



# Fastmark 400 Series Barcode Label Printer

## User's Guide

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## **IMPORTANT SAFETY INSTRUCTIONS AND OTHER NOTICES**

- This label printer complies with the requirements in Part 15 of FCC rules for a Class B or A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception, requiring the operator to take whatever steps are necessary to correct the interference.
- Place the printer on a flat, firm and solid surface.
- Do not place the printer near a heat source or near water.
- Refer to the specification label on the bottom of this printer and ensure that your power source exactly meets these requirements.
- Do not open the printer during operation to avoid electrical shock.
- Do not attempt to disassemble this printer if it malfunctions.
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## CONVENTIONS

Some of the procedures in this guide contain special notices that highlight important information:

**Note** Indicate information that you should know to help your printer run properly and efficiently.

**Caution** Indicate guidelines that, if not followed, can cause damage to equipment.

**Warning** Indicate a situation where there may be a danger to you.

The use of the term's *right* and *left* assume that you are looking at the front of the printer.

## TECHNICAL SUPPORT

Please contact your local dealer first for technical support. Your dealer is knowledgeable about driver installation, application software and general printer operation. If you still need factory technical support after contacting your dealer, you may mail any problems through the E-mail account, “[www.amtdatasouth.com](mailto:www.amtdatasouth.com)”. You can also get the most updated driver or application from the web site “<http://www.amtdatasouth.com>”.

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First Edition: April 2001

# Table of Contents

<b>PRODUCT DESCRIPTION .....</b>	<b>6</b>
<b>Unpacking and Inspection.....</b>	<b>8</b>
<b>INSTALLATION AND CONFIGURATION .....</b>	<b>9</b>
Finding a Location for the Printer.....	9
Connecting the Power Cord .....	10
Connecting the Printer to Your Host.....	11
Loading the Ribbon.....	12
Loading Media .....	15
Loading Media when Peel and Present Option is Installed .....	18
Loading Media When Cutter is Equipped.....	19
<b>OPERATING INSTRUCTIONS.....</b>	<b>20</b>
Switch, Indicators and Connections.....	20
Label Sensor Calibration Procedure .....	21
Printer's Internal Self Test Procedure and Configuration Report .....	22
Resetting the Printer to Factory Default Settings .....	25
Entering into HEX Print mode.....	25
<b>COMMAND QUICK REFERENCE .....</b>	<b>26</b>
Command Set for the PPLA.....	26
Command Set for the PPLB.....	33
<b>PRINTER DRIVER.....</b>	<b>36</b>
Driver Installation .....	36
How to Use the Driver .....	38
<b>TROUBLESHOOTING AND MAINTENANCE .....</b>	<b>43</b>
Troubleshooting .....	43
Recovery .....	45
Preventive Maintenance.....	46
<b>Appendix A: Printer Specifications.....</b>	<b>49</b>
Fonts, Bar Codes and Graphics.....	50
Optional Accessories.....	51
<b>Appendix B: INTERFACE SPECIFICATIONS .....</b>	<b>52</b>
Introduction.....	52
Serial .....	52
Parallel (Centronics) .....	54
Auto Polling.....	54
<b>Appendix C: ASCII TABLE.....</b>	<b>55</b>
<b>Appendix D: FONTS AND BAR CODES FOR THE PPLA Emulation.....</b>	<b>56</b>

Internal Fonts .....	56
Courier Font Set .....	61
Internal Bar Codes .....	65
<b>Appendix E: FONTS AND BAR CODES FOR PPLB Emulation .....</b>	<b>69</b>
Internal Fonts .....	69
Symbol Set .....	70
Internal Bar Codes .....	73

# Table of Figures

Figure 1 - Fastmark 400 series.....	7
Figure 2 - Included Materials .....	8
Figure 3 - Switches, Indicators and Connections .....	9
Figure 4 - Power Connection.....	10
Figure 5 - Printer to Host.....	11
Figure 6 - Printhead Latches.....	12
Figure 7 - Ribbon Core Notch Location.....	13
Figure 8 - Ribbon Loading .....	14
Figure 9 - Open Printhead Module .....	15
Figure 10 - Media Spindle and Retainer Disk .....	16
Figure 11 - Loading Media .....	16
Figure 12 - Loading Media - Peal and Present .....	18
Figure 13 - Loading Media - Cutter.....	19
Figure 14 - Switches and Indicators .....	20
Figure 15 - Self Test Sample - PPLA Emulation.....	23
Figure 16 - Self Test Sample - PPLB Emulation.....	24
Figure 17 - Printhead Location .....	46
Figure 18 - Platen Roller .....	47
Figure 19 - Paper Compartment and Paper Sensor.....	48

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# PRODUCT DESCRIPTION

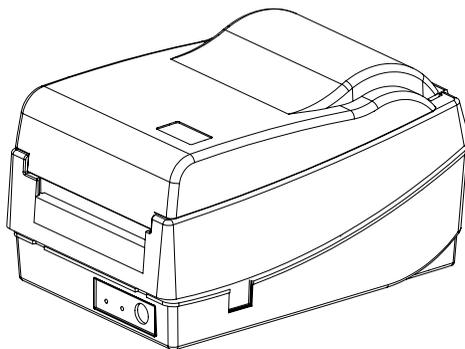
This label printer is a high-performance, low-cost direct thermal/thermal transfer labeling system. Its user-friendly design and affordable price set a new standard for the Desktop Label Printer in retail, office, industrial, and many other applications.

The printer is designed with the most efficient memory management technology - *True Speed* and prints at a speed of 2 to 3 inches per second. When bundled with its smart printer driver, the user can easily print out bar codes, texts and graphics from any editing application (e.g. CodeSoft, BarTender) under Windows 95/98/2000 and NT. All popular bar codes and fonts are resident in the printer memory to handle versatile applications.

The solidly designed mechanism allows quick and easy media (paper) and ribbon loading. The optional Peel and Present and Cutter provide the alternatives of fan-fold label and continuous paper handling.

This printer is a compact, highly integrated, high performance and high resolution on-site labeling system.

The User's Guide will help you understand basic operations of the printer such as set-up, installation, configuration and maintenance. Before reading the manual you should first identify your printer model. To determine the model and serial number of your printer, look at the label located on the bottom of the printer.



**Figure 1 - Fastmark 400 series**

# UNPACKING and INSPECTION

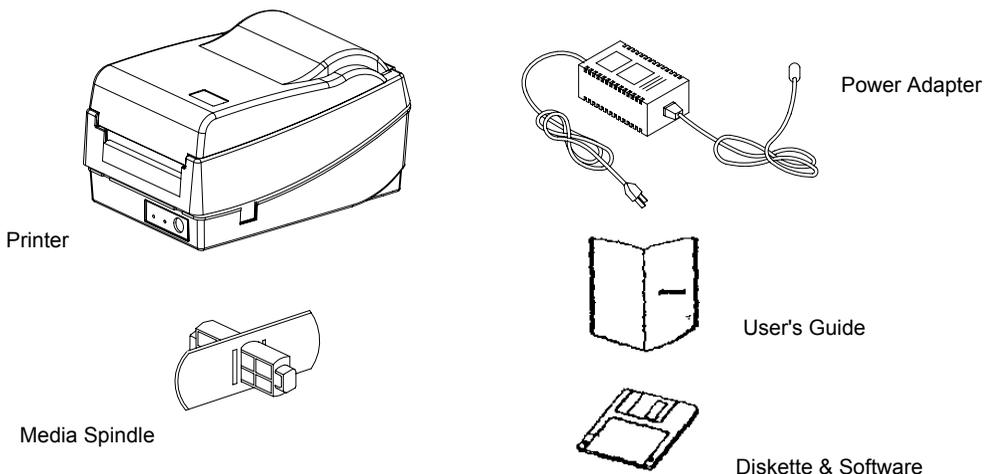
This printer is packed in a heavyweight carton and custom recyclable foam for environmental protection. Inspect the shipping carton and contact the carrier directly to report any suspected damage.

Consider the following when unpacking:

- ◆ The container should stay right side up.
- ◆ Lift the printer out of the box carefully.
- ◆ Remove the accessory items.
- ◆ Set the printer on a solid, flat surface.
- ◆ Inspect the shipping container and printer for any damage that may have occurred during shipping.

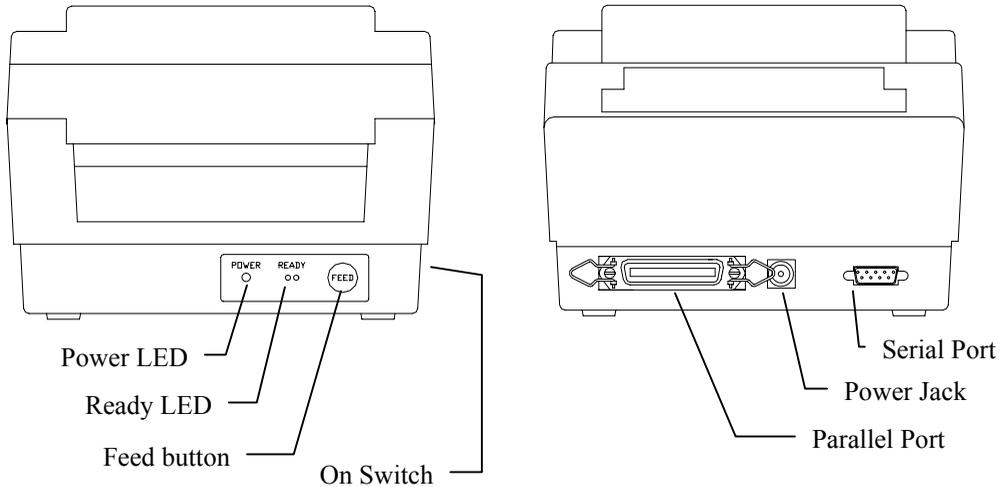
Verify that you have the following materials when unpacking:

- a. Printer
- b. User's Guide
- c. Media spindle (with retainer disk)
- d. Power adapter (AC to AC)
- e. Driver diskette for Windows 95/98/NT/2000
- f. Label Design Software.
- g. Sample Media
- h. Sample Ribbon (Thermal Transfer printers only)



**Figure 2 - Included Materials**

# INSTALLATION AND CONFIGURATION



**Figure 3 - Switches, Indicators and Connections**

## Finding a Location for the Printer

Before setting up the printer you should first consider the following:

- ◆ Find a solid flat surface with adequate room for the printer. Make sure there is enough room on the top side for the media and ribbon access.
- ◆ The location should be near the host or terminal. Consider the distance between host and printer for the communication cable (serial or parallel cable)
- ◆ The power adapter should be connected to a properly grounded and isolated electrical outlet.
- ◆ Away from direct sun, extreme temperatures, humidity dust and debris.

## Connecting the Power Cord

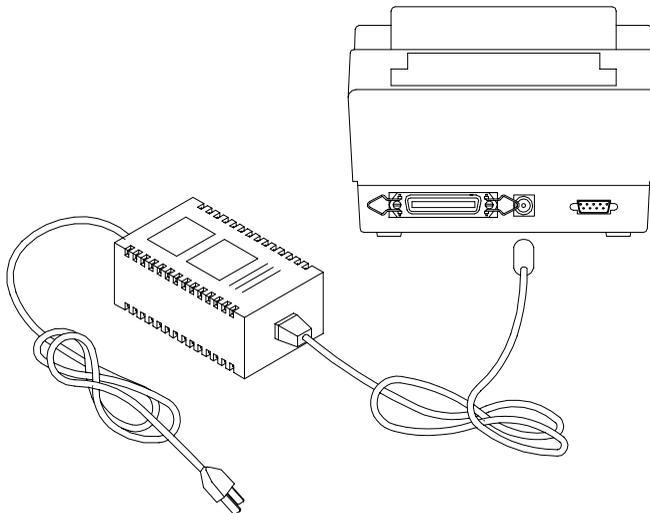
1. Make sure that the source voltage matches that on the input voltage on the power adapter.

**Caution:** Incorrect voltage could cause damage to the printer and/or the power adapter.

2. Make sure that the power switch is set to the Off, "O", position.
3. Connect the power supply plug to the power jack on the printer.

*Note:* When plugging into the power jack, make sure that you avoid the 36 pin parallel connector.

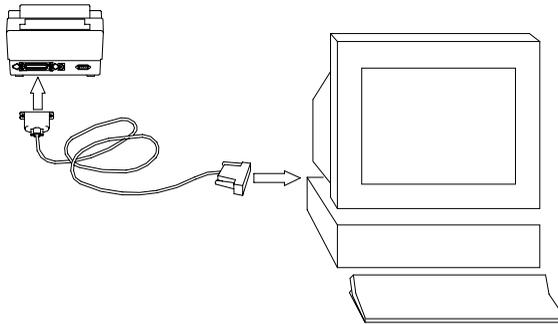
4. Connect the other end of the power adapter to your AC source.



**Figure 4 - Power Connection**

## Connecting the Printer to Your Host

1. You can connect the printer with any standard Centronics Parallel cable to the parallel port of the host computer.
2. Alternatively you can connect the printer with a serial cable to the RS-232C port of your computer or terminal. (For PC compatibles, the RS-232C port is COM1, COM2 or COM3.)



**Figure 5 - Printer to Host**

3. If you use the serial port with your own cable, refer to the Appendix A and check the pin connection. Be sure that the speed (baud rate) and protocol are consistent between printer and host.

**Caution:** Pin 9 on the serial port is directly connected to +5volts DC. It is suggested that this pin is not connected in your cable, unless required.

The factory default parameters of serial port are:

Speed (baud rate)	9600
Data format	1 start bit, 8 data bits and 1 stop bit.
Parity	None
Handshaking (Flow control)	XON/XOFF as well as RTS/CTS

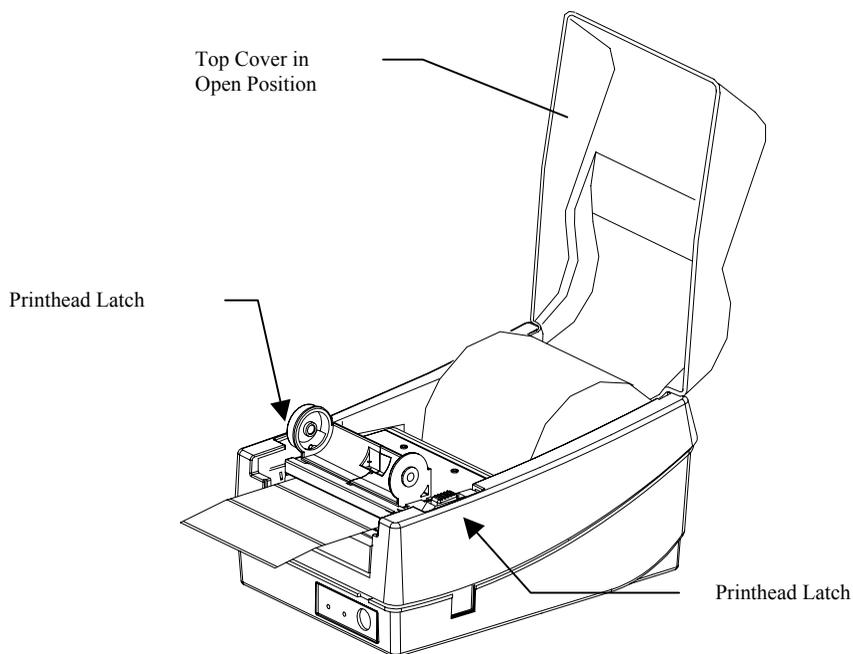
*Note: It is not necessary to set a switch or send a command for the parallel and serial port selection. The printer automatically detects the active port.*

*Print a SELF-TEST to review serial settings.*

## Loading the Ribbon

*Thermal Transfer Media only*

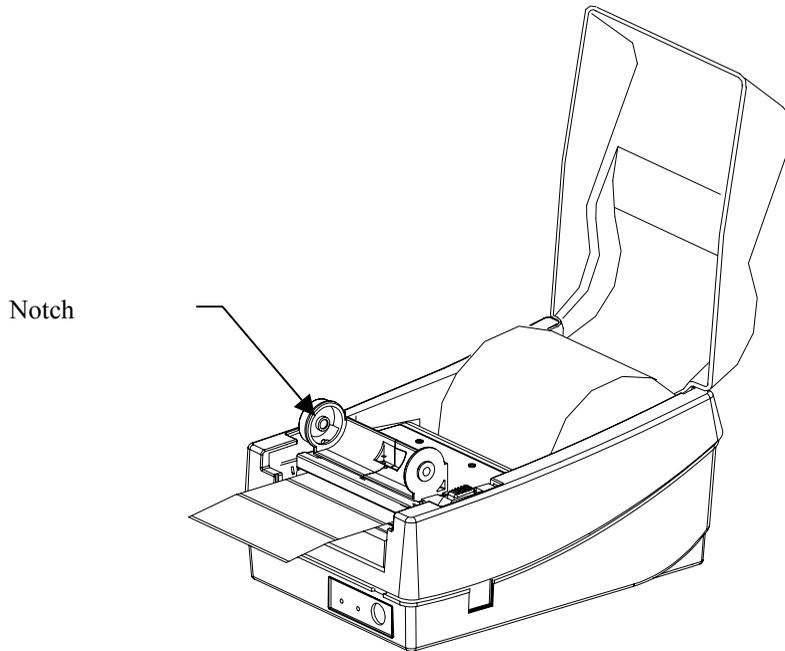
1. Lift the printer top cover and to the open position.
2. Slide the two printhead latches toward the back of the printer to unlock the printhead module.



**Figure 6 - Printhead Latches**

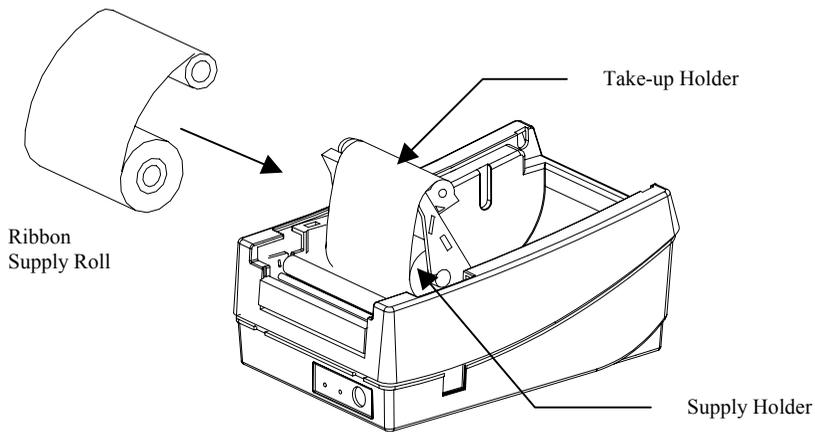
3. Raise the printhead module to the vertical position.
4. Verify that the Supply Core and the Take-up Core have two slots on the left side of the ribbon core when the ribbon is positioned to go into the printer. These notches will be inserted into the notches on the Left Ribbon Holders.

*Note: The notches are the drive mechanism for the ribbon. If the slots in the core are not present or if they are in the wrong position, contact your ribbon supplier to obtain a correct ribbon.*



**Figure 7 - Ribbon Core Notch Location**

5. Unwrap the ribbon roll and place the supply roll into the supply holder of the printhead module.  
Insert the left end of the ribbon supply onto the supply holder spindle first, and then insert the right end. Make sure that the Ribbon Core Slots match the notches on the Ribbon Drive Mechanism.
6. Place the Take-up core into the take-up holder of the printhead module.  
First insert the left end of the Take-up core into holder spindle, and then insert the other end. Make sure that the Ribbon Core Slots match the notches on the Ribbon Drive Mechanism.



**Figure 8 - Ribbon Loading**

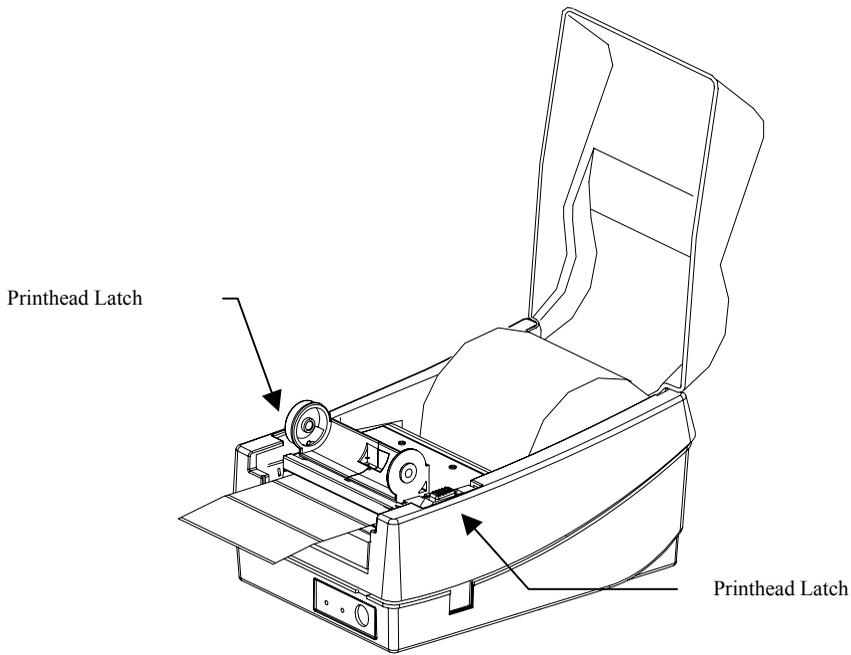
7. Manually rotate the Take-up core until the transfer (typically Black) portion of the ribbon, from the Supply Holder starts onto the Take-up core.
8. Close and latch the Printhead module.

*Note: The printer must be set to the Thermal Transfer mode to ensure the end of ribbon is detected. This setting may be made using the Windows drivers, Utility Software, or sending the appropriate printer commands via the host.*

## Loading Media

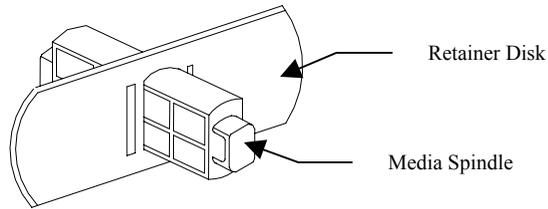
1. Lift the printer top cover to the open position.
2. Slide the two printhead latches toward the back and unlock the printhead module.

**Figure 9 - Open Printhead Module**



3. Raise the printhead module.

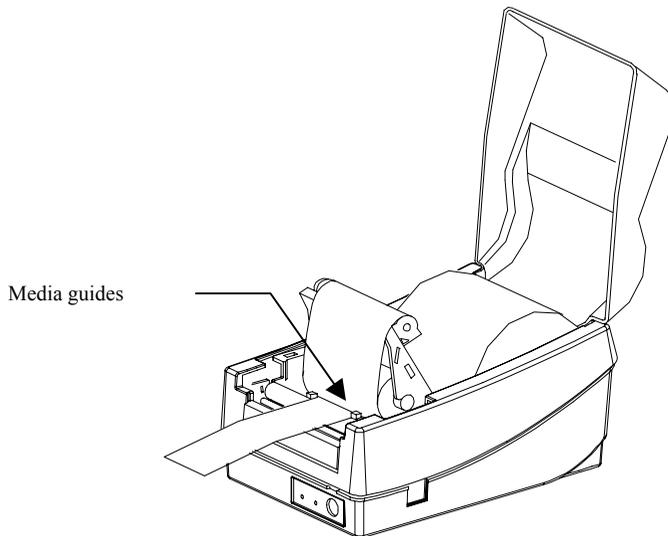
4. Insert the media spindle into core of the label media (the Retainer Disk should be on the right).



**Figure 10 - Media Spindle and Retainer Disk**

5. Insert the spindle and media into the slots in the printer. The media should feed from the top of the roll.
6. Slide the media to the far left and slide in the guide until it is snug with the media.
7. Move the Right Media guide to the far right of the printer. The Right and Left Media Guides are located under the printhead module.

*Note: The Right and Left Media Guides are 'U' shaped parts and are located at the bottom of the paper path. Only the right media guide can be moved. The media should be snugly positioned in the 'U' portion of the guides.*



**Figure 11 - Loading Media**

8. Pull out 6 inches of media and thread the end of the media between the Right and Left Media Guides.
9. Slide in the Right Media Guide until it is snug with the media.

*Note: If the guides are positioned incorrectly, the media sensor may not sense the form properly.*

*If too loose the media may slide out from under them, uncover the paper out sensor and indicate a false paper out message.*

*If too tight so that the media may buckle and a paper jam could occur.*

10. Thread the media over the roller until approximately 2 inches of the media shows out of the printer. (MAKE SURE THAT THE LABELS ARE FACING UP.)
11. Press the printhead module down firmly until it snaps into place.
12. Close the top cover.
13. Turn on the printer.
14. If you are using die-cut media, press the "FEED" button to advance the first label into the standby position.

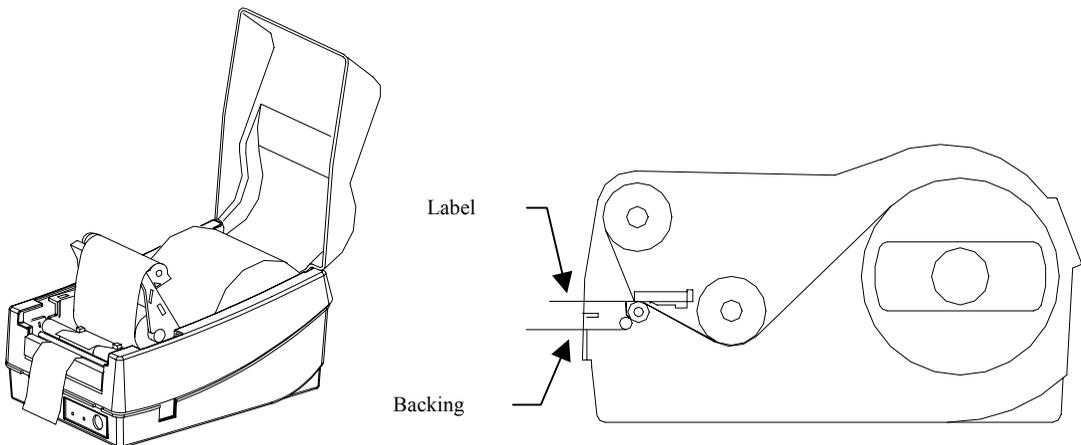
*Note: If the labels do not feed correctly, run the Label Sensor Calibration test (see the section on Label Sensor Calibration).*

*Note: The first time media is loaded, the label sensor must be calibrated. After this initial calibration, further calibration is not needed unless the media length, media changes or irregular feeding occurs. See Label Sensor Calibration for instructions on how to calibrate the Label sensor.*

## Loading Media when Peel and Present Option is Installed

1. Follow the same procedures in "**Loading Media**" up to closing of the Printhead Module.
2. Peel off 6 inches of labels from its backing.
3. Thread the label backing over the platen roller, over the Peel and Present Bar then back under the Peel and Present Bar towards the platen.
4. Turn on the power to "1" position.
5. With the Printhead module still open, press "FEED" button. The printer will advance the backing. Once the label backing comes out of the front of the printer, turn off the power to "O" position.
6. Pull down the printhead module down and latch it closed.
7. Close the top cover.
8. Turn on the power to "1" position.
9. Press the Feed key to feed up to the first label in the printer.

*Note: The printer must be configured for Peel and Present Mode. This setting may be made in the windows driver, utility software, label design software or using printer commands from the host.*

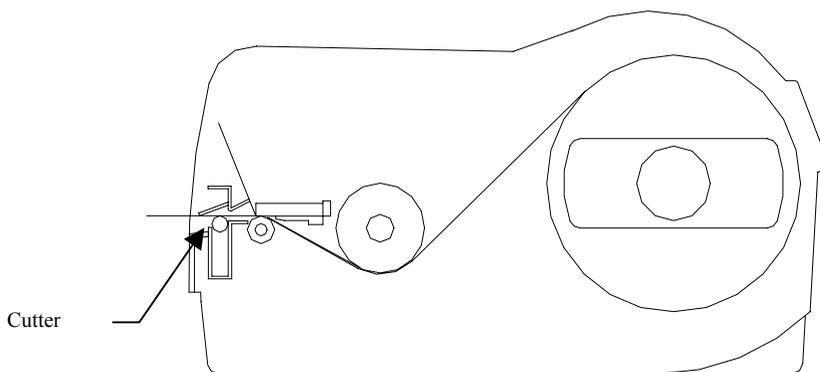


**Figure 12 - Loading Media - Peel and Present**

## Loading Media When Cutter is Equipped

1. Follow the same procedure as “**Loading Media**”.
2. After you thread the media over the platen roller, thread the media through the horizontal gap at the cutter module.

*Note: The printer must be configured for Peel and Present Mode. This setting may be made in the windows driver, utility software, label design software or using printer commands from the host.*



**Figure 13 - Loading Media - Cutter**

**Caution:** *When removing a label from a printer with the Cutter option make sure that the cutter is not rotating before removing the label or when manually opening the printer.*

# OPERATING INSTRUCTIONS

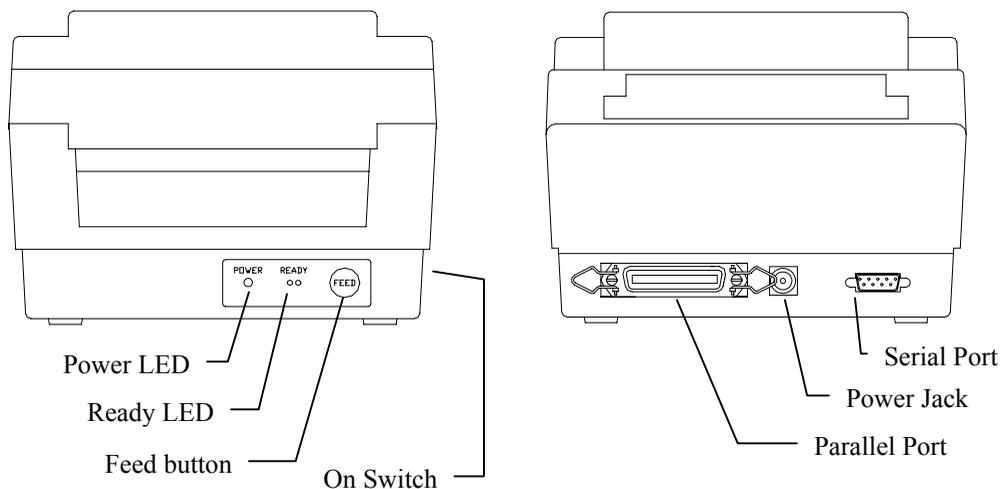


Figure 14 - Switches and Indicators

## Switch, Indicators and Connections

Device name	Function	Usage
On/Off switch (power switch)	Controls printer power	On – normal operation Off – loading paper and ribbon
<b>FEED</b> button	Advances the media stock to first printing position of next label	Press once to advance a label. Press and Hold while powering on to run Label Sensor Calibration test. Continue to press and hold to print out the self-test pattern and enter into Hex mode. Press to continue, when READY LED is blinking.
<b>READY</b> indicator	Shows the printer status	Green – printer is ready to operate Blinking – printer is paused; press “FEED” button to continue operation
<b>POWER</b> indicator	Shows the power and error status	Off – printer power off Green – printer power on Blinking – error has occurred
Power jack	Connected to power adapter	Connected with power supply transformer plug
RS-232 serial port	Communication	Connected to host (RS-232 COM port), terminal or KDU
Parallel port	Communication	Connected to host (Centronics )
Top cover	Protects the printer media and ribbon	Lift and reach the media/ribbon compartment

## Label Sensor Calibration Procedure

The Label Sensor Calibration procedure allows the printer to calibrate the Label Sensor to the media type and length being used. The Label Sensor in this procedure looks at the back of the media sensing for:

Black Bar Media  
Gap Media  
Or, Continuous Feed Media

1. Power the printer on while pressing the Feed button on the front panel.
2. When the feed motor begins moving, release the “FEED” button.
3. The printer will feed approximately 12 inches of blank media.
4. Once the printer has stopped feeding the user can, open the printhead module and manually reverse feed the media back to the first label.
5. Press the Feed button again to align the media to the top of the next label.

### **Notes:**

*These steps are very important and must always be carried out after the first installation and each time the media type (color, size, backing, etc) is changed. Failure to run the Label Sensor Calibration test may result in the label registration errors and label-empty detection being incorrect.*

## Printer's Internal Self Test Procedure and Configuration Report

1. Make sure that media is installed.
2. Press and hold down the Feed Button while powering on the printer.
3. The printer will begin the Label Sensor Calibration test.
4. Continue to hold the Feed button until the Self Test begins.
5. After feeding 12 inches of blank media, the printer will begin printing out the current configuration and font list.
6. The printer will print the following information on the installed media:
  - Firmware version,
  - ROM checksum,
  - RS-232 settings,
  - Thermal transfer/Direct thermal settings,
  - Hardware configuration and,
  - Font types.
7. If the installed emulation is PPLB emulation, the printer will enter character Hex Print Mode.
8. To exit the Hex mode, press the Feed button again.

The following pages are examples of the printer's Self Test mode. The samples that you print may be different. Before requesting service, if possible, please have this page ready.

## Self Test Pattern for PPLA

ASD Smooth font (18 points) - 01234

ASD Smooth font (14 points) - 0123456789 ABC

ASD Smooth font (12 points) - 0123456789 ABCabcXy

ASD Smooth font (10 points) - 0123456789 ABCabcXyz

ASD Smooth font (8 points) - 0123456789 ABCabcXyz

ASD Smooth font (6 points) - 0123456789 ABCabcXyz

ASD Smooth font (4 points) - 0123456789 ABCabcXyz

0123456789

This is internal font 7. 0CR-A ABCabc

**THIS IS FONT 6.**

THIS IS INTERNAL FONT 5. 0123456789

THIS IS INTERNAL FONT 4. 0123456789

THIS IS INTERNAL FONT 3. 0123456789 ABCXYZ

This is internal font 2. 0123456789 ABCabcXyz

This is internal font 1. 0123456789 ABCabcXyz

This is internal font 0. 0123456789 ABCabcXyz

CHECKSUM : 0000 0000

RS232 : 8. N. 1P. 9600

NO. OF DL SOFT FONTS : 0

DIRECT THERMAL STD CTRL CODES

AVAILABLE RAM : 355712 BYTES

EXPANSION RAM : 0 BYTES

STANDARD RAM : 524288 BYTES USASCII

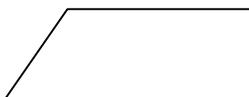
Label Printer with Firmware PPLA S3A0-1.35 001198 0113

Emulation  
designation

**Figure 15 - Self Test Sample - PPLA Emulation**

## Self Test Pattern for PPLB

Emulation  
designation



Label Printer with Firmware PPLB S3B0-1.02 09  
STANDARD RAM: 524288 BYTES      8 bit data: Code Page 437  
EXPANSION RAM: 0 BYTES  
AVAILABLE RAM: 357184 BYTES  
THERMAL TRANSFER  
NO. OF DL SOFT FONTS : 0  
H. POSITION ADJUST.: 0000  
RS232: 8, N, 1P, 9600  
CHECKSUM: 0000 0200

This is internal font 1. 0123456789 ABCabcXyz

This is internal font 2. 0123456789 ABCabcXyz

This is internal font 3. 0123456789 ABCabcXyz

This is internal font 4. 0123456789 ABCXYZ

**THIS IS INTERNAL FONT 5**

**Figure 16 - Self Test Sample - PPLB Emulation**

## Resetting the Printer to Factory Default Settings

Resetting the printer back to Factory settings will set the printers non-volatile memory back to a known condition. To reset the printer to its factory defaults:

1. Printer must be powered On.
2. Press and hold the “FEED” button for about 10 seconds.
3. The “READY” LED will turn off.
4. Release the “FEED” button.
5. The Power LED will then turn off for about 2 seconds after that.
6. When both LED’s turn on again, the printer is reset to the factory default condition.

*Note: All settings are stored in non-volatile memory and will not be erased even by turning the printer off. After a reset, send to the printer the appropriate commands to re-configure the printer's software to the appropriate installed options, and run the **Label Sensor Calibration** test.*

## Entering into HEX Print mode

Hex Print mode is a valuable tool for solving programming print issues. It can be used to determine if the printer is receiving the correct information and if the printer is receiving any extra control codes.

*Note: Hex mode is only available when PPLB emulation is installed.*

1. Make sure that media is installed.
2. Power the printer on while pressing the button on the front panel.
3. The printer will begin the Label Sensor Calibration test.
4. Continue to hold the Feed key until the Self Test begins
5. After feeding 12 inches of blank media, the printer will begin printing out the current configuration and font list.
6. The printer will then enter into Hex Print mode.
7. To exit the Hex mode, press the Feed button again.

# COMMAND QUICK REFERENCE

This section lists all software commands of the printer.

## Command Set for the PPLA

### System Setting Commands

These commands will cause related parameters to be saved in the non-volatile memory. These parameters will be stored unless other commands or a front panel reset changes them.

Command	Description	Parameter	Factory default
<STX>KI4 <i>n</i>	Media empty check	<i>n</i> : 0 - disable, 1 - enable.	1
<STX>KI5 <i>nn</i>	Set gap length	<i>nn</i> : 01 to 10 (mm)	1
<STX>KI7 <i>n</i>	Set transfer type	<i>n</i> : 0 - direct thermal, 1 - thermal transfer.	1
<STX>KI8 <i>n</i>	Set baud rate	<i>n</i> : 0 - 9600, 1 - 2400, 2 - 2400, 3 - 19200, 4 - 4800, 5 - 38400, 6 - 2400, 7 - 9600 baud.	0
<STX>KI; <i>n</i>	Set standard control code. Set alternative control code.	<i>n</i> : 1 - <i>Standard control code</i> 2 - <i>alternate control code</i>	1
<STX>KI< <i>m</i>	Set symbol set for ASD smooth font set	<i>m</i> : 0 - USASCII, 1 - United Kingdom, 2 - Spanish, 3 - Swedish, 4 - French, 5 - German, 6 - Italian, 7 - Danish/Norwegian.	0

*Note: <STX>KI7*n* command is ignored by model FM402DT*

## Interaction Commands

These commands only apply to the serial port. They allow the host to request the status and configuration of the printer.

Command	Description	Response	Contents
<SOH>#	Reset	Y	<XOFF><XON>T
<SOH>A	Send a readable status string	Y	<8 bytes, Y/N> <CR> byte 1 : Y - printer busy byte 2 : Y - paper out byte 3 : Y - ribbon out byte 4 : N (always) byte 5 : Y - printing byte 6 : Y - printer paused byte 7 : Y - label presented byte 8 : N (always)
<SOH>B	Toggle pause condition	N	
<SOH>E	Send the number of labels to be printed	Y	0000<CR> no label left to be printed
<SOH>F	Send status byte	Y	<i>n</i> <CR> Same as <SOH>A, except bit 1 to 8 corresponding to byte 1 to 8 of <SOH>A.

Notes:

1. Control codes for the printer commands.

Symbol	Code (hexadecimal)
XON	11H
XOFF	13H
STX	02H
SOH	01H
ESC	1BH
LF	0AH
CR	0DH

2. There is no space code in the command.

## System Level Commands

Command	Description	Remarks
<STX>a	Enable page/job echo characters	
<STX>cxxxx	Set continuous paper length and disable edge sensor	
<STX>Dxxxxxxx	Memory dump**	xxxxxxx : memory address in HEX value
<STX>Exxxx	Set copy count for stored label	
<STX>e	Enable edge sensor	
<STX>F	Feed a page	
<STX>fxxx	Back feed from top position	
<STX>G	Print stored label	
<STX>I	Download graphics	either PCX, BMP, PCX or HEX format
<STX>J	Set pause for each label	
<STX>j	Cancel pause	
<STX>KQ	System configuration details	
<STX>L	Enter label formatting state	
<STX>Mxxxx	Set maximum label length	
<STX>m	Set measurement in metric	
<STX>n	Set measurement in inches	
<STX>Oxxxx	Set start of print position	
<STX>P	Enable data dump	
<STX>Q	Clear memory (fonts & graphics)	
<STX>r	Select reflective sensor	
<STX>Sn	Set feed rate for motor	n : 'A', 'B' or 'C'
<STX>T	Print test pattern	
<STX>Vn	Set Cutter or Peel and Present configuration	n : '1' - enable cutter, '4' - enable peel and Present
<STX>v	Printer version information	
<STX>Wn	Graphics/fonts/labels and memory status details	n : 'G', 'F' or 'L'. RS-232 port only
<STX>x	Release file from printer memory	

Note: \*\* Models FM402DT and FM402TT, the memory dump command only needs a 6-digit hexadecimal.

## Formatting Commands

Command	Description
:xxxx	Set cut amount
An	Set print mode n : '1' - exclusive, '2' - transparent
Cxxxx	Set horizontal offset
cxx	Set cut amount
Dwh	Set pixel width and height
E	Form feed and return to system level command mode
G	Store previous data to global register
<STX>Sn	Retrieve from global register. n : global register ID
Hxx	Set heating value, xx=01 to 20
M	Toggle the mirror mode
m	Set measurement in metric
n	Set measurement in inches
Pn	Set print speed. n='A', 'B', or 'C' **
Qxxxx	Set copy count
Rxxxx	Set vertical offset
r<n..n>	Retrieve label data from printer buffer. <n..n> : label name
sm<n..n>	Save label data to printer buffer. m : memory module, <n..n> : label name
Txx	Set end-of-line code, xx : hex value
z	Change slash zero to normal zero (0).
+xx	Make auto increment for numeric or alphanumeric,
>xx	xx : count
-xx	Make auto decrement for numeric or alphanumeric,
<xx	xx : count
^xx	Set count amount, xx : count

*Notes: The formatting and editing commands should be grouped together, lead by <STX>L and ended by E command.*

*\*\* : The parameter is ranged from 'A' to 'C' (1, 1.5 and 2 ips) for model FM403TT, while for models FM402DT and FM402TT it is from 'A' to 'D' (1.5, 2, 2.5 and 3 ips).*

## Editing Commands

Command	format	Description
General format	rthveeeyyyyxxx<string><CR>	See below
Print direction	r	'1', '2', '3' or '4' (rotation)
Object type	t	'0' to '9' and ':' (fonts) **, 'A' to 'Z' and 'a' to 'z' (bar codes), 'X' (lines or boxes), 'Y' (graphics). See Object Table below
Width multiplier	h	'1' to '9' and 'A' to 'O'. '0' stands for default.
Height multiplier	v	'1' to '9' and 'A' to 'O', '0' stands for default.
Bar code height	eee	This is ignored for box, line and graphics. It represents point size for font '9' and symbol set for Courier font.
Y coordinate	yyyy	
X coordinate	xxxx	
Data	<string>	Depends on object types

Note: \*\*The model FM403TT does not include Courier fonts.

## Object Table

The following table is used for the Object Type, 't', in the Editing Command Table.

<b>Object</b>	<b>String</b>	<b>Description</b>
L : line	Lwwwhhh	www : width, hhh : height.
L : line	Lwwwwhhhh	www : width, hhhh : height.
B : box	Baaabbbccddd	aaa : horizontal width bbb : vertical height ccc : thickness of top and bottom edges ddd : thickness of left and right bars
B : box	Baaaavvvccddd	aaaa : horizontal width vvv : vertical height ccc : thickness of top and bottom edges ddd : thickness of left and right bars
bar code (Range 'A' to 'Z' or 'a' to 'z')	bar code data	Bar codes (and human readable text) will be printed according to the selected bar code type ('A' to 'Z' or 'a' to 'z').
Text (Range '0' to '9')	text data	Text data will be printed according to the selected font ('0' to '9').
	Yfile name	'Y' and the file that was downloaded by <STX>I command.

## Font Downloading Commands

Such commands are only used for soft fonts with PCL format.

Command	Description
ESC *c###D	assign the soft fonts ID number (### : 100 ~ 999)
ESC )s###W	download font descriptor (### : length of font descriptor)
ESC *c###E	set character code (### : 1 ~ 255)
ESC (s###W	download character descriptor and image (### : length of character descriptor and image)

*Note: No spaces are after the escape character.*

## Command Set for the PPLB

All PPLB commands must end with <LF> or <CR>+<LF> codes. No spaces are allowed between parameters and leading command character.

Command	Description	Parameter
<i>Ax,y,rot,font,hm,vm,nr,string</i>	Print text.	<i>font</i> : 1to 5 for internal font and A to Z for soft font.
<i>Bx,y,rot,bar,nw,ww,v,hum,string</i>	Print Bar Code. <i>bar</i> : barcode selection	<i>nw</i> : width of narrow bar <i>ww</i> : width of wide bar <i>v</i> : bar code height <i>hum</i> : <b>B</b> for printing readable code and <b>N</b> for disabling.
<i>bx,y,type,[...]</i>	Print 2D Bar Code	<i>type</i> : M for Maxi code and P for PDF 417
<i>Ccn,dn,just,step,string</i>	Counter declaration	<i>cn</i> : counter index <i>dn</i> : digit number <i>just</i> : L,R,C and N for field justification <i>step</i> : step value
<i>Dp1</i>	Heat setting	<i>p1</i> : density, 0 to 15
EI	Print soft font names	
EK <i>string</i>	Delete soft font	<i>string</i> : soft font name or "*" to delete all soft fonts
ES <i>string</i> ,....	Download soft font	
FE	End form store	
FI	Print form names	
FK <i>string</i>	Delete form	<i>string</i> : form name or "*" to delete all forms
FS <i>string</i>	Execute form	<i>string</i> : form name
FS <i>string</i>	Save form	<i>string</i> : form name
GG <i>x,y,string</i>	Print graphics	<i>string</i> : graphic name
GI	Print graphic list	
GK <i>string</i>	Delete graphics	<i>string</i> : graphic name or "*" to delete all graphics
GM <i>string,size</i> <LF>...	Store graphics	<i>string</i> : graphic name <i>size</i> : graphic size in bytes

Command (Cont)	Description	Parameter
<i>lp1,p2,001</i>	Select symbol set**	<i>p1</i> : 7 or 8 data bits <i>p2</i> : symbol set
JB	Disable back feed**	
JF	Enable back feed**	
<i>LEx,y,hlen,vlen</i>	Line draw by exclusive	<i>hlen</i> : horizontal length <i>vlen</i> : vertical length
<i>LOx,y,hlen,vlen</i>	Line draw by OR	
<i>LWx,y,hlen,vlen</i>	Draw white line	
N	Clear frame buffer	
<i>O[,C][,N][,D]</i>	Select options**	
<i>Pp1[,p2]</i>	Print label	<i>p1</i> : label set number <i>p2</i> : copy number of each label
<i>PAp1[,p2]</i>	Print automatic	
<i>Qp1,p2[,p3]</i>	Set label and gap length**	<i>p1</i> : label length <i>p2</i> : gap length <i>p3</i> : offset length
<i>qw</i>	Set label width**	<i>w</i> : label width
<i>Rx,y</i>	Set origin point**	
<i>Sp1</i>	Set print speed	<i>p1</i> : speed value, 1 to 3
U	Print configuration	
UN	Disable Error Report	
US	Enable Error Report	
<i>Vvn,dn,just,string</i>	Define variable	<i>vn</i> : variable index <i>dn</i> : digit number <i>just</i> : L,R,C and N for field justification
<i>Xx,y,thick,ex,ey</i>	Draw box	<i>ex, ey</i> : end position <i>thick</i> : line thickness
<i>Ybaud</i>	Setup serial port**	<i>baud</i> : 38,19,96,48 or 24
ZT	Set print direction	ZS: print from top ZB: print from bottom
ZS	Enable/disable store-to-Flash**	power-on default is ZN(disabled)
ZN		
?	Download variables or counters	

<b>Command (Cont)</b>	<b>Description</b>	<b>Parameter</b>
d0, <i>euro</i>	Enable/disable European dollar mark**	0: disable European dollar mark. 1: enable
d1, <i>hadj</i>	Set horizontal position adjustment**	<i>hadj</i> : adjustment in dots.
d2, <i>hadj</i>	Same as d1 except the parameter is not saved to non-volatile memory.	

Notes:

1. *x* and *y* represents horizontal and vertical co-ordinate values.
2. *hm* and *vm* stand for horizontal and vertical multipliers.
3. *rot* is the rotation direction, its value is from 0 to 3.
4. *nr* is either N for normal printing or R for reverse printing.
5. string is bracket by double quote marks, e.g. "text".
6. \*\* Commands will cause the printer to save the parameters to non-volatile memory.
7. ZS takes effect only if flash memory board is installed.

# PRINTER DRIVER

The bundled printer driver is used for applications under Windows 95/98/2000 and Windows NT. You may run any popular software application, such as MS-Word, as long as they are for Windows and printing the contents to the printer through the designated driver.

Before starting installation you should:

- ◆ Check the contents of the driver to ensure it is complete.
- ◆ Make a backup copy of the driver.
- ◆ Read the README.TXT file for installation guide and change notices.

Under the root directory of the floppy there are some sub-directories

- WIN98
- WIN95
- NT40
- WIN2000

Select the proper directory for installation according to your operating system.

## Driver Installation

- ◆ Windows needs to be running.
  - ◆ Insert the appropriate printer driver diskette into the floppy disk drive.
1. Click the “Start” button.
  2. Select “Settings”, then “Printers”
  3. Double click the “Add Printer” icon.
  4. At the Add Printer Wizard, Click “Next”.
  5. Specify the “Network” or “Local” button and click the “Next” button.
  6. Select “Installation from Floppy Disk” or "Have Disk".
  7. Enter the floppy drive and path.  
    **A:\WIN95**      **A:\NT40**  
    **A:\WIN98**      **A:\WIN2000**
  8. Select the printer name to be installed on the “List of Printers”, window. Click “Next”.
  9. Select the communication port for the label printer. For parallel port, select “LPT1:”, “LPT2:” or “LPT3”, for serial port select “COM1:” or “COM2:”, Click "Next".

10. You may wish to change the Printer Name to be more descriptive. Also select this printer as the Default printer. Click "Next".
11. Select whether you want a test page to be printed, then click on Finish.
12. After the related files have been copied to your system, the procedure is complete.

*Notes:*

1. *If you are just updating your driver, make sure to delete the previous version first.*
2. *If you install new bar code application software like BarTender, LabelView or CodeSoft, the driver should be activated and set as the current printer driver.*

## How to Use the Driver

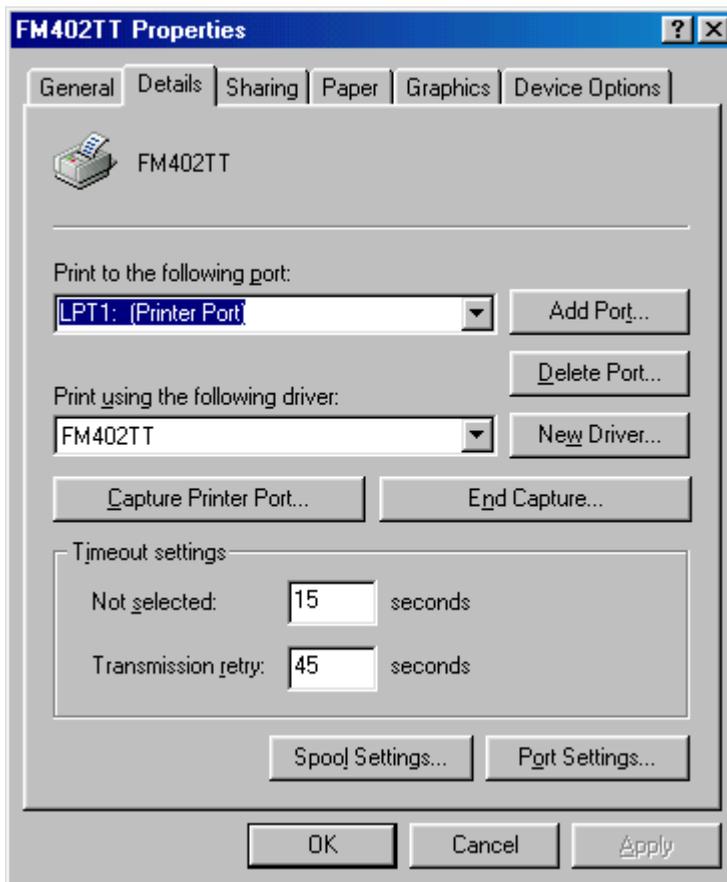
After the driver is installed, you can open the Printer's dialogue box and make parameter settings:

Windows 95/98/2000/NT4.0 - Start ⇨ Settings ⇨ Printers ⇨ Printer *Name* ⇨ Properties

### Parameter setting:

After entering the Selected Printer you can change the parameters to meet your configuration and needs. The following Format is from Windows 98.

## Details Tab



### Print to the following port

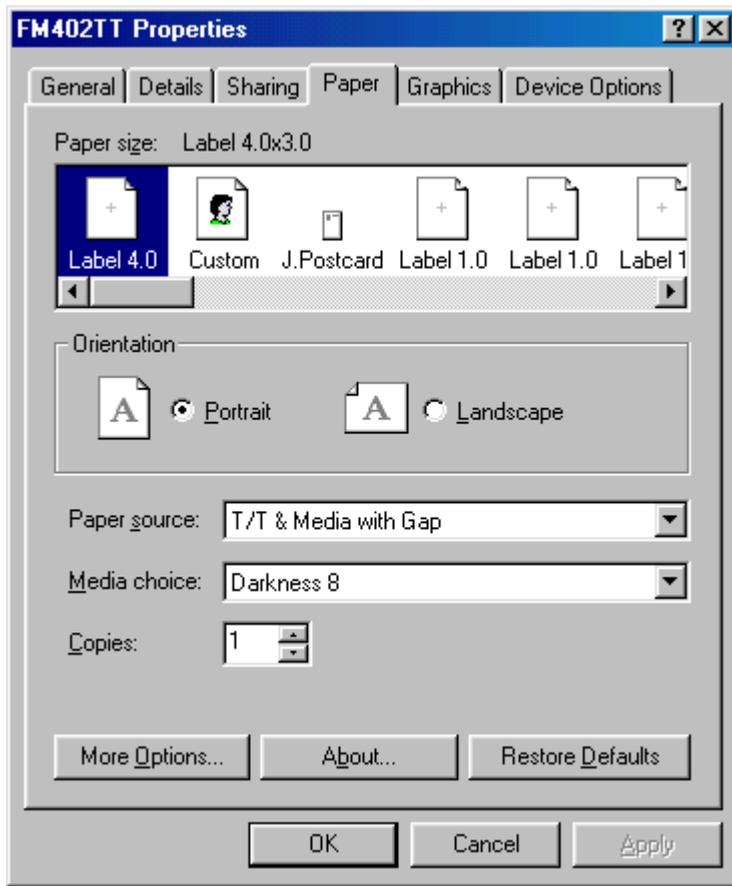
This allows you to select the IO port to link with the printer. The port may be one of parallel (LPT), serial (COM), network port or file.

If the communication port is the serial port (COM1: or COM2:), check the baud rate and flow control as they must be consistent between host and printer. The printer's baud rate is printed on the following the self-test page. The factory default baud rate is 9600.

### Print using the following driver

This must match the printer that is attached (for the FM402DT, FM402TT or FM403TT) when using the label printer.

## Paper



### Paper size

Select the label size for your printer. The selected label size may be a little longer than that of the physical label.

### Orientation

Set portrait or landscape according to the print direction.

### Paper source

Select one of the following items:

- T/T & Media with Gap
- T/T & Media with Black Line
- T/T & Continuous Media
- D/T & Media with Gap
- D/T & Media with Black Line
- D/T & Continuous Media

T/T stands for thermal transfer (ribbon) mode and D/T for direct thermal model (without ribbon).

### Media choice

Set the heat value or darkness from this field. The darkness value ranges from 0 to 15.

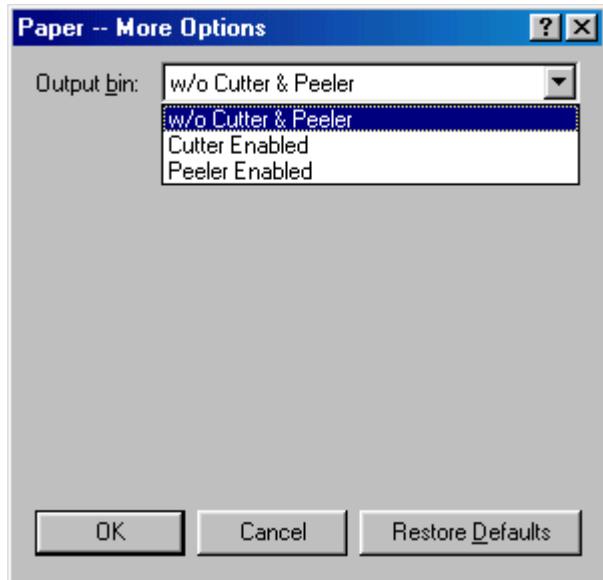
### Copies

This function designates the number of printed copies of each page.

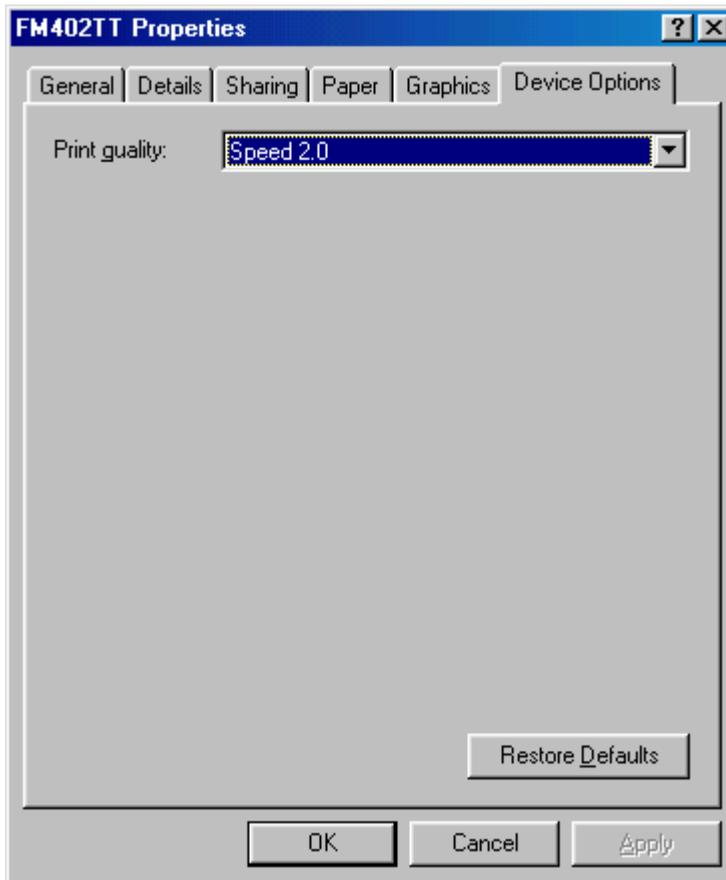
### More Options

To use the cutter and peeler function you need to select **More Options** and select one of the items.

- w/o Cutter and Peeler
- Cutter Enabled
- Peeler Enabled



## Device Options



Print speed for the FM402TT can be set at 1 to 3 IPS.

Print speed for the FM402DT and FM403TT can be set for 1 to 2 IPS.

# TROUBLESHOOTING AND MAINTENANCE

## Troubleshooting

Generally, when a malfunction or an abnormal condition occurs, the “POWER” LED will keep blinking. Printing and communication between the host and printer will stop.

### Power and Ready LEDs blink together at the same time

Possible Problems	Solutions	Remarks
Missing gap	Check the media path Check the paper sensor	If using continuous media with Windows then in the Paper Tab section <b>continuous</b> should be selected.
Media out	Install a Media roll	
Media not installed	Install a media roll	
Media jam	Clear the jam	Verify that the media is routed correctly.
Printhead module is not closed	Close and latch the printhead module	

### Power and Ready LEDs alternate blinking \*\*

Possible Problems	Solutions	Remarks
Ribbon has run out	Supply the ribbon roll	Does not apply to direct thermal. If you use direct thermal and run under Windows the <b>Ribbon</b> should not be selected.
Ribbon jam	Clear the jam	not for direct thermal
Ribbon sensor error	Replace the ribbon sensor	not for direct thermal

Note: \*\*The FM402DT does not use a ribbon and should not display this error.

### Only the Power LED blinks

Possible Problems	Solutions	Remarks
Serial I/O error	Check the baud rate Check the flow control	
Memory full	Add the extension RAM	
Cutter failed, or jam at cutter	Check the cutter Clear the jam	Only when cutter is installed.
Hardware error	Call for service	

## Host and Data related errors

Possible Problems	Solutions
Host Displays: "Printer Time Out"	Verify that the communication cable is connected securely to the parallel or serial port on the PC and to the connector on the printer.
	Verify that the Power LED is illuminated. If not, verify that the power cord is connected, the power switch is at position '1'. If Power LED is still not illuminated, check the fuse in the power adapter.
Data has been sent, but there is no output from the printer.	Print a Self Test and verify that the emulation being used is the correct one.
	If using Windows, verify the active printer driver.

## Blank or Extra lines in the label

Problem	Solutions
Dark Vertical lines that go the full length of the label.	Verify Program does not have an inadvertent line command.
	Clean printhead. Look for dirt or dust in the print area.
	Faulty Printhead. Replace the printhead.
Blank vertical lines that go the full length of the label.	Verify Program does not have an inadvertent line command.
	Direct Thermal printing: Verify label stock does not have voids in the Direct Thermal coating.
	Thermal Transfer printing. Verify ribbon is not damaged in the area in question. Verify that ribbon is not folded or wrinkled.
	Faulty Printhead. Replace the printhead.
Ribbon not rotating properly	Verify that the ribbon cores (Supply and Take-up) have notches on the proper side (Left)
	Verify that the notches in the ribbon core are in the correct locations.
	Verify ribbon is tight between the two ribbon cores.
	Verify that the ribbon is not folding.
Dust on or dirty on platen	Clean Platen Roller.

## Print Quality

Problem	Solutions
Too light in Thermal Transfer	Verify printer is set for Thermal Transfer stock.
	Verify that a certified ribbon is installed.
	Verify that the Media is certified to work with the ribbon. <i>Note: Direct Thermal media can be used with a ribbon, however inadequate heat transfer may result in light print. It is not recommended to use Direct Thermal media with a Thermal Transfer ribbons.</i>
	Clean the printhead.
	Adjust the Darkness setting.
	Slow down the print speed
Too light in Direct Thermal	Verify printer is set for Direct Thermal stock.
	Verify that the stock is coated with Direct Thermal material.
	Verify that a ribbon is not installed.
	Clean the printhead.
	Adjust the Darkness setting.
	Slow down the print speed
Too dark in Direct Thermal mode	Clean the printhead.
	Adjust the Darkness setting.
	Adjust the print speed

## Recovery

To continue your print jobs after any abnormal conditions have been recovered, simply press the Feed button or restart the printer. Make sure that the LED's are not blinking and you may need to re-send the print job.

## Preventive Maintenance

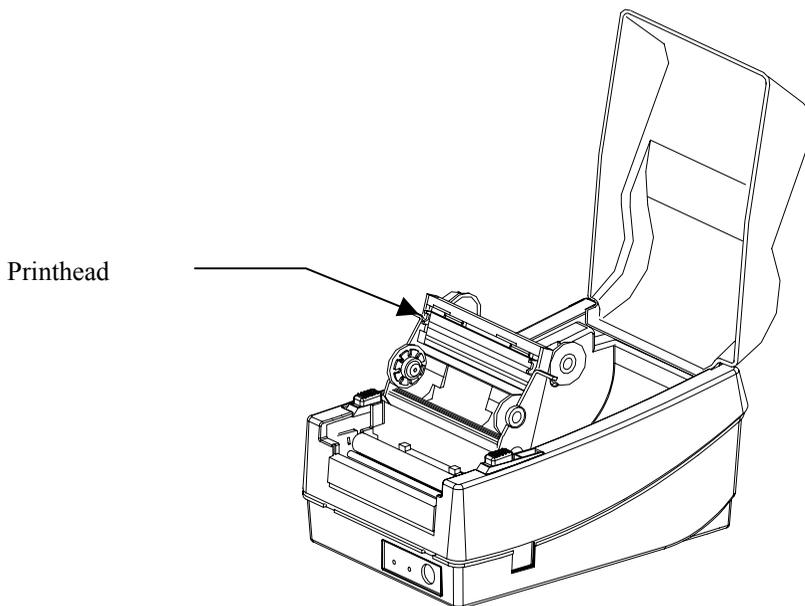
Before performing any Preventive Maintenance be sure to turn off the printer's power and unplug the power cable.

### Cleaning the Thermal Printhead (TPH)

It is recommended at a minimum that the Printhead should be cleaned:

- Each time a Ribbon is changed.
- Each time a new roll of media is installed.

1. Turn off the printer, open the top cover, and if installed remove the ribbon.
2. Lift the printhead module to the vertical position.
3. Rub the printhead with a piece of cotton, which has been moistened with Isopropyl Alcohol, or use a thermal head cleaning pen.
4. Check for any traces of discoloration or adhesive on the cotton after cleaning.
5. Repeat if necessary until the cotton is clean, after it is passed over the printhead.



**Figure 17 - Printhead Location**

*Note: The printhead should be cleaned at least every time the ribbon is replaced and more often depending on actual usage and conditions.*

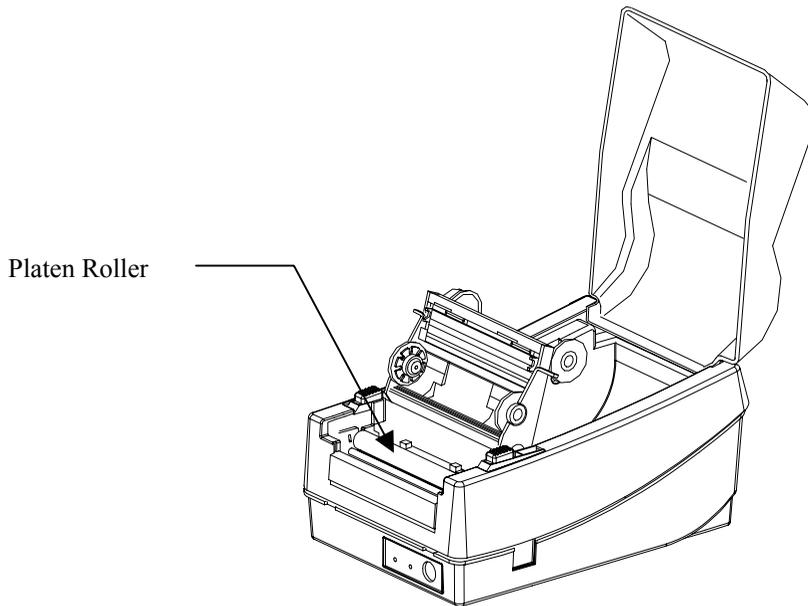
## Cleaning the Platen Roller

It is recommended that the platen roller should be cleaned when:

Excessive dusty condition exists.

Following a media jam where the adhesive comes in contact with it.

1. Turn off the printer and open the top cover.
2. Lift the printhead module to the vertical position.
3. Rub the full length of the platen available with a piece of cotton, which has been moistened with Isopropyl Alcohol.
4. Manually rotate the platen and repeat step 3 until the entire platen has been cleaned.



**Figure 18 - Platen Roller**

*Note: The roller should be cleaned whenever it has been in contact with foreign materials such as dust or adhesives.*

## Cleaning the Paper Compartment

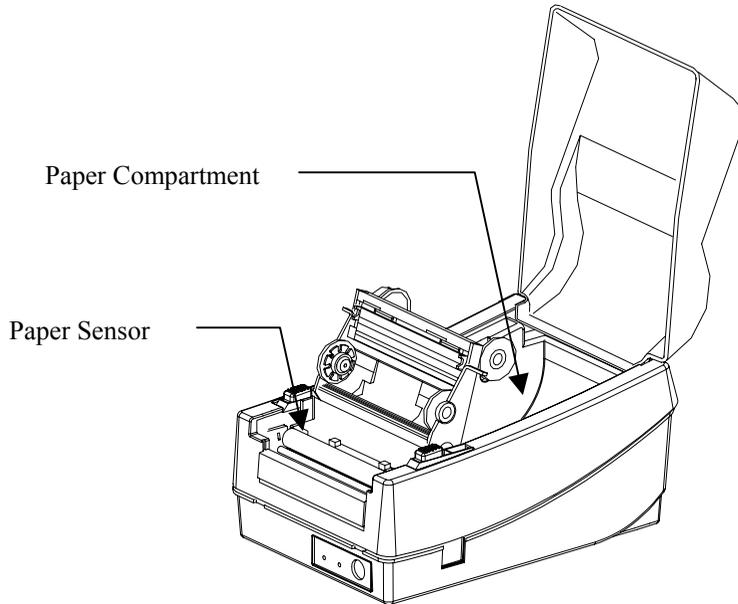
It is recommended that the Paper Compartment be cleaned regularly if exposed to a dust environment. This will keep dirt and dust from contaminating or damaging your printer (Printhead and Platen).

1. Turn off the printer and open the top cover.
2. Remove paper dust by blowing using compressed air or vacuuming.
3. Clean the paper compartment with cotton, which has been moistened with mild detergent.

## Cleaning the paper sensor

It is recommended that the Paper Sensor be cleaned regularly if exposed to a dusty environment. This will prevent false paper OUT or paper IN conditions.

1. Turn off the printer and open the top cover.
2. Remove paper dust by blowing using compressed air or vacuuming.
3. Clean the two Paper Sensor LED's with cotton stick, which has been moistened with Isopropyl Alcohol.



**Figure 19 - Paper Compartment and Paper Sensor**

# Appendix A: Printer Specifications

Specification	FM402DT	FM402TT	FM403TT
Print method	Direct thermal	Direct thermal and thermal transfer	
Resolution	203 DPI (8 dots/mm)		300 DPI (12 dots/mm)
Maximum print width	4.2 in. (107 mm)	4.10 in. (104 mm)	
Maximum print length	43 in. (1090 mm)**		29 in. (736 mm)**
Maximum print speed	2 inches (50.8 mm) per second	3 inches (76.2 mm) per second	2 inches (50.8 mm) per second
Onboard RAM	512 K bytes		2 M bytes
Media type	I. Direct thermal: Paper, vinyl, visible light and infrared scannable label, tag stock, butt cut or die cut, with various adhesives.		
	II. All above media, plus thermal transfer paper or vinyl labels and tags, butt cut or die cut, with various adhesives.		
Maximum label roll diameter	4 in.(102mm) outside diameter, 1 in.(25.4mm) inside diameter		
Label indexing	Black stripe and gap		
Ribbon types	Wax, Wax/resin and Resin		
Ribbon size	OD 1.45 in. (37 mm); ID 0.5 in. (12.7mm)		
Interface	RS-232 serial and Centronics parallel ports, auto polling for both ports		
Dimension	W7.3 in. x D10.9 in. x H6.0 in. (W186 mm x D278 mm x H153mm)		
Weight	1.7 kg (3.74 lbs.)	1.9 kg (4.1 lbs.)	
Electrical	FCC class B		FCC class A
	CE, UL and CUL approved. Input 19 VAC or 24 VDC (min. 2.5 A), 50/60 Hz		
Operating temperature	40° to 140°F (5° to 38°C)		
Storage temperature	-40° to 140°F (-40° to 60°C)		
Humidity	15 to 85% RH		
Windows driver	Win, 95, 98, 2000 and NT		
Rotation	0°, 90°, 180° and 270°, 4 direction rotations		

## Fonts, Bar Codes and Graphics

The specifications of fonts, bar codes and graphics depend on the printer emulation. The emulation is a printer programming language, through which the host can communicate with your printer. There are two printer-programming languages: **PPLA** and **PPLB**. Only one emulation can be resident at a time.

### Printer Programming Language A, PPLA

Specification	FM402DT	FM402TT	FM403TT
General fonts	7 alpha-numeric fonts, OCR A and OCR B		
ASD smooth fonts	6, 8, 10, 12, 14 and 18 points		4, 6, 8, 10, 12, 14, and 18 points
Symbol sets for smooth fonts	USASCII, UK, German, French, Italian, Spanish, Swedish, and Danish/Norwegian		
Courier fonts	8 symbol set (PC, PC-A, PC-B, EAMA-94, Roman8, Legal, Greek and Russian)		
Soft fonts	Downloadable PCL fonts		
Font expandability	1x1 to 24x24		
Bar code types	Code 39, Code 93, Code 128/subset A, B, C, Codabar, Interleave 2 of 5, UPC A/E/2 and 5 add-on, EAN-8/13, UCC/EAN-128, Postnet, Plessey, HBIC, Telepen and FIM. MaxiCode and PDF417 (2D symbologies).		
Graphics	PCX, BMP, IMG and HEX formats		

### Printer Programming Language B, PPLB

Specification	FM402DT	FM402TT	FM403TT
General fonts	5 fonts with different point sizes		
Symbol sets (Code pages)	8 bits: Code page 437, 850, 852, 860, 863 and 865. 7 bits: USA, British, German, French, Danish, Italian, Spanish, Swedish and Swiss.		
Soft fonts	Downloadable soft fonts		
Font expandability	1x1 to 24x24		
Bar code types	Code 39(checksum), Code 93, Code 128/subset A, B, C, Codabar, Interleave 2 of 5(checksum), Matrix 25, UPC A/E 2 and 5 add-on, EAN-8/13, Code 128UCC, UCC/EAN, Postnet, German Postcode. MaxiCode and PDF417 (2D symbologies).		
Graphics	PCX and binary raster		

## Optional Accessories

- ◆ Serial (RS-232) cable
- ◆ External media supplier (for media roll with max. 8 inch OD)
- ◆ Peel and Present
- ◆ Cutter
- ◆ Flash memory
- ◆ Font board
- ◆ Extension RAM<sup>++</sup> (0.5M for models FM402DT, FM402TT and FM403TT and 1M for the FM403TT model)

*Notes:*

<sup>\*\*</sup>: *Since this printer uses band buffers technology the maximum print length depends on the printout contents. Text and bar code printing typically allow long label lengths up to 30 inches or more. Extensive use of graphics may reduce the maximum label length to approximately 10 inches.*

<sup>++</sup>: *The Peel and Present, Cutter, expansion RAM and flash memory options are all installed at factory. As the extension RAM, font board and flash modules use the same connector, only one may be installed at a time.*

# Appendix B: INTERFACE SPECIFICATIONS

## Introduction

This appendix presents the interface specifications of I/O ports for the printer. These specifications include pin assignments, protocols and detailed information about how to properly interface your printer with your host or terminal.

## Serial

### Pin Configuration

The RS-232 connector on the printer side is a female, DB-9.

Pin	Direction	Definition
1	Tied to in 6	Not used
2	In	Receive Data (RxData)
3	Out	Transmit Data (TxData)
4	-	No connection
5	-	Logic Ground
6	Tied to pin 1	Not used
7	Out	Request to Send (RTS)
8	In	Clear to Send (CTS)
9	Out	+5V

*Note: Pin 9 is reserved for Keyboard Device Unit (KDU) only, **do not connect** this pin if you are using a general host like a PC.*

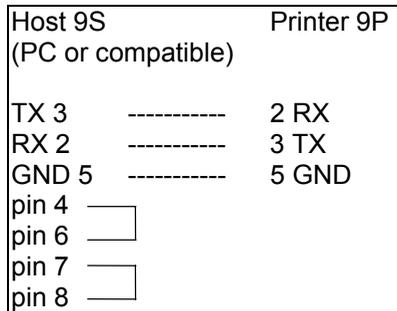
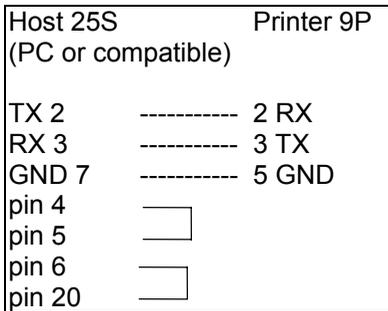
### Connection with host:

Host 25S (PC or compatible)	Printer 9P
DTR 20	----- 1
DSR 6	----- 6
TX 2	----- 2 RX
RX 3	----- 3 TX
CTS 5	----- 7 RTS
RTS 4	----- 8 CTR
GND 7	----- 5 GND

Host 9S (PC or compatible)	Printer 9P
DTR 4	----- 1
DSR 6	----- 6
TX 3	----- 2 RX
RX 2	----- 3 TX
CTS 8	----- 7 RTS
RTS 7	----- 8 CTS
GND 5	----- 5 GND

### Three Wire connection:

This method is the simplest method of connecting the printer to a host or terminal. This method requires Software Protocol Handshaking (Xon/Xoff flow control).



### Serial port Set-up Parameters

**Baud rate:** 2400, 4800, 9600, 19200 and 38400.

Baud rate set-up parameters are programmable by software commands only.

**Data bits:** 8 data bits, 1 start bit and 1 stop bit.

**Parity bit:** None

**Handshaking:** XON/XOFF (software flow control) and CTS/RTS (hardware flow control).

Before trying to print with applications verify that the Windows Printer Driver and the serial port communications parameters are checked. You should also set the flow control to “Xon/Xoff” or “Hardware”.

## Parallel (Centronics)

### Pin Configuration

The parallel port is a standard 36-pin Centronics.

Pin	Direction	Definition	Pin	Direction	Definition
1	In	/STROBE	13	Out	SELECT
2	In	Data 1	14,15		NC
3	In	Data 2	16	-	Ground
4	In	Data 3	17	-	Ground
5	In	Data 4	18		NC
6	In	Data 5	19 to 30	-	Ground
7	In	Data 6	31		NC
8	In	Data 7	32	Out	/Fault
9	In	Data 8	33 to 36	-	NC
10	Out	/ACK			
11	Out	BUSY			
12	Out	PE			

### Auto Polling

Both the serial and parallel ports are active at the same time on this printer. Data can be received on either one, however no provision is made for port contention. If data is transmitted to both ports simultaneously, it will cause the data in the received buffer to be corrupted.

# Appendix C: ASCII TABLE

	0	1	2	3	4	5	6	7
0	NUL			0	@	P	`	p
1	SOH	XON	!	1	A	Q	a	q
2	STX		"	2	B	R	b	r
3		XOFF	#	3	C	S	c	s
4			\$	4	D	T	d	t
5		NAK	%	5	E	U	e	u
6	ACK		&	6	F	V	f	v
7	BEL		'	7	G	W	g	w
8	BS		(	8	H	X	h	x
9			)	9	I	Y	i	y
A	LF		*	:	J	Z	j	z
B		ESC	+	;	K	[	k	{
C	FF		,	<	L	\	l	
D	CR		-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL









12 points

20H ~ 3FH: !"#\$%&'()\*+,-./0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 7FH: 'abcdefghijklmnopqrstuvwxyz{|}~  
A0H ~ BFH: áíóúñÑ<sup>ao</sup>¿<sup>®1/2 1/4</sup>¡ÁÀÀ©¢¥  
C0H ~ DFH: ãÃðÐÊËÈìíîï  
E0H ~ FFH: ÓΒÔÒòõÕμρϑÚÛÙýÝ± ¾÷ √ ∘°

14 points

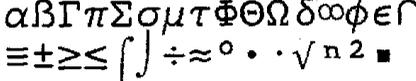
21H ~ 3FH: !"#\$%&'()\*+,-./0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 7FH: 'abcdefghijklmnopqrstuvwxyz{|}~  
A0H ~ BFH: áíóúñÑ<sup>ao</sup>¿<sup>®1/2 1/4</sup>¡ÁÂÀ©¢¥  
C0H ~ DFH: ãÃðÐÊËÈìíîï  
E0H ~ FFH: ÓΒÔÒòõÕμρϑÚÛÙýÝ± ¾÷ √ ∘°

18 points

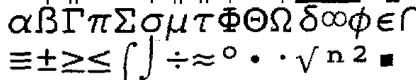
20H ~ 2FH: !"#\$%&'()\*+,-./  
30H ~ 3FH: 0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 6FH: 'abcdefghijklmnop  
70H ~ 7FH: pqrstuvwxyz{|}~  
A0H ~ AFH: áíóúñÑ<sup>ao</sup>¿<sup>®1/2 1/4</sup>¡  
B0H ~ BFH: ÁÀÀ©¢¥  
C0H ~ CFH: ãÃ  
D0H ~ DFH: ðÐÊËÈìíîï  
E0H ~ EFH: ÓΒÔÒòõÕμρϑÚÛÙýÝ  
F0H ~ FFH: ± ¾÷ √ ∘°



## PC

20H ~ 2FH: !"#\$%&'()\*+,-./  
30H ~ 3FH: 0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 6FH: `abcdefghijklmnop  
70H ~ 7FH: pqrstuvwxyz{|}~△  
80H ~ 8FH: ÇüéâäååçêëèìîïÄÅ  
90H ~ 9FH: ĒæÆôöòûùÿÖÜç£¥Ptƒ  
A0H ~ AFH: áíóúñÑã º ¿ ¯ ½¼ ; « »  
B0H ~ BFH:   
C0H ~ CFH:   
D0H ~ DFH:   
E0H ~ EFH: αβΓπΣσμτΦΘΩδ∞φ∈∩  
F0H ~ FFH: ≡±≥≤ ∫ ÷ ≈ ° · √ n 2 ■

## PC-A

20H ~ 2FH: !"#\$%&'()\*+,-./  
30H ~ 3FH: 0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 6FH: `abcdefghijklmnop  
70H ~ 7FH: pqrstuvwxyz{|}~△  
80H ~ 8FH: ÇüéâäååçêëèìîïÄÅ  
90H ~ 9FH: ĒæÆôöòûùÿÖÜø£∅Ll·  
A0H ~ AFH: áíóúñÑõ õ º ã Ã ℓ n ; ³ ∞  
B0H ~ BFH:   
C0H ~ CFH:   
D0H ~ DFH:   
E0H ~ EFH: αβΓπΣσμτΦΘΩδ∞φ∈∩  
F0H ~ FFH: ≡±≥≤ ∫ ÷ ≈ ° · √ n 2 ■

## PC-B

20H ~ 2FH: !"#\$%&'()\*+,-./  
30H ~ 3FH: 0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 6FH: `abcdefghijklmnop  
70H ~ 7FH: pqrstuvwxyz{|}~△  
80H ~ 8FH: ÇüéâääåçêëèìíîÄÅ  
90H ~ 9FH: ÆæËëÖöÜüÿÖÜøƒØ×ƒ  
A0H ~ AFH: áíóúñÑªº¿®-½¼¡«»  
B0H ~ BFH: ▒|ÁÂÀ©-|||ç¥  
C0H ~ CFH: ¨|äã|  
D0H ~ DFH: ðÐÉÊÈìÍî|  
E0H ~ EFH: ÓÔÕõÖμϐÚÛÜýÝ-  
F0H ~ FFH: -±¼⅃\$÷, °¨.132■

## Legal

20H ~ 2FH: !"#\$%&'()\*+,-./  
30H ~ 3FH: 0123456789:;=ç?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[®]©  
60H ~ 6FH: °abcdefghijklmnop  
70H ~ 7FH: pqrstuvwxyz\$⅃†™

## Greek

20H ~ 2FH: !"#\$%&'()\*+,-./  
30H ~ 3FH: 0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 6FH: `abcdefghijklmnop  
70H ~ 7FH: pqrstuvwxyz{|}~Δ  
80H ~ 8FH: ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠ  
90H ~ 9FH: ΡΣΤΥΦΧΨΩαβγδεζηθ  
A0H ~ AFH: ιηλμνξοπρσςτυφχψ  
B0H ~ BFH:    
C0H ~ CFH:   
D0H ~ DFH:   
E0H ~ EFH: ωάέήϊίϊούϋώΑΕΗΙΟΥ  
F0H ~ FFH: Ω±≥≤ ( ) ÷ ≈ ° £ ¥ √ n 2 ■

## Russian

20H ~ 2FH: !"#\$%&'()\*+,-./  
30H ~ 3FH: 0123456789:;<=>?  
40H ~ 4FH: @ABCDEFGHIJKLMNO  
50H ~ 5FH: PQRSTUVWXYZ[\]^\_  
60H ~ 6FH: `abcdefghijklmnop  
70H ~ 7FH: pqrstuvwxyz{|}~Δ  
80H ~ 8FH: АБВГДЕЖЗИЙКЛМНОП  
90H ~ 9FH: РСТУФХЦЧШЩЪЫЬЭЮЯ  
A0H ~ AFH: абвгдежзийклмноп  
B0H ~ BFH:    
C0H ~ CFH:   
D0H ~ DFH:   
E0H ~ EFH: рстуфхцчшщъыьэюя  
F0H ~ FFH: Ёё≥≤ ( ) ÷ ≈ ° • √ n 2 ■

## Internal Bar Codes

This PPLA supports 20 one-dimensional bar codes and 2 two dimensional bar codes.

*Note: The following bar codes are scanned reproductions, actual bar codes will be of a greater quality.*

BAR CODE A : 3 OF 9



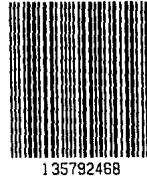
BAR CODE B : UPC-A



BAR CODE C : UPC-E



BAR CODE D :  
INTERLEAVED 2 OF 5



BAR CODE E :  
CODE 128



BAR CODE F : EAN-13



BAR CODE G : EAN-8



BAR CODE H : HBIC



CODA BAR  
BAR CODE I



BAR CODE J : I25  
WITH CHECKSUM



BAR CODE K :  
PLESSEY



BAR CODE L : I25  
WITH CHECKSUM &  
BEARER



BAR CODE M : UPC2



BAR CODE N : UPC5



BAR CODE P :  
POSTNET



BAR CODE Q :  
CODE 93



(78) 1 2989089 990899998 1

BAR CODE Q  
: UCC/EAN  
128

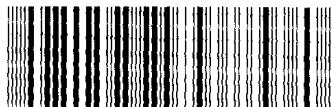


70 701194 502 2800

BAR CODE R  
: UCC/EAN  
128 K



BAR CODE T :  
TELEPEN



ABCI -=

BAR CODE V :  
FIM



BAR CODE U :  
MAXICODE



BAR CODE Z :  
PDF-417



# Appendix E: FONTS AND BAR CODES FOR PPLB Emulation

## Internal Fonts

There are 5 internal fonts for the PPLB emulation.

Each has 6 eight-bit and 9 seven-bit symbol sets. Font 5 does not contain any lower-case characters.

8 bit symbol sets	code page 437, 850, 852, 860, 863 and 865
7 bit symbol sets	USA, British, German, French, Danish, Italian, Spanish, Swedish and Swiss

### Font 1

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmno pqrstuvwxyz

### Font 2

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmno pqrstuvwxyz

### Font 3

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmno pqrstuvwxyz

### Font 4

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmno pqrstuvwxyz

### Font 5

ABCDEFGHIJKLM  
NOPQRSTUVWXYZ

# Symbol Set

## Code Page 437

20-3F: !"#%&'()\*+,-./0123456789:;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxy  
80-9F: ÇüéääääçêèèèiîiĀĀĒĒĒĒôôôôûÿŮŮŮŮŮ f  
A0-BF: áíóúñÑªº½¼; .  
E0-FF: ß μ

## Code Page 850

20-3F: !"#%&'()\*+,-./0123456789:;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxy  
80-9F: ÇüéääääçêèèèiîiĀĀĒĒĒĒôôôôûÿŮŮŮŮŮ f  
A0-BF: áíóúñÑªº½¼; AAA ç  
C0-DF: äÅ ĘĚĚ ĩî ĩ i  
E0-FF: ÓßÔôÔμ Ů Ů =¼½§

## Code Page 852

20-3F: !"#%&'()\*+,-./0123456789:;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxy  
80-9F: Çüéää ç è i Ā Ē ô ô Ů Ů  
A0-BF: áíóú ĀĀ  
C0-DF: Ę Ě ĩ ĩ  
E0-FF: Óß Ů Ů §

## Code Page 860

20-3F: !"#%&'()\*+,-./0123456789:;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxy  
80-9F: ÇüéääääçêèèèiîiĀĀĒĒĒĒôôôôûÿŮŮŮŮŮ Ů  
A0-BF: áíóúñÑªº½¼; .  
E0-FF: ß μ

## Code Page 863

20-3F: !"#%&'()\*+,-./0123456789:;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxy  
80-9F: ÇüéĀĀĀĀçêèèèiîiĀĀĒĒĒĒôôôôûÿŮŮŮŮŮ Ů  
A0-BF: óú ĩ ĩ ¼½¾  
E0-FF: ß μ

Code Page 865

20-3F: !"#%&'()\*+,-./0123456789;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxyz  
80-9F: ÇúéáàâäçèëìíîËÄÅæøðóôÿÓÜø£ø f  
A0-BF: áíóúñÑªº¿ ½¼  
E0-FF: ß μ

USASCII

20-3F: !"#%&'()\*+,-./0123456789;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxyz

UK

20-3F: !"£\$%&'()\*+,-./0123456789;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZ[\]^\_  
60-7F: `abcdefghijklmnopqrstuvwxyz

German

20-3F: !"#%&'()\*+,-./0123456789;<=>?  
40-5F: \$ABCDEFGHIJKLMNPOQRSTUVWXYZÄÖÜ^\_  
60-7F: `abcdefghijklmnopqrstuvwxyzäöüß

French

20-3F: !"£\$%&'()\*+,-./0123456789;<=>?  
40-5F: àABCDEFGHIJKLMNPOQRSTUVWXYZ°ç\$^\_  
60-7F: `abcdefghijklmnopqrstuvwxyzéùè"

Danish

20-3F: !"#%&'()\*+,-./0123456789;<=>?  
40-5F: @ABCDEFGHIJKLMNPOQRSTUVWXYZÆØÅÜ\_  
60-7F: `abcdefghijklmnopqrstuvwxyzæøåü

Italian

20-3F: !"£\$%&'()\*+,-./0123456789;<=>?  
40-5F: \$ABCDEFGHIJKLMNPOQRSTUVWXYZ°çé^\_  
60-7F: ùabcdefghijklmnopqrstuvwxyzàòèì

Spanish

20-3F: !"#\$%&'()\*+,-./0123456789:;<=>?  
40-5F: ¡ABCDEFGHIJKLMNÖPQRSTUVWXYZñ¿\_`  
60-7F: ábcdefghijklmnopqrstuvwxyzéíóú

Swedish

20-3F: !"#\$%&'()\*+,-./0123456789:;<=>?  
40-5F: ÉABCDEFGHIJKLMNÖPQRSTUVWXYZÅÖÅ\_`  
60-7F: éabcdefghijklmnpqrstuvwxyzäöå

Swiss

20-3F: !"£\$%&'()\*+,-./0123456789:;<=>?  
40-5F: §ABCDEFGHIJKLMNÖPQRSTUVWXYZàçè^\_`  
60-7F: `abcdefghijklmnpqrstuvwxyzäöüé

## Internal Bar Codes

The PPLB supports 26 one-dimensional bar codes and 2 two dimensional bar codes.

\*\* Code 39 \*\*



C39

\*\* Code 93 \*\*



\*\* Code 128UCC shipping container \*\*



(A2) 3 4567890 123456788 3

\*\* Code 128 \*\*



0123456789

\*\* Codabar \*\*



ABCD

\*\* EAN-8 \*\*



01234596

\*\* EAN-8 2 add-on \*\*



1234567089

\*\* EAN-8 5 add-on \*\*



98398126

\*\* EAN-13 \*\*



0123456789012

\*\* EAN-13 2 add-on \*\*



767679878790998

\*\* EAN-13 5 add-on \*\*



721919292929429838

\*\* German postcode \*\*



01234.567.891.23 1

\*\* UCC/EAN \*\*

\*\* UPC-A \*\*



(12)3456789



1 35790 24680 9

\*\* UPC-A 2 add-on \*\*



6 76908 93489 3 59

\*\* UPC-A 5 add-on \*\*



5 98676 12761 4 83754

\*\* UPC-E \*\*

\*\* UPC-E 2 add-on \*\*



0 438959 0



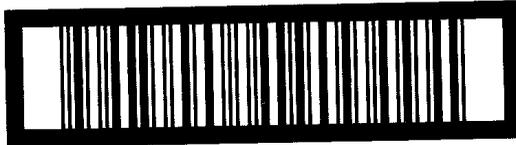
0 432328 0 32

\*\* UPC-E 5 add-on \*\*



0 438959 0 09274

\*\* UPC I25 \*\*



1 23 45678 90122 4

\*\* Maxi Code \*\*

\*\* PDF-417 \*\*



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