M-84PRO
Thermal Transfer Printer

OPERATOR MANUAL

Copyrights

Any unauthorized reproduction of the contents of this document, in part or whole, is strictly prohibited.

Limitation of Liability

SATO Corporation and its subsidiaries in Japan, the U.S. and other countries make no representations or warranties of any kind regarding this material, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose. SATO Corporation shall not be held responsible for errors contained herein or any omissions from this material or for any damages, whether direct, indirect, incidental or consequential, in connection with the furnishing, distribution, performance or use of this material.

Specifications and contents in this document are subject to change without notice.

Trademarks

SATO is a registered trademark of SATO Holdings Corporation and its subsidiaries in Japan, the U.S. and other countries.

Windows is a registered trademark of Microsoft Corporation in the United States.

QR Code is a registered trademark of DENSO WAVE INCORPORATED.

All other trademarks are the property of their respective owners.

Version: GBS-M84PRO-r02-16-07-18OM

© 2018 SATO Corporation. All rights reserved.

TABLE OF CONTENTS

Section 1. Printer Overview

Introduction....1-1
Specifications....1-2

Section 2. Installation

Introduction....2-1
Unpacking and Parts Identification....2-2
Setting Up the Printer....2-3
Loading Labels and Tags....2-5
Loading the Ribbon....2-8
Operators Panel....2-10
Rear Panel....2-12
Sensors....2-13

Section 3. Configuration

Printer Dip Switch Configuration....3-1
Default Settings....3-7
Potentiometer Adjustments....3-8
LCD Panel Printer Configuration....3-10

Section 4. Cleaning and Maintenance

Introduction....4-1
Adjusting the Print Quality....4-1
Cleaning the Print Head, Platen and Rollers....4-2
Cleaning the Label Edge Sensors....4-3
Replacing the Print Head....4-4

Section 5. Troubleshooting

Initial Checklist....5-1
Using the IEEE1284 Parallel Interface....5-1
Using the RS-232C Serial Interface....5-2
Using The Universal Serial Bus (USB) Interface....5-3
Using the LAN Ethernet Interface....5-3
Error Signals....5-6

Section 6. Interface Specifications

Introduction....6-1
Interface Types....6-1
The Receive Buffer....6-2
IEEE1284 Parallel Interface....6-3
RS-232 Serial Interface....6-5
Universal Serial Bus (USB) Interface....6-8
Local Area Network (LAN) Optional Interface....6-8
Bi-directional Communications....6-8

Section 7. Optional Accessories

PCMCIA Memory Cards....7-1
Plug-in Interface Modules....7-2
Cutter....7-3
Label Dispenser....7-4
Label Rewinder....7-5
Real Time Clock....7-6
Flash Memory Expansion....7-6

SECTION 1.
PRINTER OVERVIEW

INTRODUCTION

The SATO M-84PRO Thermal Transfer Printers are complete, high-performance on-site labeling systems. All printer parameters are user programmable using the front panel controls and the DIP switches. All popular bar codes and 14 human-readable fonts, including a vector font and two raster fonts, are resident in memory providing literally thousands of type styles and sizes.

The Operator's Manual will help you understand the basic operations of the printer such as setup, installation, configuration, cleaning and maintenance.

The M-84PRO can print labels up to four inches wide and is available in three resolutions; 203 dpi, 305 dpi and 609 dpi. The resolution is determined by the print head that is installed in the printer and can be changed in the field simply by installing the desired print head. The printer automatically detects the resolution of the print head and loads the appropriate controlling firmware.

The M-84PRO uses the standard SATO RISC printer command codes. The only differences between it and other RISC printers are the allowable values representing the print positions on the label. These values are specified in "dots" and will vary depending upon the resolution of the printer and the amount of memory available for imaging the label. The allowable range for the various M-84PRO models is specified in a table in the *"e" and PRO Printer Programming Reference*.

This commonality makes it very easy to convert labels from one RISC printer to another without having to create an entirely different command stream. There are some caveats that must be observed though to compensate for the different resolution print heads. The effect of the different printer resolutions are best illustrated by taking a label designed for a 203 dpi printer and sending the command stream to the its 305 dpi counterpart. The label printed will be an exact two-thirds scale, including the fonts, bar code dimensions and line lengths/widths. The only exception is the PostNet bar code which has only one legal size and the printer resolution is automatically compensated for by the printer. Conversely, a label designed for a 305 dpi printer and sent to its 203 dpi cousin will be one-third larger. It probably will be "truncated" if the resulting label size is larger than the maximum allowable for the printer.

Always close the cover of the printer

Always close the cover of the printer during operation. You may get injured by touching the moving parts. Also, dust or foreign objects may enter and cause the printer to malfunction.

GENERAL PRINTER SPECIFICATIONS

SPECIFICATION	M-84PRO-2	M-84PRO-3	M-84PRO-6
PRINT			
Method	Direct or Thermal Transfer		
Speed (User Selectable)	2 to 10 ips 50 to 250 mm/s	2 to 8 ips 50 to 200 mm/s	2 to 6 ips 50 to 150 mm/s
Print Module (Dot Size)	.0049 in. .125 mm	.0033 in. .083 mm	0017 in. .081 mm
Resolution	203 dpi 8 dots/mm	305 dpi 12 dots/mm	609 dpi 24 dots/mm
Maximum Print Width	4.1 in. 104 mm		
Maximum Print Length	49.2 in. 1249 mm	32.8 in. 833 mm	14.0 in. 356 mm
MEDIA			
Minimum Width	.87 in. 22 mm		
Minimum Length Continuous Tear-Off Cutter Dispense	0.24 in. (6 mm) 0.63 in. (16 mm) 1.18 in. (30 mm) 1.18 in. (30 mm)		
Maximum Width	5.0 in. 125 mm		
Type	Roll or Fan-Fold Die Cut Labels Thermally Sensitive		
Maximum Caliper	0.008 in. 0.21 mm		
Roll OD (max) Face-In	8.6 in. 220 mm		
Core ID (min)	3 in 76.2 mm		
SENSING			
See-Thru	Movable		
Reflective eye-mark	Movable		
Continuous Form	Sensor Not Used		
RIBBON			
Maximum Width	4.4 in. (111 mm)		
Length (max)	1475 ft. (450 m)		
Thickness	4.5 micron, Wound Face-In		

SPECIFICATION	M-84PRO All Models
CONTROLS AND INDICATORS	
Power	Green LED
On-Line	Green LED
Label	Red LED
Ribbon	Red LED
Error	Red LED
LCD Panel	2 Lines x 16 Characters
Label Feed	Front Panel
Power On/Off Switch	Front Panel
POTENTIOMETER ADJUSTMENTS	
Print Darkness	Front Panel
Offset	Front Panel
Pitch	Front Panel
Display	Front Panel
INTERFACE CONNECTIONS (1)	
Parallel	IEEE1284 Standard
Serial	RS-232C (9600 to 57600 bps) Standard RS-422/485 (9600 to 57600 bps) Optional Ready/Busy or X-On/X-Off Flow Control Bi-directional Status
Universal Serial Bus	USB Ver. 1.1 Standard
Ethernet	10/100BaseT
PROCESSING	
CPU	32 Bit RISC
Flash ROM	2 MB
SDRAM	16 MB
Receive Buffer	2.95 MB
Memory Expansion	See Options and Accessories
(1) Only one interface module can be installed in a printer at a time.	

CHARACTER FONTS

SPECIFICATION	M-84PRO-2	M-84PRO-3	M-84PRO-6
MATRIX FONTS			
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 H x 9 dots H (Helvetica)		
XS Font	17 dots H x 17 dots W (Univers Condensed Bold)		
XM Font	24 dots H x 24 dots W (Univers Condensed Bold)		
OA Font (OCR-A)	15 dots W x 22 dots H	22 dots W x 33 dots H	44 dots W x 66 dots H
OB Font (OCR-B)	20 dots W x 24 dots H	30 dots W x 36 dots H	60 dots W x 72 dots H
AUTO SMOOTHING FONTS			
WB	18 dots W x 30 dots H		
WL	28 dots H x 52 dots H		
XB	48 dots H x 48 dots W (Univers Condensed Bold)		
XL	48 dots W x 48 dots H (Sans Serif)		
VECTOR FONT			
	Proportional or Fixed Spacing Font Size 50 x 50 dots to 999 x 999 dots Helvetica, 10 Font Variations		
AGFA® RASTER FONTS			
Font A	CG Times ®, 8 pt to 72 pt		
Font B	CG Triumvirate®, 8 pt to 72 pt		
DOWNLOADABLE FONTS			
	Bit Mapped TrueType® Fonts with Utility Program		
CHARACTER CONTROL			
	Expansion to 12X in either X or Y coordinates Character Pitch control Line Space control Journal Print facility 0°, 90°, 180° and 270° Rotation		

BAR CODES

BAR CODE	M-84PRO All Models
SYMBOLOGIES	
Linear Bar Codes	Bookland (UPC/EAN Supplemental)
	EAN-8/EAN-13
	CODABAR
	CODE 39
	CODE 93
	CODE 128
	Interleaved 2 of 5 (I 2/5)
	Industrial 2 of 5
	Matrix 2 of 5
	MSI
	POSTNET
	UCC/EAN-128
	UPC-A/UPC-E
Two Dimensional	Data Matrix
	Maxicode
	PDF417
	Micro PDF
	Truncated PDF
	QR Code
Ratios	1:2, 1:3, 2:5, User Programmable
Bar Height	4 to 999 dots, User Programmable
Rotation	0°, 90°, 180° and 270° Rotation
OTHER FEATURES	
Sequential Numbering	Sequential numbering of both numerics and bar codes
Custom Characters	RAM storage for custom designed characters
Graphics	Dot addressable, SATO Hex/Binary, BMP or PCX formats
Forms Overlay	Overlay of predesigned forms in image buffer

PHYSICAL

SPECIFICATION	M-84PRO All Models
PHYSICAL	
Wide	10.4 in. (265 mm)
Deep	17.1 in. (435 mm)
High	13.2 in.(335 mm)
Weight	40.8 lb. (18.5 Kg)
POWER	
Input Voltage	AC 100 - 120/200 - 240 V, ±10 %, 50/60 Hz
Power Consumption	Input power voltage condition: AC 100 V, 50 Hz At peak: 190 VA / 130 W (at 30 % printing ratio) Standby: 24 VA / 16 W
ENVIRONMENTAL	
Operating Temperature	41° to 104°F (5° to 40°C)
Storage Temperature	23° to 140°F (-5° to 60°C)
Operating Humidity	30 to 80% RH Non-Condensing
Storage Humidity	30 to 90% RH Non-Condensing
Electrostatic Discharge	8kV
REGULATORY APPROVALS	
Safety	CB IEC 60950-1, UL 60950-1, CSA C22.2, EN 60950-1, EAC, CCC, BSMI
RFI/EMI	FCC PART15B, ICES-003, EN55024, EN55032, EAC, CCC, BSMI

OPTIONAL ACCESSORIES

ACCESSORIES AND OPTIONS	
PCMCIA MEMORY EXPANSION	One slot for PCMCIA Memory Card (up to 4 MB SRAM or 16 MB Flash ROM). Can be used for graphic file storage, print buffer expansion, format storage and downloaded fonts.
FLASH ROM EXPANSION	Internal 4MB Flash ROM PCB.
REAL TIME CLOCK	An internal Date/Time clock that can be used to date/time stamp labels at the time of printing.
LABEL DISPENSER	Internally mounted attachment allowing labels to be peeled from backing for immediate (on demand) applications. Backing not rewound.
LABEL REWINDER	External Option that rewinds labels onto a roll after they are printed.
LABEL CUTTER	An attachment allowing labels to be cut at specified intervals. Controlled through programming.
COAX/TWINAX INTERFACE	Coan/Twinax Plug-In Interface module. Coax interface emulates an IBM 3287-2 printer with a standard Type A BNC connector. Twinax interface emulates IBM 5224, 5225, 5226 or 4214 printers with auto-terminate/cable through capabilities.
PARALLEL INTERFACE	IEEE1284 Bi-Directional Plug-In Interface Module
SERIAL INTERFACE	High Speed RS-232 Plug-In Interface Module
USB INTERFACE	Universal Serial Bus Plug-In Interface Module
ETHERNET INTERFACE	10/100 BaseT Plug-In Interface Module

All specifications subject to change without notice.

This page left intentionally blank.

SECTION 2.
INSTALLATION

INTRODUCTION

This section of the manual has been written to help you install the SATO M-84PRO printers and to get started as quickly as possible. It is recommend to read each chapter in this manual before the installation or the use of the printers.

The following information is provided in this section:

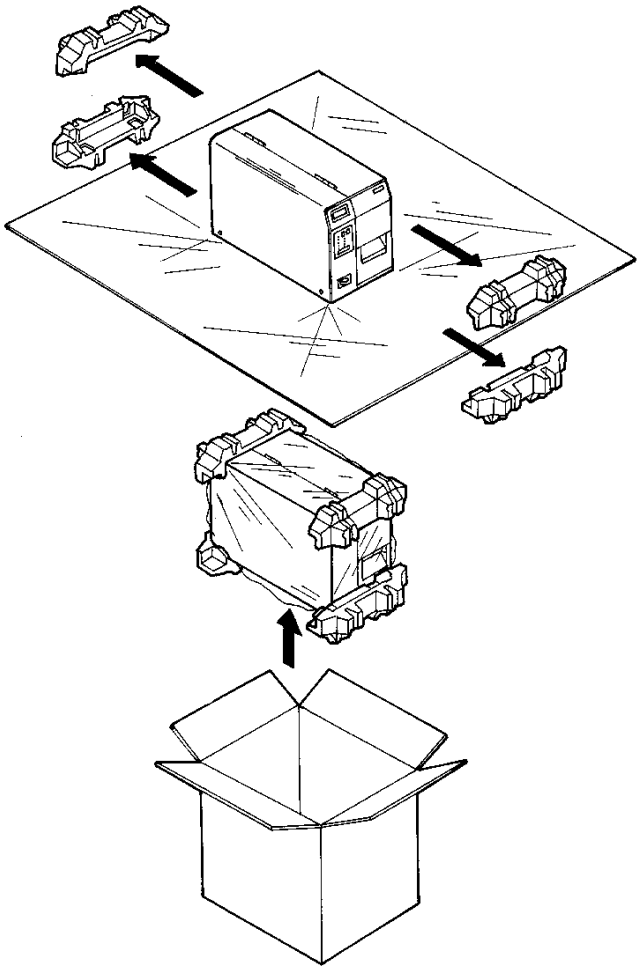
- Unpacking and Parts Identification
- Setting Up the Printer
- Loading Labels or Tags
- Loading the Ribbon
- Operator Panel

UNPACKING AND PARTS IDENTIFICATION

Consider the following when unpacking the printer:

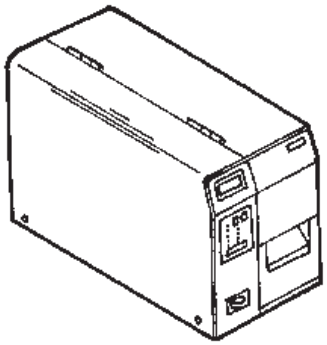
- The box should stay right-side up.
- Lift the printer out of the box carefully.
- Remove the plastic covering from the printer.
- Remove the accessory items from their protective containers.
- If the printer has been stored in a cold environment, allow it to reach room temperature before powering it on.
- Set the printer on a solid, flat surface. Inspect the shipping container and printer for any signs of damage that may have occurred during shipping.

NOTE: The following illustrations are representative only. Your printer may not be packed exactly as shown here, but the unpacking steps are similar.

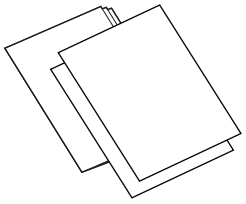


Verify that you have the following materials when unpacking:

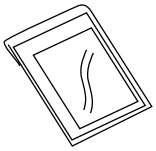
- Printer
- Quick Guide, Safety Instructions, Global Warranty Program leaflet
- Head cleaning sheet
- AC power cord
- Ribbon core
- Core adapter



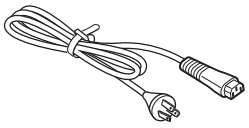
Printer



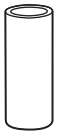
Quick Guide, Safety Instructions, Global Warranty Program leaflet



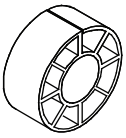
Head cleaning sheet



AC power cord



Ribbon core



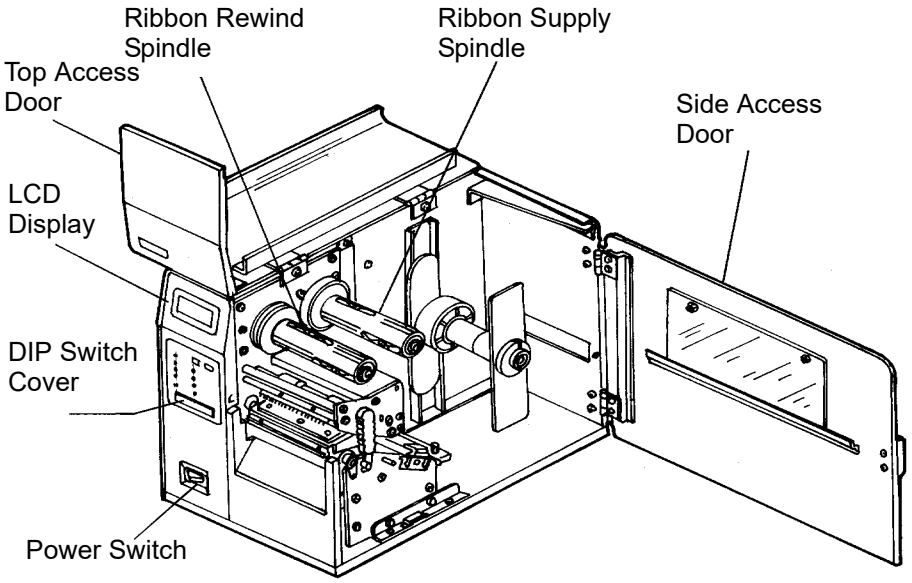
Core adapter

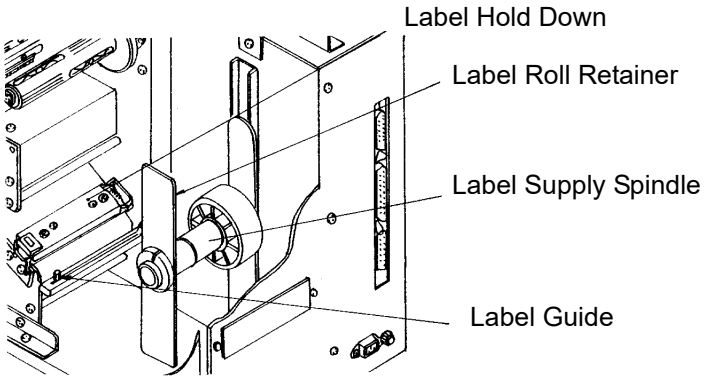
SETTING UP THE PRINTER

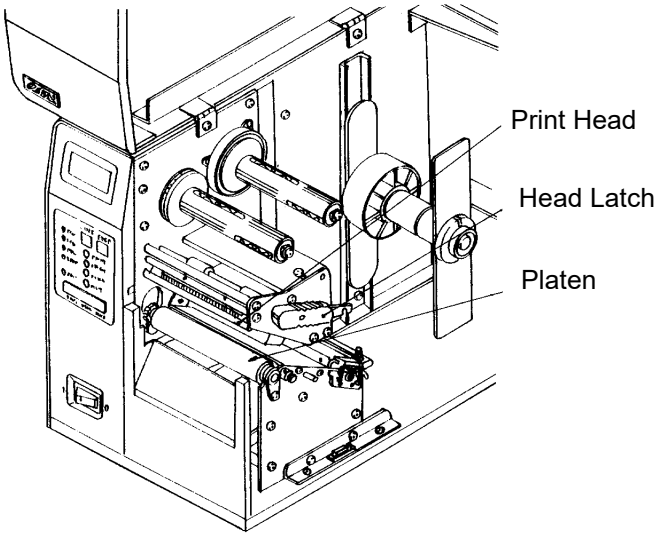
Consider the following when setting up the printer:

- Locate a solid flat surface with adequate room to set the printer. Make sure there is enough room at the top and right-hand (facing the printer) side to provide clearance for the label access door to swing open.
- The location should be near the host computer or terminal. The maximum distance for RS-232 cables is 35 feet and six feet for IEEE1284 Parallel cables. Cables can be purchased locally, and their configuration will depend upon the host system being used. A IEEE1284 compliant cable must be used to realize the full throughput potential of the printers.

• For information on interfacing the printer to a host system, see *Section 5: Interface Specifications.*

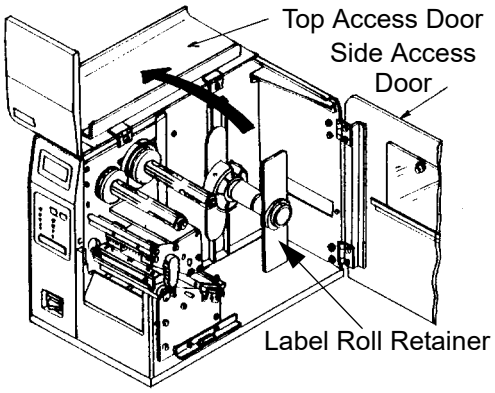

Ribbon Rewind Spindle
Ribbon Supply Spindle
Top Access Door
Side Access Door
LCD Display
DIP Switch Cover
Power Switch

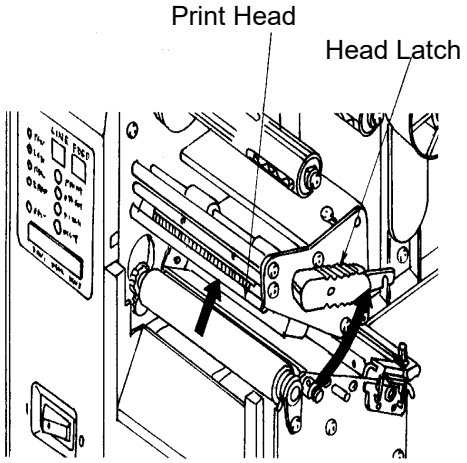

Label Hold Down
Label Roll Retainer
Label Supply Spindle
Label Guide

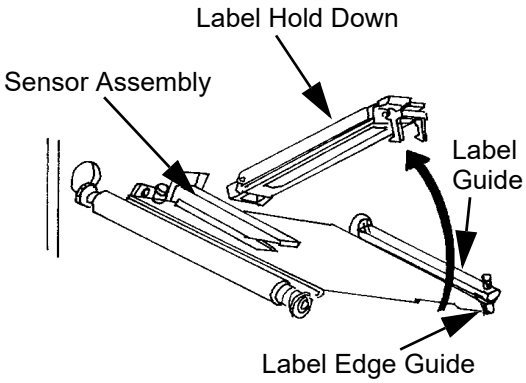

Print Head
Head Latch
Platen

LOADING LABELS AND TAGS

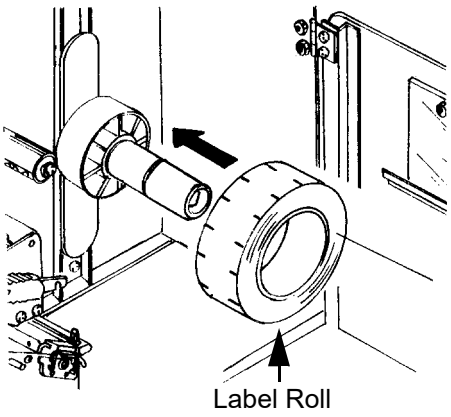
1. Open the Top Access Door by swinging it up and to the left. Open the Side Access Door by swinging it to the rear of the printer.
2. Open the Print Head Assembly by pushing the Head Latch toward the rear of the printer. The Print Head Assembly is spring-loaded and will automatically open as soon as the Head Latch is disengaged.
3. Loosen the Label Edge Guide and push it to the outside of the printer to give the maximum label width.
4. Remove the Label Roll Retainer

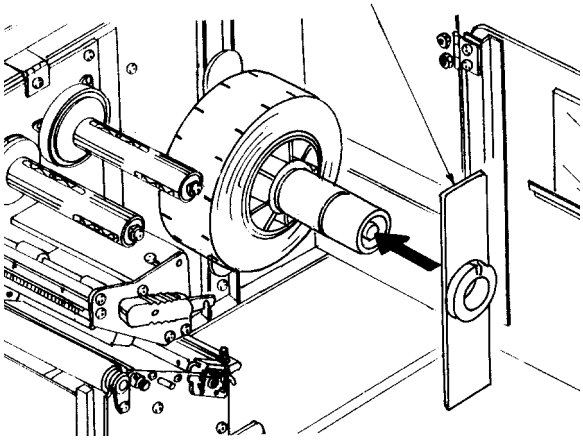




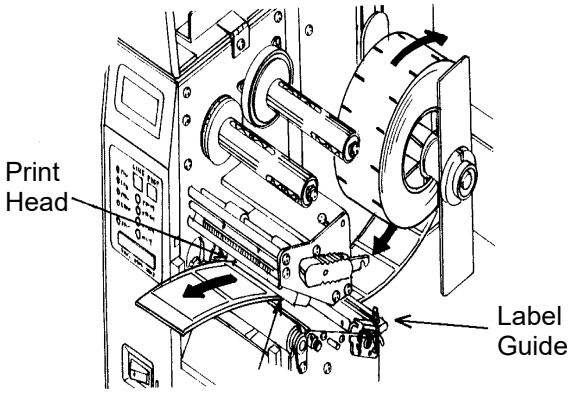


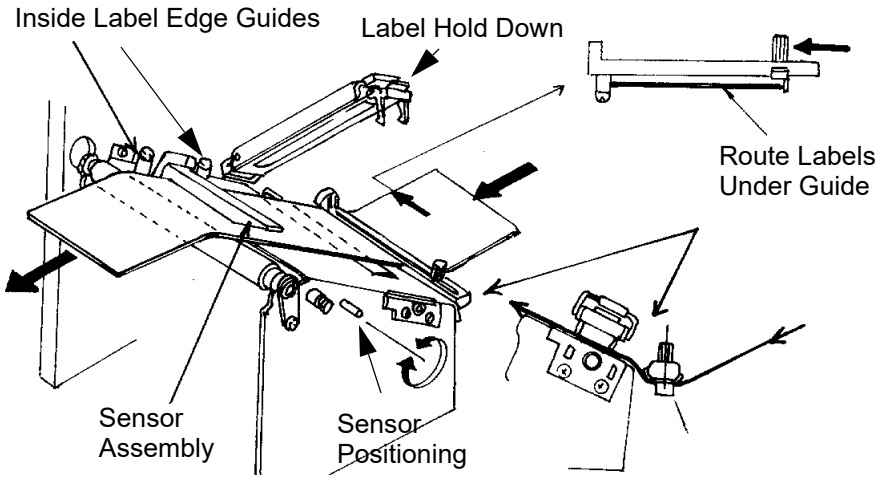
5. If using roll labels (or tags), load the roll onto the Label Supply Spindle so that the printing side of the labels faces upwards as it unwinds from the roll. The labels should be wound *face-in*. Push the roll all the way to the inside of the printer and push the Label Roll Retainer snugly against the outside of the label roll.
6. If using fanfold labels (or tags) set them on a flat surface behind the printer. Pass the labels (printing side up) through the slot in the rear of the printer.
7. Make sure the labels are routed under the Label Guide and through the Sensor Assembly.
8. Open the Label Hold-Down by squeezing the green tab and the release tab together. The Label Hold Down is spring loaded and will open automatically when the latch is disengaged. Feed the labels under the Label Guide, under the Label Hold Down, through the Sensor Assembly and out the front of the printer.
9. Inspect the label routing and verify that the path matches that illustrated in the Label Loading diagram. Set the Adjustable Label Guide to keep the labels against the inside of the printer.
10. Close the Label Hold-Down by pushing downward on the green tab until it latches closed.





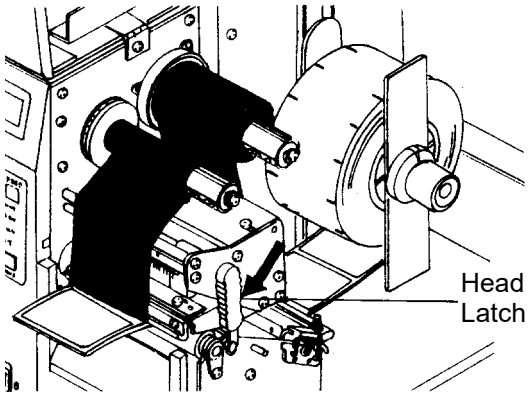
NOTE: If the Label Dispenser option has been purchased, see Appendix A, for proper label routing instructions.



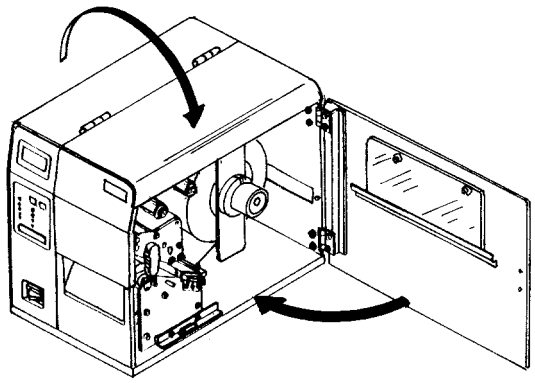


11. Adjust the outside Label Edge Guide until it touches the outside edge of the label and tighten the thumb screw. Make sure the labels are also touching the inside edge guides.

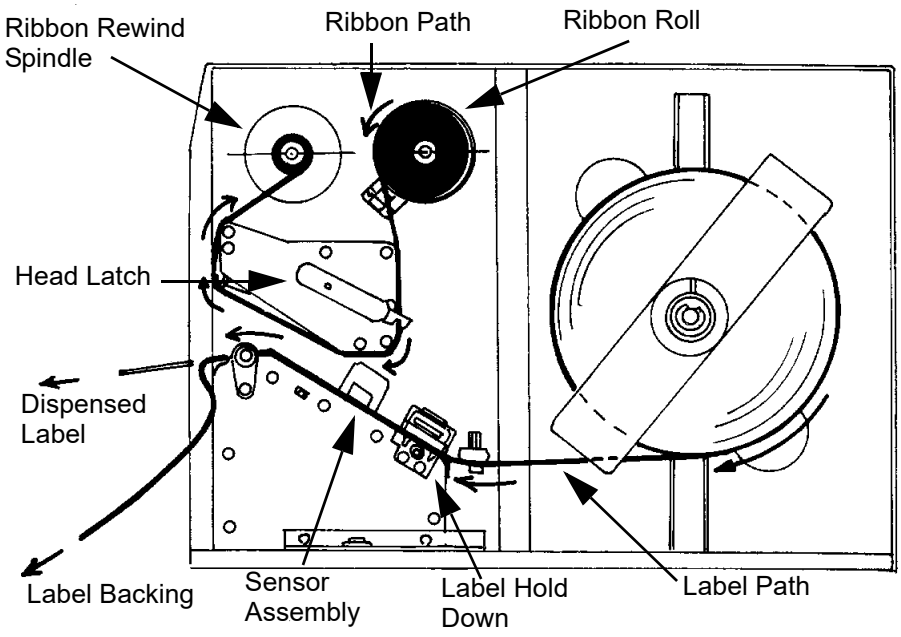
CAUTION: Using media narrower than the maximum print width may cause excess head wear due to the label edge. See page 2-9 for precautions.



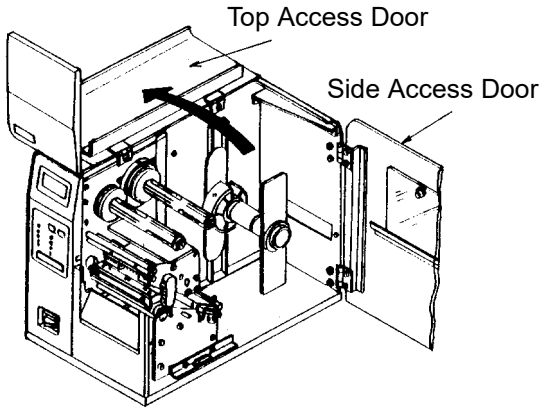
12. If the ribbon is already loaded, close the Print Head by rotating the black Head Latch toward the front of the printer until it latches closed.
13. If the ribbon is not loaded, see the following description for loading instructions.
14. Close both the Access Doors.



LOADING THE RIBBON

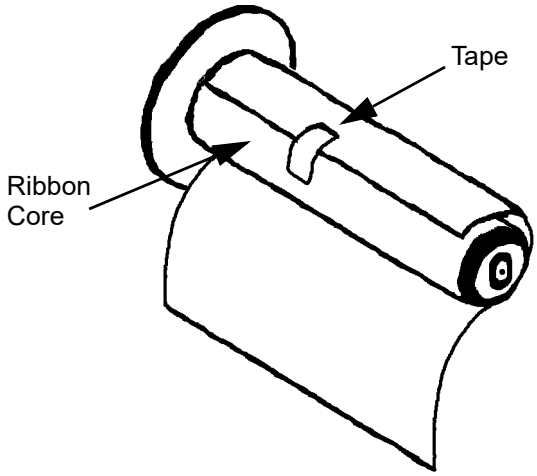


1. Open the Top Access Door by swinging it up and to the left and the Side Access Door by swinging it toward the rear of the printer.
2. Open the Print Head by rotating the Head Latch toward the rear of the printer. The Print Head is spring-loaded and will automatically open as soon as the Head Latch is disengaged.
3. Locate the extra ribbon core supplied with the printer. Place the core on the Ribbon Rewind Spindle, pushing it all the way to the inside of the spindle. *Note that the new empty core of* each subsequent roll becomes the next rewind core.



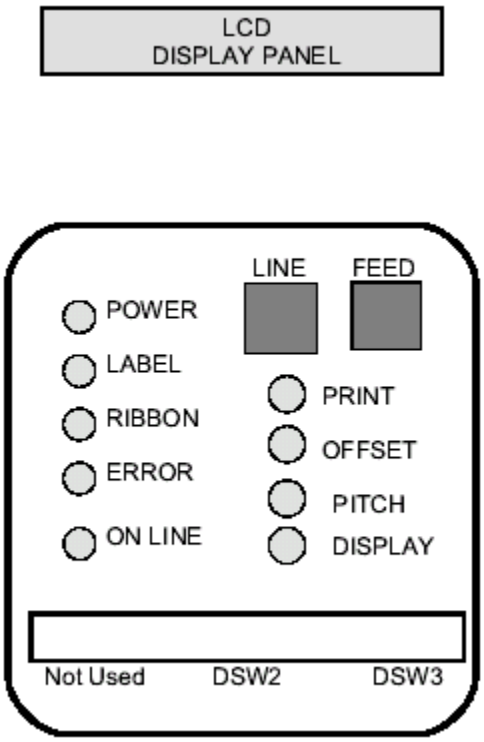
4. Load the ribbon onto the Ribbon Supply Spindle, also pushing it all the way to the inside of the spindle. The dull side of the ribbon should be facing down as it travels through the Print Head Assembly.
5. Feed the leader portion of the ribbon through the Print Head Assembly and up to the Ribbon Rewind Spindle following the routing shown in the diagram.
6. Load the ribbon behind and over the top of the Ribbon Rewind Spindle and tape it to the Extra Ribbon Core. Make sure it matches the ribbon path shown in the diagram.
7. Manually turn the Rewind Spindle to wrap the ribbon onto the core one to two turns to secure it.

8. If the labels or tags are already loaded, close the **Print Head Assembly** by pushing downward on the green tab until it latches closed.
9. Run a test print to ensure that the labels and ribbons were loaded correctly.



CAUTION: If your labels are less than the full width of the print head, the outside edge will eventually wear out a small portion of the print head, resulting in an area that will not print. Special care must be taken if you plan to use multiple widths of labels, since the damaged portion of the print head caused from edge wear on a more narrow label may affect the printing on a wider label. We suggest you plan your print formats carefully to avoid using the area of possible damage on the print head when using a wider label. The small area of damage will have no effect on printing with the undamaged part of the print head. Damage from a label edge is physical damage and is unavoidable. It is not covered by warranty. It is possible to delay such damage by always ensuring that the ribbon used is wider than the label stock. This will help to protect the print head from label edge damage.

OPERATOR PANEL



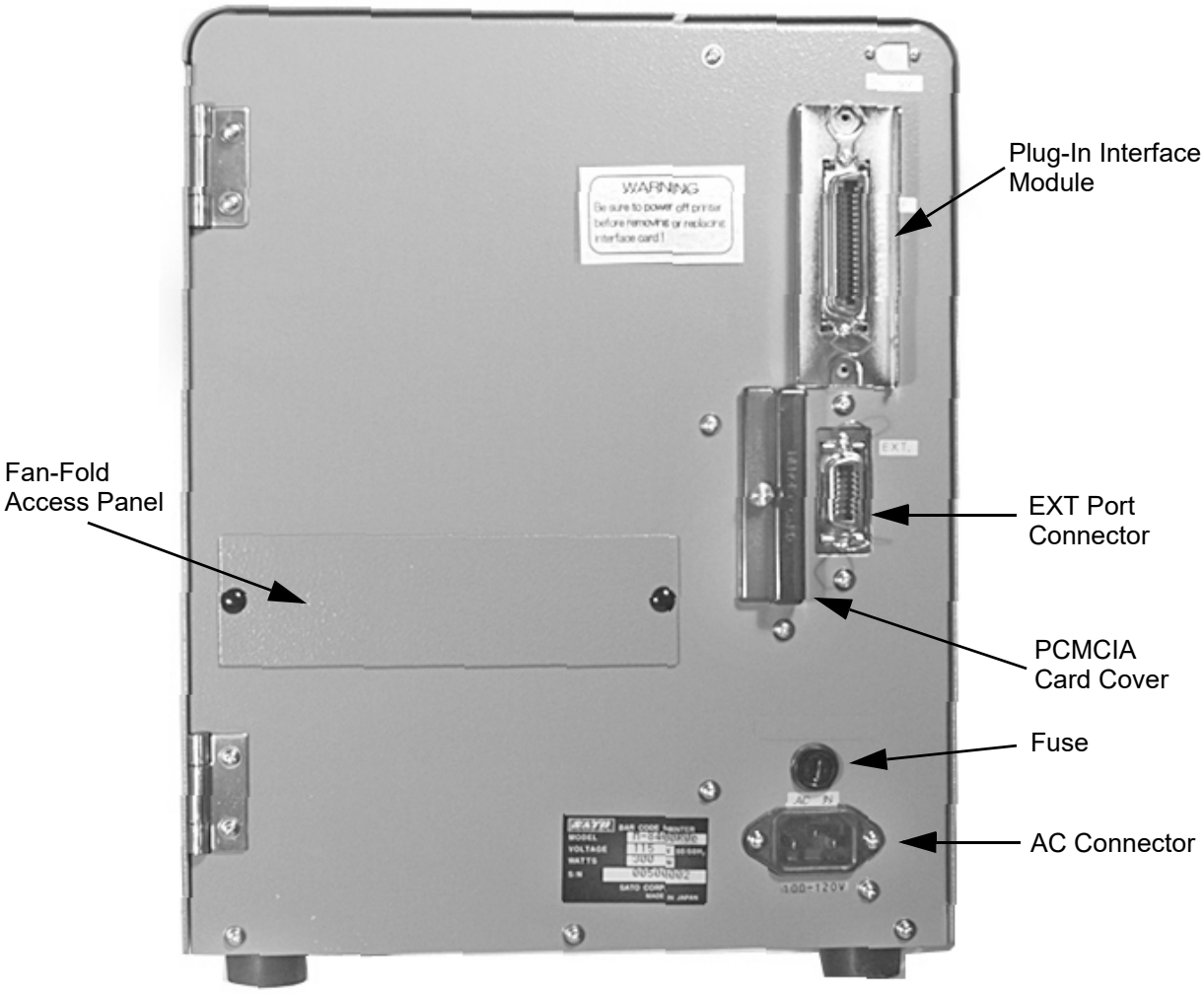
The M-84PRO Operator Panel consists of five LED indicators, two momentary contact switches, three DIP switches, four adjustment potentiometers and one LCD Display. All of these are accessible from the front of the printer. They are used to set the printer operating parameters and to indicate the status of the printer to the operator. After you power on the printer, familiarize yourself with the keys and indicators as it will help you understand the configuration process.

PRINT	Potentiometer to adjust print darkness (fine tuning)
OFFSET	Potentiometer to adjust amount of back/forward feed for dispenser/cutter/tear-off position (+/- 3.75 mm)
PITCH	Potentiometer to adjust home position of the label (+/- 3.75 mm). Affects stop position of label feed, print position and dispense position.
DISPLAY	Potentiometer to adjust the contrast of the LCD display.
POWER	LED, illuminated when the power is on.
LABEL	LED, illuminated when the label supply is not detected.
RIBBON	LED, illuminated when the ribbon motion sensor does not detect any ribbon motion (ribbon out condition).
ERROR	LED, illuminated when there is a system fault such as an open print head.

ON LINE	LED, illuminated when printer is ready to receive data. Toggled on/off with LINE key.
LINE	Momentary switch. Pressing this key toggles the printer between the on-line and off-line mode. When the printer is on-line, it is ready to receive data from the host. This key acts as a pause during a print job by taking the printer off-line. It can also be used as a Pause function key to stop the printer during the printing process.
FEED	Momentary switch. Pressing this key feeds one blank label when the printer is Off-Line. When the printer is On-Line, another copy of the last label will be printed (Reprint W/Feed must be enabled in the LCD panel Service Mode).
DSW	DIP switch array to set operational parameters of the printer.
LCD	2 Line x 16 Character LCD display. Used for setting operational parameters of the printer and displaying error conditions.

REAR PANEL

AC INPUT	Input 115VAC, 50/60 Hz connector. Use cable provided.
AC FUSE	Input power protection.
INTERFACE SLOT	Connector for Plug-In Interface Module.
MEMORY CARD SLOT	Connector for optional PCMCIA Memory Card.
EXT	External signal connector, AMP 57-60140.



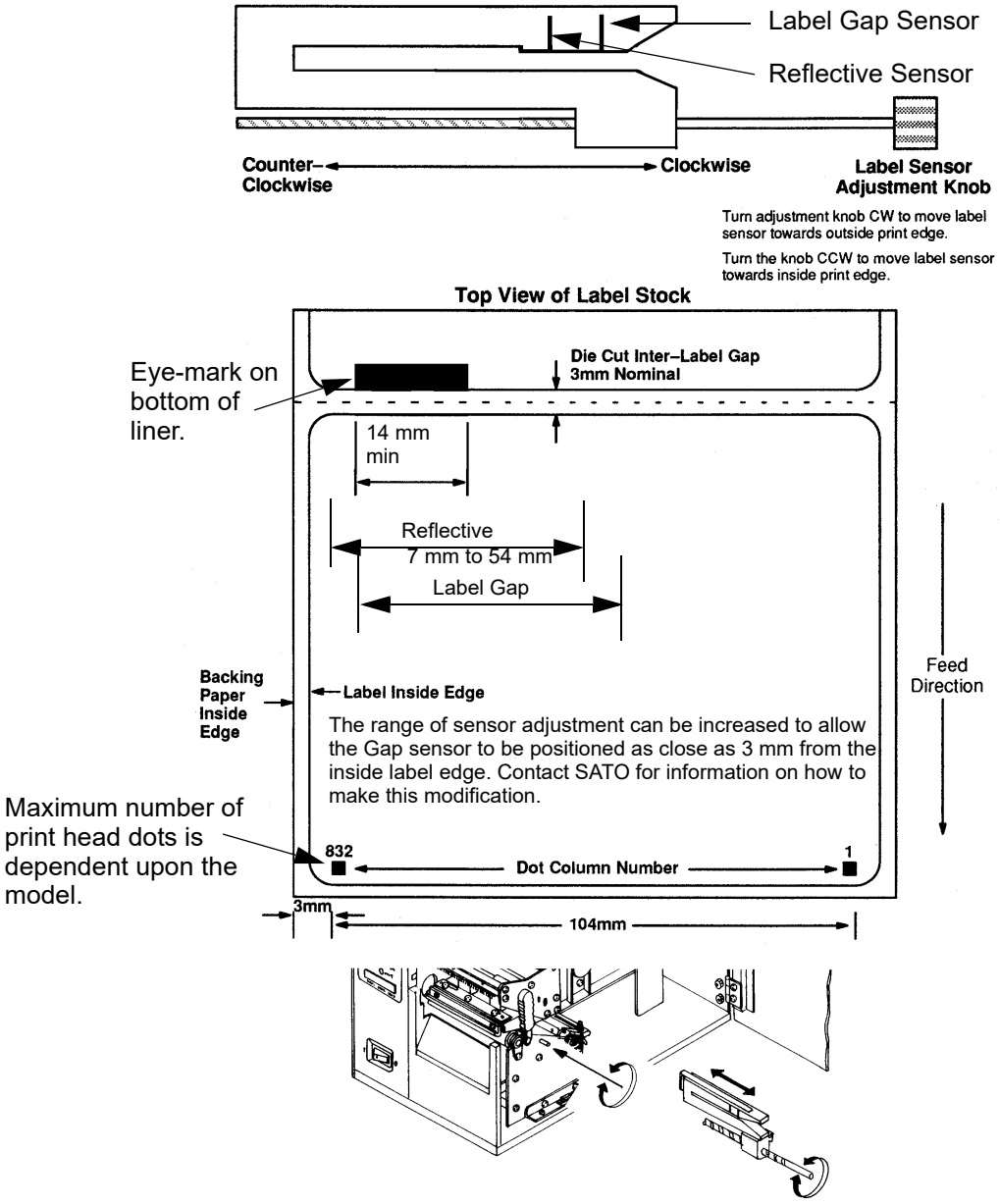
SENSORS

The M-84PRO printers contain three sensing units; a Ribbon End motion sensor, a Head Open micro-switch and a Label Indexing Sensor.

RIBBON END SENSOR Detect motion of the Ribbon Supply Spindle and signals the printer when it is turning.

HEAD OPEN SENSOR A micro-switch that is activated when the head is unlatched.

LABEL INDEXING SENSOR The sensing assembly contains two types of sensors, one for label gap and one for eye-mark sensing. The sensors are adjustable over a limited range.



This page left intentionally blank.

SECTION 3.
CONFIGURATION

PRINTER DIP SWITCH CONFIGURATION

DIP SWITCH PANELS

There are two DIP switches (DSW2 and DSW3) located on the front panel under a protective cover. In addition, a third DIP switch is located on the RS-232C Serial Adapter card and is used to set the RS-232C transmit/receive parameters. These switches can be used to set:

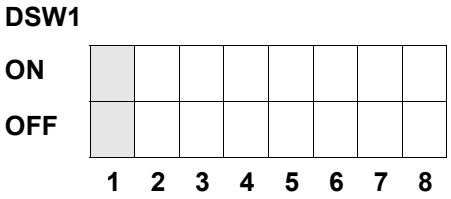
- Thermal transfer or direct thermal mode
- Label sensor enable/disable
- Head check mode
- Hex dump mode
- Single Job or Multi-Job Receive buffer
- Operation mode

Each switch is an eight section toggle switch. The ON position is always up. To set the switches, first power the unit Off, then position the DIP switches. Finally, after placing the switches in the desired positions, power the printer back on. The switch settings are read by the printer electronics during the power up sequence. They will not become effective until the power is cycled.

RS-232 TRANSMIT/RECEIVE SETTING

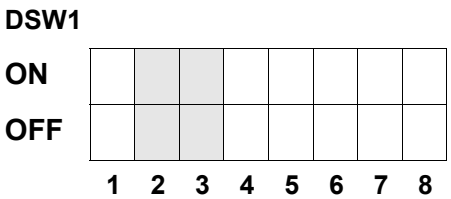
Data Bit Selection (DSW1-1). This switch sets the printer to receive either 7 or 8 bit data bits for each byte transmitted.

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



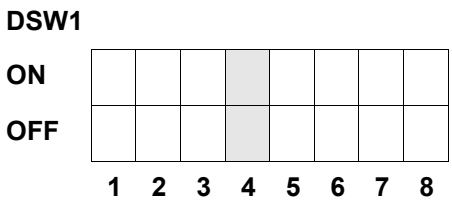
Parity Selection (DSW1-2, DSW1-3. These switches select the type of parity used for error detection.

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



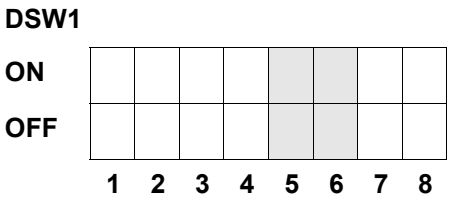
Stop Bit Selection (DSW1-4). Selects the number of stop bits to end each byte transmission.

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



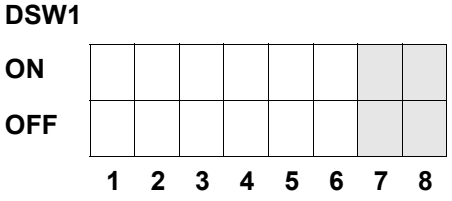
Baud Rate Selection (DSW1-5, DSW1-6). Selects the data rate (bps) for the RS-232 port.

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. See *Section 6: Interface Specifications* for more information. (* Will select the Status 2 protocol if DSW2-8 is ON).

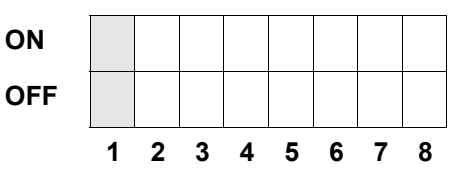
DSW1-7	DSW1-8	SETTING
Off	Off	Rdy/Bsy
Off	On	Xon/Xoff
On	Off	Bi-Com 3
On	On	Bi-Com 4



PRINTER SET UP

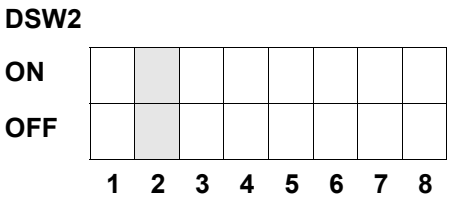
Print Mode Selection (DSW2-1). Selects between direct thermal printing on thermally sensitive paper and thermal transfer printing using a ribbon.

DSW2-1	SETTING
Off	Therm Xfr
On	Direct Therm



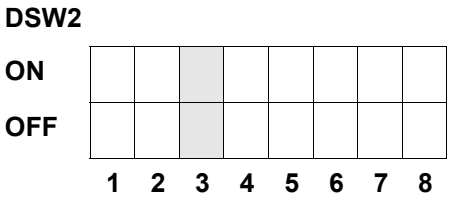
Sensor Type Selection (DSW2-2). Selects between the use of a label gap or a reflective eye-mark detector.

DSW2-2	SETTING
Off	Gap
On	Eye-mark



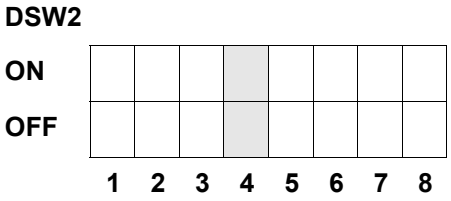
Head Check Selection (DSW2-3). When selected, the printer will check for head elements that are electrically malfunctioning.

DSW2-3	SETTING
Off	Disabled
On	Enabled



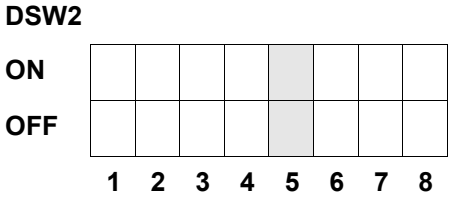
Hex Dump Selection (DSW2-4). Selects Hex Dump mode (see page 3-21).

DSW2-4	SETTING
Off	Disabled
On	Enabled



Receive Buffer Selection(DSW2-5). Selects the operating mode of the receive buffer. See *Section 6.Interface Specifications* for more information.

DSW2-5	SETTING
Off	Single Job
On	Multi Job

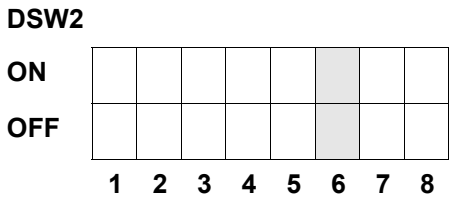


If a 10/100BaseT LAN card is installed, DS2-5 has the following definitions:

DSW2-5	SETTING
Off	ENQ Response
On	Periodic Response

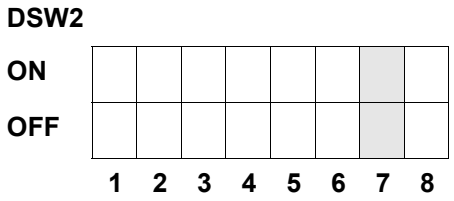
Firmware Download (DSW2-6). Places the printer in the Firmware Download mode for downloading new firmware into flash ROM.

DSW2-6	SETTING
Off	Disabled
On	Enabled



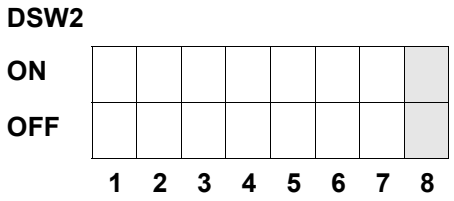
Protocol Code Selection (DSW2-7). Selects the command codes used for protocol control. Refer to page E-1 for more information.

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.

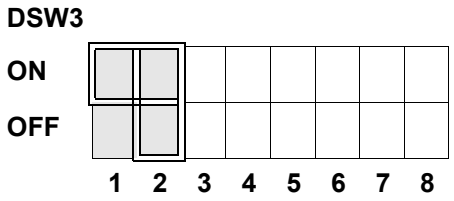
DSW2-8	SETTING
Off	Status 3 & 4 Enabled
On	Status 2 & 3 Enabled



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.

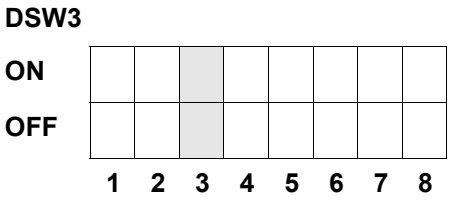
DSW3-1		SETTING
Off	Off	Continuous
Off	On	Tear-Off
On	Off	Cutter*
On	On	Dispenser

* Defaults to Continuous if cutter not installed



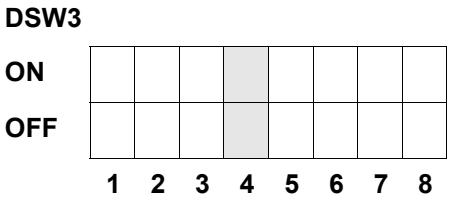
Label Sensor Selection (DSW3-3). Enables or disables the Label Sensor. If the Sensor is enabled, it will detect the edge of the label and position it automatically. If it is disabled, the positioning must be under software control using Line Feed commands.

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.

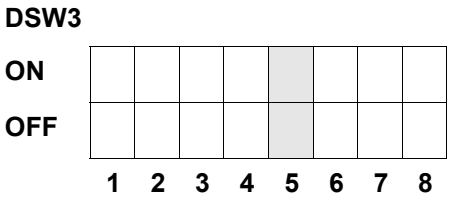
DSW3-4	SETTING
Off	Enabled
On	Disabled



External Signal Interface. See *Section 6: Interface Specifications* for information on the External Signals.

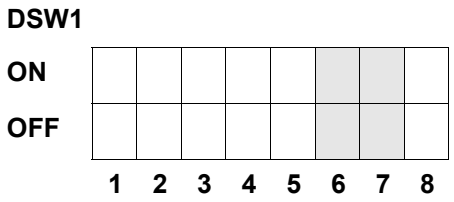
EXT Print Start Signal Selection (DSW3-5). Allows an external device to initiate a label print for synchronization with the applicator. When DSW3-5 is On, the unit is in the Continuous print mode, Backfeed is disabled and External Signals are ignored.

DSW3-5	SETTING
Off	Disabled
On	Enabled



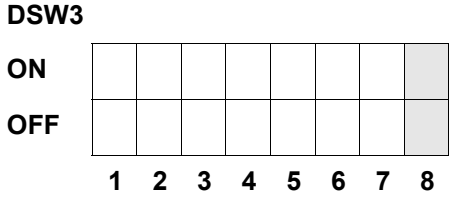
External Signal Type Selection (DSW3-6, DSW3-7). Both the polarity and signal type (level or pulse) of the external print synchronizing signal can be selected.

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 to reprint the current label in the print buffer.

DSW3-8	SETTING
Off	Disabled
On	Enabled



DEFAULT SETTINGS

SWITCH SELECTIONS

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

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:

	M-84PRO
Print Darkness	3
Print Speed	6 ips (3 ips for M-84PRO-6)
Print Reference	Vertical = 0000, Horizontal = 0000
Zero	No Slash
Print Offset	+0
Ignore CR/LF	Disabled
Character Pitch	Proportional
Ignore CAN/DLE	Disabled
Auto On Line	Enabled
Feed on Error	Enabled
Feed Reprint	Disabled
Priority	Command
Language	English
CC1 Mem Select	Card
Eurocode	$D5_H$

Once the default operation is completed, 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.

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.

1. While depressing the FEED key on the front panel, power the printer on.
2. When you hear one beep from the printer, release the FEED key and the printer will display on the LCD panel a message asking what type of Test Label you want to print.
3. Use the Cursor keys to step to the Configuration selection and press the ENTER key to accept the selection.
4. Use the Cursor keys to select the Test Label Size. After the size is selected, press the ENTER key to accept the selection and the printer will begin to print test labels continuously.
5. Adjust the PITCH potentiometer on the front panel until the first print position is at the desired location on the label. If the potentiometer does not have enough range, then you will have to change the pitch setting using the front panel display.
6. Press the FEED key to stop the printer.
7. To exit the Test Label mode, power the printer off and then back on.

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

BACKFEED OFFSET

When a label is printed it must be correctly positioned for dispensing and application. The Backfeed adjustment is used to position the label so that it is fully dispensed and ready for application. It may then be necessary to reposition the next label before printing. The Backfeed (repositioning of the label) operation is enabled if DSW3-4 is in the Off position. If Backfeed is enabled, placing DSW3-1 is 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. When turned all the way counterclockwise, the amount of backfeed is +3.75 mm, and -3.75 mm when turned all the way counterclockwise.

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.
4. Adjust the position using the OFFSET potentiometer on the front control panel and feed another label by depressing the FEED key. Repeat this procedure until the 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.

NOTE: The PRINT potentiometer adjustment will affect the darkness in all of the command code speed and darkness ranges.

LCD PANEL PRINTER CONFIGURATION

The LCD Panel is used by the operator in conjunction with the LINE and FEED switches to manually enter printer configuration settings. Many of these settings can also be controlled via software commands and in the case of conflict between software and control panel settings, the printer will always use the last valid setting. If you load a label job that includes software settings and then enter a new setting via the LCD panel, the manually set values will be used by the printer. If you set the values manually and then download a job with software settings, the software settings will be used.

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.

MODE	KEY SEQUENCE	INITIAL DISPLAY	PAGE
Normal	POWER	ONLINE QTY:000000	3-10
Advanced	LINE + POWER	ADVANCED MODE	3-13
Test Print	FEED + POWER	TEST PRINT MODE CONFIGURATION	3-25
Default Setting	LINE + FEED + POWER	DEFAULT SETTING YES NO	3-26
Clear Non-Standard Protocol	DSW2-7 ON + LINE + FEED+ POWER	ALT. PROTOCOL	3-27
Protocol Code Download	DSW2-7 ON + POWER + LINE	USER DOWNLOAD	3-27
Hex Dump	DSW2-4 ON + POWER	ONLINE QTY:000000	3-28

NORMAL MODE

The printer initially powers on in the ONLINE mode. The user can access the User Settings using the following procedures.

M-84Pro XXXDPI **ROM VXX.XX.XX.XX**

Displays the firmware during the initialization.

ONLINE **QTY:000000**

The LCD will display the ONLINE status on the top line and the bottom line will contain the label quantity (QTY) status. The message will be changed to OFFLINE whenever the printer is switched offline by pressing the LINE key. As soon a print job is received, the quantity line will indicate the number of labels to be printed. As soon as the label job begins to print, the display will indicate the number of labels in the print job that remains to be printed.

OFFLINE 000000

Press the LINE key once. When the display changes to OFFLINE, press the FEED and LINE keys simultaneously for more than one second. Release the keys.

PRINT DARKNESS 1 2 3 4 5

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 setting.
2. Once the correct setting is underlined, press the ENTER key to accept the selection and step the display to the next adjustment.

PRINT SPEED 2 4 6 8 10

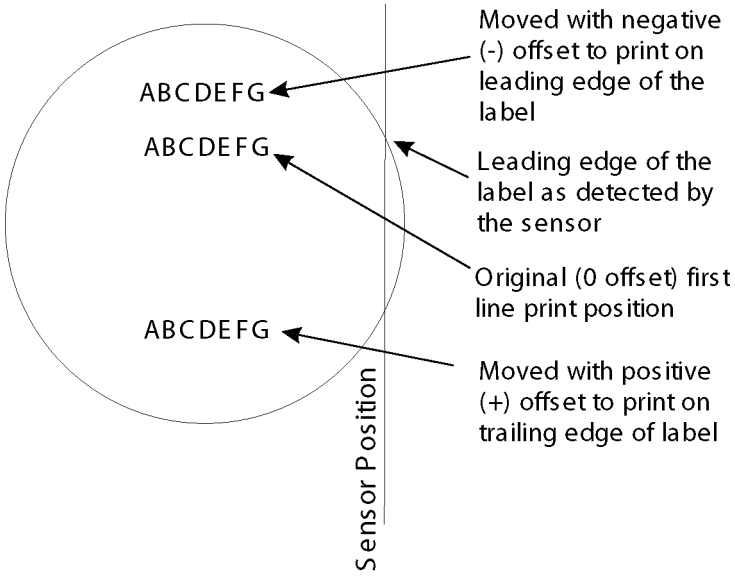
The print speed selections are dependent upon the printer model. The current setting is indicated by the cursor.

1. Use the Cursor keys to step the cursor to the desired setting.
2. Once the correct setting is selected, press the ENTER key to accept the selection and step the display to the next adjustment.

PITCH OFFSET
+ 00mm

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 +/- 49mm in increments of 1mm. Once the position is set, it can be fine adjusted +/- 3.75mm using the PITCH potentiometer on the Adjustment Panel.

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.
2. Once the correct direction is selected, pressing the FEED key will accept the setting and advance the cursor to the Offset selection.
3. Use the LINE key to step the first digit of the counter to the desired setting. The display will increment one step each time the Cursor keys are pressed. The maximum setting is 4.
4. Press the FEED key to accept the setting and advance the cursor to the second digit. Again use the LINE key to step to the desired setting. Once it is correct, pressing the FEED key will step to the next adjustment.
5. You may wish to print a test label after completing the adjustments to ensure they are correct.



CANCEL PRINT JOB **YES NO**

If the printer has a print job(s) in memory, selecting YES will cause the job(s) to be cleared. The default selection is NO. Be sure you want to cancel the print job(s) before selecting yes as the job(s) cannot be recovered and will have to be retransmitted to the printer.

1. Use the Cursor keys to step the cursor to either the YES or NO selection.
2. Once the correct setting is selected, pressing the ENTER key will accept the setting.

CANCEL PRINT JOB **COMPLETED**

3. After the print job(s) have been cleared from memory, the printer will beep 3 times and display a COMPLETED message for 3 seconds and then return to the initial ONLINE Normal Mode.
4. If you wish to change any of the settings, you must enter the User Settings mode again by taking the printer OFFLINE and pressing the LINE and FEED keys.

ADVANCED MODE

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.

M-84Pro XXXDPI **ROM VXX.XX.XX.XX**

Displays the firmware during the initialization.

ADVANCED MODE

The Advance Mode is entered by pressing the LINE key while simultaneously turning power on. The printer will emit one long beep after which the LINE key is released. Press FEED.

DARKNESS RANGE **A B C**

Allows the darkness (print density) selection of the printed image. Two options (A, B) are available for M-84PRO-2(203dpi) and M-84PRO-3(305dpi). Three options (A, B, C) are available for M-84PRO-6(609dpi).

Note: This menu displays only when HEATPROOF is set to 0.

ZERO SLASH **YES NO**

This setting determines if a zero is printed with a slash 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.

1. Use the LINE key to step the cursor to either the YES or NO selection.
2. Once the correct setting is selected, pressing the FEED key will accept the setting and advance the display to the Auto Online display.

AUTO ONLINE YES NO

This setting determines the mode in which the printer powers up. If the YES selection is made, 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.

1. Use the LINE key to step the cursor to either the YES or NO selection.
2. Once the correct setting is selected, pressing the FEED key will accept the setting and advance the display to the Print Offset display.

PRINT OFFSET V:+0000 H:+0000

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 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 <ESC>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 dependent upon the print head resolution. If you exceed the allowable limit, the printer will not accept the setting.

1. Use the LINE key to step the counter to the desired setting. The display will increment one step for each time the FEED key is pressed.
2. Once the setting is correct, pressing the ENTER key will accept the setting and advance to the next display.

Note: This setting can be overridden by the Base Reference Point Command.

HEAD DOT DENSITY 4 6 12

Toggle the head dot density from 12 dots/mm to 4 dots/mm.

The following options are available (inch): 4, 6, 12.

This menu displays only if the head dot density is 12 dots/mm and DSW2-8 is ON.

SET CALENDAR
YES NO

The Calendar is a optional feature in the M-84PRO printer allowing the date and time to be set manually using the LCD Display or via the <ESC>WT Calendar Set command. This screen will not be displayed if the Calendar Option is not installed. The last setting, set either manually via 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 is installed in the printer.

To enable the Calendar feature, press the LINE key until the cursor is over the YES. If the Calendar feature is to be disabled, press the LINE key until the cursor is over the NO selection. When the desired setting is selected, press the FEED key.

CALENDAR
00/00/00 00:00

1. Year - The first display shown will have the cursor over the two digit year selection. You can scroll through the dates by pressing the LINE/FEED keys. The year number will increase by one each time the LINE key is pressed until it reaches its maximum legal value (i.e., “99” for the year digits). Pressing the FEED key will decrease the year number.
2. Month - After you have set the correct year, pressing the ENTER key will advance the cursor to the two digit Month position. You can scroll through the numbers corresponding to the month by pressing the LINE key. The month number will increase by one each time the LINE key is pressed until it reaches a value of “12”. Pressing the FEED key will decrease the month number.
3. Day - After you have set the correct month, pressing the ENTER key will advance the cursor to the two digit Day position. You can scroll through the numbers corresponding to the month date by pressing the LINE and FEED keys. The date number will increase by one each time the LINE key is pressed until it reaches a value of “31”. Pressing the FEED key will decrease the day number.
4. Hour - After you have set the correct date, pressing the LINE key will advance the cursor to the two digit Hour position. You can scroll through the numbers corresponding to the hour (using a 24 hour clock) by pressing the LINE and FEED keys. The hour number will increase by one each time the LINE key is pressed until it reaches a value of “24”. Pressing the FEED key will decrease the hour number.
5. Minute- After you have set the correct hour, pressing the ENTER key will advance the cursor to the two digit Minute position. You can scroll through the numbers corresponding to the hour by pressing the LINE and FEED keys. The minute number will increase by one each time the LINE key is pressed until it reaches a value of “60”. Pressing the FEED key will decrease the minute number.
6. After you have set the minutes, pressing the FEED key will accept the setting and advance to the Ignore CR/LF selection.

IGNORE CR/LF
YES NO

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 primarily to maintain compatibility with earlier models of SATO printers.

1. Use the LINE key to step the underline cursor to either the YES or NO selection.
2. Once the correct setting is underlined, pressing the FEED key will accept the setting and advance the display to the Character Pitch display.

CHARACTER PITCH **PROP FIXED**	This selection allows you to set the default character pitch to either fixed character spacing or proportional character spacing. 1. Use the LINE key to step the cursor to the desired setting. 2. Once the correct setting is selected, pressing the FEED key will accept the setting and the display will return to the Advanced Mode display.
HEAD CHECK **NORMAL BARCODE**	Select the area for checking print head. NORMAL: Check the entire print area. BARCODE: Check only the area for printing a barcode. This menu displays only if the head check is enabled (DSW2-3 is ON).
ADVANCED MODE	To exit the Advanced mode, power the printer off and then back on.

CARD MODE

The Card Mode allows the operator to manage the Expanded Memory (PCMCIA Card or Internal Expanded Flash ROM).

M-84Pro XXXDPI **ROM VXX.XX.XX.XX**	Displays the firmware during the initialization.
ADVANCED MODE	The Card Mode is entered from the Advanced Mode display by pressing the LINE key once.
CARD MODE	The Card Mode display indicates that the printer is in the Card Mode. To advance to the first selection, press the FEED key.
MEM SELECT (CC1) **CARD MEMORY**	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. 1. Step the cursor to the desired selection using the LINE key. 2. Once the cursor is positioned over the desired selection, press the FEED key to accept the selection and advance the display.
CARD->MEMORYCOPY **TRUETYPEFONT Y/N**	This selection allows you to copy TrueType fonts from the PCMCIA Memory card installed in the Memory Card slot on the rear of the printer to the optional Flash ROM. 1. Use the LINE key to step the cursor to desired setting. 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.

COPY START **YES NO**

2. Confirm your selection by stepping the cursor to the Yes selection. If you select No, the display will return to the previous selection.

TRUETYPEFONTCOPY **COPYING**

3. Press the FEED key to accept the selection. If Yes was selected the copy process will start.

TRUETYPE **FONTCOPY** **COMPLETED**

4. Once the copy process is completed, press the FEED key to step the display.

CARD COPY/FORMAT **XXXXXXX ERROR**

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.

CARD->MEMORYCOPY **SATOFONT Y/N**

This selection allows you to copy SATO fonts from the PCMCIA Memory card installed in the Memory Card slot on the rear of the printer to the optional Flash ROM.

1. Use the LINE key to step the cursor to desired setting. 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.

COPY START **YES NO**

2. Confirm your selection by stepping the cursor to the Yes selection. If you select No, the display will return to the previous selection.

SATO FONT COPY **COPYING**

3. Press the FEED key to accept the selection. If Yes was selected the copy process will start

SATO FONT COPY **COMPLETED**

4. Once the copy process is completed, press the FEED key to step the display.

CARD COPY/FORMAT **XXXXXXX ERROR**

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.

MEMORY->CARDCOPY
ALL <0MB> Y/N

This selection allows you to copy the entire contents from the PCMCIA Memory card installed in the Memory Card slot on the rear of the printer to the optional internal Expanded Memory.

1. Use the LINE key to step the cursor to desired setting. 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.

COPY START
YES NO

2. Confirm your selection by stepping the cursor to the Yes selection. If you select No, the display will return to the previous selection.

CARD->MEMORY
COPY COPYING

3. Press the FEED key to accept the selection. If Yes was selected the copy process will start

CARD->MEMORYCOPY
COMPLETED

4. Once the copy process is completed, press the FEED key to step the display.

CARD COPY/FORMAT
XXXXXXX ERROR

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.

MEMORY->CARDCOPY
ALL <0MB> Y/N

This selection allows you to copy the entire contents of the optional Expanded Memory to the PCMCIA Memory card installed in the Memory Card slot on the rear of the printer.

1. Use the LINE key to step the cursor to desired setting. 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.

COPY START
YES NO

2. Confirm your selection by stepping the cursor to the Yes selection. If you select No, the display will return to the previous selection.

MEMORY->CARDCOPY
COPYING

3. Press the FEED key to accept the selection. If Yes was selected the copy process will start

MEMORY->CARDCOPY
COMPLETED

4. Once the copy process is completed, press the FEED key to step the display.

CARD COPY/FORMAT
XXXXXXX ERROR

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.

CARD->MEMORYCOPY PROGRAM Y/N

This selection allows the user to copy printer firmware from the PCMCIA Memory Card to the printer.

1. Use the LINE key to step the cursor to desired setting. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the mode display.

COPY START YES NO

2. Confirm your selection by stepping the cursor to the Yes selection. If you select No, the display will return to the previous selection.

CARD->MEMORY COPY COPYING

3. Press the FEED key to accept the selection. If Yes was selected the copy process will start

CARD->MEMORYCOPY COMPLETED

4. Once the copy process is completed, press the FEED key to step the display.

CARD COPY/FORMAT XXXXXXX ERROR

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.

MEMORY->CARDCOPY PROGRAM Y/N

This selection allows the user to copy the current firmware installed in the printer to a PCMCIA Memory Card.

1. Use the LINE key to step the cursor to desired setting. If Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the mode display.

COPY START YES NO

2. Press the FEED key to accept the selection. If Yes was selected the copy process will start. If you select No, the display will return to the previous selection.

MEMORY->CARDCOPY COMPLETED

3. Once the copy process is completed, press the FEED key to step the display.

CARD COPY/FORMAT XXXXXXX ERROR

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.

CARD FORMAT YES NO

Before a PCMCIA card can be used, it must be formatted.

Note: Formatting a card destroys all data currently stored on the card.

1. Use the LINE key to step the cursor to desired setting. If Yes is selected, the printer will enter the Card Format mode. If No is selected, the display will advance to the mode display.

MEMORY FORMAT **YES NO**

Before the internal Expanded Memory can be used, it must be formatted.

Note: Formatting the Memory will destroy any stored data.

1. Use the LINE key to step the cursor to desired setting. If Yes is selected, the printer will enter the Memory Format mode. If No is selected, the display will advance to the mode display.

CARD MODE

To exit the Card Mode, power the printer off and then back on.

SERVICE MODE

The Service Mode allows the operator to set up the basic operation parameters of the printer.

M-84Pro XXXDPI **ROM VXX.XX.XX.XX**

Displays the firmware during the initialization.

ADVANCED MODE

The Service Mode is entered from the Advanced Mode display by pressing the LINE key twice.

SERVICE MODE

The Service Mode display indicates that the printer is in the Card Mode. To advance to the first selection, press the FEED key.

GAP [X.XXV] **INPUT [X.XV]**

The M-84PRO printers determine 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 you to manually set the threshold voltage level, 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.

GAP	**[X.XXV]**
INPUT	**[X.XV]**

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:

(High Voltage Level + Low Voltage Level) x 0.5 = Start Value

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). Make sure the label is all the way under the sensor.
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, you may have trouble in 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.

3. Calculate the starting point voltage using the formula.
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.
5. Once the setting is correct, pressing the ENTER key will accept the setting and advance the next display.

EYE [X.XXV]
INPUT [X.XV]

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:

(High Voltage Level + Low Voltage Level) x 0.5 = Start Value

1. Insert a label into the sensor and close the Label Hold-Down. 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).
2. Now 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

If the measured values are outside this range, you may have trouble in 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.

3. Calculate the starting point voltage using the formula.
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.
5. Once the setting is correct, pressing the ENTER key will accept the setting and advance to the next display.

AUTO ONLINE FEED
YES NO

This selection specifies whether or not the printer will feed a label when it is placed in the Online mode.

1. Use the LINE key to step the cursor to desired setting. If Yes is selected, the printer will feed a blank label anytime it enters the Online mode.
2. Once the setting is correct, pressing the FEED key will accept the setting and advance to the next display.

FEED ON ERROR
YES NO

This selection specifies whether or not the printer will feed a label when an error condition is cleared.

1. Use the LINE key to step the cursor to desired setting. If Yes is selected, the printer will feed a blank label anytime an error condition is cleared.
2. Once the setting is correct, pressing the FEED key will accept the setting and advance to the next display.

REPRINT W/FEED YES NO

This selection 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.

1. Use the LINE key to step the cursor to desired setting. If Yes is selected, the printer will reprint the last label when the FEED key is pressed when the printer is Online. If the printer is Offline, pressing the FEED key will feed a blank label.
2. Once the setting is correct, pressing the FEED key will accept the setting and advance to the

FORWARD/BACKFEED DISTANCE DEFAULT

This display will only appear Backfeed is enabled (DSW3-4 = OFF). The maximum backfeed distance is 255 mm.

1. Use the LINE key to select either the Default or the Manual selection.
2. Once the setting is correct, pressing the FEED key will accept the setting and advance to the next display.

FORWARD/BACKFEED DISTANCE XXXmm

3. If Manual setting is selected, use the Cursor keys to advance the distance to the desired setting. Each time the LINE key is pressed, the Distance will advance 1 mm. The maximum distance is 255 mm.
4. Once the desired distance is set, press the FEED key to accept the setting and step to the next display.

EXT PIN 9 SELECT MODE1 MODE2

This selection allows the user to select 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 Online 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 Online.

1. Use the LINE key to step the cursor to the desired setting.
2. Once the desired setting is selected, press the FEED key to accept the setting and step to the next display.

EURO CODE D5

This selection allows the user to specify the hexadecimal code for the character which is replaced with the Euro Character. The default is D5H.

1. The cursor should be positioned over the first digit selection. Use the LINE key to step to the desired setting.
2. Press the FEED key to advance the cursor to the second digit of the desired hexadecimal code.
3. Press the LINE key to step to the desired setting.
4. When the setting is correct, press the FEED key to accept the setting and step to the next display.

SELECT LANGUAGE
ENGLISH

This selection allows the user to select the character set used by the printer. The selections are English, French, German, Spanish, Italian and Portuguese.

1. Press the LINE key to advance to the desired language setting.
2. When the setting is correct, press the FEED key to accept the setting and step to the next display.

PRIORITY SETTING
COMMAND LCD

This selection allows the user to assign 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.

1. Use the LINE key to step to the desired priority.

Once the desired setting is selected, press the FEED key to accept the setting and step to the next display.

IGNORE CAN/DLE
YES NO

If the printer is placed in the Multi-Item Buffer Mode (DSW2-5 = ON), the user can chose to ignore CAN (18H) and DLE (10H) commands used in bi-directional communications (see Section 6: Interface Specifications). If the Single Item Buffer Mode is chosen (DSW2-5 = OFF), this display will be skipped.

RIBBON NEAR END
ENABLE DISABLE

To set the printer to automatically notify when ribbon is nearly end.

This menu displays only when RS-232C interface, status 3 is selected.

IEEE1284
ACK SIGNAL 00.5

If the printer is placed in the Single Item Buffer Mode (DSW2-5 = ON), this selection allows the user to set the width of the IEEE1284 ACK pulse. In the Multi-Item Buffer Mode, this display will be skipped.The range is 0.5 µsec to 10 µsec.

1. Use the LINE key to step the display to the desired setting. The setting will advance in increments of 0.1 µsec each time the LINE key is pressed until the setting reaches 10.0 µsec when it will wrap around to the 0.5 µsec setting.

Once the desired setting is selected, press the FEED key to accept the setting and step to the next display.

HEATPROOF **0 1 2 3**

To set the heatproof mode used for printing heatproof labels.

0: disable heatproof printing

1: to print with darkness range B and speed 2 in/sec (50mm/sec)

2: to print with darkness range E and speed 2 in/sec (50mm/sec)

3: reserved (same setting as mode 2)

Note:

1. This menu displays only for M-84PRO-2 (8 dots/mm).
2. When heatproof is enabled, the print speed and darkness are fixed. The setting display will not show.
3. When heatproof is enabled, if the print head is changed to12 or 24 dots/mm, heatproof will be disabled. Therefore, after changing the print head back to 8 dots/mm, select mode 1 to 3 to enable heatproof if necessary.

BACKFEED MOTION **AFTER BEFORE**

Allows of the backfeed movement to be applied before printout or after printout. Two setting options are available, AFTER or BEFORE.

Note:

1. Backfeed motion setting is available only when HEATPROOF is set to mode 1 to 3. When HEATPROOF is set to 0, this menu does not display and AFTER is the default setting.
2. Backfeed motion is enabled only when DSW3 is set to: DSW3-1=ON + DSW3-2=OFF + DSW3-3=ON + DSW3-4=OFF.

SERVICE MODE

The Service mode is exited by powering the printer off and then back on.

COUNTERS MODE

The Counters Mode is provided to allow the user to access the internal printer counters.

ADVANCED MODE

The Counter Mode is accessed from the Advanced Mode. Press the LINE key to step to the Counter Mode.

COUNTERS MODE

Pressing the FEED key will advance the display to the counter selections.

COUNTERS **HD DSP CUT LIFE**

The counters are identified in the display as:

HD: Head Counter (should be reset when print head is replaced)

DSP: Dispenser Counter

CUT: Cutter Counter

LIFE: Life Counter (cannot be reset)

1. Use the LINE key to step the cursor to the desired counter, the Head (HD) counter or the LIFE counter. The default position is the Head Counter.

HEAD COUNTER 0.5M

2. Once the correct setting is selected, pressing the FEED key will display the current value (in meters) stored in the counter. The maximum number of digits displayed is 8.
3. Pressing the FEED key again will advance the counter to the Clear mode. All counters with the exception of the LIFE counter may be cleared.

HEAD COUNT CLEAR YES NO

4. Use the LINE key to select the desired setting. If you only wanted to read the counter value, select NO. If you want to read the counter and reset it to 0.0, place the cursor over the YES. Once the desired setting is selected, pressing the FEED key will advance the return you to the Counters Mode display.

COUNTERS MODE

5. To exit the Counters Mode, turn power to the printer off and then back on.

TEST PRINT MODE

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.

M-84Pro XXXDPI ROM VXX.XX.XX.XX

Displays the firmware during the initialization.

TEST PRINT MODE CONFIGURATION

This option allows you to print a test label. It is recommended that you print a test label after you have changed any of the settings in the Advanced Mode. The test label allows you to verify that you indeed did make the desired changes. To enter the Test Print Mode, power the printer on while pressing the FEED key. The printer will beep. Release the FEED key and the printer will display the following message on the LCD panel:

1. Use the LINE key to step the cursor to type of test label you wish to print. The choices are:

   CONFIGURATION
   BARCODE
   HEADCHECK
   MEMORY
   FACTORY

TEST PRINT SIZE 10 CM

Note: This screen will not be displayed for the Memory Test Label.

Once you have selected the type of test label to be printed, use the FEED key to accept the selection and the display advances to the Test Print Size display. This display allows you to select the label width.

1. Use the LINE key to select the label width. Each time the LINE key is pressed, the label size advances 1 cm until it reaches a maximum width of 26 cm, at which point it will wrap to the smallest size of 13 cm.

PRESS FEED KEY TO STOP PRINTING

2. Pressing the FEED key accepts the selection and starts printing test labels continuously.
3. Press the FEED key to stop the printer.
4. To exit the Test Print Mode, power the printer off and then back on.

DEFAULT SETTING MODE

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.

M-84Pro XXXDPI ROM VXX.XX.XX.XX

Displays the firmware during the initialization.

DEFAULT SETTING YES NO

You enter the Default Setting Mode by pressing the LINE and FEED keys while simultaneously powering the printer on. The printer will emit one long beep after which the FEED and LINE keys should be released.

1. Use LINE key to select either the YES or NO.
2. Once the desired setting is selected, pressing the FEED key will accept the selection and the printer will reset to the original default conditions.

DEFAULT SETTING COMPLETED

3. 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.
4. To exit the Default Setting Mode, power the printer off and then back on.

CLEAR NON-STANDARD PROTOCOL

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.

M-84Pro XXXDPI ROM VXX.XX.XX.XX

Displays the firmware during the initialization.

ALT.PROTOCOL DEFAULT COMPLETE

To Clear Non-Standard protocol codes, DSW2-7 is placed in the On position and the printer powered on while simultaneously pressing the LINE and FEED keys.

The printer will emit one long beep at which time the LINE and FEED keys should be released.

When the keys are released, the printer will replace the Alternate protocol codes with the default values.

After the default setting is complete, the printer will emit two short beeps indicating the process is complete.

To exit the mode, power the printer off and then back on.

DOWNLOAD USER DEFINED PROTOCOL CODES

The user can define a set of custom protocol codes and download them to the printer using the <ESC>LD command.

M-84Pro XXXDPI ROM VXX.XX.XX.XX

Displays the firmware during the initialization.

USER DOWNLOAD PRESS THE LINE KEY

To enter the User Download mode, DSW2-7 is placed in the on position and the printer is powered on while simultaneously pressing the LINE key. The printer will emit one long beep after which the LINE key is released.

1. Set DSW2-7 Off to replace the Standard protocol codes or On to replace the Alternate set of protocol codes.

USER DOWNLOAD WAITING

2. Press the LINE key. The printer is now waiting for the data to be sent.
3. Transmit the download data command stream to the printer.
4. 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.
5. 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.
6. 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.

HEX DUMP MODE

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.

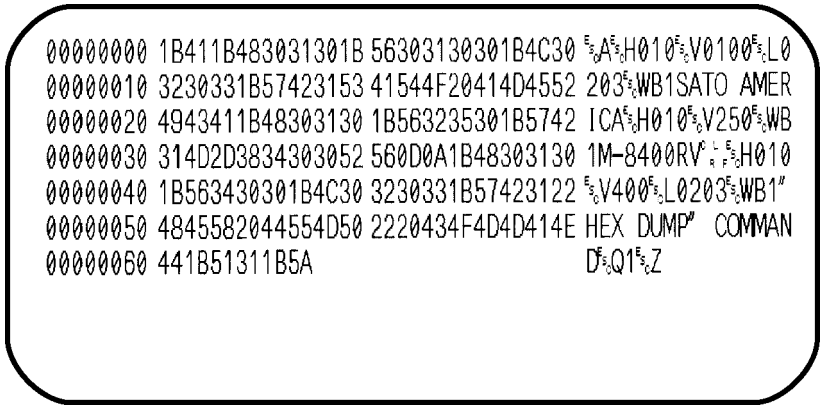
M-84Pro XXXDPI ROM VXX.XX.XX.XX

Displays the firmware during the initialization.

ONLINE
QTY:000000

The Hex Dump Mode is entered by placing DSW2-4 in the on position and powering the printer on.

1. The printer is now ready to receive data.
2. Send the data stream to the printer.
3. The received data will be printed in a hexadecimal format4. To return the printer to normal operation, place DSW2-4 in the off position and power the printer off and then back on.



SECTION 4.
CLEANING AND MAINTENANCE

INTRODUCTION

The following information is presented in this section:

- Adjusting the Print Quality
- Cleaning the Print Head, Platen and Rollers
- Cleaning the Label Edge Sensors
- Replacing the Print Head

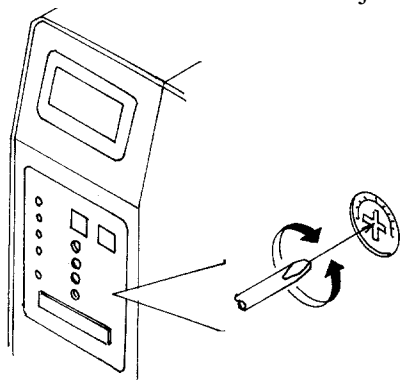
ADJUSTING THE PRINT QUALITY

One of the nice features of the SATO printers are their high print quality. They are equipped with two different methods of adjusting the quality of the print; print darkness and speed. When adjusting for optimum print quality, a bar code verifier system should be used. The human eye is a poor judge of the relative widths of the bars in a symbol, a characteristic that is extremely important for good bar code quality.

PRINT (DARKNESS)

This adjustment allows the user to control (within a specified range) the amount of power that is used to activate the individual print head heat elements. It is important to find a proper print darkness level based on your particular label and ribbon combination. The printed images should not be too light nor should the ink from the ribbon “bleed.” The edges of each image should be crisp and well defined.

The Print Darkness can be set using the front panel LCD panel or by downloading the setting using the Print Darkness software command. Once the range has been selected, the PRINT Potentiometer on the front panel can be used to make finer adjustments.



The primary adjustment for Print Darkness is the PRINT potentiometer on the Front panel. It provides a continuous range of adjustment, allowing you to make precise changes. Use a small cross-point screwdriver, turning clockwise for darker print and counterclockwise for lighter print.

NOTE: The PRINT potentiometer adjustment will affect the darkness in all of the command code speed ranges, i.e. if the PRINT potentiometer is adjusted for lighter print, the darkness will be lighter in all speed ranges selected by the command code.

PRINT SPEED

The other method of controlling print quality is by controlling the speed at which the label is printed. This adjustment is made only on an individual label basis using the Print Speed command code. For more details on this command, see the *"e" and PRO 3Printer Programming Reference*. Changing the print speed allows the user to control the amount of time allowed for print element cooling before the media is stepped to the next print position. It is especially critical when printing "ladder" bar codes (bar codes printed with the bars parallel to the print line). When printing a "ladder" bar code, it is important to allow the head to cool sufficiently before stepping to the next position. If it does not have sufficient time to cool, the bar will be "smeared" on the trailing edge.

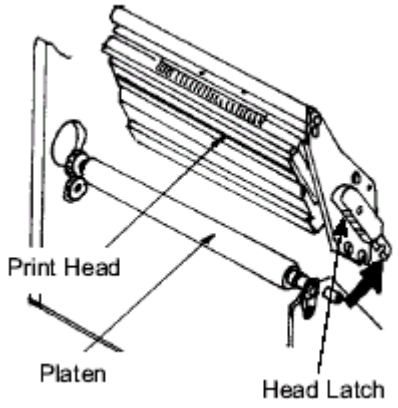
The Print Speed can be set using the LCD panel or with the Print Speed software command. The software command will override the any setting entered using the LCD panel.The other method of controlling print quality is by controlling the speed at which the label is printed. This adjustment is made only on an individual label basis using the Print Speed command code. For more details on this command, see the *"e" and PRO Printer Programming Referenc*e.

CLEANING THE PRINT HEAD, PLATEN AND ROLLERS

Supplies needed: **Cleaning Kit**

Cleaning the Print Head

1. Turn the printer off and remove the power cable.
2. Open the Top and Side Access Doors.
3. Open the Print Head Assembly by rotating the Head Latch toward the back of the printer. The Print Head Assembly is spring-loaded and will automatically open as soon as the Head Latch is disengaged.
4. Remove the ribbon.
5. Apply SATO Thermal Print Head Cleaner to a cotton swab.

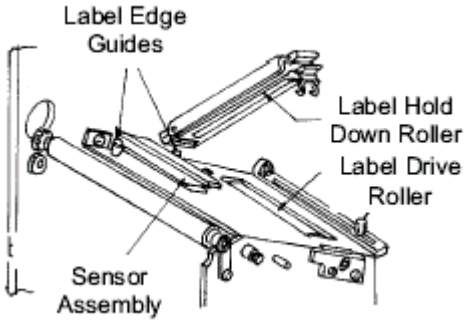


6. The Print Head faces downward along the front edge of the assembly. Pass the end of the dampened swab along the epoxy ridge that runs the entire width of the Print Head.
7. Check for any black coloring or adhesive on the swab after cleaning.
8. Repeat if necessary until the swab is clean after it is passed over the head.

9. The head should be cleaned at least every time the ribbon is changed and more often in dusty environments.

Cleaning the Platen and Rollers

1. Turn the printer off and remove the power cable.
2. Open Top and Side Access doors.
3. Open the Print Head Assembly by rotating the Head Latch toward the rear of the printer. The Print Head Assembly is spring-loaded and will automatically open as soon as the Head Latch is disengaged.



4. Unlatch the Label Hold-Down by lifting up on the latch lever (immediately below the green PUSH tab.
5. Apply SATO Thermal Print Head Cleaner to one of the cotton swabs.
6. The Platen is the rubber roller directly below the Print Head. It should be cleaned of any ribbon or label residue.
7. A pair of Label Feed Rollers are used to assist in label feeding at high print speeds. One located in the bottom of the Label Hold-Down and the other directly underneath it in the label feed path. They should be cleaned of any label residue or foreign material.
8. Repeat if necessary. The platen and rollers should be cleaned whenever foreign matter such as dust or adhesive is present.
9. Close the Label Hold-Down until it latches in place.
10. Close the Print Head by rotating the Head Latch Lever down and towards the front until it latches in place.

CLEANING THE LABEL EDGE SENSORS

There are two sensors that are used to control the positioning of the label. One is a transmissive see-thru sensor that detects the edge of the label by looking through the backing paper which is translucent and detecting the presence of the opaque backing. The other is a reflective sensor that detects the light reflected from the bottom of the label liner. When a printed black eye-mark passes through the beam, the light is no longer reflected back to the sensor detector, indicating to the printer that it should use this position as the start of a new label. When dust, dirt or other foreign matter interferes with the light path of either of these sensors, the results is erratic label positioning. These sensors should be cleaned regularly, at least every two rolls of labels. They are both located on an adjustable assembly in the throat of the printer between the Label Hold Down and the Print Head.

Supplies Needed: **Cleaning Kit**

1. Turn the printer off and remove the power cable.
2. Open the Top and Side Access doors.

3. Open the Print Head by pushing the Head Latch toward the rear of the printer. The Print Head is spring-loaded and will automatically open as the Head Latch is disengaged.
4. Remove the ribbon.
5. Apply SATO Thermal Print Head Cleaner to a cotton swab.
6. Carefully insert the swab between the top and bottom portions of the Sensor Assembly. The location of the sensors is identified by two marks on the assembly.
7. Move the swab back and forth to clean any residue from the sensors.

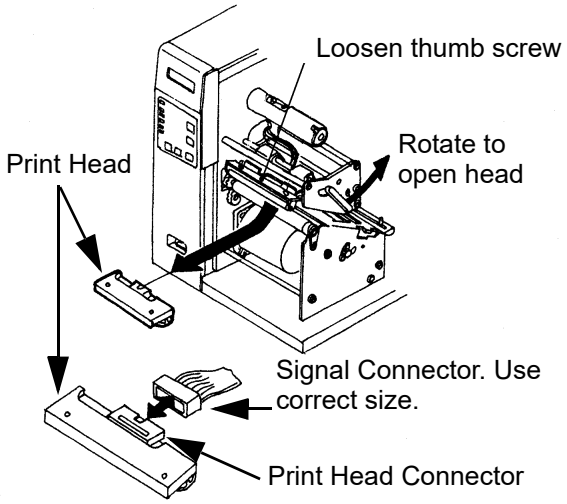
REPLACING THE PRINT HEAD

The print head on the M-84PRO printers is a user-replaceable item. If it becomes damaged for any reason, it can be easily removed and replaced. Contact your local SATO representative for information on obtaining a new print head. The M-84PRO is available with three different print heads with 203, 305 or 609 dpi.Make sure you have the correct replacement head as the printer will automatically detect the print head resolution and load the operating parameters for that head.

Supplies needed: **Flat blade screwdriver**
Replacement Print Head

1. Turn the printer off and remove the power cable.
2. Open the Top and Side Access doors.
3. Open the Print Head by pushing the Head Latch toward the rear of the printer. The Print Head is spring-loaded and will automatically open as soon as the Head Latch is disengaged.
4. Remove the ribbon from the Ribbon Rewind Spindle if necessary.
5. View the Print Head from the front of the printer. Locate the center mounting thumb screw on the top of the assembly. Unscrew this screw. It remains captive and will not come out of the top attachment plate.
6. The Print Head should now be loosened from the top of the assembly by grasping either side and carefully pulling it down.

7. Disconnect the signal and power cables from the print head connectors and set the Print Head aside. There are two connectors on the signal cable. The smaller connector is used for the 203 and 305 dpi print heads, the larger one for the 609 dpi print head. Note which connector was connected to the print head.



***DO NOT** remove the two outside screws (painted red) on either side of the center mounting screw. The Print Head is pre-aligned and if these screws are loosened, it will have to be re-aligned for proper print quality.*

8. Carefully attach the new print head to the connectors, using caution to make sure the connector keys are correctly positioned and that the correct cable connector is used. The connector on the print head should be the same size as the one you are replacing.

NOTE: Be careful not to scratch the printing surface of the print head while installing it. Scratching the surface will cause permanent and irreparable damage and is not covered by the warranty!

9. Align the thumb screw with the tapped hole in the new print head.
10. 11. Re-secure the print head by tightening the screw.

This page left intentionally blank.

SECTION 5.
TROUBLESHOOTING

This section has been devised to help you if you are unable to produce output on the M-84PRO printers. Use this section to make sure the basics have been checked before deciding you are unable to proceed any further. The section is divided into five parts:

- Initial Checklist
- IEEE1284 Parallel Interface
- RS-232C Serial Interface
- Universal Serial Bus Interface
- LAN Ethernet Interface

INITIAL CHECKLIST

1. Is the printer powered up and ON-LINE?
2. Is the ERROR light on the front panel off? Is this light is on, it may mean the Print Head Assembly or the Label Hold-Down is not closed and latched in position.
3. Are the LABEL and RIBBON lights on the front panel off? If these lights are on, the labels or ribbons may be incorrectly loaded.

USING THE IEEE1284 PARALLEL INTERFACE

1. Is the IEEE1284 printer cable connected securely to your parallel port (DB-25S Female) on the PC and to the Parallel Interface connector on the printer?

WARNING: 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.

2. Does the Parallel interface cable used meet IEEE1284 specifications? If it does not and you are connected to an IEEE1284 or ECP parallel port on the computer, the printer may not be able to communicate correctly.
3. Is there more than one parallel interface port on your PC (LPT1, LPT2, etc.)? If so, make sure you are sending data out the correct port.
4. Is the IEEE1284 Interface Module installed in the printer? Older versions of the Parallel Interface module will not work correctly in the M-84PRO printers.
5. When you send the print job to the printer, and it does not respond, do you get an error message on your PC that says “Device Fault” or something similar?

   This may mean that the computer doesn’t know the printer is there. Verify that:

   a. Both ends of the cable are securely inserted into their respective connectors.

   b. The printer is ONLINE.

   c. The cable is not defective. There are other things that can cause this error message on your computer, but at this stage, a defective cable may be one of the reasons.

6. When you send the print job to the printer and it does not respond, and there is no error message on the PC:

   a. Check your data stream for some of the basics. Is your job framed as follows?

   <ESC>A—DATA—<ESC>Z

   b. Verify that you've included all required parameters in the data stream.

   c. Verify the following:

   You have not typed a "0" (zero) for an "O" (letter) or vice-versa.

   You have not missed any <ESC> characters where they're needed.

   Make sure all printer command codes are capital letters.

7. If you've checked all of the above and the printer still isn't printing, you may want to try a Buffer Hex Dump to determine what (if anything) the printer is receiving from your computer. See Printing Hex Dump Labels in *Section 3. Configuration.*

   The Parallel port is now listening for incoming data. Send your print job. The printer will now print (only once) a Hexadecimal (Hex) Dump of everything it received from the host computer. Each 2-digit hexadecimal character represents a character the printer received. It may be tedious, but now you can analyze and troubleshoot the data stream.

8. While checking the Hex Dump printout, if you notice $0D_H$ $0A_H$ (Carriage Return and Line Feed) characters throughout. The command string should be continuous and no CR or LF characters are allowed between the Start Command (<ESC>A) and the Stop Command (<ESC>Z). If you are using BASIC, it may be adding these characters automatically as the line wraps. Adding a "width" statement to your program can help to suppress these extra $0D_H$ $0A_H$ characters by expanding the line length up to 255 characters. See the *"e" and PRO Printer Programming Reference* for details on writing a program in BASIC.

   If you're not programming in BASIC, check to see if you have an equivalent statement in the language you're using to suppress extra carriage returns and line feeds from your data being sent out to the printer. We want the data stream to be one complete line going to the printer.

USING THE RS-232C SERIAL INTERFACE

1. Is the RS-232C Serial cable connected securely to your serial port on the PC (DB- 25S or DB-9S Male) and to the RS-232C connector on the printer?

WARNING: 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.

2. Is the cable defective? At the very least, you should be using a "Null Modem Cable," which crosses pins in a specific manner. This should enable your printer to print. But we recommend that you eventually use a cable built to specifications as described in Section 6: Interface Specifications.

3. Is the RS-232 Interface Module installed in the printer? The M-84PRO printers require the new Hi Speed Serial Interface (PN WCL40451)to take advantage of the faster data transmission speeds. The older Serial Interface Modules will work, but at a reduced capability.

4. Check for obvious errors in the data stream. Is the data properly framed with the <ESC>A and <ESC>Z commands? See the "e" Programming Reference if necessary.
5. If after sending your job to the printer, it only "beeps" and displays an error message on the LCD display, you may have a configuration problem. There may be some inconsistencies with the Baud Rate, Parity, Data Bits, or Stop Bits in relation to your host computer. If you are confused as to what the printer's current RS-232 settings are, print a Configuration Test label (see *Section 3. Configuration*). It will list all of the current printer configuration settings.
6. If you still are unable to get printer output, try the Hex Dump as described in Step 5 under the Parallel Interface troubleshooting. In this case, the printer monitors the RS-232C interface for incoming data.
7. From the Hex Dump, if you are seeing extra $0D_H$ $0A_H$ (CR and LF) characters, and are using BASIC, refer to *"e" and PRO Printer Programming Reference*. It provides hints for writing a SATO program in BASIC.

USING THE UNIVERSAL SERIAL BUS (USB) INTERFACE

If nothing prints when doing a test print you will need to verify that the device drivers have been successfully installed by doing the following:

1. Click on Start, then Settings and then Control Panel.
2. Within the new Window you should have an Icon listed as System. Double Click on this.
3. Click on the Device Manager tab.
4. Make sure that the View Device by type is checked. Scroll down until you get to SATO-USB device.
5. Verify that it does not have any errors next to it. If it shows an error, remove the device and then reinstall it.
6. Reboot the PC and the Printer.
7. Consult the Windows Troubleshooting guide or contact technical support for further assistance.

USING THE LAN ETHERNET INTERFACE

Printer Does Not Come Up Ready

If you cannot print to the print server after you install it, check the following:

1. Make sure that the printer is powered on, that all cables are securely plugged in, and that the printer is on-line.
2. If possible, connect a terminal to the serial port. If you see the boot prompt, the print server firmware has not been loaded properly. If reloading does not fix the problem, try setting switch 1 to ON (factory defaults) and powering the print server off and then on again; if the problem persists, the product may be defective.

Installation Problems (Printer Comes up Ready but You Cannot Print)

- If the printer starts up OK but you cannot print, the problem could one of the following:
- There is a problem with the interface between the print server and the printer

- There is a problem with the network connection or cabling.
- There is a queue setup problem, a print server setup problem, or other protocol-related problem.

Checking the Interface between the Print Server and the Printer

First make sure that the cable between the print server and the printer is securely plugged in at both sides. Then:

1. Wait about two minutes after the printer is powered on and then run a printer self-test (see Section 3:Configuration for information on how to run the self-test).

   If the self-test does not print, then there is possibly a hardware problem. Double check the connections.

   In some rare instances, disabling NBUF with the command SET PORT P1 NBUF DISABLED will solve port compatibility issues.

Checking the Network Connection and Cabling

If the self-test page prints but you cannot print documents, first check the network connection and cabling.

1. If you are connecting to a 10baseT network, verify that the OK LED is on. If the appropriate LEDs are not on, there is probably a bad 10BaseT or 100BaseTX cable or the hub port is bad. If possible, try a different cable and hub port, or try connecting a different device (such as a PC) to the cable.
2. If you are using a repeater or hub, make sure that SQE (heartbeat) is turned off at the hub (this is the default setting for most hubs). Also, if you have a hub or multiport repeater, verify that the hub or repeater port is good by trying the print server on a different port.
3. If you have a bridge or router located between the print server and the host computer, make sure that the device is set up to allow the print server to send and receive data from the host. For example, a bridge can be set up to only allow certain types of Ethernet addresses to pass through (a process known as filtering); therefore, such a bridge must be configured to allow print server addresses. Likewise, a router can be set up to pass only certain protocols, so be sure that the desired protocol can be passed through to the print server. In the case of routers, also make sure that the protocol is routable (LAT, NetBEUI, and DLC/LLC are not routable).
4. Make sure that you are not trying to perform an illegal operation, such as attempting to print a label larger than the printer can handle.
5. Check the individual protocol troubleshooting sections in provided with the Ethernet Interface Module for additional causes of intermittent printer problems.

Intermittent Problems

If the print server and the printer start up OK, but you intermittently have problems printing, check the following:

1. Excessive NetWare polling can be a big cause of intermittent problems. Make sure that you have only enabled the NetWare file servers that you need for printing (do a SHOW NETWARE command from the print server console to see the enabled file servers). If you have V3.21 or earlier firmware, make sure that NetWare polling is disabled by using the console command SET NETWARE RANGE 0. If you are not using NetWare, you can disable NetWare entirely with the command SET NETWARE DISABLED.

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

ERROR SIGNALS

The LCD Display, Front Panel LED Indicators and Buzzer provide a visual/audio indication of the type of error encountered.

LED	LCD MESSAGE	AUDIBLE BEEP	ERROR CONDITION	POSSIBLE CAUSES
Error On	Machine Error	1 Long	Machine Error	1. Defective Board
Error On	EEPROM Error	1 Long	EEPROM Read/ Write	1. EEPROM not installed correctly. 2. Overwriting EEPROM.
Error On	Head Error	1 Long	Head	1. Electrical head malfunction
Error On	Sensor Error	3 Short	Sensor	1. Paper jam. 2. Sensor DSW setting. 3. Sensor level adjustment.
Error Blinks	Card R/W Error	1 Long	Memory Card Read/Write	1. Card not formatted 2. No card recognized.
Error Blinks	Card Low Battery	1 Long	Memory Card Battery Low	1. Card battery needs replacement.
Error Blinks	Card No Battery	1 Long	No Battery in Card	1. Card needs battery installed.
Error Blinks	Head Open	3 Short	Head Open	1. Head not latched. 2. Head latch switch bad.
Error Blinks	Cutter Error	3 Short	Cutter	1. Cutter jam. 2. Cutter sensor dirty.
Error On Line Blinks	Parity Error	3 Short	RS-232 Parity Error	1. RS-232 parameter mismatch.
Error On Line Blinks	Overrun Error	3 Short	RS-232 Overrun Error	1. RS-232 parameter mismatch
Error On Line Blinks	Framing Error	3 Short	RS-232 Framing Error	1. RS-232 parameter mismatch
Error On Line Blinks	Buffer Over	3 Short	Buffer Overflow	1. Command stream exceeds buffer size.
Error Blinks Label On	Paper End	3 Short	Media End	1. No paper. 2. Paper incorrectly loaded.
Error Blinks Ribbon On	Ribbon End	3 Short	Ribbon End	1. Needs new ribbon roll. 2. Ribbon sensor needs adjustment.
	Download Error R/W Error No Card Mem Full Error	1 Long	Download Error	1. Read/Write error. 2. Corrupted download file. 3. Download file too large.
Error Blinks	CopyCard/Format R/W Error No Card Error Mem Full Error	1 Long	Card Copy or Format Error	1. R/W error during copying. 2. Card not installed properly. 3. File too large.

SECTION 6.
INTERFACE SPECIFICATIONS

INTRODUCTION

The M-84PRO printer utilize a Plug-In Interface Module for maximum printer configuration flexibility. This section presents the interface specifications for the M-84PRO printers. These specifications include detailed information on how to properly interface your printer with your host system.

The following information is presented in this section:

- Interface Types
- Using the Receive Buffer
- IEEE1284 Parallel Interface
- Universal Serial Bus (USB) Interface
- Local Area Network (LAN) Interface
- RS-232C Serial Interface
- Bi-Comm Communications Protocol
- Status Response

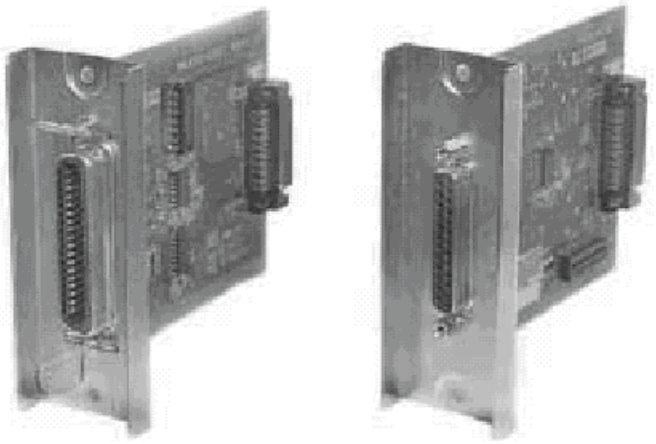
INTERFACE TYPES

The parallel interface for the M-84PRO printer 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 severely compromised.

In order to provide flexibility in communicating with a variety of host computer systems all the 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 are a high speed (to 57.6K bps) serial interface, an Ethernet interface or an optional Universal Serial Bus (USB) interface.

The Parallel interface will probably be the most useful in communicating with IBM PCs and compatibles. The RS-232C 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. The interfaces available are a high speed (to 57.6K bps) serial interface, an Ethernet interface or an optional Universal Serial Bus (USB) interface.

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.



THE RECEIVE BUFFER

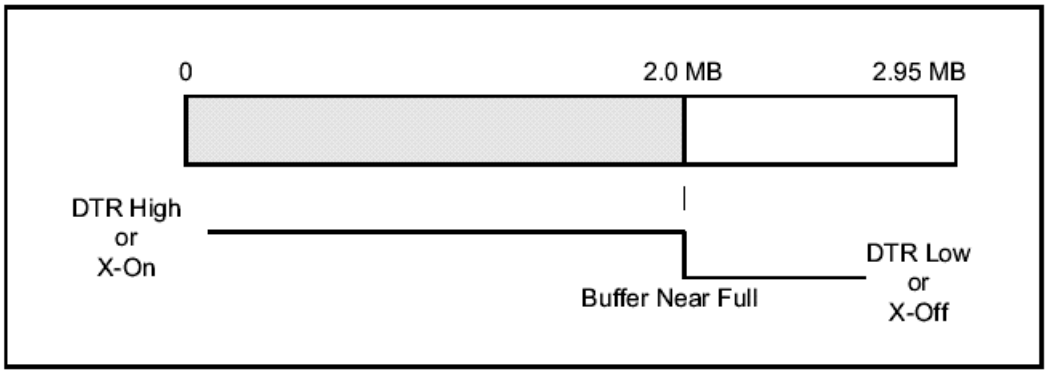
The M-84PRO printers have the ability to receive a data stream from the host in one of two ways. The receive buffer may be configured to accept one print job at a time or multiple print jobs. The single job print buffer is generally used by software programs that wish to maintain control of the job print 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

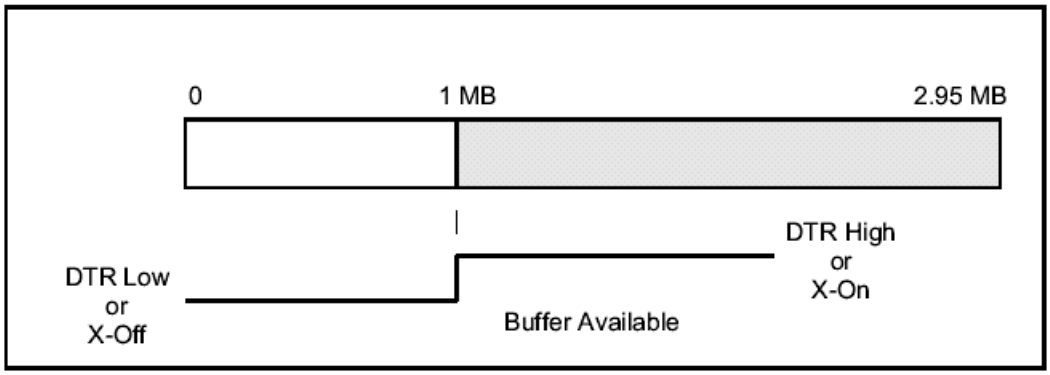
The printer receives and prints one job at a time. Each job must not exceed 2.95 MB.

MULTI JOB BUFFER

The printer is able to continuously receive print jobs, 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 RS-232C Serial interface, the Multi 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" (or an 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" (or 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.

ELECTRICAL 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

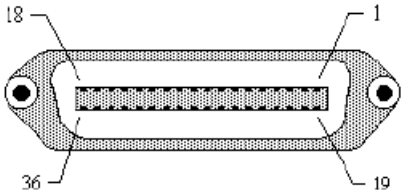
DATA STREAMS

<ESC>A . . Job#1 . . <ESC>Z<ESC>A . . Job#n . . <ESC>Z

IEEE1284 Parallel Interface Pin Assignments

PIN	SIGNAL	DIRECTION	PIN	SIGNAL	DIRECTION
1	$\overline{\text{STROBE}}$	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	$\overline{\text{ACK}}$	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	$\overline{\text{INIT}}$	From Host
14	$\overline{\text{AUTOFD}}$ (1)	To Host	32	$\overline{\text{FAULT}}$	To Host
15	Not Used		33	Not Used	
16	Logic Gnd		34	Not Used	
17	FG	Frame Ground	35	Not Used	
18	+5V (Z=24K ohm)	To Host	36	$\overline{\text{SELECTIN}}$ (1)	From Host

(1) Signals required for IEEE1284 mode.



RS-232 SERIAL INTERFACE

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

GENERAL 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)

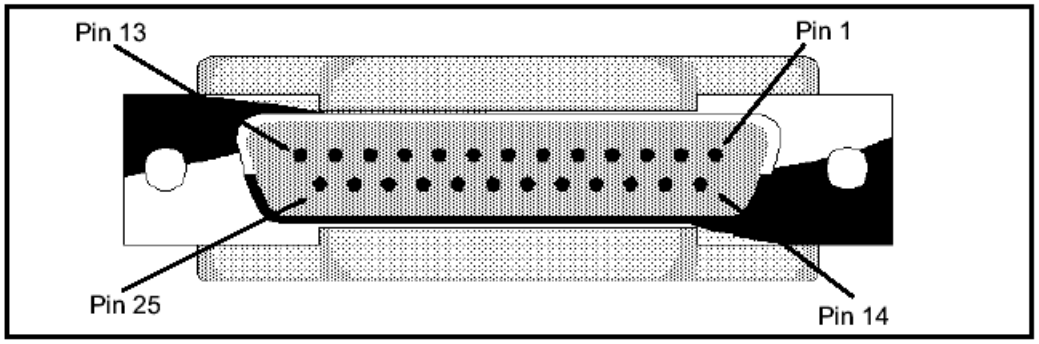
ELECTRICAL SPECIFICATIONS

Connector DB-25S (Female)

Cable
DB-25P (Male), 50 ft. maximum length.
For cable configuration, refer to Cable Requirements appropriate to the RS-232C protocol chosen.

Signal Levels
High = +5V to +12V
Low = -5V to -12V

PIN ASSIGNMENTS



RS232C 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)
20	To Host	DTR (Data Terminal 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 (pin 5) 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 RS-232C 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

Example: <ESC>A . . Job#1 . . <ESC>Z

NOTE: All characters are in ASCII.

UNIVERSAL SERIAL BUS (USB) INTERFACE

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.

GENERAL SPECIFICATIONS

Connector:	USB Type B Plug
Cable:	10 ft (3 m) max
Host:	Windows 98 or above with USB Port

ELECTRICAL SPECIFICATIONS

Power Supply:	BUS Power through cable
Power Consumption:	+5V@80ma

LOCAL AREA NETWORK (LAN) OPTIONAL INTERFACE

A Local Area Network (LAN) 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. 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.

GENERAL SPECIFICATIONS

Cable:	10/100BaseT Category 5
Connector:	RJ-45 Receptacle

ELECTRICAL SPECIFICATIONS

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 RS-232C 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 Multi 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>

ID - This 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 zeros.

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 RS-232C 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 RS-232 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.

SECTION 7.
OPTIONAL ACCESSORIES

This section contains instructions for using the following features:

- PCMCIA Memory Cards
- Plug-In Interface Modules
- Cutter
- Dispenser
- Label Rewinder
- Real Time Clock
- Flash Memory Expansion

PCMCIA MEMORY CARDS

DESCRIPTION

The Memory Card Option provides the connectors and interface board for one PCMCIA memory cards slots. The printer memory can be expanded up to 16MB.

Type	SRAM or Flash-ROM
Applicable Specifications	PCMCIA Version 2.1 (JEIDA Version 4.1)
Size	Up to 4 MB SRAM or 16MB Flash ROM
Connector Pins	68
Battery	Two years for SRAM type (approximately)
Write Protect	Yes
Low Battery Detect	Yes (SRAM only)

INSTALLATION

Instructions for installing the Memory Card Option are included with the installation kit.

ERROR HANDLING

Memory Card error conditions are indicated to the operator using a combination of the LCD panel, the ERROR LED on the front panel and the audible indicator.

ERROR DESCRIPTION	INDICATION	REMEDY
Low Battery - Low battery condition is detected when printer is powered on.	ERROR LED: Blinking Audible Beep: 1 long Display: Card Low Battery	Depress LINE key to print Card Status. Replace Memory Card battery. Note that all data will be lost when the battery is removed.
Card R/W Error 1 No card is inserted. 2 Card is write protected. 3 Invalid store/recall number. 4 Card has not been initialized.	ERROR LED: On Audible Beep: 1 long Display: Card R/W Error Printer must be powered off to reset.	1 Insert card into selected slot. 2 Remove write protect tab. 3 Correct program 4 Initialize card with BJF command.
Warning 1 Duplicate number. 2 Data not in print area. 3 Data overflows card memory.	Audible Beep: 1 short Display: None Printer will ignore invalid commands.	1 Correct program. 2 Correct program. 3 Use card with more capacity.

PLUG-IN INTERFACE MODULES

The Series “e” and PRO printers have user changeable Plug-In Interface Modules. The Interface Module is accessible from the Rear Panel and is retained by two screws. Use the following procedure to replace an interface module.

1. Turn power off both the printer and the host and remove the power and interface cables.

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 and is not covered by warranty.

2. Remove the two Interface Module Retaining Screws.
3. Grasp the Interface Module and pull it out of the connector.
4. Place the new Interface Module in the slot and press inward firmly until it is properly seated.
5. Replace the two Interface Card Retaining Screws.
6. If the new Interface Module is for a serial interface, set DSW1 for the proper operation.
7. Connect the interface cable to the connector

CUTTER

The label cutter consists of an internal mechanism that will cut labels or tags as they exit from the printer. The cutter can be used to print labels of various lengths using continuous form label/tag stock or to easily separate labels when there is no perforation at the label gap.

OPERATOR SETUP

The following steps should be taken to set up the label cutter.

1. Install the label cutter, following the instructions provided with the unit.
2. Power the printer ON.
3. The printer must be configured to use the Label Cutter option. Switches DSW3-1 and DSW3-2 on the front panel are used to configure the printer. To enable the cutter, DSW3-1 should be in the ON position and DSW3-2 should be in the OFF position.
4. Open the Print Head Assembly and feed the edge of the labels/tags into the cutter assembly and out between the label cutters.

NOTE: Although the cutting blade is fairly well protected, be careful as you feed labels into the cutter area. You may want to have the printer powered OFF at this point.

5. Close the Print Head Assembly and place the printer on-line.
6. The Label Cutter is ready for use.
7. Adjust the cut position using the backfeed adjustment procedures outlined in *Section 2. Installation.*

GENERAL OPERATION

The data stream to be sent to the printer may need to be altered to add the Cutter Command. If this command is not used, the cutter will default to cut after every label assuming it has been enabled in the printer configuration. For more details, see the *"e" and PRO Printer Programming Reference*. As the labels are printed, they will be cut based on the data supplied using the cutter command.

LABEL DISPENSE OPTION

The M-84PRO Label Dispense Option is an external mechanism that provides the ability to print labels in the “demand” mode. It is attached to front of the printer. When the label dispenser is installed and configured for operation, the printer dispenses one label at a time, peeling the backing from the label, which allows for immediate application to the product by the operator.

OPERATOR SETUP

The following steps should be taken to set up the Label Dispense Option.

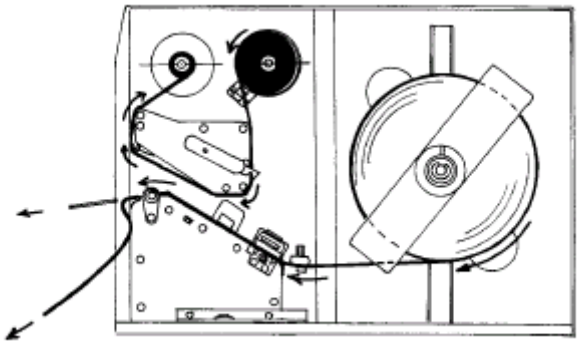
1. Install the option using the instructions provided with the unit. The installation time is approximately 30 minutes.
2. Power the printer ON.
3. The printer must be configured to used the label dispenser option. Switches DSW3-1 and DSW3-2 on the front panel are used to configure the printer. To enable the dispenser, both DSW3-1 and DSW3-2 should be in the ON position.
4. Remove enough labels from the backing paper to provide 12 inches of backing free from labels.
5. Open the Print Head assembly and feed the backing paper through the print area in the normal manner.
6. At the label exit area, feed the backing paper down and behind the Knurled Roller, then back down and around the Backing Roller.
7. Close the Print Head and place the printer on-line.
8. The Label Dispense Option is ready for use.

GENERAL OPERATION

Send your data stream in the normal manner to the printer. Labels should print one at a time, even if your print quantity command requests more than one label. As the labels are printed and presented for the operator to remove, the backing paper will be rewound on the spindle. The next label will only print after removing the current label from the label exit path.

Note: The label dispenser will function only if it has been enabled using the front panel switches (DSW3-1 and DSW3-2 in the ON positions).

The Label Taken Sensor is adjusted at the factory for the optimal setting for most label material. However, the use of labels with a substantially different opacity may require that the threshold be adjusted.



LABEL REWINDER

The rewinder is an external unit that allows for labels and tags to be rewound in rolls up to 8.5 inches in diameter. It derives its power directly from the printer's EXT connector using a built-in cable. The rewinder provides the ability to rewind tags/labels from the printer and subsequently be unwound for later use with applicators.

INSTALLATION

1. Position the **Rewinder** at the front of the printer and align it with the label slot. (The Rewind Wheel/ Spindle should be positioned away from the printer.)
2. Connect the built-in cable from the Rewinder to the EXT connector at the rear of the printer.
3. On the Rewinder, remove the metal clamp from the Rewind Spindle.
4. Feed the lead end of the label stock under the first spindle and onto the Rewind Spindle. Feed the stock around the spindle once, then replace the metal clamp over the label stock. Wind another revolution to ensure the labels are secure on the spindle.
5. Select the REWIND option on the rewinder, then set the power switch to ON. (The printer must be powered ON for the rewinder to function.)

REMOVING AND UNWINDING THE ROLL

As labels are printed, tension from the rewinder should keep the label stock taut as it wraps itself on the spindle.

To remove the roll from the spindle, first set the power switch to OFF. Remove the metal clamp, then remove the rewound roll of labels.

To unwind for using with an applicator, first set the power switch OFF. Attach the lead edge of the labels from the rewind spindle to the applicator entry point. Select the WIND option on the rewinder, and when ready to begin, set the power switch to ON.

REAL TIME CLOCK

The Real Time Clock Option 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 EPROM on the main PCB assembly. A qualified technician should perform the upgrade as it requires modifications to the main PCB assembly. Please call SATO Technical Support if you need to add this option to an existing printer in the field.

FLASH MEMORY EXPANSION

The flash memory of this printer can be expanded by installing a 4MB Flash ROM PCB to the main circuit board.