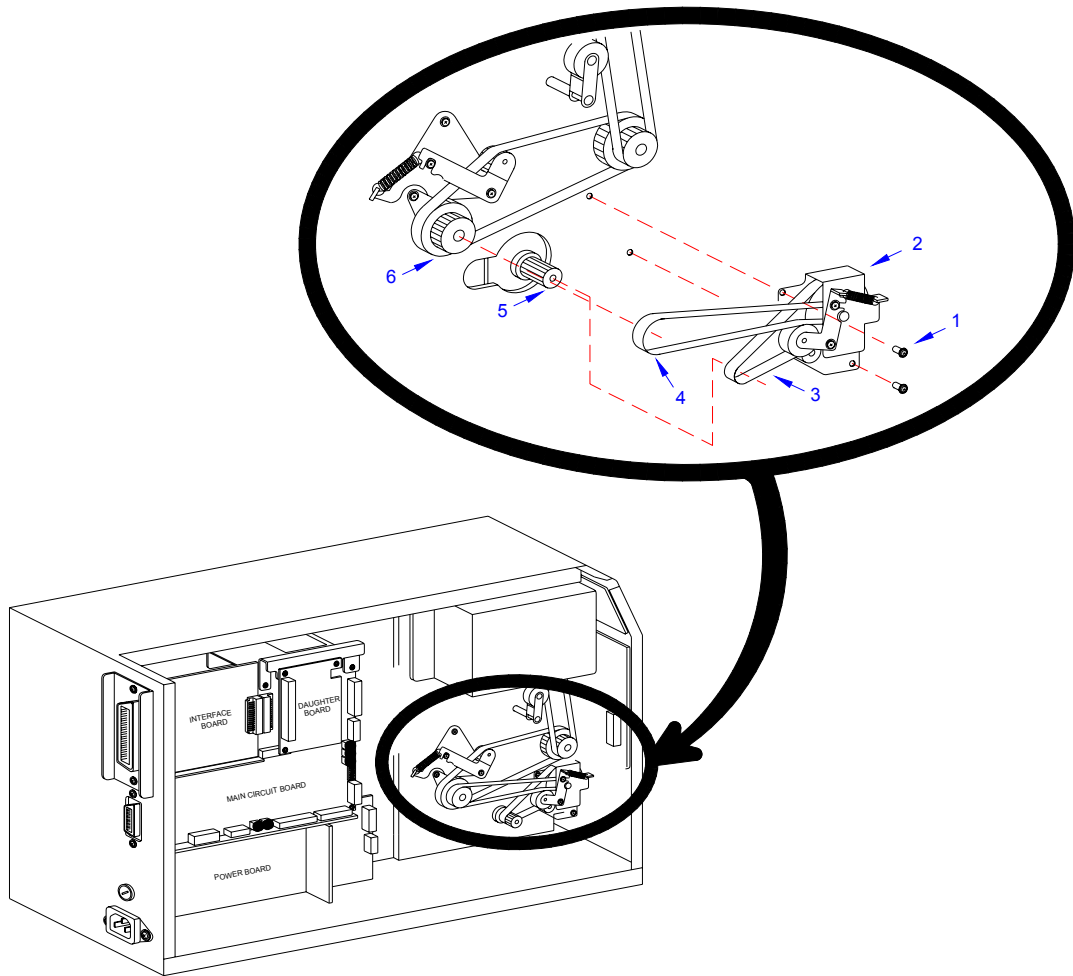
The M84pro Printer utilizes four timing belts coupled with dual action toothed pulleys to provide drive distribution throughout the assembly. Two belts are configured to transfer torque from the motor to the label feed roller. A third belt transfers torque from the feed roller to the platen roller. And the fourth transfers torque from the platen roller to the ribbon rewind spindle. All four operating in conjunction provide the total drive configuration for the primary machine.

The optional cutter assembly has its own drive mechanism that operates when directed by the printer, but independently of the printer drive assembly. The cutter drive assembly also comprises drive belts and pulleys. Those will not be addressed in this procedure.

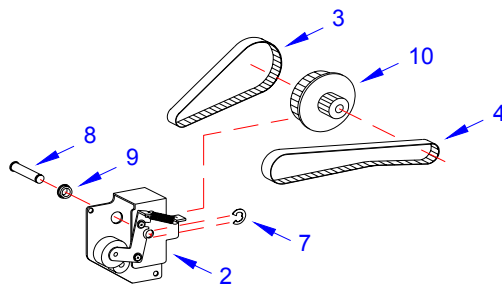
- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 of the Daigrams & Schematics section provides guidance on housing cover removal.

- 3 Disconnect all wiring harnesses that pose an obstruction to belt removal.
- 4 Remove two screws (1, Figure 7-12a) securing pulley bracket (2) to the printer frame.
- 5 Withdraw bracket (2) along with belts (3) and (4) from motor spindle (5) and feed roller pulley (6) respectively.

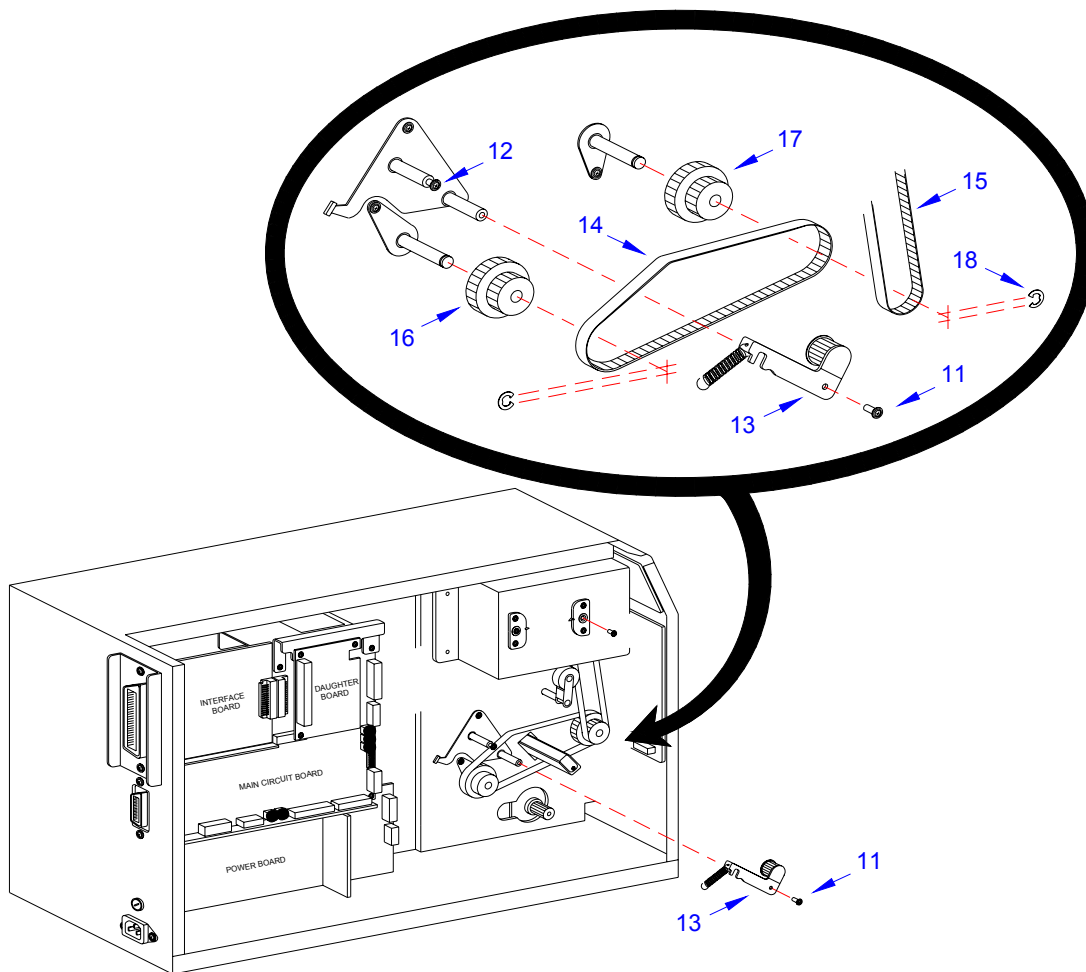


**Figure 7-12a, Motor and Feed Belt Replacement**



**Figure 7-12b, Motor and Feed Belt Replacement**

- 6 Remove e-clip (7, Figure 7-12b), pin (8), and bushing (9) from pulley bracket (2) to free transition pulley (10), and belts 3, 4.

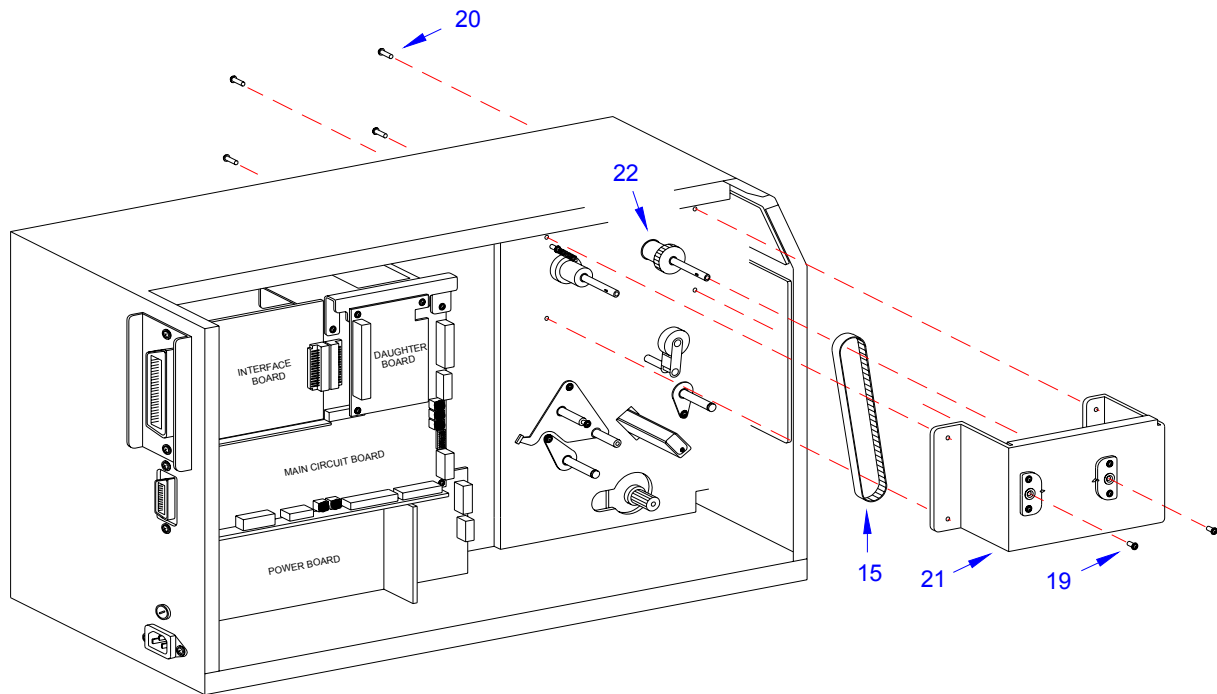


**Figure 7-12c, Platen Roller Belt Replacement**

- 7 Remove screw (11, Figure 7-12c) and loosen screw (12) to free pulley tension bracket (13).
- 8 Remove platen roller belt (14) and ribbon rewind belt (15) from feed roller pulley (16) and platen roller pulley (17) respectively.

**NOTE:** Remove e-clips (18) if removal or replacement of pulleys (16) and (17) is required.

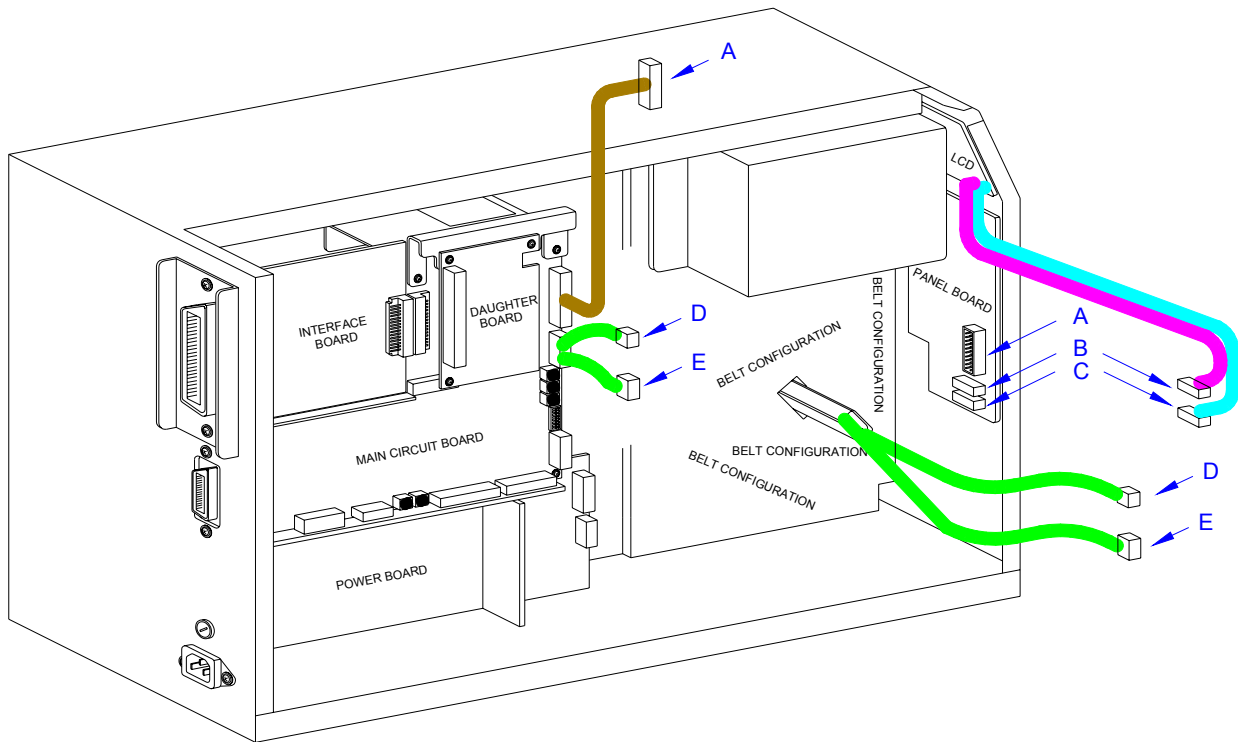
- 9 Remove two screws (19, Figure 7-12d) and four screws (20) and withdraw ribbon frame (21).
- 10 Remove ribbon rewind belt (15) from ribbon rewind spindle pulley (22).
- 11 Prepare to replace timing belts (3), (4), (14), and (15).
- 12 Apply replacement belt (15) to pulley (22) and allow to suspend.
- 13 Apply ribbon frame (21) to the printer frame and secure using four screws (20) and two screws (19).



**Figure 7-12d, Ribbon and Rewind Belt Replacement**

- 14 Apply belt (14, Figure 6-12c) to the large diameter of pulleys (17) and (16).
- 15 Apply the lower end of belt (15) to the smaller diameter of pulley (17).
- 16 Apply pulley tension bracket (13) so that its pulley is oriented under the upper span of belt (14) and secure using screw (11).
- 17 Manipulate pulley tension bracket (13) so as to apply tension to belt (14) and tighten screw (12).
- 18 Apply replacement belts (4, Figure 7-12b) and (3) to pulley (10) and insert into pulley bracket (2).
- 19 Apply bushing (9) to pin (8) and insert through bracket (2) and pulley (10) from the rear.
- 20 Secure pin (8) at the face of bracket (2) using e-clip (7).
- 21 Apply the free ends of belts (4, Figure 7-12a) and (3) to feed roller pulley (6) and motor spindle (5) respectively.
- 22 Secure pulley bracket (2) to printer frame using two screws (1).
- 23 Adjust belt tension in accordance with its relative procedure in the Adjustment Procedures section of this manual.
- 24 Reconnect all wiring harnesses as directed in Figure 7-13.
- 25 Reconnect power supply cord, test cycle, and reattach/close all covers.

NOTE: Figure 10-1 of the Diagrams & Schematics section provides guidance on housing cover installation.



**Figure 7-13, Wiring Harness Connection**

### PRINT HEAD REPLACEMENT

If the print head becomes damaged or wears out, it can be easily removed and replaced without having to make critical adjustments. Before replacing the print head, check the head counter values by printing a test pattern.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open/remove the top, right, and front housing covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon removal.

- 3 Remove ribbon and media to provide free access to print head (1, Figure 7-14).
- 4 Turn thumb screw (2) located on the top side print assembly (3) to release print head (1).
- 5 Disconnect the two wiring harnesses from print head (1) and lift away.

NOTE: It is recommended that print head mounting plate (4) be removed from the damaged print head (1) and saved as a spare. The mounting plate may be removed by removing two screws (5).

## Section 7: Replacement Procedures

- 6 Connect the power harness to the larger connector (6) and the thermal head harness to the smaller connector (7) of replacement print head (1) with the head oriented downward.
- 7 Apply print head (1) with mounting plate (4) attached, to lower side of print assembly (3).

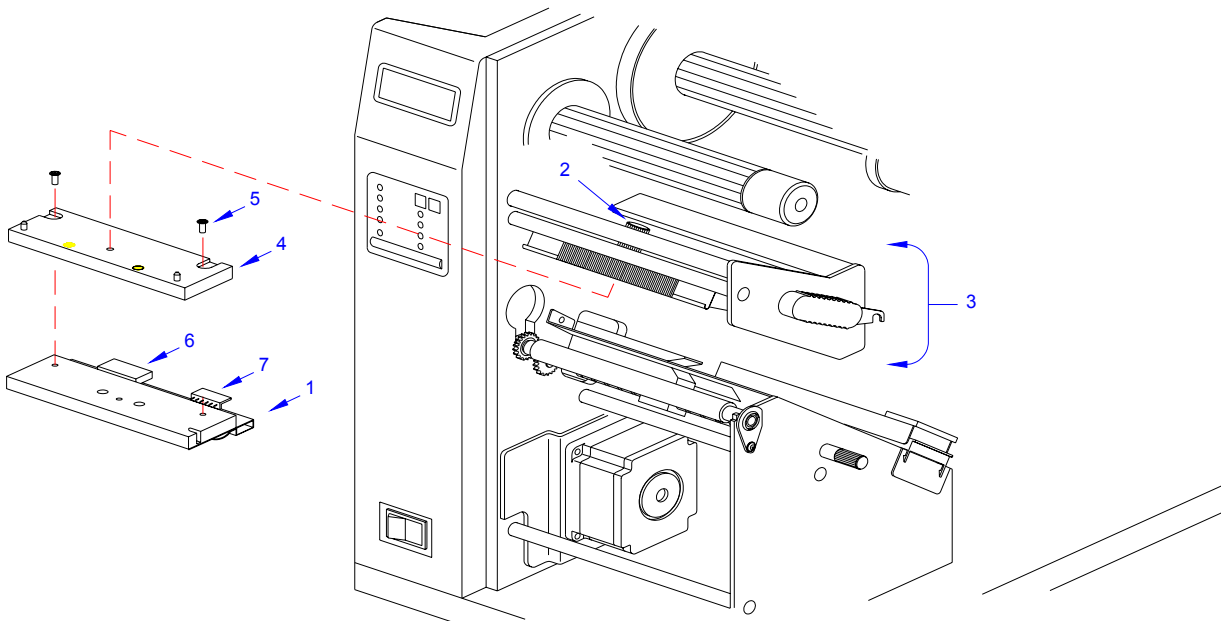
**NOTE:** When the print head is properly oriented under the print assembly, two colored alignment dots may be seen through two slots when peering downward from the top side.

- 8 Secure replacement print head (1) to print assembly using thumb screw (2).

**CAUTION:** ENSURE THAT THE WIRING HARNESSSES ARE ROUTED IN A MANNER SO AS TO PREVENT PINCHING AND THAT THEY DO NOT TOUCH THE HEAD OPENING SPRING. ALSO CONFIRM THAT THE HEAD MAY BE OPENED AND CLOSED WITHOUT RESTRICTION.

- 9 Clear the print head counter. Refer to the relative procedure for instructions if required.
- 10 Reconnect power supply cord, test cycle, and reattach/close all covers.

**NOTE:** Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon installation.



**Figure 7-14, Print Head Replacement**

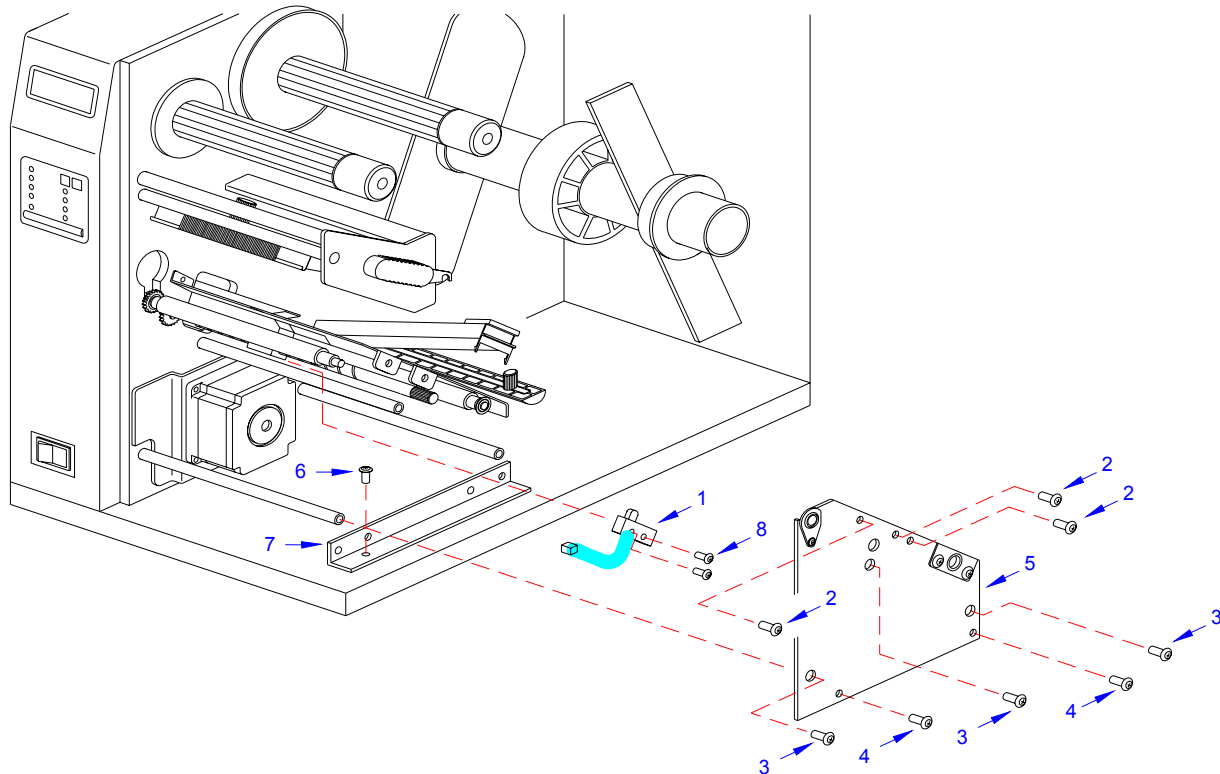
## LABEL-OUT SENSOR SWITCH REPLACEMENT

The label-out sensor switch detects the presence of print media and sends an error signal to the processor should the absence of print media be detected. The switch is of a simple on/off variety that is wired. If print media is present it will depress the switch into the closed position. However, if print media is not present, the switch will not be depressed and the non-depress state is the on position.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open or remove the top, left, right, and front housing covers.

**NOTE:** Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon removal.

- 3 Remove ribbon and media to provide free access to label-out sensor (1, Figure 7-15).
- 4 Remove two screws (2), (3), and (4) from side frame (5).
- 5 Remove one screw (6) from side frame bracket (7) to permit side frame (5) removal.
- 6 Remove two screws (8) securing label-out sensor switch (1).



**Figure 7-15, Label-Out Sensor Switch Replacement**



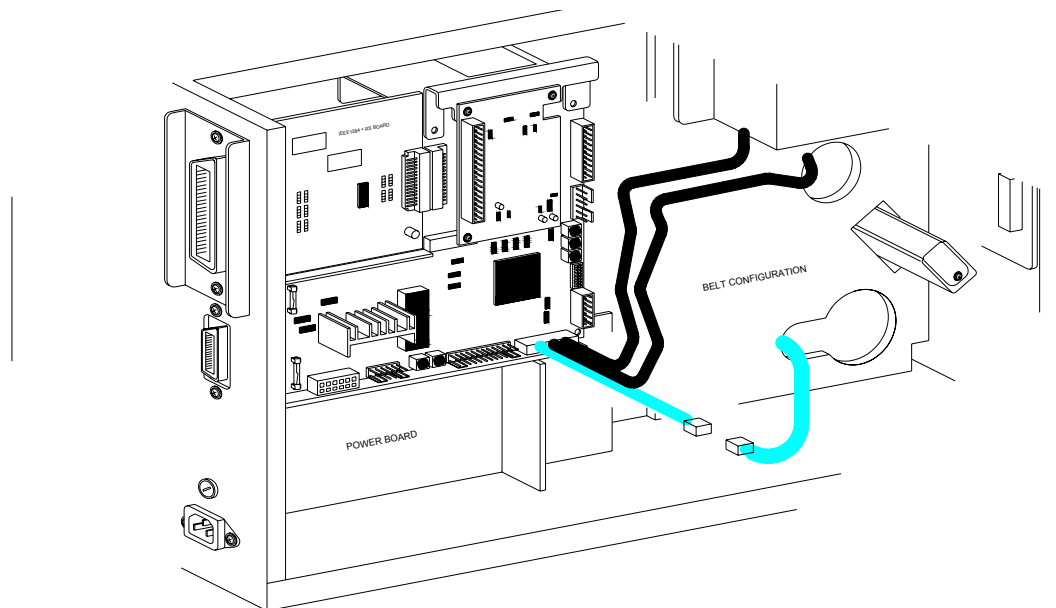
## Section 7: Replacement Procedures

- 7 Disconnect the sensor switch wiring harness from the main circuit board and withdraw switch (1) from printer.
- 8 Feed the wiring harness of replacement switch (1) through the slot adjacent to the motor.
- 9 Apply switch (1) against the printer frame and secure using two screws (8).

NOTE: A properly oriented sensor switch will permit its mounting orifices to align with those of the frame while its contact arm protrudes through the paper ramp.

- 10 Connect the wiring harness of replacement label-out sensor switch (1) to the main circuit board. Refer to Figure 7-16 for guidance.
- 11 Reconnect power supply cord, test cycle, and reattach/close all covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon installation.



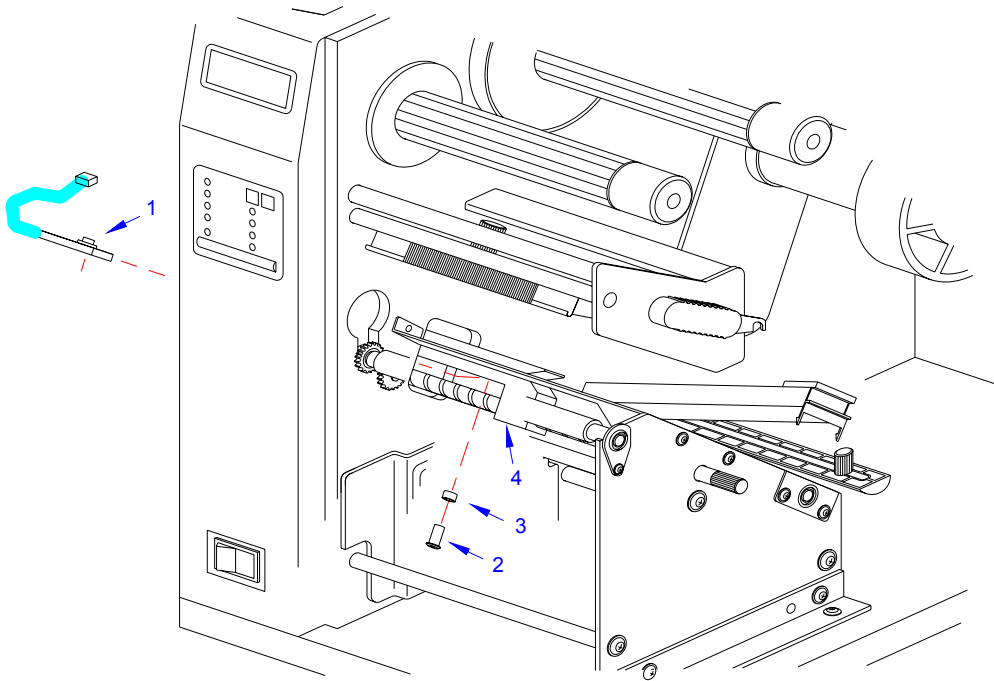
**Figure 7-16, Wiring Harness Connection**

## LABEL POSITION SENSOR REPLACEMENT

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open or remove the top, left, right, and front housing covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon removal.

- 3 Remove ribbon and media to provide free access to label position sensor (1, Figure 7-17).



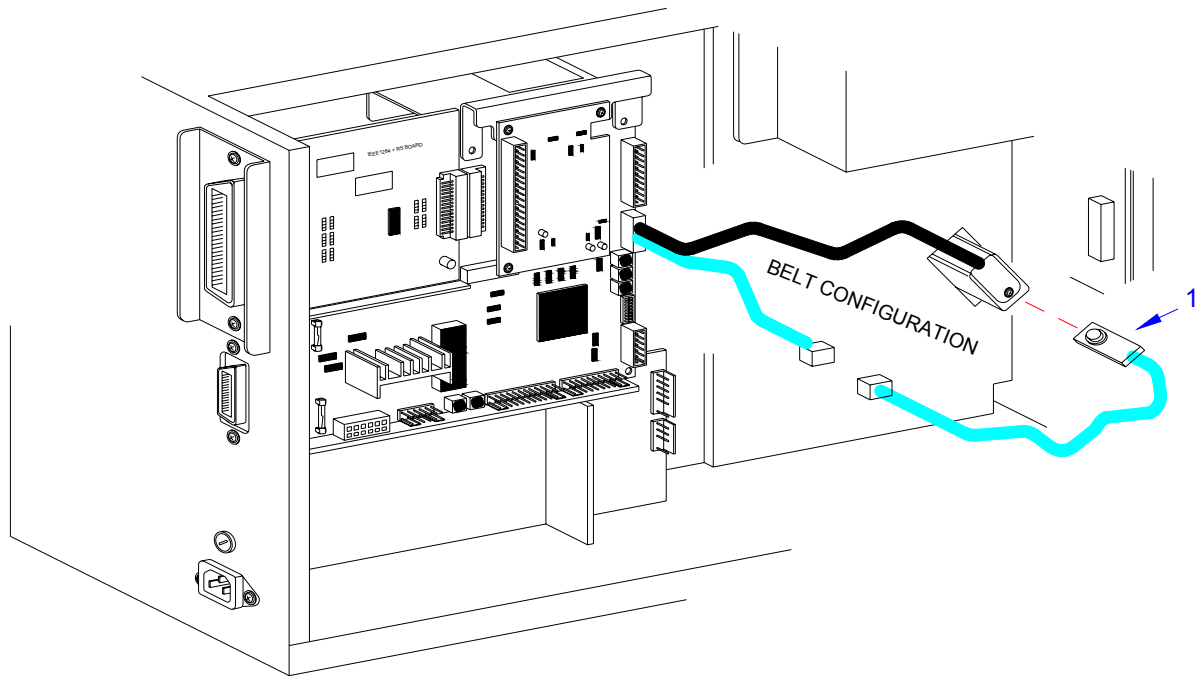
**Figure 7-17, Label Position Sensor Replacement**

- 4 Remove screw (2) and nylon spacer (3) securing sensor (1) to media sensor guide (4).

NOTE: The sensor is attached to the underside of the sensor guide. The sensor guide is manufactured of black phenolic material and is attached to the brass auger type spindle.

- 5 Disconnect wiring harness of damaged sensor (1) from the main circuit board.
- 6 Connect the wiring harness of replacement label position sensor (1) to main circuit board. Refer to Figure 7-18 for guidance.
- 7 Reconnect power supply cord, test cycle, and reattach/close all covers.

NOTE: Figures 10-1, 10-2, and 10-3 of the Daigrams & Schematics section provides guidance on housing cover, media, and ribbon installation.



**Figure 7-18, Wiring Harness Connection**

## **RIBBON SENSOR REPLACEMENT**

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Open or remove the top, left, and right housing covers.

NOTE: Figures 10-1 and 10-3 of the Daigrams & Schematics section provides guidance on housing cover and ribbon removal.

- 3 Remove ribbon to allow access to ribbon sensor (1, Figure 7-21) and supply assembly (2).
- 4 Remove screw (3) and screw (4) from ribbon supply assembly (2).
- 5 Withdraw boss cap (5), two collars (6), ribbon boss (7), another collar (6), and disk plate (8) from ribbon supply shaft (9) consecutively.
- 6 Disconnect the wiring harness of ribbon sensor (1) from the main circuit board.
- 7 Remove screw (10) securing ribbon sensor (1) to printer frame. Lift away sensor (1).
- 8 Route replacement sensor (1) through printer frame.
- 9 Secure replacement sensor (1) to printer frame using screw (10).
- 10 Apply disk plate (8), a collar (6), ribbon boss (7), two additional collars (6), and boss cap (5) onto ribbon supply shaft (9) and secure with screw (4).
- 11 Align orifices of boss (7) and shaft (9) and apply screw (3).
- 12 Connect wiring harness of replacement ribbon sensor (1) to main circuit board. Refer to Figure 7-22 for guidance.

Section 7: Replacement Procedures

- 13 Install ribbon, restore power, test cycle, and install/close housing covers.

NOTE: Figures 10-1 and 10-3 of the Daigrams & Schematics section provides guidance on housing cover and ribbon installation.

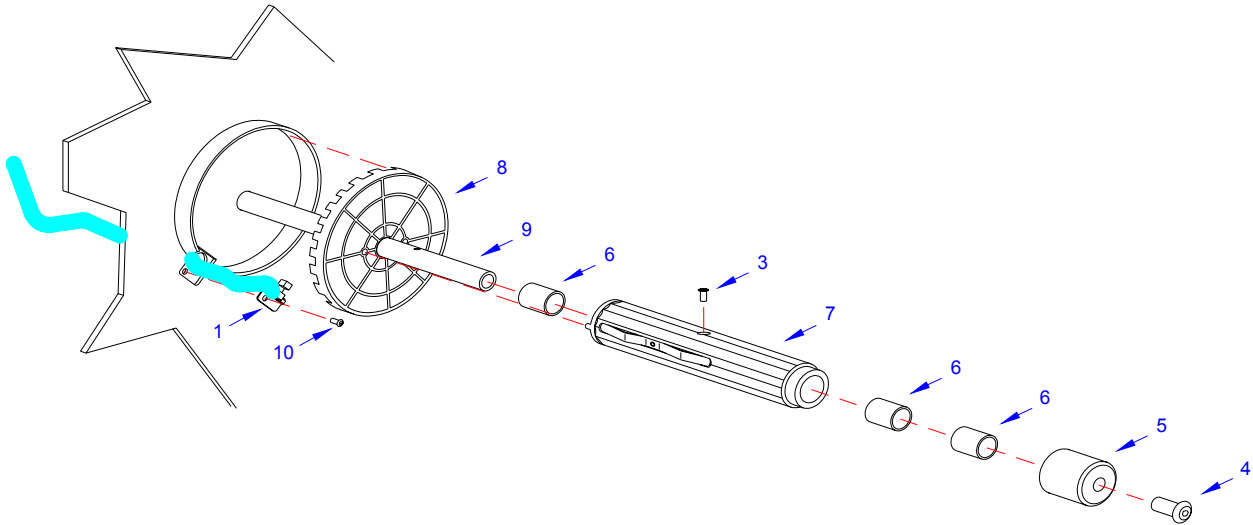


Figure 7-21, Ribbon Sensor Replacement

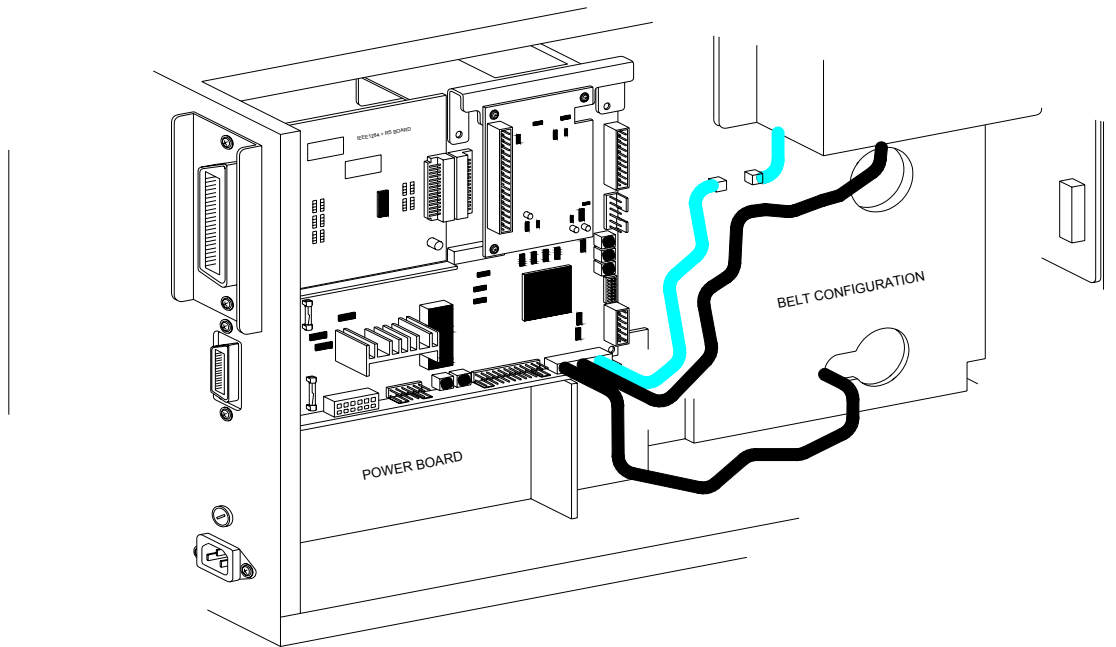


Figure 7-22, Wiring Harness Connection

## CUTTER BELT REPLACEMENT

The cutter assembly is an accessory to the printer. As a purchase option, the cutter assembly may not apply to the printer in question. The cutter assembly mounts to the face of the printer in place of the standard front cover.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Remove cutter assembly (1, Figure 7-23a) from the printer.

NOTE: If unsure how to remove the cutter assembly, refer to the Label Cutter Installation procedure in the Accessories Installation section for guidance.

- 3 Remove two screws (2) securing idle gear bracket (3) and lift away.
- 4 Withdraw cutter timing belt (4) and motor timing belt (5) from cutter assembly (1).
- 5 Apply replacement motor belt (5) to motor pulley (6) and idle pulley (7).
- 6 Apply replacement cutter belt (4) to idle pulley (7) and cutter pulley (8).
- 7 Apply bracket (3) to the assembly oriented as removed and secure using two screws (2).

NOTE: When properly installed, the idle bracket gear will apply tension pressure to the outer surface of the cutter belt.

- 8 Prepare to replace o-ring belt (9, Figure 7-23b).
- 9 Remove two screws (10) and two screws (11) from left and right sides of cutter frame (12).
- 10 Lift cutter cover (13) away from cutter frame (12).
- 11 Loosen screws (14), (15), (16), (17), and (18) located on the right side of cutter frame (12) sufficiently to manipulate the right end of feed roller (19) free.
- 12 Remove worn o-ring belt (9) from feed roller (19) and stepper motor (20).
- 13 Apply replacement o-ring belt (9) to feed roller (19) and stepper motor (20).
- 14 Insert right end of feed roller (19) into cutter frame (12) and tighten screws (18), (17), (16), (15), and (14).
- 15 Apply cutter cover (13) to cutter frame (12) and secure with two screws (11) and (10) to the right and left sides respectively.
- 16 Re-install the cutter assembly, connect power supply cord, and test cycle.

NOTE: Refer to the Label Cutter Installation procedure in the Accessories Installation section of this manual for installation guidance.

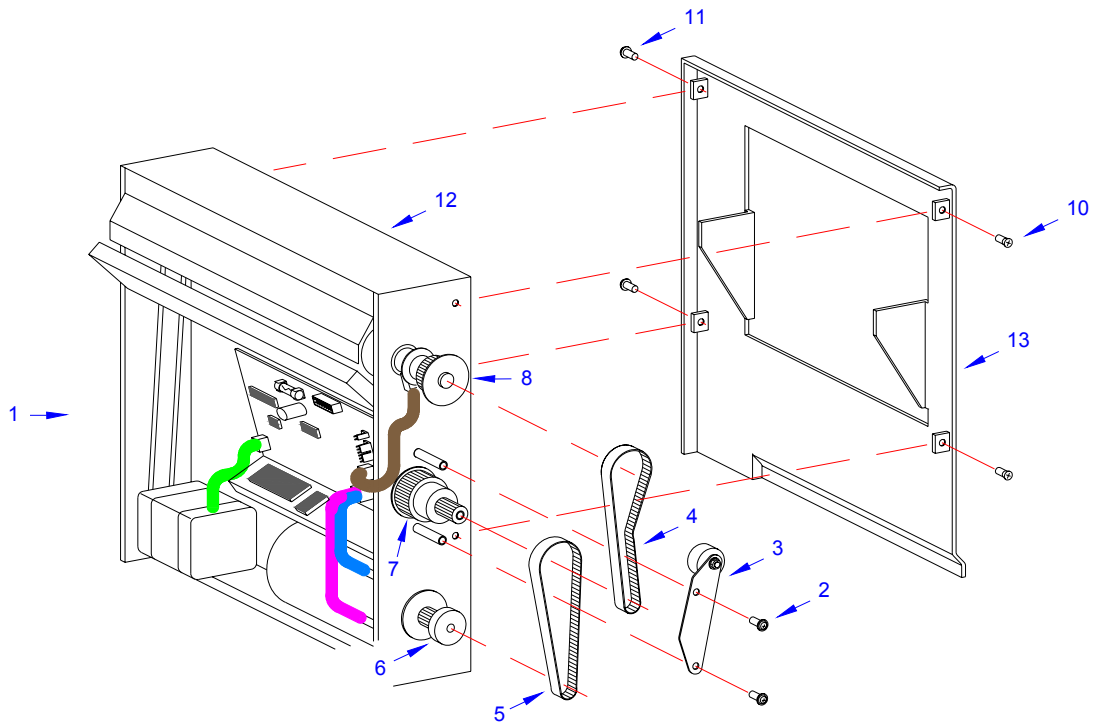


Figure 7-23a, Cutter Belt Replacement

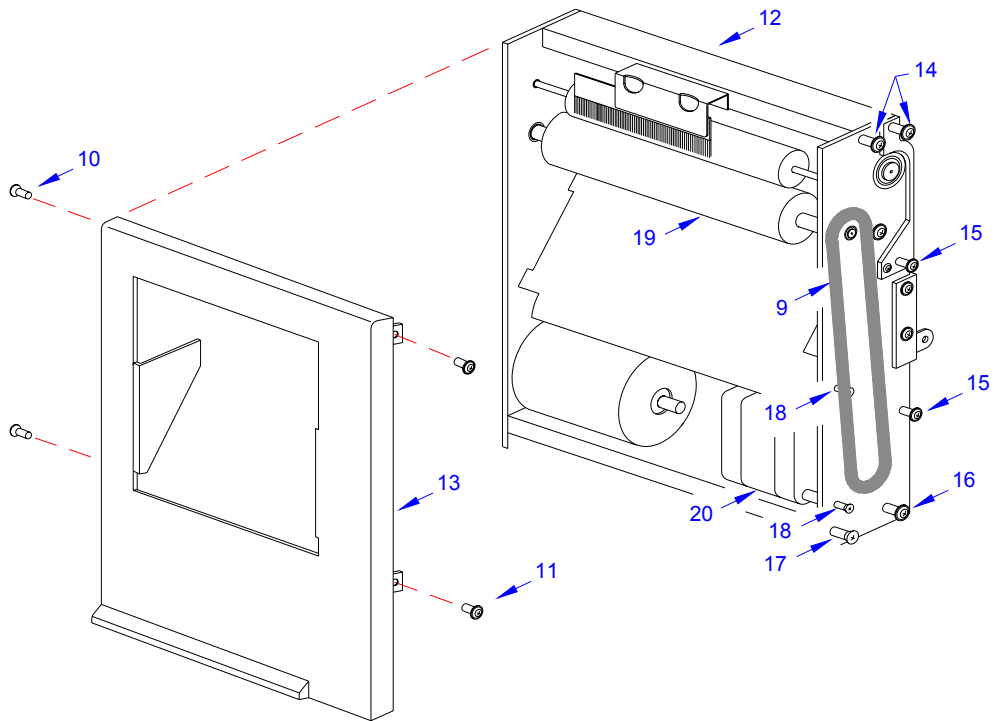


Figure 7-23b, Cutter Belt Replacement

## CUTTER CIRCUIT BOARD REPLACEMENT

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Remove cutter assembly (1, Figure 7-24) from the printer.

**NOTE:** If unsure how to remove the cutter assembly, refer to the Label Cutter Installation procedure in the Accessories Installation section for guidance.

- 3 Disconnect all wiring harnesses from circuit board (2).
- 4 Remove two screws (3) from paper guide plate (4).

**NOTE:** The two screws that are to be removed from the paper guide plate are located on the front side of the cutter along the lower perimeter of the plate.

**CAUTION:** WHEN THE TWO SCREWS ARE REMOVED FROM THE PAPER GUIDE PLATE, TWO NYLON SPACERS LOCATED BETWEEN THE CIRCUIT BOARD AND THE PLATE WILL BE FREED. ENSURE THAT THE CUTTER ASSEMBLY IS HORIZONTAL WITH THE CIRCUIT BOARD ORIENTED UPWARD WHEN THE BOARD IS REMOVED TO PREVENT THEIR LOSS.

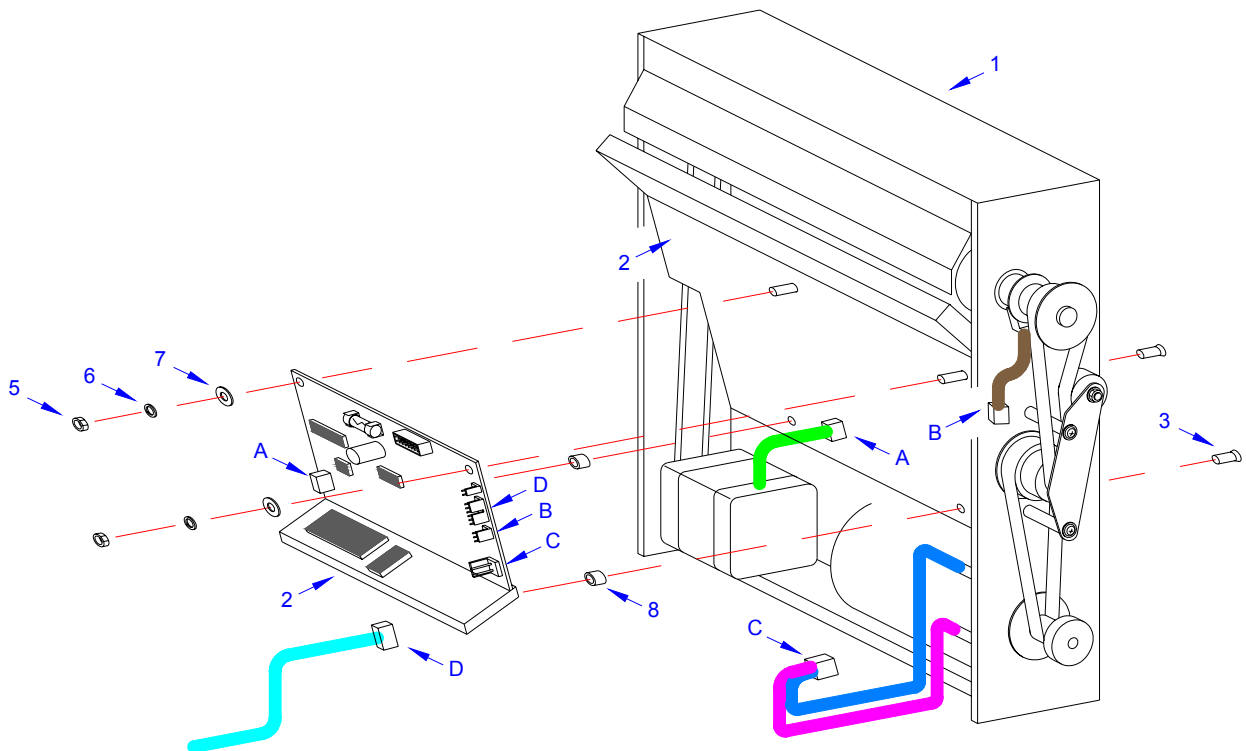


Figure 7-24, Cutter Circuit Board Replacement

## Section 7: Replacement Procedures

- 5 Remove two nuts (5), lock washers (6), and flat washers (7) from circuit board (2).
- 6 Manipulate damaged cutter circuit board (2) from cutter assembly (1).
- 7 Retrieve two nylon spacers (8) from within cutter assembly (1).
- 8 Apply and hold two screws (3) to paper guide plate (4) from the exterior.
- 9 Apply a nylon spacer (8) to each screw (3) from the interior.
- 10 Thread screws (3) into circuit board (2).

**CAUTION:** IT IS RECOMMENDED THAT STEPS 8 THROUGH 10 BE PERFORMED OVER A TABLE. GREAT DEXTERITY IS REQUIRED AND THE POTENTIAL FOR COMPONENT LOSS IS HIGH.

- 11 Apply flat washers (7), lock washers (6), and nuts (5) consecutively to circuit board (2).
- 12 Connect wiring harnesses to replacement circuit board.
- 13 Re-install the cutter assembly, connect power supply cord, and test cycle.

**NOTE:** Refer to the Label Cutter Installation procedure in the Accessories Installation section of this manual for installation guidance.



## ADJUSTMENT PROCEDURES

The SATO M84pro Printer incorporates a series of sub-assemblies that, in conjunction, comprise the total printer assembly. Many of these sub-assemblies are designed to be adjustable to maintain optimum performance of the printer throughout its life. This service manual section addresses the proper technique for their adjustment.

It may be necessary to refer to this section following component replacement. Use the relative procedures in that section to replace the component, test cycle the printer, and then adjust as necessary in accordance to the relative procedures in this section.

**NOTE:** Refer to Figure 10-6, Print Position Reference and Figures 10-7 through 10-19, Print Operation Sequence in the Diagrams & Schematics section for additional operational data as deemed necessary.

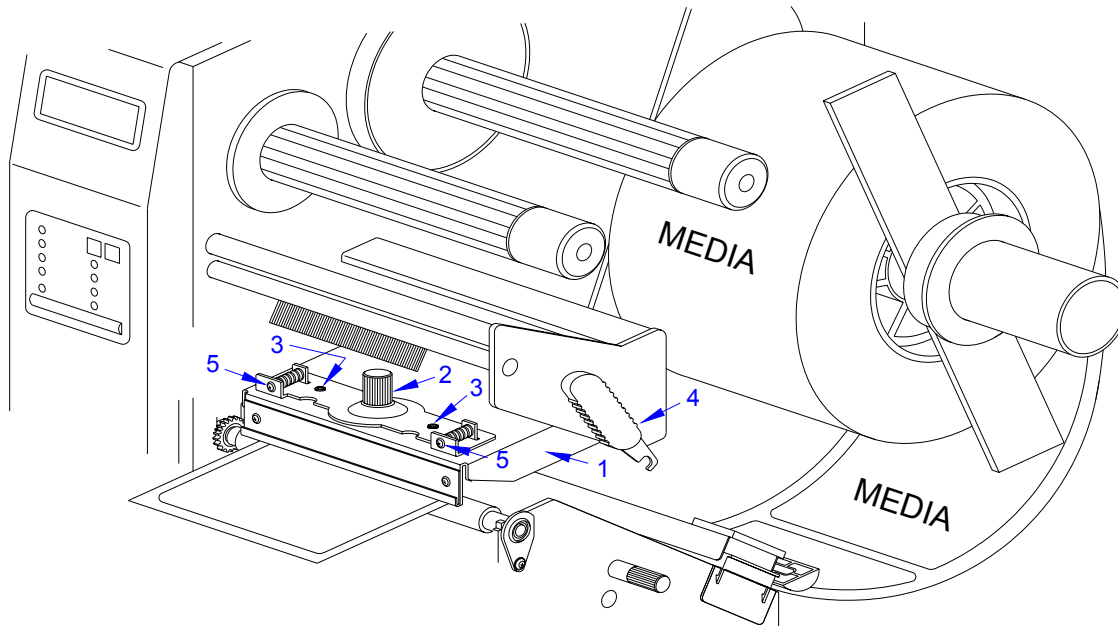


**Figure 8-1, Print Defects**

PRINT DEFECTS	RELATIVE PROCEDURE
Print becomes lighter or darker from one side to the other. This condition is repetitive from label to label.	Print Head Balance Adjustment
Voids in the overall print image. This condition is repetitive from label to label.	Print Darkness Adjustment
A visible path on the label where print image is missing. The path will change somewhat from label to label.	Print Head Position Alignment Platen Roller Adjustment Ribbon Guide Plate Adjustment
The scales at the lower left and right sides are not equal distances from the labels lower edge.	Print Head Position Alignment
The lines are not sharp.	Print Darkness Adjustment
The image is too light.	Print Darkness Adjustment
The image is severely dark.	Print Darkness Adjustment
Bar code label has a sharp line where print is missing.	Print Darkness Adjustment
The printed position is too far in one direction or another.	Print Position Adjustment Feed Roller Adjustment Offset Label Stop Position

**PRINT HEAD POSITION ALIGNMENT**

Print head position has a direct impact on print quality. An improperly aligned print head will cause the print to be inconsistent across the label. The following procedure will provide guidance on print head alignment.



**Figure 8-2, Print Head Alignment**

- 1 Remove ribbon as applicable to gain access to the top side of print head (1, Figure 8-2).

NOTE: Figure 10-3 in the Diagrams & Schematics section provides guidance on ribbon removal.

- 2 Loosen thumbscrew (2) and two set screws (3).
- 3 Load printer with media and ribbon as applicable and latch (4) print head (1) closed.

NOTE: Figures 10-2 and 10-3 of the Diagrams & Schematics section provides guidance on media and ribbon installation.

- 4 Begin continuous printing of self-test labels.

NOTE: The self-test label identifies if any elements are malfunctioning. To the far right of the Head Check row, OK will be printed if elements are not missing and NG if any are missing. Begin a troubleshooting process should difficulties be found. It is recommended that the troubleshooting process begin at the rear of the printer and work forward.

- 5 Adjust left or right screw/s (5) to manipulate print head (1) as deemed necessary until the print image is deemed acceptable.

NOTE: The print speed and darkness should be set so as to assist in determining if the print image is being improved during alignment. The speed and darkness settings are identified on the self-test label. Adjust as deemed necessary.

NOTE: The self-test label provides a scale in the lower right and left corners to assist in adjustment. The label is properly aligned perpendicular to the print head when the scale increments are proportionate on each side.

- 6 Retighten two set screws (3) and thumbscrew (2) to complete the adjustment process.

### **PRINT HEAD BALANCE ADJUSTMENT**

Print quality may be further optimized by the adjustment of the print head balance. When the print head is balanced, there is equal pressure applied across the print media and platen roller by the print head. The left side of the print head remains fixed and the right side is adjusted vertically to obtain balance. To adjust print head balance, follow the instructions below.

- 1 Visually inspect the condition of the feed and platen rollers and replace as necessary.
- 2 Adjust the feed roller in accordance with its relative procedure in this manual.
- 3 Load printer with media and ribbon as applicable.

NOTE: Figures 10-2 and 10-3 of the Diagrams & Schematics section provides guidance on media and ribbon installation.

- 4 Begin continuous printing of self-test labels.

NOTE: The self-test label identifies if any elements are malfunctioning. To the far right of the Head Check row, OK will be printed if elements are not missing and NG if any are missing. Begin a troubleshooting process should difficulties be found. It is recommended that the troubleshooting process begin at the rear of the printer and work forward.

NOTE: The print speed and darkness should be set so as to assist in determining if the print image is being improved during alignment. The speed and darkness settings are identified on the self-test label. Adjust as deemed necessary.

NOTE: The self-test label provides incremented patterns across its upper and lower perimeters for adjustment assistance. Observe print quality in these regions during adjustment.

- 5 Loosen paper guide thumbscrew (1, Figure 8-3) and adjust guide fully outward.

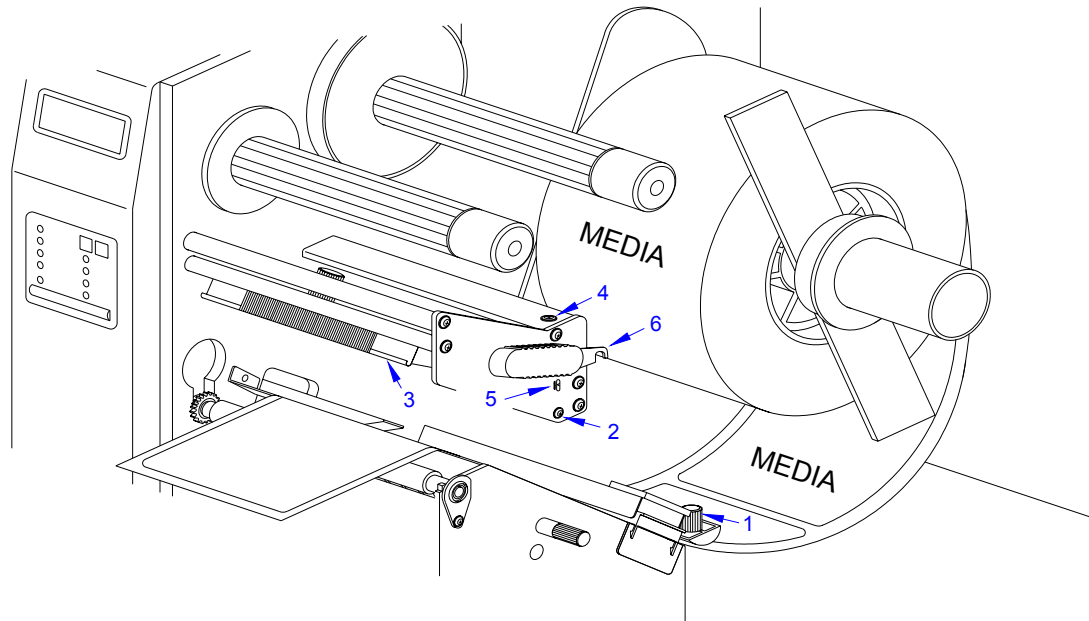
NOTE: By moving the paper guide away from the label's edge, it allows the stock to wander. Observe label movement during the printing and adjustment process for assistance.

NOTE: The left edge of the ribbon should always cover the label's left edge by 1/8 inch.

- 6 Loosen set screw (2) to allow the right side of print head (3) to be adjusted.
- 7 Manipulate screw (4) to adjust print head (3) while observing scale (5) under latch (6).

NOTE: Clockwise screw rotation raises the print head on the right side. Counter-clockwise rotation conversely lowers the print head.

- 8 Retighten set screw (3).



**Figure 8-3, Print Head Balance Adjustment**

### **RIBBON GUIDE PLATE ADJUSTMENT**

Ribbon wrinkling has a negative impact on print quality and should be avoided. If ribbon wrinkling is observed across the ribbon guide plate, adjustment may be necessary. Before adjusting the ribbon guide plate, it is recommended that the print head balance be adjusted first, followed by the guide plate if necessary.

The left side of the ribbon guide plate remains fixed and the right side is adjusted vertically. To adjust the ribbon guide plate, follow the instructions below.

- 1 Load printer with media and ribbon as applicable.

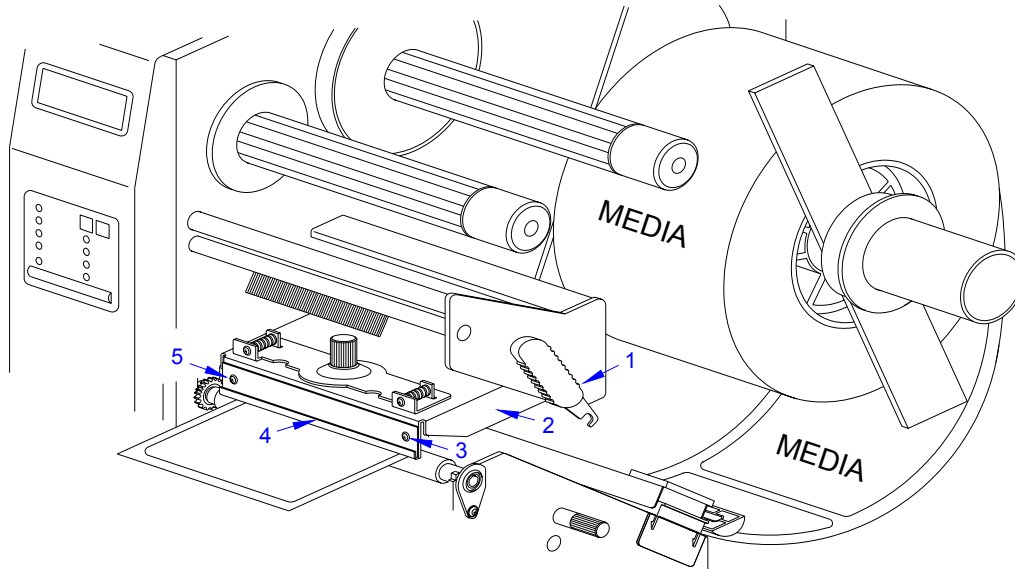
**NOTE:** Figures 10-2 and 10-3 of the Diagrams & Schematics section provides guidance on media and ribbon installation.

- 2 Connect the power supply cord, restore power, and test cycle.
- 3 Manually manipulate print head latch (1, Figure 8-4) to open print head (2).

**NOTE:** The printer will go into a standby mode when the print head is opened. It is not necessary to turn the printer off.

- 4 Loosen set screw (3) to allow the right side of ribbon guide plate (4) to be adjusted.
- 5 Manipulate guide plate (4) until the ribbon seems to smooth itself out.
- 6 Retighten screw (3) to hold that position.

- 7 Ensure screw (5) is secure on the left side of guide plate (4).
- 8 Test cycle and readjust as necessary.



**Figure 8-4, Ribbon Guide Plate Adjustment**

### **FEED ROLLER ADJUSTMENT**

Feed roller adjustment is used for fine tuning label tracking. By adjusting the pressure between the upper and lower rollers, the media may be directed through the printer as desired. If mal-adjusted, the label media will have a tendency to want to track to the left or to right depending on which side has the greatest pressure.

A properly adjusted upper and lower feed roller assembly will have evenly applied pressure to each side and be properly aligned. The pressure difference between each side should be 100 grams or less. A tension gauge will be required to measure the tension.

To acquire the desired adjustment; the upper, the lower, or both feed rollers may require manipulation. Each roller may be adjusted along opposing X and Y axis. Different variations may be required until the correct adjustment is achieved.

- 1 Switch the printer off and disconnect the power supply cord.
- 2 Open the top and right side housing covers.

**NOTE:** Figures 10-1, 10-2, and 10-3 of the Diagrams & Schematics section provides guidance on housing cover, media, and ribbon removal.

- 3 Remove label stock from the printer and leave print head open.
- 4 Attach a strip of 20mm + wide liner backing paper to the end of the tension gauge.

## Section 8: Adjustment Procedures

- 5 Place the strip between the upper and lower feed rollers on one end and latch media cover.
- 6 Slowly pull the tension gauge sufficiently enough to take a reading.
- 7 Repeat steps 5 and 6 for the opposite end of feed roller assemblies.
- 8 Adjust lower roller (1, Figure 8-5) by slightly loosening two screws (2) securing roller bracket (3) and adjusting as deemed necessary while observing scale (4).

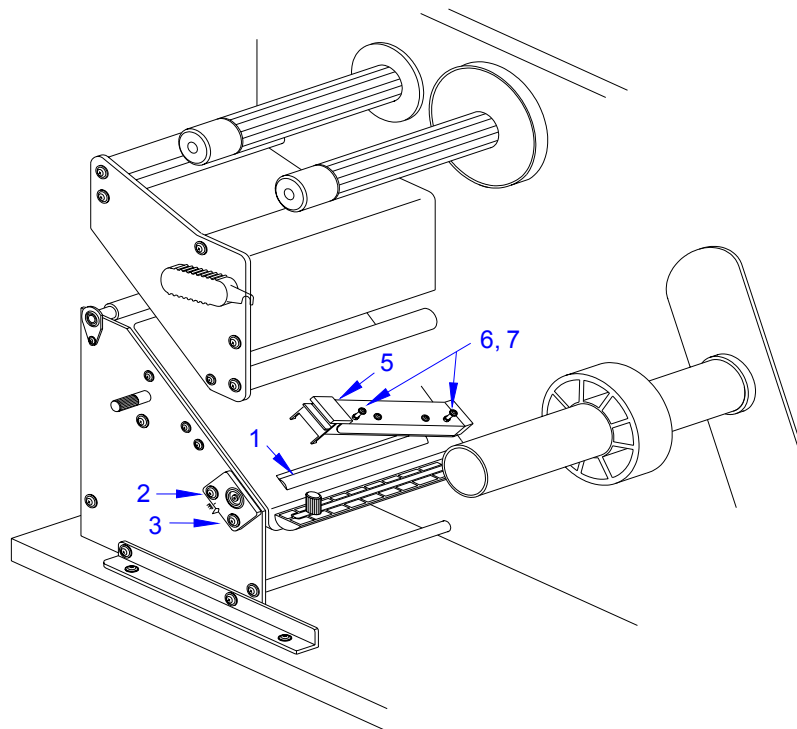
**NOTE:** The lower roller may be adjusted by inserting a medium sized standard screwdriver into the slot located along the lower periphery of the roller bracket and twisting. The scale is located adjacent to the adjustment slot.

**CAUTION:** ONLY ADJUST THE UPPER ROLLER IF IT HAS DEFINATELY BEEN DETERMINED THAT ADJUSTMENT OF THE LOWER ROLLER WILL NOT SUFFICE.

- 9 Adjust upper roller (5) by loosening the two lock nuts (6) and adjusting their respective set screws (7) as deemed necessary. Retighten nuts (6) to secure.

**NOTE:** Each side of the upper roller may be adjusted independently. Only loosen the lock nut and adjust the set screw on the end of the roller deemed necessary to adjust.

- 10 Test cycle and readjust as necessary.



**Figure 8-5, Feed Roller Adjustment**

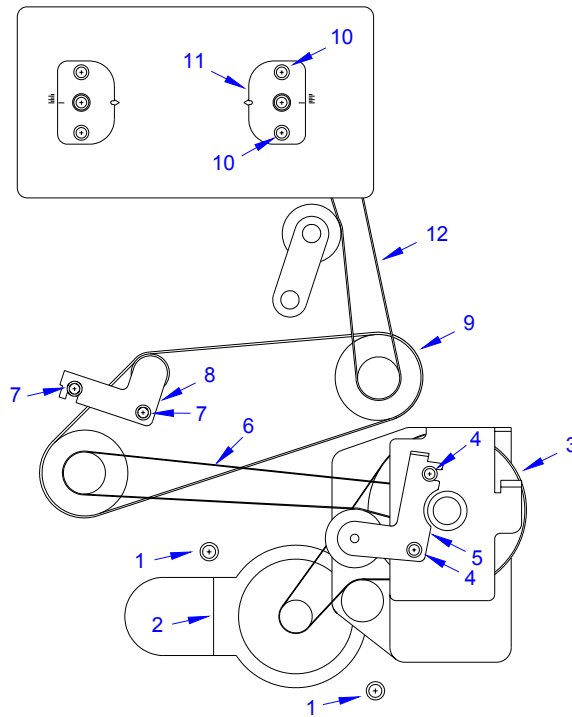
## TIMING BELT ADJUSTMENT

The following procedure covers the adjustment of all timing belts within the printer. Not included, is the adjustment procedure for the optional cutter assembly. However, the adjustment technique is exactly the same as here. Remove the cutter assembly to gain access to its belts.

- 1 Switch the printer off and disconnect the power supply cord.
- 2 Open/remove the top, right, and left housing covers.

**NOTE:** Figure 10-1 of the Diagrams & Schematics section provides guidance on housing cover removal.

- 3 Loosen two screws (1, Figure 8-6) and manipulate motor (2) as required to tighten motor belt (3). Retighten screws (1).



**Figure 8-6, Tightening Timing Belts**

- 4 Loosen two screws (4) and manipulate bracket (5) as required to tighten feed roller belt (6). Retighten screws (4).
- 5 Loosen two screws (7) and manipulate bracket (8) as required to tighten platen roller belt (9). Retighten screws (7).

**CAUTION:** STEP 6 SHOULD ONLY BE PERFORMED BY FACTORY PERSONNEL. THIS ADJUSTMENT MAY MAKE MATTERS WORSE BY AFFECTING RIBBON REWIND ANGLE AND CAUSING RIBBON WRINKLING.



## Section 8: Adjustment Procedures

- 6 Loosen two screws (10) and manipulate bracket (11) to tighten ribbon rewind belt (12). Retighten screws (10).

NOTE: The lower roller may be adjusted by inserting a medium sized standard screwdriver into the slot located along the lower periphery of the roller bracket and twisting. The scale is located adjacent to the adjustment slot.

- 7 Restore power and test cycle to ensure proper function.
- 8 Close/replace housing covers.

NOTE: Figure 10-1 of the Diagrams & Schematics section provides guidance on housing cover installation.

### PITCH SENSOR SETUP FOR NOTCH TAGS

The following procedure applies to labels with notches along the left perimeter of the label stock. Ignore this procedure otherwise.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Remove the front housing cover.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover removal.

- 3 Remove e-clip (1, Figure 8-7) from brass sensor adjustment shaft (2) as necessary.

NOTE: Removal of the e-clip permits the sensor to be adjusted an additional 14mm to the left for tag stock applications.

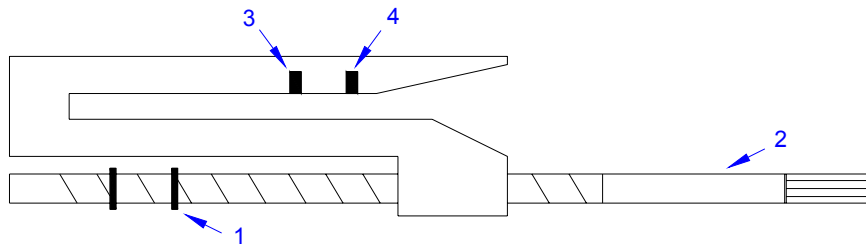


Figure 8-7, Pitch Sensor Assembly

## Section 8: Adjustment Procedures

- Turn the knurled knob of sensor adjustment shaft (2) to laterally adjust sensors (3) and (4).

NOTE: Adjust sensor to align with, and register; the label hole, notch, gap, or edge as applicable.

- Close/install housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover installation.

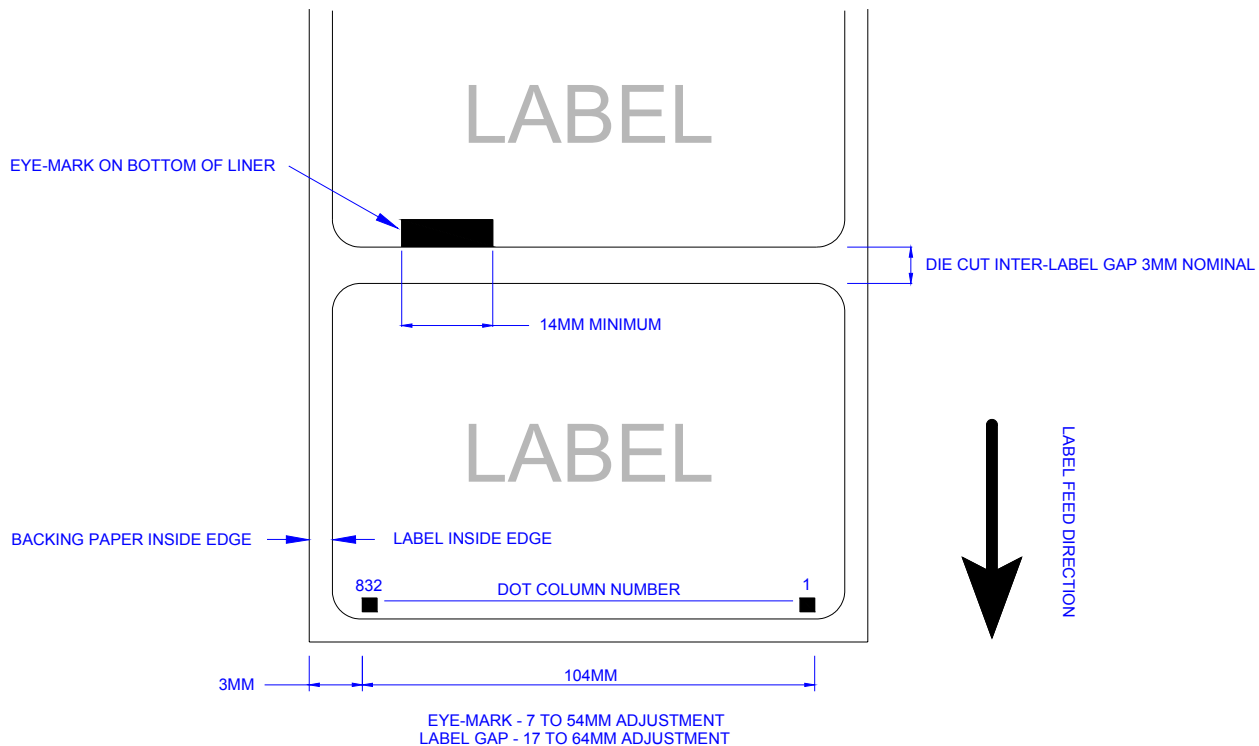


Figure 8-8, Label Stock Diagram

### PRINT POSITION ADJUSTMENT

There are three methods of print position adjustment. Two of the methods allow for coarse adjustment, and the third permits fine adjustment.

Although there are three methods, only two are recommended for non-SATO personnel. For this reason, the VR1 potentiometer located on the main circuit board will only be identified here and not explained.

Coarse print position adjustment should be through the software provided with the printer and fine adjustment should be performed by manually adjusting the PITCH potentiometer located on the printer front panel cover.

- 1 Turn OFFSET potentiometer (1, Figure 8-9) located on the front panel to the center position.

NOTE: The potentiometer has a scale imprinted on its face. Due to its size, it may be difficult to see.

- 2 Press the FEED key while simultaneously switching on the power switch.
- 3 When the printer beeps, release the key and observe the LCD.

Display: "Initializing ROM V00.00.00.00" and "Test Print Mode Configuration".

- 4 Press the Feed key to display the next screen.

Display: "Test Print Size 10CM".

- 5 Press the LINE key to step to the second digit of the counter to the desired setting.

NOTE: The display will increment one step each time the key is pressed.

- 6 Press the FEED key to test print a label. Press the FEED key again to stop printing.
- 7 Repeat the above steps as required until the correct setting is achieved.

## LABEL GAP SENSOR ADJUSTMENT

This adjustment will require the use of a multimeter and the TP Test Module.

NOTE: Figure 10-5, Accessories & Sensors Location; Figure 10-6, Print Position Reference Diagram; and Figures 10-7 through 10-19, Print Operation Sequence in the Diagram & Schematics Section provide additional instruction.

- 1 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover removal.

- 2 Turn the VR4 potentiometer fully counter-clockwise.
- 3 Connect test module (1, Figure 8-9) to main circuit board connector (2).

NOTE: Refer to TP Test Module Usage in the Troubleshooting section for additional instruction on test module use.

- 4 Turn dial (3) on test module (1) to position number 5.
- 5 Connect the positive (+) probe of the multimeter to pin SIG (4) on test module (1).
- 6 Connect the negative (-) probe of the multimeter to pin GND (5) on test module (1).
- 7 Ensure the millimeter is set for DC voltage reading.
- 8 Place the label backing only in position to be read by the sensor.
- 9 Adjust VR4 potentiometer so that the multimeter value is less than 0.5 volts.
- 10 Replace the label backing with a label in position to be read by the sensor.
- 11 Regard the millimeter for a value of +1.0 volts more than the prior value read.
- 12 Repeat steps 8 through 11 until the value is +1.0 volts.
- 13 Test print labels to ensure proper function.
- 14 Disconnect test module (1) from main circuit board (2) and replace housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover installation.

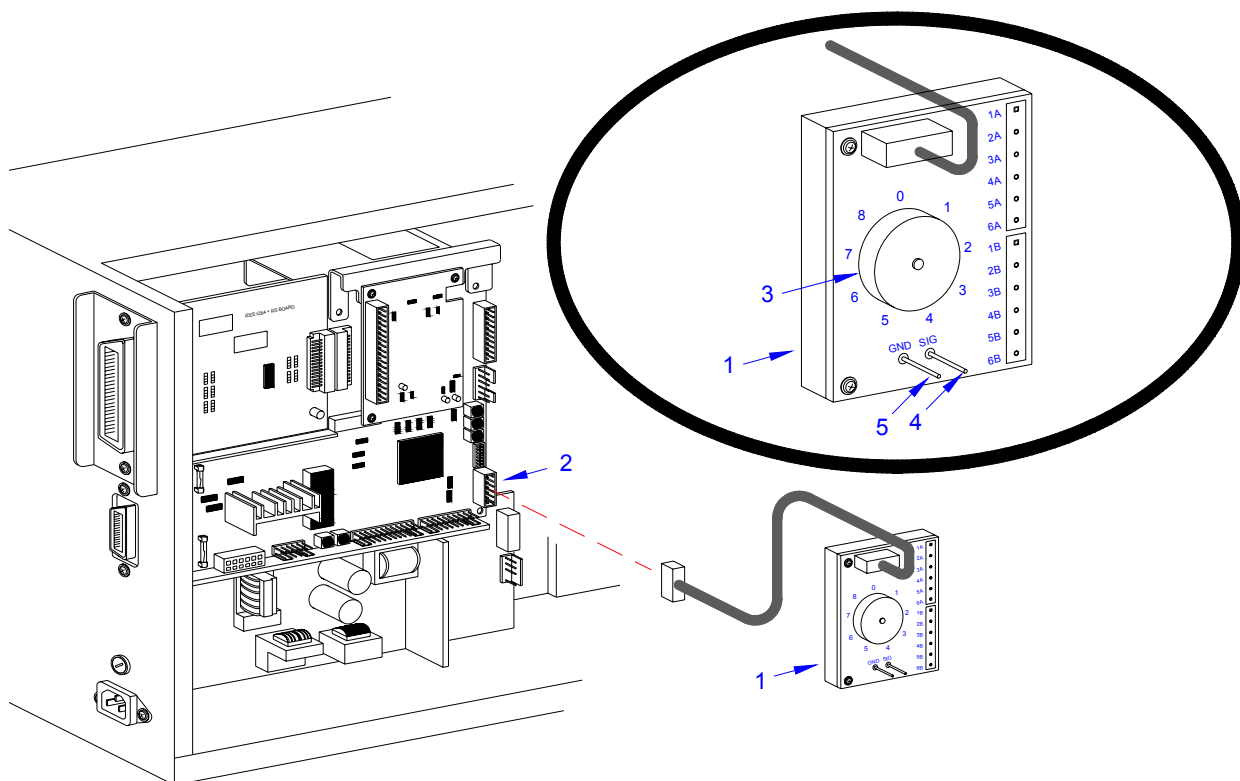


Figure 8-9, Label Sensor Adjustment

## EYE-MARK SENSOR ADJUSTMENT

This adjustment will require the use of a multimeter and the TP Test Module.

NOTE: Figure 10-5, Accessories & Sensors Location; Figure 10-6, Print Position Reference Diagram; and Figures 10-7 through 10-19, Print Operation Sequence in the Diagram & Schematics Section provide additional instruction.

- 1 Open/remove the top, right, and left housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover removal.

- 2 Turn the VR5 potentiometer fully counter-clockwise.
- 3 Connect test module (1, Figure 8-9) to main circuit board connector (2).

NOTE: Refer to TP Test Module Usage in the Troubleshooting section for additional instruction on test module use.

- 4 Turn dial (3) on test module (1) to position number 4.
- 5 Connect the positive (+) probe of the multimeter to pin SIG (4) on test module (1).
- 6 Connect the negative (-) probe of the multimeter to pin GND (5) on test module (1).
- 7 Ensure the multimeter is set for DC voltage reading.
- 8 Place a label without the eye-mark part in position to be read by the sensor.
- 9 Adjust VR4 potentiometer so that the multimeter value is less than 0.5 volts.
- 10 Replace the label without the eye-mark with one that has the eye-mark for sensor reading.
- 11 Regard the millimeter for a value of +1.0 volts more than the prior value read.
- 12 Repeat steps 8 through 11 until the value is +1.0 volts.
- 13 Test print labels to ensure proper function.
- 14 Disconnect test module (1) from main circuit board (2) and replace housing covers.

NOTE: Figure 10-1 in the Diagrams & Schematics section provides guidance on housing cover installation.

### OFFSET LABEL STOP POSITION ADJUSTMENT

The following procedure provides for fine adjustment of the label stop position for Tear-Off, Cutter, and Dispense Modes. The Feed/Backfeed is adjusted with the Offset potentiometer located on the front panel. The Offset adjustment range is +/- 3.75 mm.

NOTE: Figure 10-5, Accessories & Sensors Location; Figure 10-6, Print Position Reference Diagram; and Figures 10-7 through 10-19, Print Operation Sequence in the Diagram & Schematics Section provide additional instruction.

NOTE: Only the stop position is changed with the Offset potentiometer. The print position is changed using the Pitch potentiometer.

- 1 Turn the OFFSET potentiometer to the center position.

NOTE: The Offset potentiometer is located on the Operator Panel of the front housing cover.

- 2 Press and hold the FEED key while switching on the printer.
- 3 When the printer beeps, release the FEED key.

LCD DISPLAY:           INITIALIZING ROM V00.00.00.00

LCD DISPLAY:           TEST PRINT MODE  
                                  CONFIGURATION

- 4 Press the FEED key to advance to the next screen.

LCD DISPLAY:           TEST PRINT SIZE  
                                  10CM

- 5 Press the LINE key to advance the counter to the desired setting.
- 6 Press the FEED key to begin test printing. Press the FEED key again to stop test printing.
- 7 Readjust the OFFSET potentiometer as necessary until proper positioning is achieved.

### LCD DISPLAY ADJUSTMENT

This procedure allows illumination intensity adjustment of the LCD display. Adjustment is performed by use of the DISPLAY potentiometer located on the Operator Panel of the front housing cover.

- 1 Turn on the printer.
- 2 Confirm that the LCD is illuminated and a message is displayed.
- 3 Adjust the DISPLAY potentiometer as necessary achieved the desired setting.

## PRINT DARKNESS ADJUSTMENT

Print darkness is adjusted by use of the PRINT potentiometer located on the Operator Panel of the front housing cover.

- 1 Turn the PRINT potentiometer to the center position.
- 2 Turn on the printer press the LINE key to go off-line.
- 3 Press the LINE and FEED keys simultaneously.

LCD DISPLAY:	PRINT DARKNESS
	1 2 3 4 5

- 4 Press the LINE key to advance the cursor to the desired option.
- 5 Press the FEED key to select the option.
- 6 Turn the printer off and then on again.
- 7 Begin printing test labels antedates the PRINT potentiometer as necessary to achieve the desired results.

NOTE: It may be necessary to repeat the procedure and selecting a different print darkness setting from the operator panel.
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## FACTORY RESETS

This section of the service manual covers instructions on how to return the printer to its factory settings. The instructions are separated into differing categories of interest.

### FACTORY SETTINGS / TEST PRINT

**CAUTION:** RESETTING THE PRINTER WILL CLEAR ALL REGISTERS.

- 1 Record all dip switch positions.
- 2 Place all dip switches in the OFF position.
- 3 Place the DSW2-4 in the ON position.
- 4 Simultaneously, press and hold the LINE and FEED keys while turning on the power switch.
- 5 Release the LINE and FEED keys upon hearing a beep.

LCD DISPLAY:           INITIALIZING ROM V00.00.00.00  
                                  MAINTENANCE MODE DIPSW2-4 ON->OFF

- 6 Place the DSW2-4 in the Off position.

LCD DISPLAY:           FACTORY MODE

- 7 Press the FEED key to display the next screen.

LCD DISPLAY:           COUNTER CLEAR - NONE

- 8 Press the LINE key once to change the message from NONE to ALL.

LCD DISPLAY:           COUNTER CLEAR - ALL

- 9 Press the FEED key to clear the EEPROM.

LCD DISPLAY:           PRINT SIZE  
                                  SMALL            LARGE

- 10 Select the print label size by pressing the LINE key.

**NOTE:** The default selection is large. The LINE key allows scrolling from one option to another.

- 11 Press the FEED key to test print. Press the FEED key again to stop printing.

**WARNING: THIS TEST ACTIVATES ALL THE HEATING ELEMENTS ON THE PRINT HEAD AND THEREFORE SHOULD BE USED FOR TESTING PURPOSES ONLY. FULL WIDTH LABELS MUST BE USED TO PREVENT PRINT HEAD DAMAGE.**

- 12 Verify that the counters on the test print have reset to 0.0 km.
- 13 Power Off the printer and confirm that all switches are in the Off or down position.

## CLEAR HEAD COUNTERS

**CAUTION: RESETTING THE PRINTER WILL CLEAR ALL REGISTERS.**

- 1 Record all dip switch positions.
- 2 Place all dip switches in the Off position.
- 3 Place the DSW2-4 switch in the On or up position.
- 4 Simultaneously, press and hold the LINE and FEED keys while turning on the power switch.
- 5 Release the LINE and FEED keys upon hearing a beep.

LCD DISPLAY:           INITIALIZING ROM V00.00.00.00  
                                  MAINTENANCE MODE DIPSW2-4 ON->OFF

- 6 Place the DSW2-4 in the Off position.

LCD DISPLAY:           FACTORY MODE

- 7 Press the FEED key to display the next screen.

LCD DISPLAY:           COUNTER CLEAR - NONE

- 8 Press the LINE key twice to change the message from NONE to HEAD.

LCD DISPLAY:           COUNTER CLEAR - HEAD

- 9 Press the FEED key to clear the head counter.

LCD DISPLAY:           PRINT SIZE -  
                                  SMALL            LARGE

- 10 Select the print label size by pressing the LINE key.

- 11 Press the FEED key to test print. Press the FEED key again to stop printing.

**WARNING: THIS TEST ACTIVATES ALL THE HEATING ELEMENTS ON THE PRINT HEAD AND THEREFORE SHOULD BE USED FOR TESTING PURPOSES ONLY. FULL WIDTH LABELS MUST BE USED TO PREVENT PRINT HEAD DAMAGE.**

- 12 Verify that the counters on the test print have reset to 0.0 km.
- 13 Power Off the printer and confirm that all switches are in the Off or down position.

## CLEAR DISPENSER COUNTER

**CAUTION: RESETTING THE PRINTER WILL CLEAR ALL REGISTERS.**

- 1 Record all dip switch positions.
- 2 Place all dip switches in the OFF position.
- 3 Place the DSW2-4 in the ON position.
- 4 Simultaneously, press and hold the LINE and FEED keys while turning on the power switch.
- 5 Release the LINE and FEED keys upon hearing a beep.

LCD DISPLAY:       INITIALIZING ROM V00.00.00.00  
                          MAINTENANCE MODE DIPSW2-4 ON->OFF

- 6 Place the DSW2-4 in the Off position.

LCD DISPLAY:       FACTORY MODE

- 7 Press the FEED key to display the next screen.

LCD DISPLAY:       COUNTER CLEAR - NONE

- 8 Press the LINE key twice to change the message from NONE to DIS.

LCD DISPLAY:       COUNTER CLEAR - DIS

- 9 Press the FEED key to clear the dispenser counter.

LCD DISPLAY:       PRINT SIZE  
                          SMALL                LARGE

- 10 Select the print label size by pressing the LINE key.

**NOTE: The default selection is large. The LINE key allows scrolling from one option to another.**

- 11 Press the FEED key to test print. Press the FEED key again to stop printing.

**WARNING: THIS TEST ACTIVATES ALL THE HEATING ELEMENTS ON THE PRINT HEAD AND THEREFORE SHOULD BE USED FOR TESTING PURPOSES ONLY. FULL WIDTH LABELS MUST BE USED TO PREVENT PRINT HEAD DAMAGE.**

- 12 Verify that the counters on the test print have reset to 0.0 km.
- 13 Power Off the printer and confirm that all switches are in the Off or down position.

## CLEAR CUTTER COUNTER

**CAUTION: RESETTING THE PRINTER WILL CLEAR ALL REGISTERS.**

- 1 Record all dip switch positions.
- 2 Place all dip switches in the OFF position.
- 3 Place the DSW2-4 in the ON position.
- 4 Simultaneously, press and hold the LINE and FEED keys while turning on the power switch.
- 5 Release the LINE and FEED keys upon hearing a beep.

LCD DISPLAY:       INITIALIZING ROM V00.00.00.00  
                          MAINTENANCE MODE DIPSW2-4 ON->OFF

- 6 Place the DSW2-4 in the Off position.

LCD DISPLAY:       FACTORY MODE

- 7 Press the FEED key to display the next screen.

LCD DISPLAY:       COUNTER CLEAR - NONE

- 8 Press the LINE key twice to change the message from NONE to CUT.

LCD DISPLAY:       COUNTER CLEAR - CUT

- 9 Press the FEED key to clear the cutter counter.

LCD DISPLAY:       PRINT SIZE  
                          SMALL            LARGE

- 10 Select the print label size by pressing the LINE key.

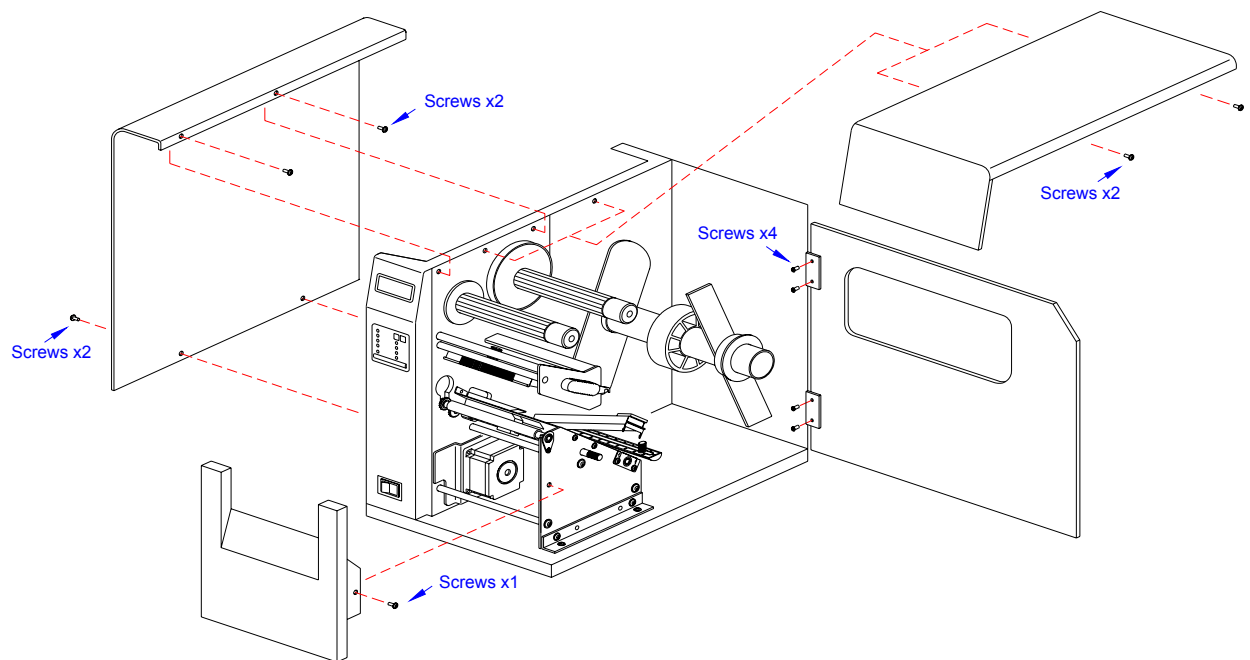
**NOTE: The default selection is large. The LINE key allows scrolling from one option to another.**

- 11 Press the FEED key to test print. Press the FEED key again to stop printing.



## DIAGRAMS & SCHEMATICS

### HOUSING COVER REMOVAL & INSTALLATION



Figure, 10-1, Housing Cover Removal & Installation

## MEDIA LOADING

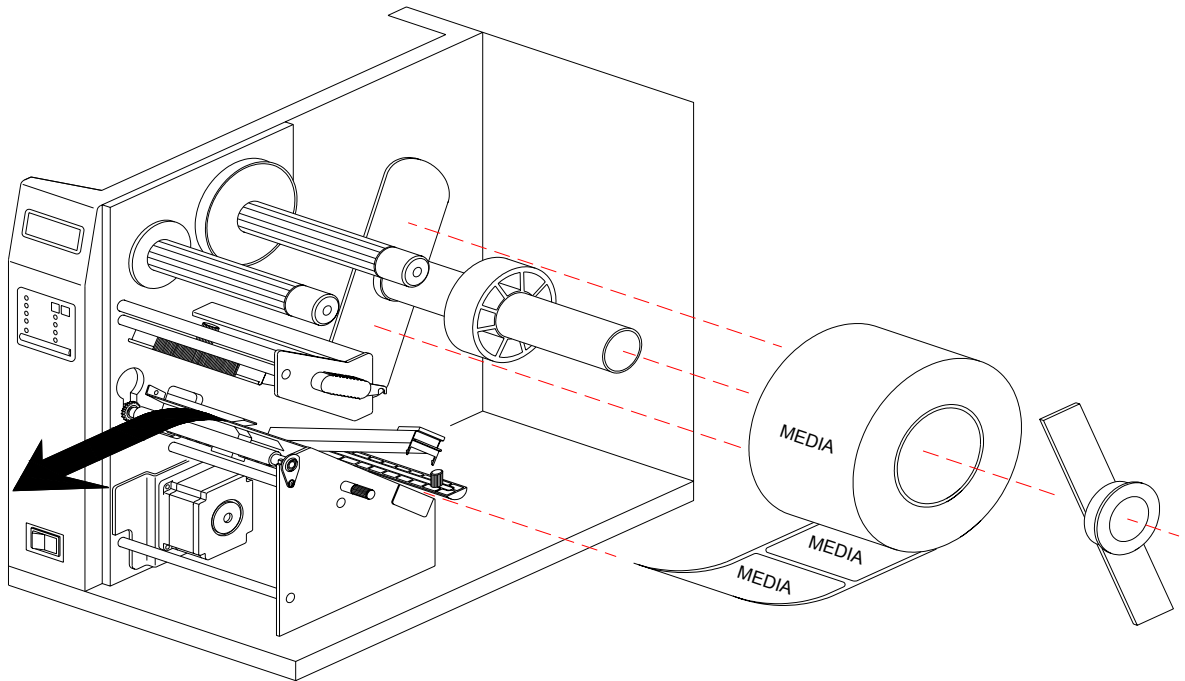


Figure 10-2, Media Loading

## RIBBON LOADING

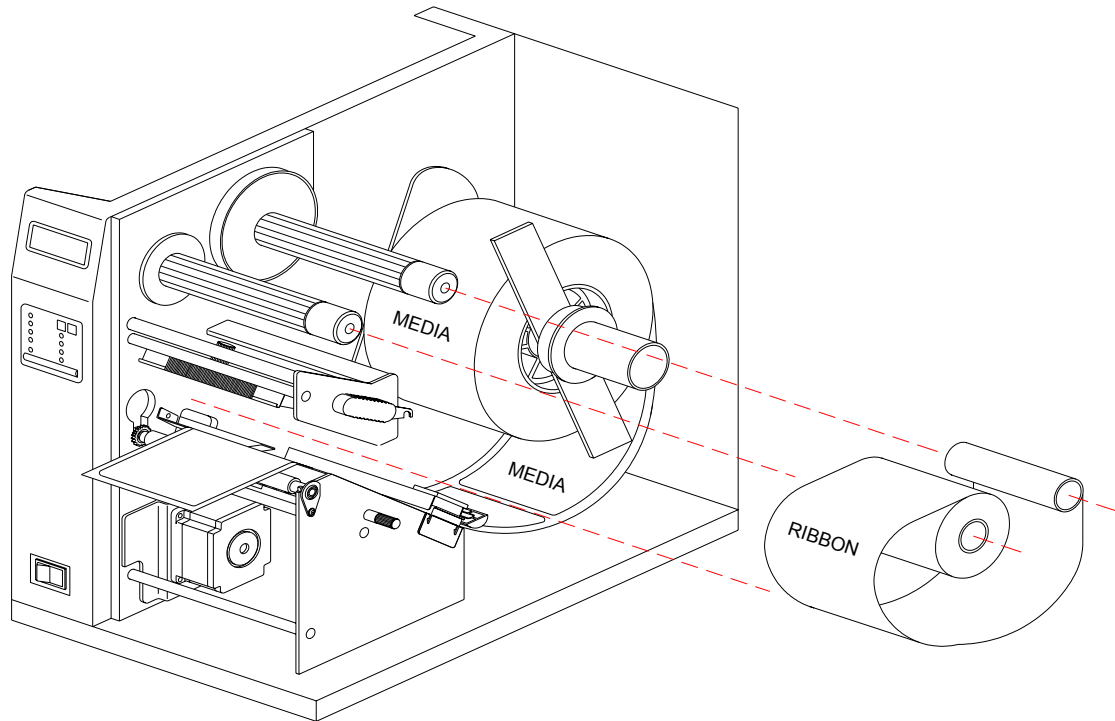


Figure 10-3, Ribbon Loading

### PAPER SPECIFICATIONS

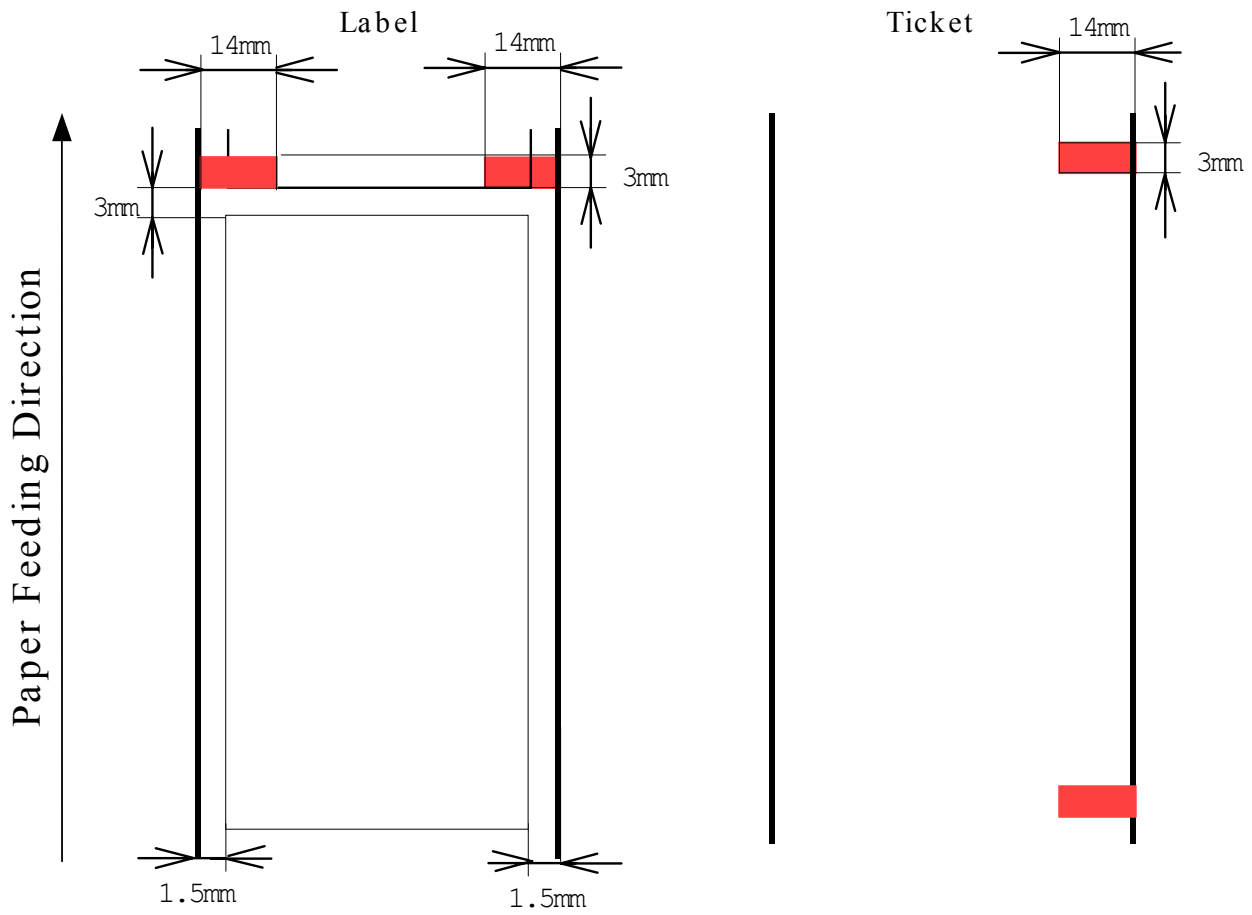


Figure 10-4, Paper Specifications



## ACCESSORIES & SENSORS LOCATION

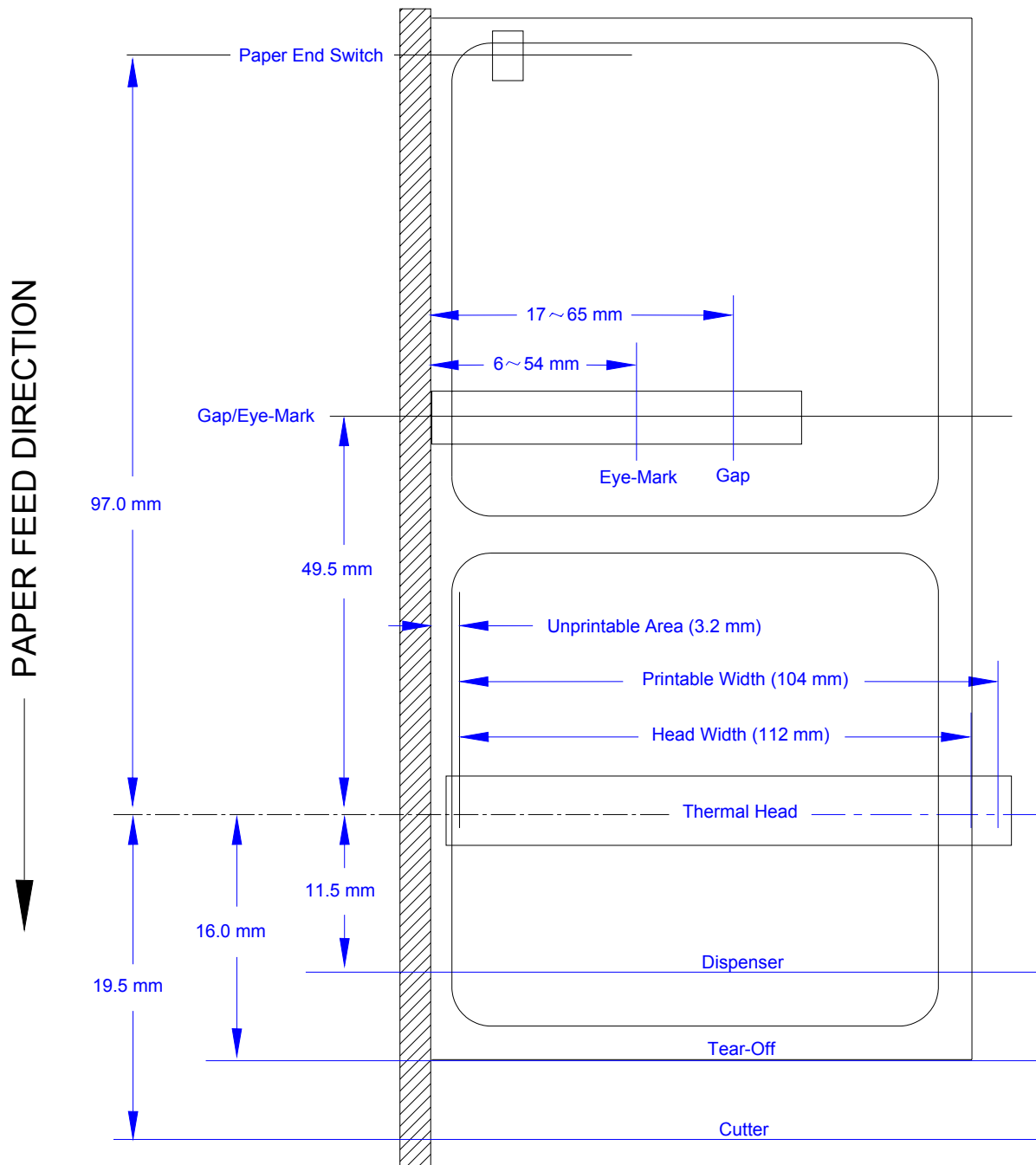


Figure 10-5, Accessories & Sensors Location Diagram

### PRINT POSITION REFERENCE DIAGRAM

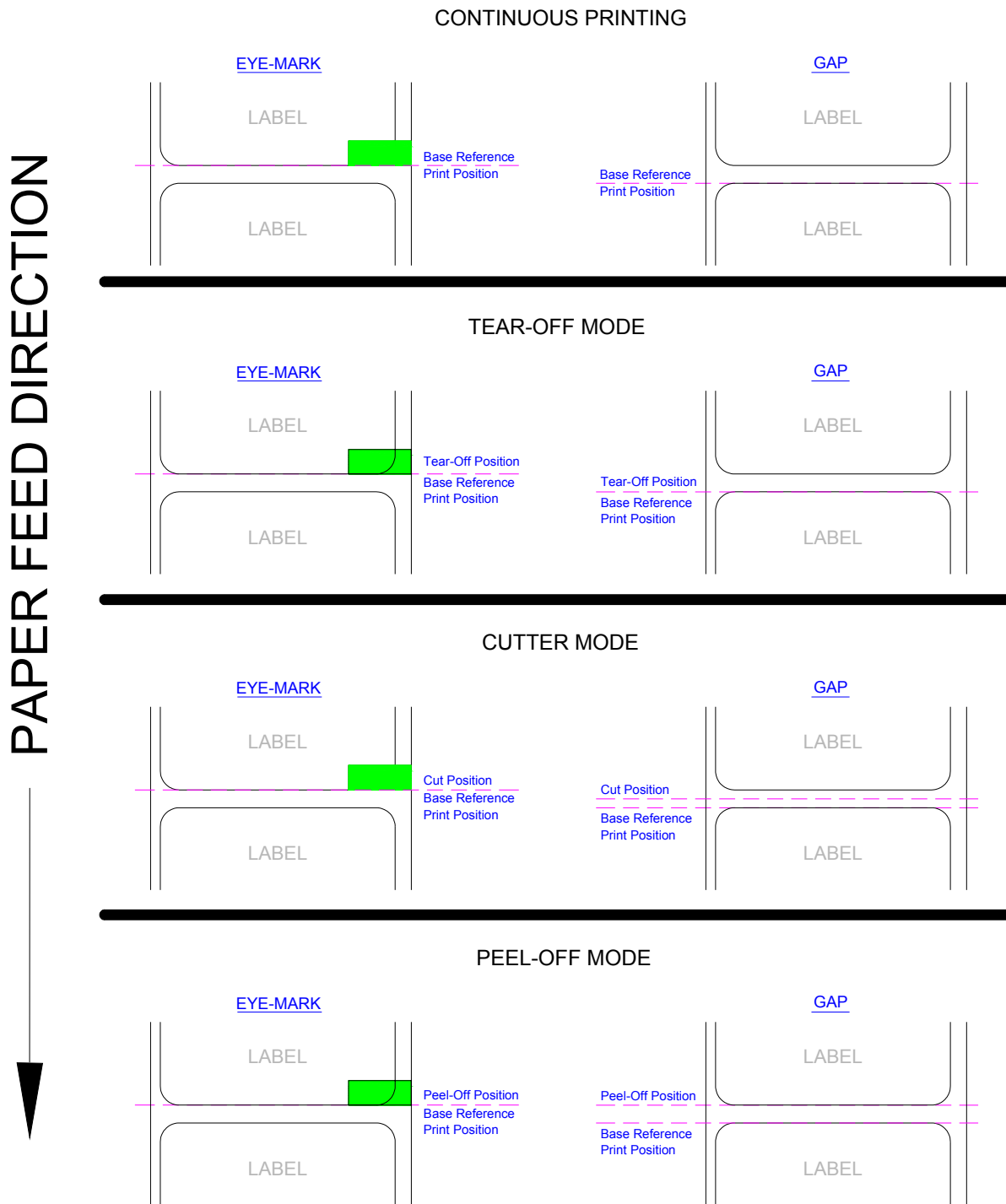
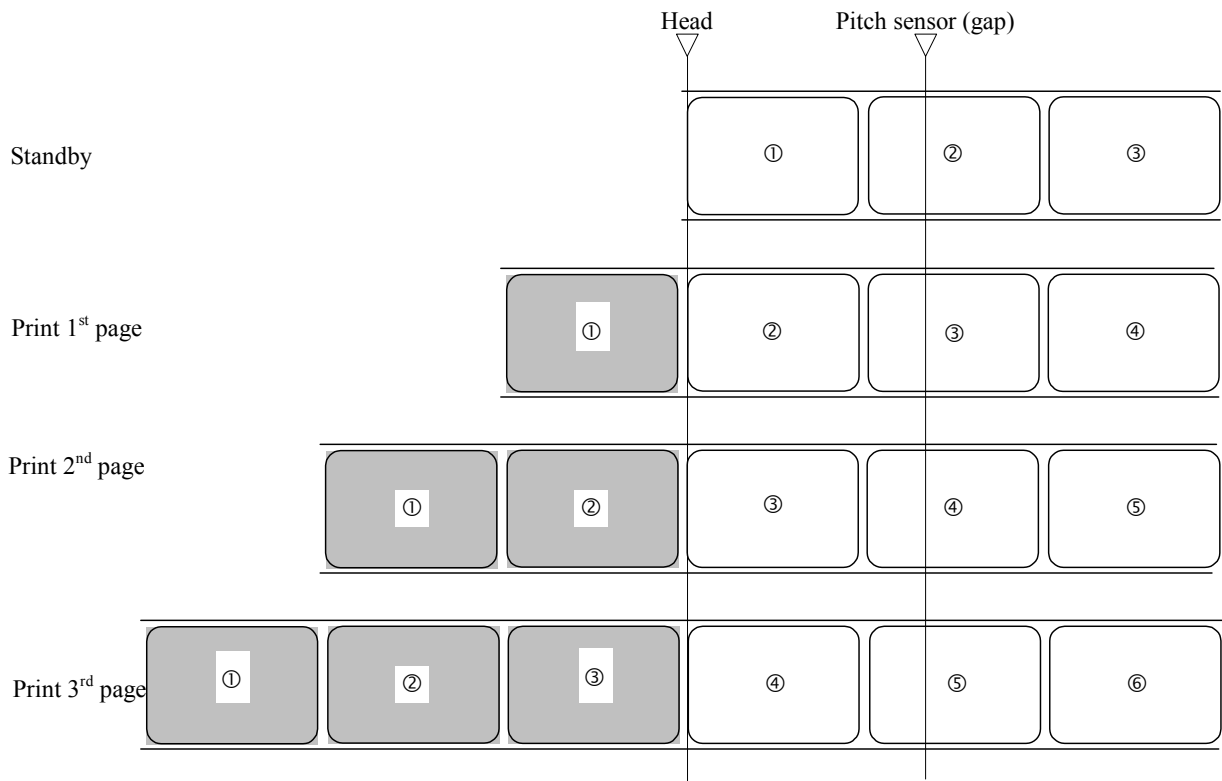


Figure 10-6, Print Position Reference Diagram

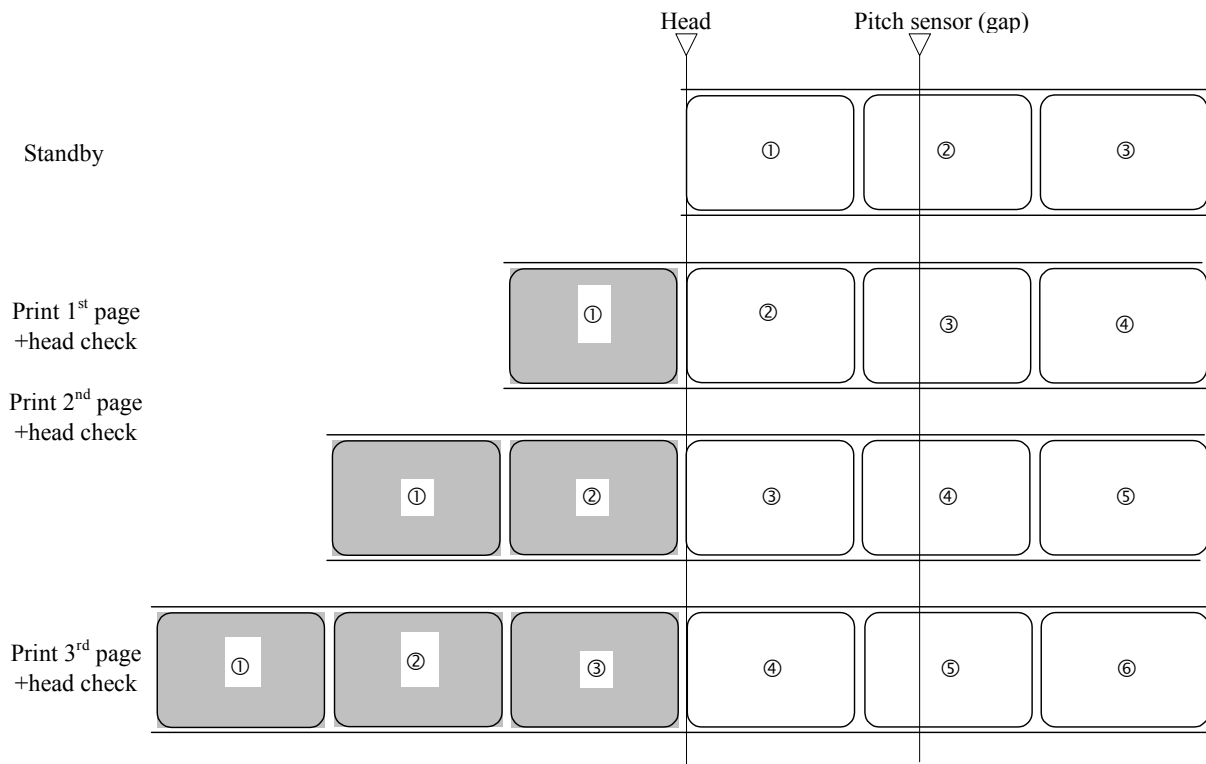
**PRINT OPERATION SEQUENCE**  
**CONTINUOUS, PITCH SENSOR ENABLED (HEAD CHECK DISABLED)**



(Note)  
 Above is the base reference position when the gap sensor is used.

**Figure 10-7, Operation Sequence Chart**

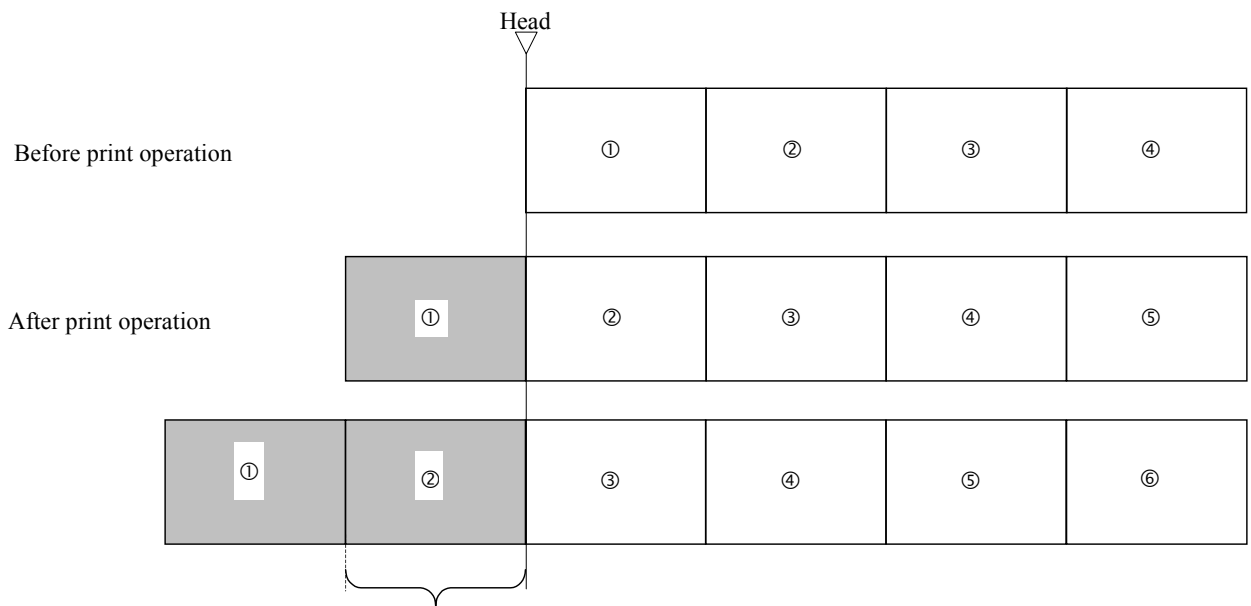
**CONTINUOUS, PITCH SENSOR DISABLED (HEAD CHECK DISABLED)**



(Note)  
Above is the base reference position when the gap sensor is used.

**Figure 10-8, Operation Sequence Chart**

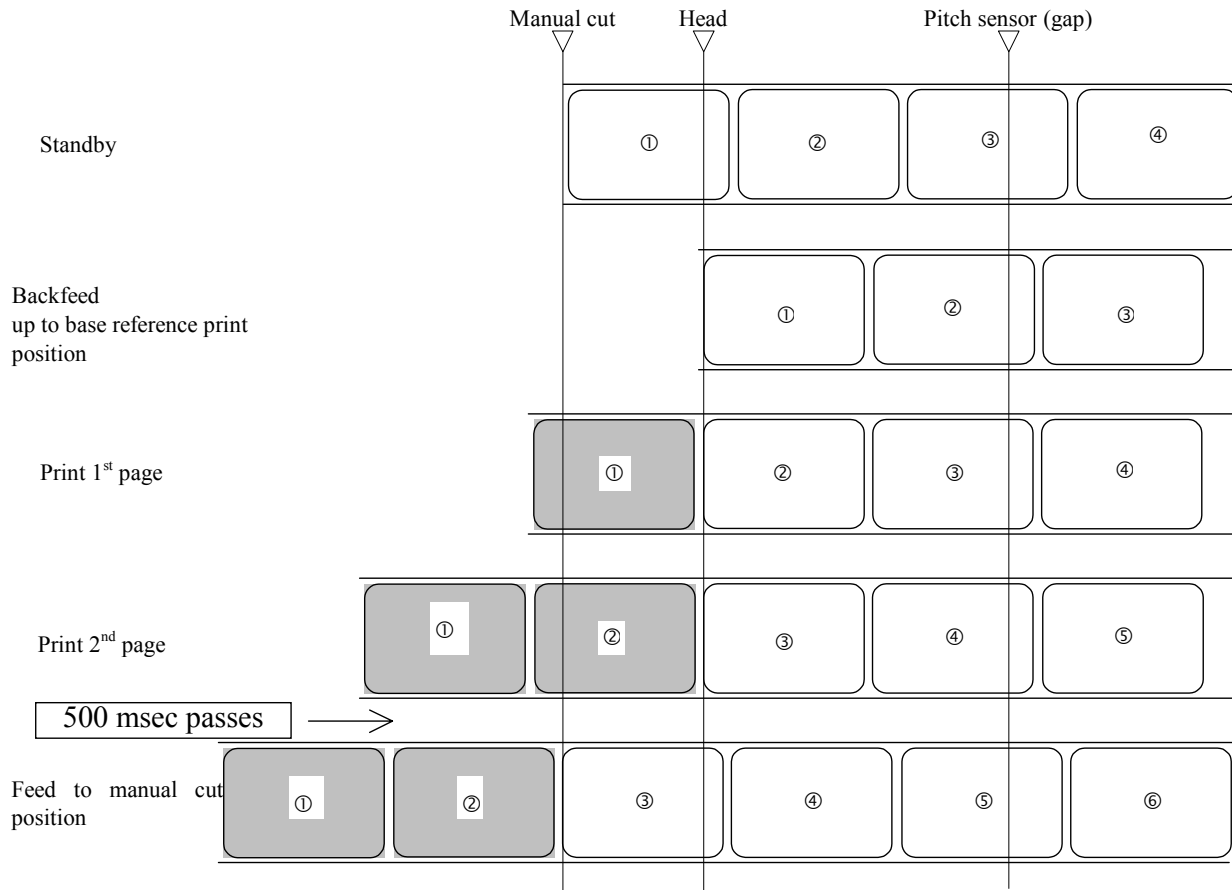
**CONTINUOUS, PITCH SENSOR DISABLED (HEAD CHECK ENABLED)**



Paper is transported actual print size portion in vertical direction.  
However, if the <EP> command is specified, the paper is transported at the specified vertical paper size portion.

**Figure 10-9, Operation Sequence Chart**

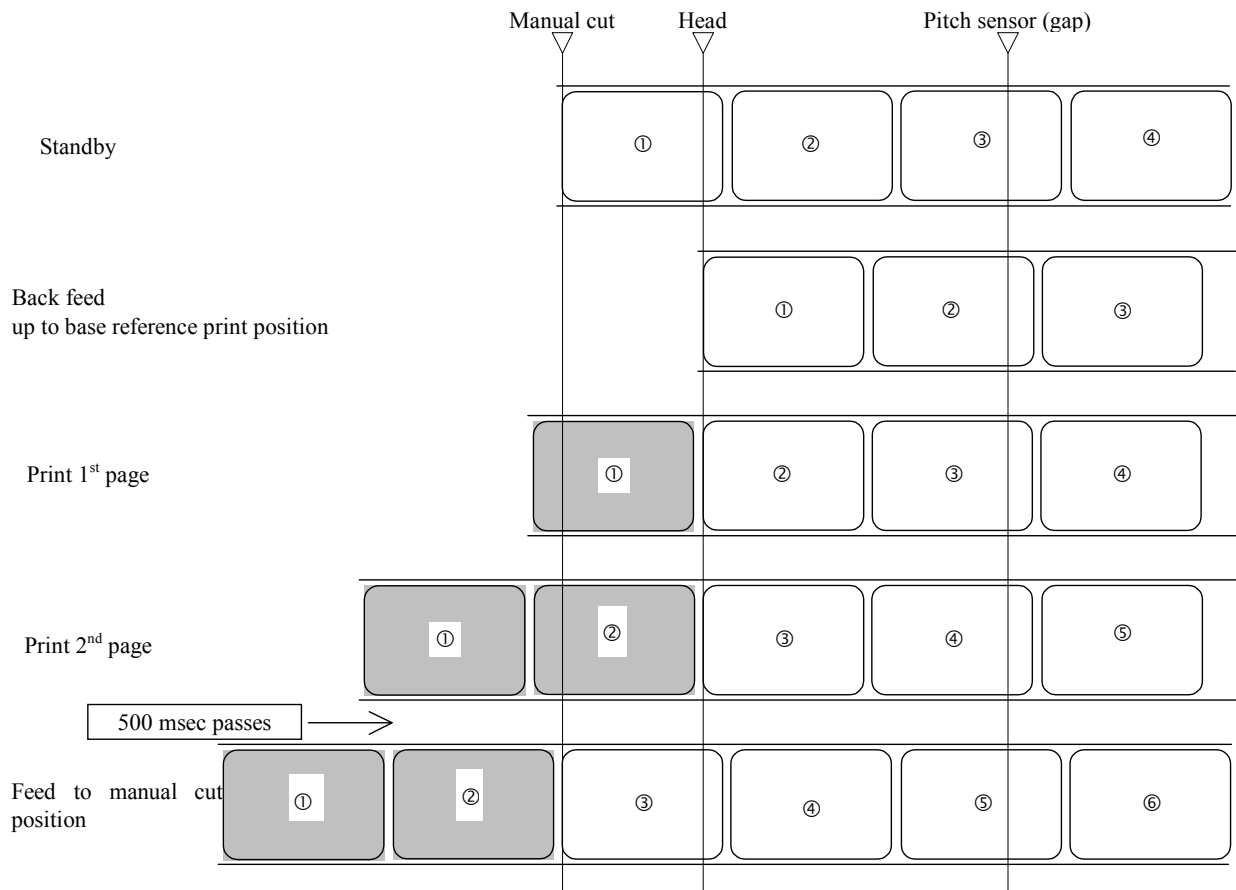
**TEAR-OFF, PITCH SENSOR ENABLED (HEAD CHECK DISABLED)**



(Note)  
 After printing, if there is no following print data after 500 msec passes, feeds to manual cut position  
 Above is the base reference position when the gap sensor is used.

**Figure 10-10, Operation Sequence Chart**

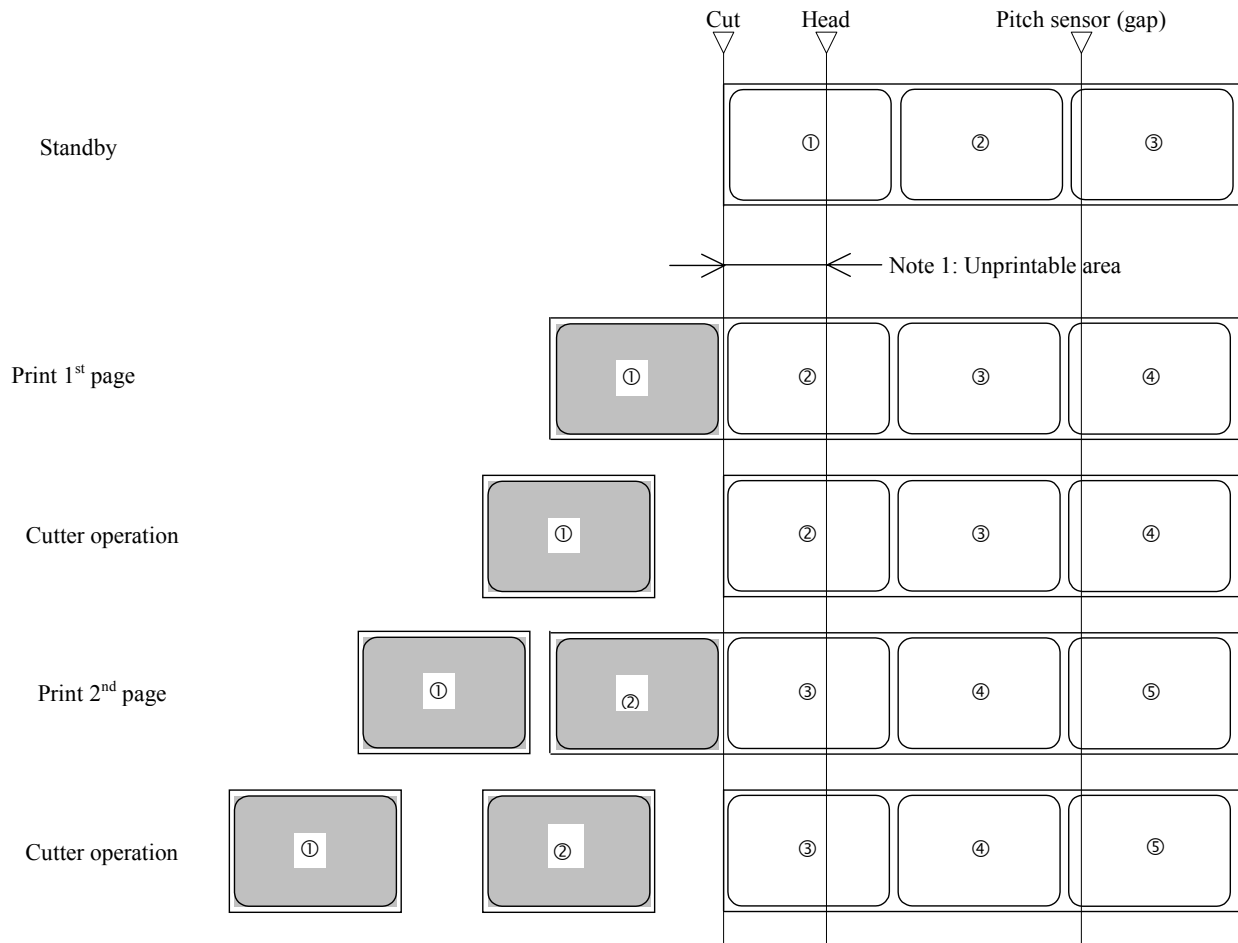
**TEAR-OFF, PITCH SENSOR ENABLED (HEAD CHECK ENABLED)**



(Note)  
 After printing, if there is no following print data after 500 msec passes, feeds to manual cut position  
 Above is the base reference position when the gap sensor is used.

**Figure 10-11, Operation Sequence Chart**

**CUTTER, NO BACKFEED**



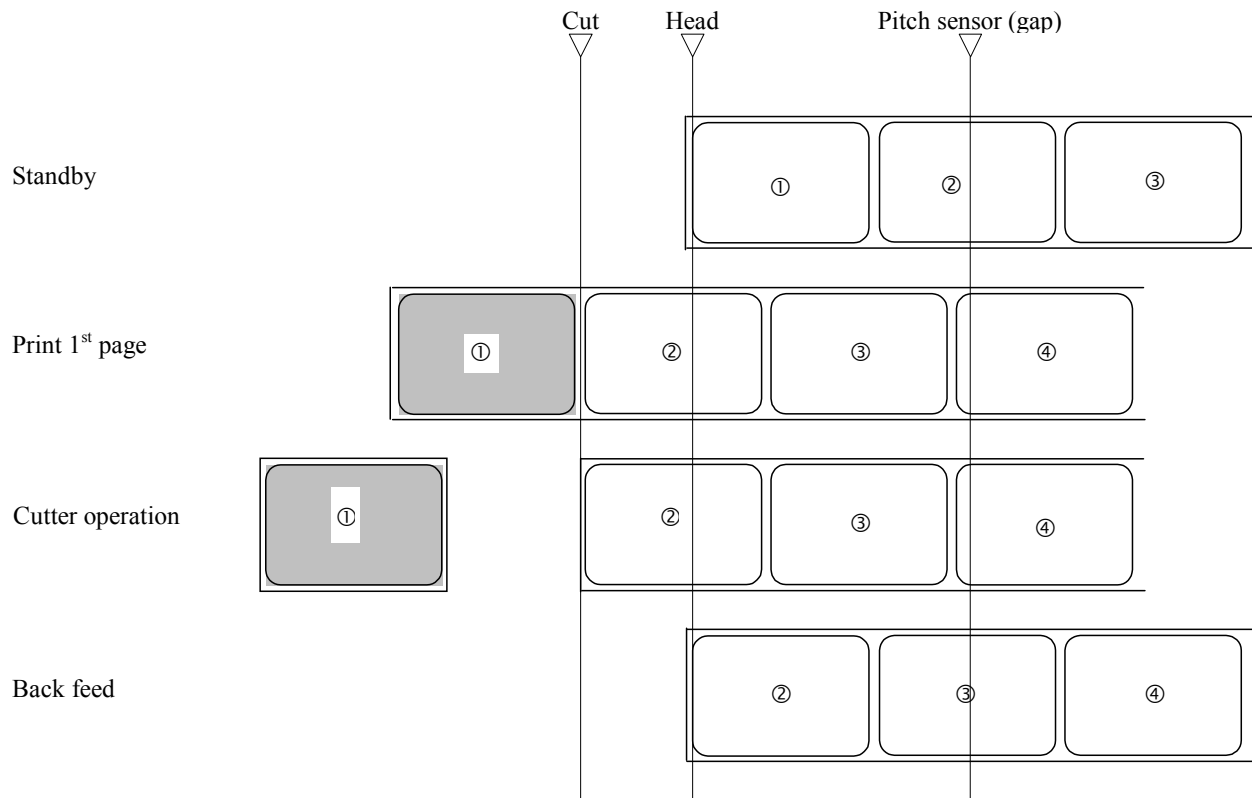
\* 1: Because back feed operation is not performed, an unprintable area occurs at the front.  
 (Note)

Above is the base reference print position when the gap sensor is used.

**Figure 10-12, Operation Sequence Chart**



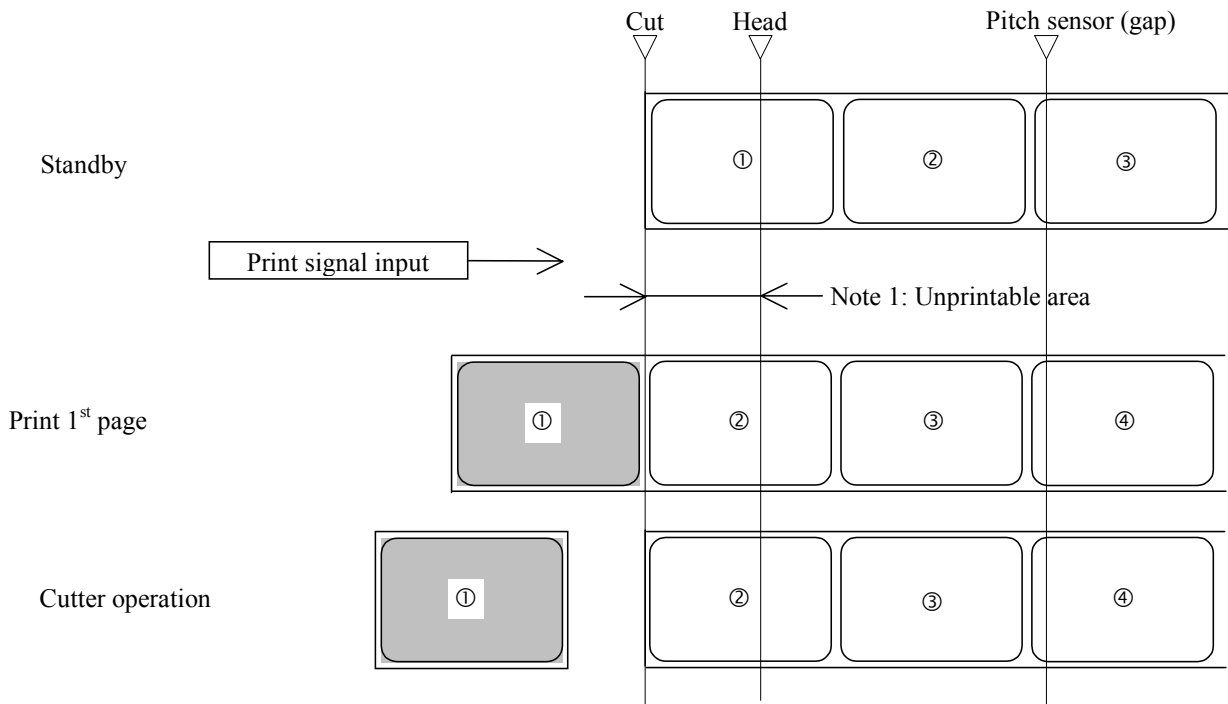
**CUTTER, OPERATION 1**



(Note)  
Above is the base reference position when the gap sensor is used.

**Figure 10-13, Operation Sequence Chart**

**CUTTER, NO BACKFEED, EXTERNAL PULSE INPUT**

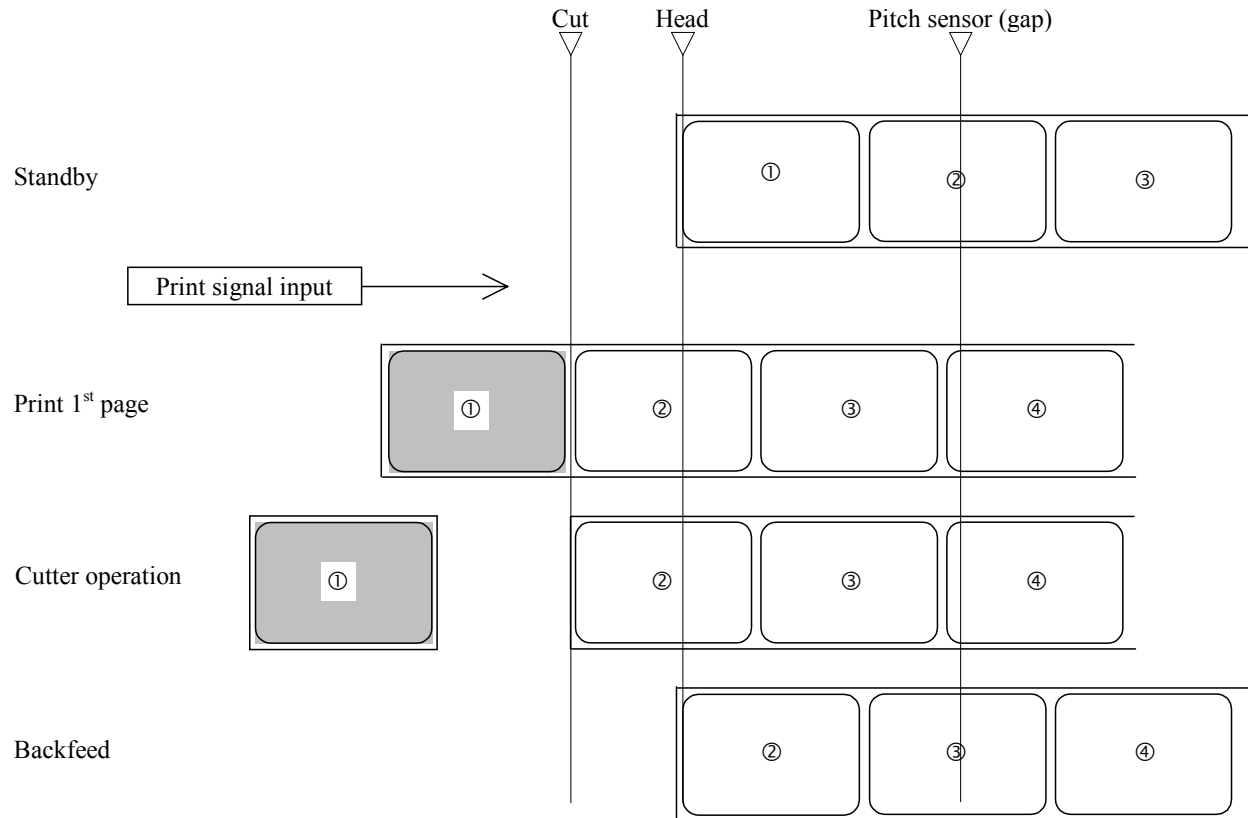


Note 1: Because backfeed operation is not performed, an unprintable area occurs at the front.  
 (Note)

Above is the base reference print position when the gap sensor is used.

**Figure 10-14, Operation Sequence Chart**

**CUTTER, OPERATION 1, EXTERNAL PULSE INPUT**

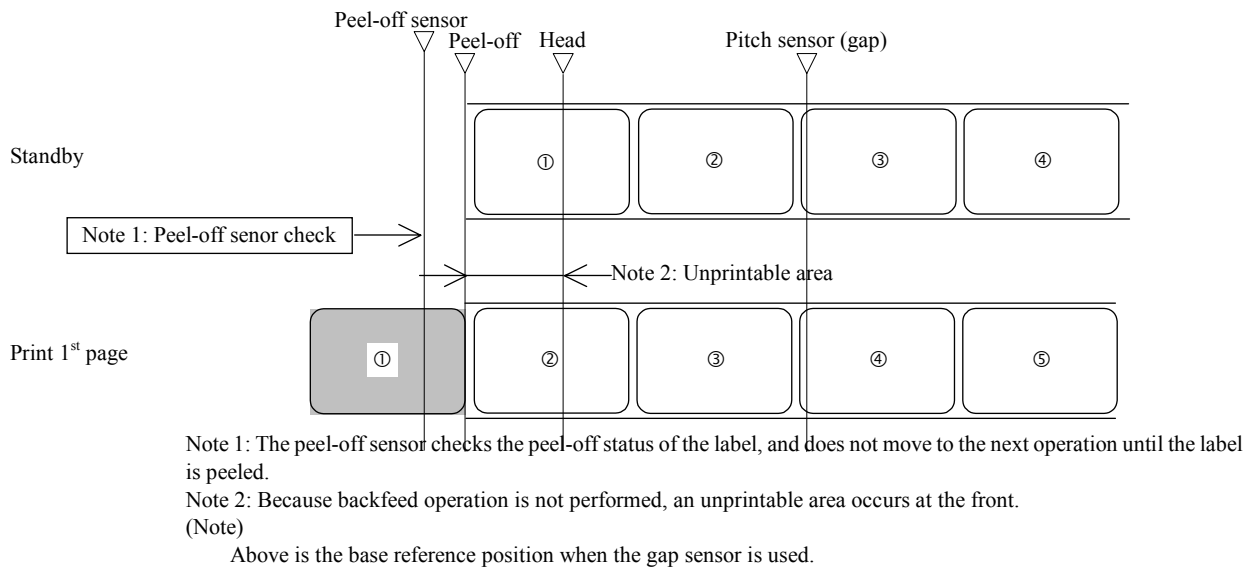


(Note)

Above is the base reference position when the gap sensor is used.

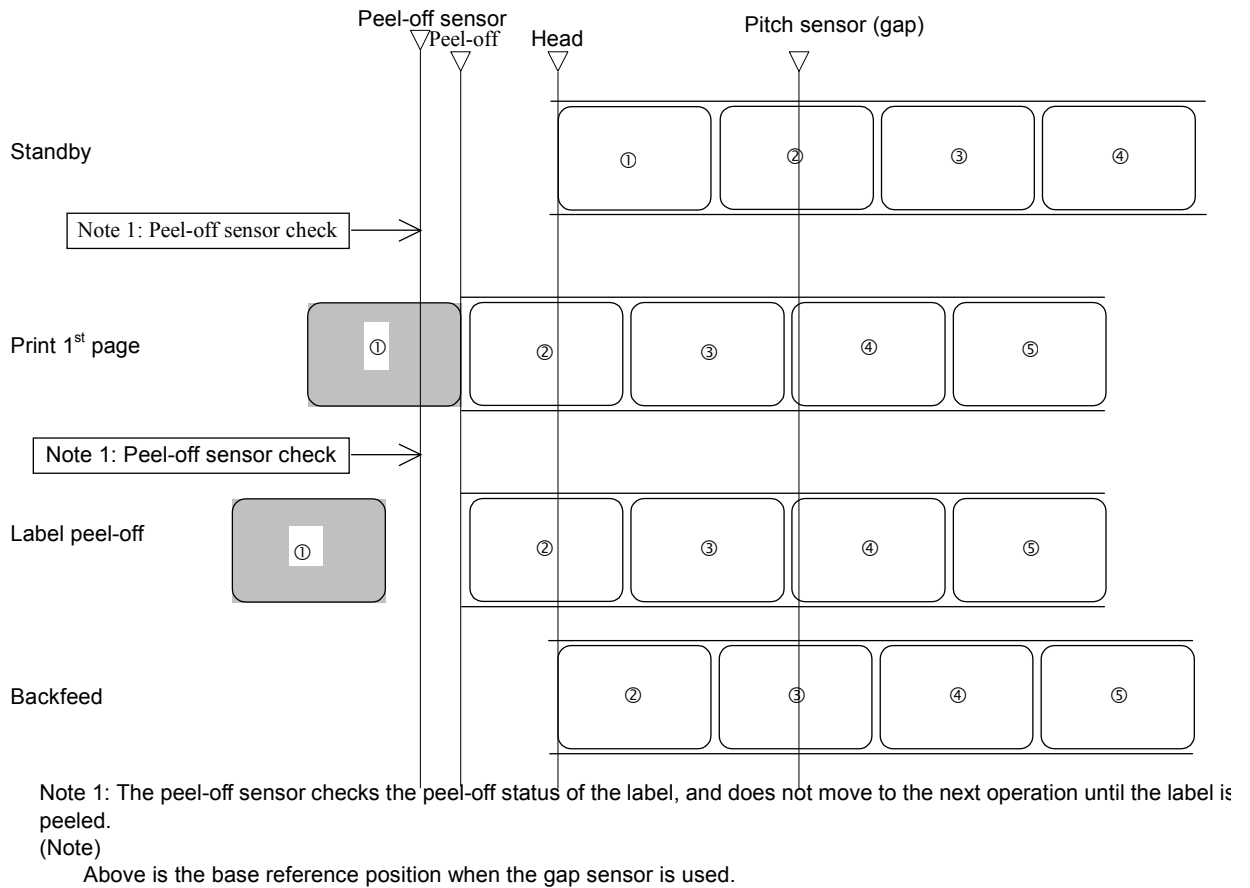
**Figure 10-15, Operation Sequence Chart**

**PEEL-OFF, PEEL-OFF SENSOR, NO BACKFEED**



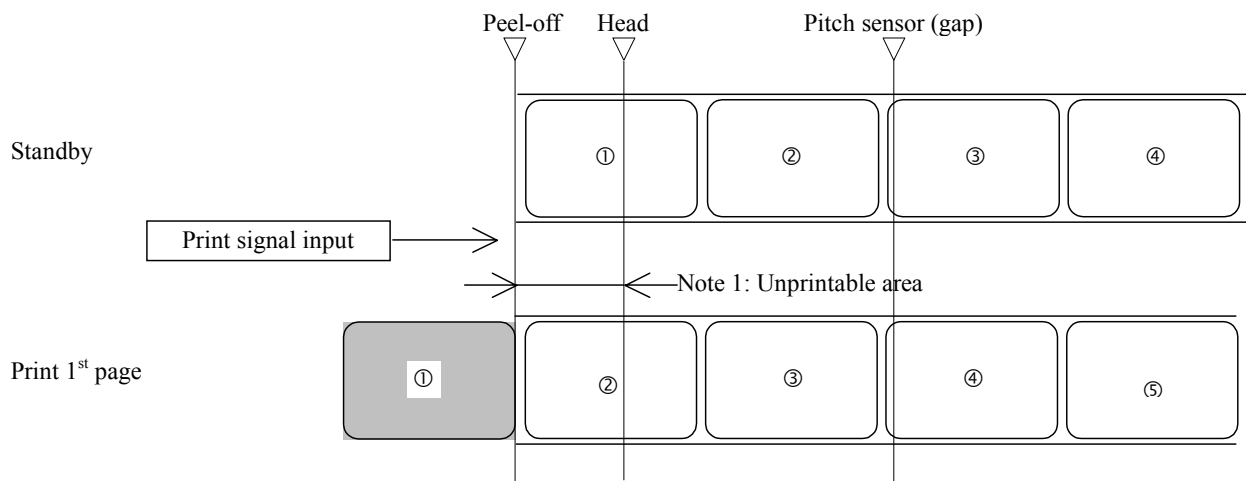
**Figure 10-16, Operation Sequence Chart**

**PEEL-OFF, PEEL-OFF SENSOR, OPERATION 1**



**Figure 10-17, Operation Sequence Chart**

**PEEL-OFF, EXTERNAL PULSE INPUT, NO BACKFEED**

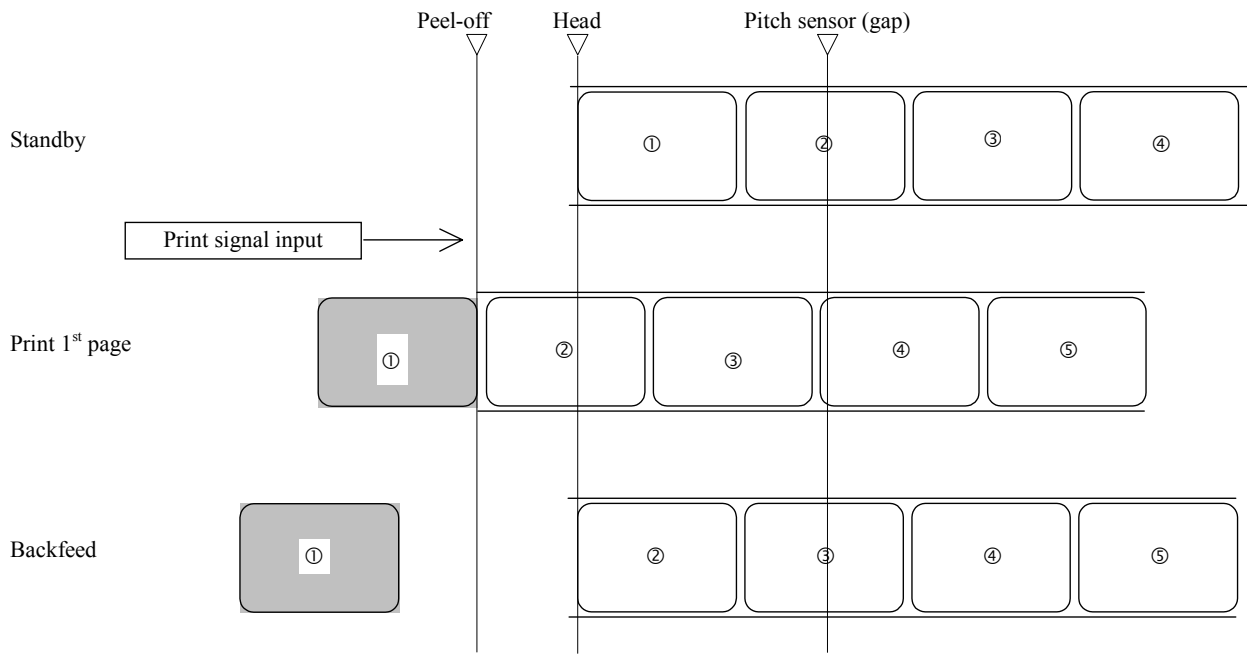


Note 1: Because backfeed operation is not performed, an unprintable area occurs at the front.  
(Note)

Above is the base reference position when the gap sensor is used.

**Figure 10-18, Operation Sequence Chart**

**PEEL-OFF, EXTERNAL PULSE INPUT, OPERATION 1**



(Note)  
Above is the base reference position when the gap sensor is used.

**Figure 10-19, Operation Sequence Chart**