BCS bar coding SYSTEM

B a r c o d e S y s t e m s

Meto mi-4

Label and Tag Printer

Extended Operating Manual

Checkpoint® METO

Copyright Information:

Firmware (Software) Agreement

The enclosed Firmware (Software) resident in the Printer is owned by Licensor or its suppliers and is licensed for used only on a single printer in the user s Trade or Business. **The User agrees not to, and not to authorize or permit any other person or party to duplicate, or copy the Firmware or the information contained in the non-volatile or programmable memory.** The firmware (Software) is protected by applicable copyright laws and Licensor retains all rights not expressly granted. In no event will Licensor or its suppliers be liable for any damages or loss, including direct, incidental, economic, special, or consequential damages, arising out of the use or inability to use the Firmware (Software).

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Part Number: 425464
Revision: B
Ref Number: 88-2241-11

Agency Compliance and Approvals:

UL1950 Information Technology Equipment
C22.2 No. 950-M93

EN60950

For 230 Volt Operation (Europe): Use a cord set, marked "HAR," consisting of a min H05VV-F cord which has a minimum 0.75 square mm diameter conductors, provided with an IEC 320 receptacle and a male plug for the country of installation rated 6A, 250V

Für 230 Volt (Europa): Benützen Sie ein Kabel, das mit "HAR" markiert ist, bestehend mindestens aus einem H05VV-F Kabel, das mindestens 0,75 Quadratmillimeter Drahtdurchmesser hat; sowie eine IEC320 Steckdose und einen für das Land geeigneten Stecker, 6A, 250 Volt.

As an Energy Star Partner, the manufacturer has determined that this product meets the Energy Star guidelines for energy efficiency.

The manufacturer declares under sole responsibility that this product conforms to the following standards or other normative documents:

EMC: EN 55022 (1993) Class B
EN 50024 (1998)

Safety: This product complies with the requirements of EN 60950/All:1997

Gost-R

BE01

FCC: This device complies with FCC CFR 47 Part 15 Class A.

☑ **Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions in this manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Important Safety Instructions:

This unit has been carefully designed to provide years of safe, reliable performance; however, as with all electrical equipment, there are some basic precautions you should take to avoid hurting yourself or damaging the printer:

- Before using the printer, carefully read all the installation and operating instructions.
- Observe all warning instruction labels on the printer.
- Install the printer on a flat, firm, surface.
- Do not place the printer on or near a heat source.
- To protect your printer from overheating, make sure no openings on the printer are blocked.
- Never insert anything into the ventilation slots and openings of the printer.
- Do not use the printer near water or spill liquid into it.
- Ensure that the AC power source matches the ratings listed for the printer. (If unsure, check with your dealer or local utility provider.)
- Do not place the AC power cord where it can be stepped on. If the AC power cord becomes damaged or frayed, replace it immediately.
- If the printer ever needs repair, consult only qualified, trained service personnel.

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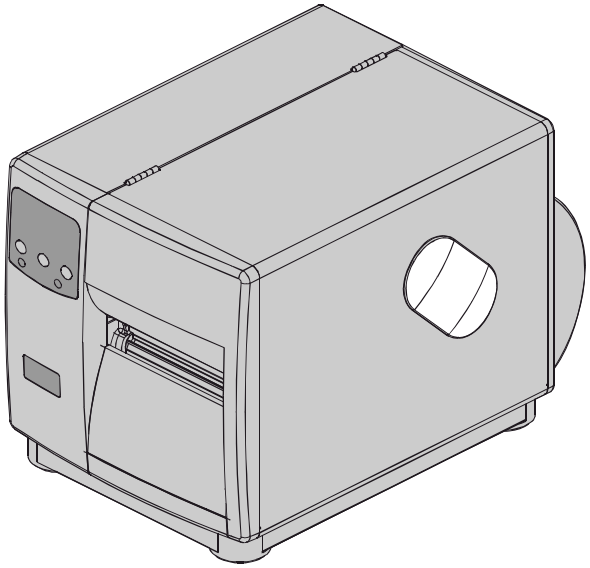
1 Printer Overview



1.0 About this Printer

Congratulations on your purchase of a ***mi-4*** Series printer. The ***mi-4*** Series, hereafter referred to as 'the printer', blends the rugged durability of solid die-cast construction with state-of-the-art electronics and user-friendly features to redefine the standard in industrial thermal printers.

This manual provides all the information necessary for everyday printer operation. To begin printing labels, refer to the instructions provided with the label-creation software you have chosen. If you wish to write custom label programs, a copy of the *Programmer's Manual* is included on the enclosed Accessories CD.

To grow with all of your printing needs, the design of the printer allows most upgrades to be performed easily by an operator (see Section 1.1). The following subsections detail the standard printer features and available options.

1.0.1 Standard Features

This printer offers the following standard features:

mi-4 **Standard Features Table**						
Feature	**Model**					
	4206	**4208**	**4212**	**4308**	**4406**	**4604**
Printhead Density (Dots Per Inch)	203	203	203	300	406	600
Direct Thermal Printing	X	X	X	X	X	X
On-Demand and Batch Printing	X	X	X	X	X	X
Rotating Media Hub	X	X	X	X	X	X
Media Tear Bar	X	X	X	X	X	X
Fan-fold media capability	X	X	X	X	X	X
Flash memory	1MB	1MB	2MB	2MB	4MB	4MB
SDRAM	8MB	8MB	16MB	16MB	16MB	16MB
RS-232 interface port	X	X	X	X	X	X
IEEE 1284 Compliant parallel interface port	X	X	X	X	X	X
Liquid Crystal Display	X	X	X	X	X	X
EFIGS (multi-language display and configuration label support)	X	X	X	X	X	X
AGFA Scalable font engine	X	X	X	X	X	X
Printhead Resistance Verification	X	X	X	X	X	X

1.0.2 Optional Features (available except as noted)

The printer offers the following optional features:

Light-Duty (Backing-Only) Cutter

A rotary-type cutter for material with a maximum thickness of .005" (.127mm).

Standard Cutter

A rotary-type cutter material with a maximum thickness of .010" (.254mm).

Cutter Tray

An adjustable tray for collecting up to 200 cut labels or tags.

External Keyboard Support

An interface that allows connection to an external keyboard.

Font Expansion Card (cannot be used with the I/O Expansion card)

A slide-in circuit card assembly with 8MB Flash memory expansion for International Language Printing Capability (ILPC) and/or additional fonts and graphics. ILPC consists of one of the following:

- CG-Times™ (Western European) Scalable font
- Kanji Gothic B Scalable font
- Simplified Chinese GB Scalable font
- Korean Hangul Scalable font

Internal Media Rewinder

An internal hub with a six-inch outer diameter capacity to wind printed labels, or backing material only when the Peel and Present Mechanism is attached.

I/O Expansion Card (specify features at time of order)*

Standard features of this slide-in circuit card assembly include:

- General purpose (GPIO) interface for external printer and device control.
- Time and date calendar (Real Time Clock) function for label time-stamping.

This optional memory feature can also be included:

- 8MB Flash memory expansion for graphics and/or additional fonts including International Language Printing Capability (ILPC).

*Not available for the ***mi-4206*** model.

LAN Interface

A slide-in circuit card assembly that provides for network connectivity, allowing multiple users on various platforms to share the same printer.

Peel and Present Mechanism *(requires the Internal Rewind option)*

A device that automatically separates printed labels from the backing material and allows subsequent printing to occur only after the removal of a previously printed label.

Present Sensor

An output control device that allows subsequent printing to occur only after the removal of a previously printed label.

*RS-422 Serial Interface**

Single-drop interface hardware to support greater distances from the host at communication rates of up to 38,400 baud.

Thermal Transfer *(specify feature type at time of order)*

A printing method that uses ribbon to produce exceptional image clarity, as compared to most direct thermal media types. This option can be ordered for use with either 'coating in' or 'coating out' ribbons.

Twinax/Coax Interface

A slide-in circuit card assembly that provides connectivity to AS/400 and System/3X Twinax host system or 3270-type host system. Cable included.

ILPC – CG Times™ Firmware

The printer's firmware can be upgraded to include the ILPC CG Times™ font. This supports the Enhanced Language Code Pages.

*Not available for the ***mi-4206*** and ***mi-4208*** models.

1.1 Option Installation

The following table lists the available options and the recommended qualification level of the installer. For detailed information concerning a specific option, contact your dealer or our Technical Support.

Option	Qualified Installer
Cutter Tray	Operator
Cutters: Light and Standard Duty	Operator
External Keyboard	Operator
Font Expansion Card	Certified Technician
Internal Rewind	Operator
I/O Expansion Card	Certified Technician
LAN Interface	Certified Technician
Peel and Present Mechanism	Operator
Present Sensor	Operator
RS-422 Serial Interface	Certified Technician
Thermal Transfer Assembly	Operator
Twinax/Coax Interface	Certified Technician

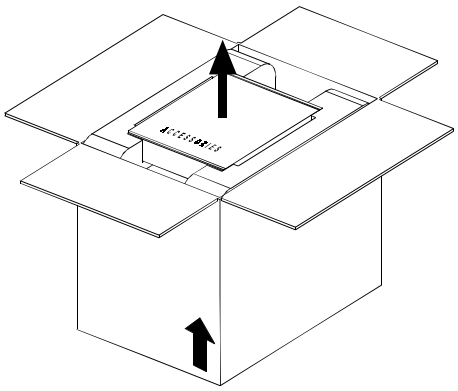
2 Getting Started

2.0 Unpacking the Printer

Inspect the shipping container(s) for damage; if evident, immediately notify the shipping company to report the nature and extent of the damage.

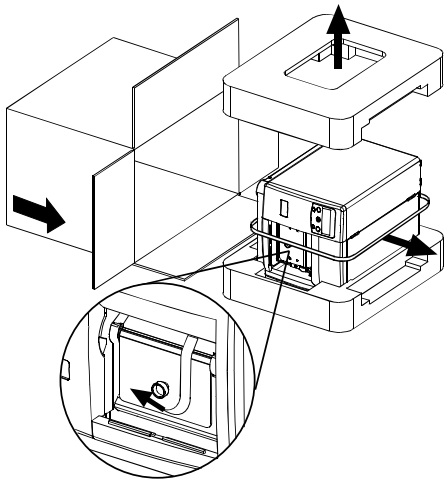
The printer has been carefully packaged to avoid damage during transit. In order to operate the printer, you will need to remove the packaging materials (i.e., tape and foam) placed there for shipment. Complete the following steps prior to connecting power or attempting to load media.

❶ With the arrow on the box pointing up, open the box.



❷ Remove Accessories Box.

❸ Tilt the printer on its side and slide the printer out of its box.



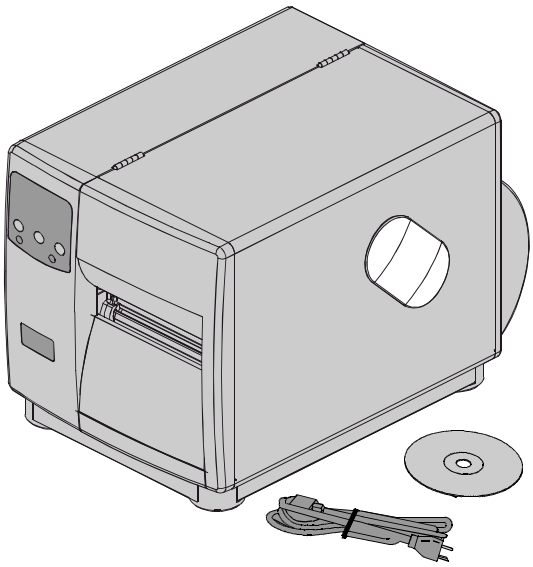
❹ Place the printer in an upright position and remove the packing foam, plastic bag, and tape.

☑ **Note:** It is a good idea to save the carton and packaging materials in the event that future shipment is required.

2.0.1 Inspection

After removing the printer from the packaging material, check the contents of the package. In addition to this manual, the following items should be included:

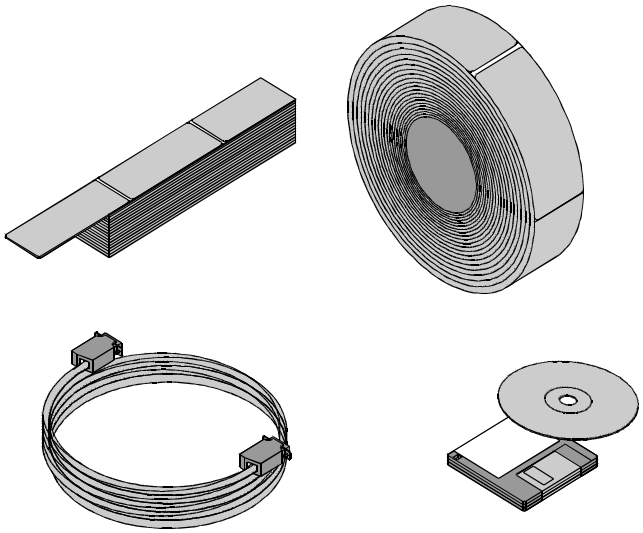
- Printer
- Power Cord
- Accessories CD
- Any special or additionally purchased items.



2.0.2 Additional Requirements

The following items are necessary to produce labels. Contact your dealer or a customer support representative for advice on which media and software may best suit your needs.

- A serial or parallel interface cable (see Section 3.0.1)
- Applicable media (see Section 2.1)
- ¬ Applicable software



2.1 Media and Ribbon Selection

The following is a limited overview of media characteristics. For complete information and advice regarding your specific application needs, always consult a qualified media specialist or our Media Representative.

Media Selection – Direct Thermal

Consider three important factors when selecting direct thermal stock:

- The abrasive qualities of the material that covers the thermal reactive layer of the paper.
- The ability of that layer to control the chemical reaction that occurs when the image is "burned".
- The amount of heat required to create an image on the paper.

Media Selection – Thermal Transfer

Consider three important factors when selecting thermal transfer media combinations:

- The label top coating and ribbon combinations affect image quality.
- Ribbon backcoating is highly recommended. It provides protection for the printhead and may also provide an anti-static coating.
- For additional printhead protection, use ribbon with a slightly greater width than the overall width of the label and backing material.

2.1.1 Print Quality Controls

The printer provides total application flexibility with a comprehensive set of print controls; of these, the amount of heat applied by the printhead and the rate of media movement under the printhead will have the most effect on the images (i.e., barcodes, text, and graphics) being printed. For example, low cost direct thermal stocks have raised reaction temperatures and therefore require higher heat values and slower print speeds to make a clear image on the media. In general, there are four methods of controlling print quality:

- The first is the 'Media Type' menu setting, which should be set to match the media being used (i.e., when printing with ribbon use the thermal transfer setting).

(Continued next page)

- The second method would be to change the 'Print Control / Heat' menu setting (usually selectable as 'Heat Setting' in most software programs). Increasing this value causes more energy to be transferred to the media, resulting in a darker image. If the image is too dark, reduce this value or increase the print speed.
- The next method would be to change the 'Print Control / Print Speed' menu setting (also selectable as 'Print Speed' in most software programs). Changing the print speed changes the amount of time the media is under the printhead. Slowing the speed allows more time for energy to be transferred. Increasing the speed will increase throughput, but may require a higher heat setting.
- The final method, providing only subtle contrast changes, would be to change the 'Custom Adjustments / Darkness' menu setting.

You will find that printing barcodes and detailed images on less expensive direct thermal and thermal transfer media at higher speeds can be tricky. At one heat setting, the images will fade and at the next higher heat setting, the images will bleed. This is because the reaction temperature of the media is so high that at higher rates of speed, it cannot react fast enough. To print fine images at higher speed, media with lower reaction or release temperatures are required. On the slower end of the print rate settings, crisper images are possible because the media is not being stretched beyond its limits.

The following table is intended for reference only (for specific application information, consult your media specialist or our Media Representative).

Direct Thermal Media Type		Print Speed*		Print Energy
Fasson 300 HD™ Direct Thermal Facesheet Fasson 300 MD™ Direct Thermal Facesheet		10-12**		Medium
Thermal Transfer Media Type	**Ribbon Type**	**Print Speed***	**Print Energy**	**Image Durability**
Great Label TTL™	GPR Plus™ MaxWax™ IIMAK Versamark™	10-12**	Medium	Medium
Coated Paper, Uncoated Paper, Tag Stock, Some Films, Some Synthetics	Wax	2 - 10	Low	Low
Coated Paper, Glossy Paper, Tag Stock, Some Synthetics, Films	Wax/Resin	2 - 8	Medium	High
Synthetics, Films	Resin	4 - 6	High	High

*Values given in inches per second (IPS)

**For optimum print quality at speeds above 10 IPS these are highly recommended.

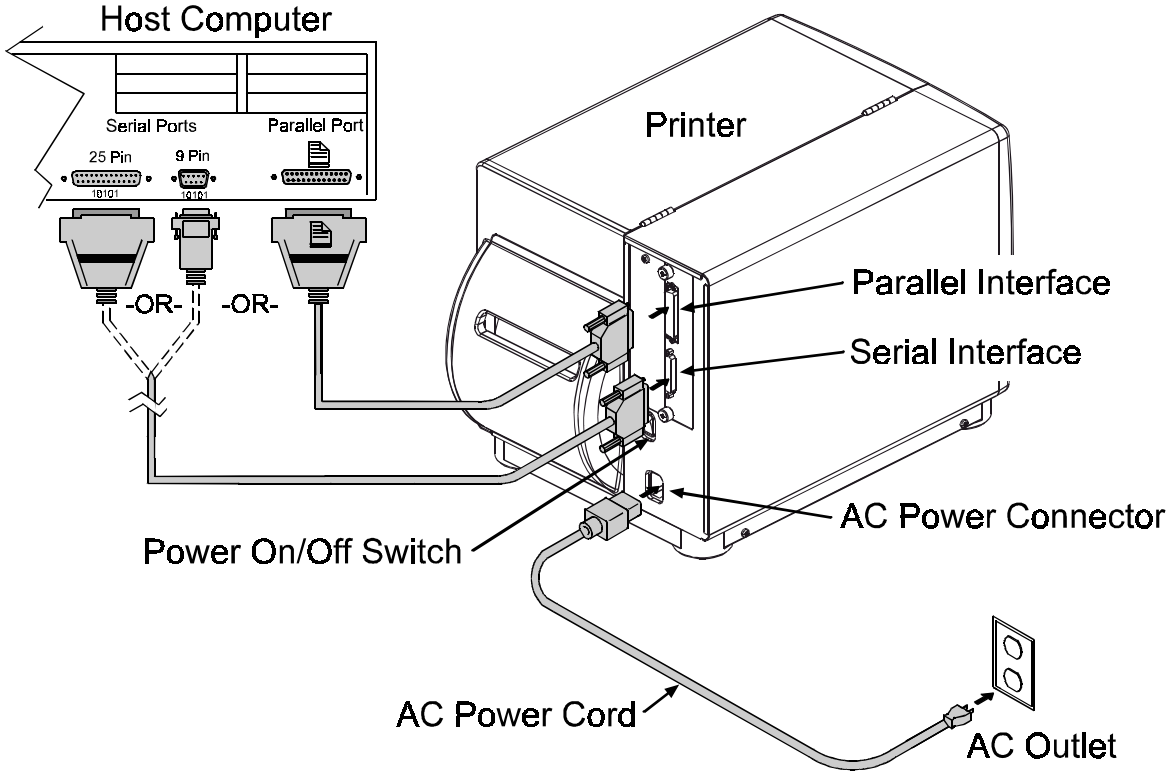
3 Setting up the Printer

3.0 Installing the Printer

This section explains how to connect and load the printer with media and ribbon.

☑ **Note:** When connecting the AC Power Cord or data cables to the printer, ensure the Power On/Off Switch is in the 'Off' position.

Connect the AC power cord to the receptacle located on the back of the printer, then plug the cord into a properly grounded outlet.



☞ For ease of connectivity, the standard printer can be connected to the Host Computer though the Parallel or Serial Interface, as described in Section 3.0.1.

3.0.1 Communications Interfacing

Using a data detection process, the interface selection occurs automatically in the printer. At power-up, the printer begins monitoring the interface ports for activity. When the host transmits data, the printer port detecting this data is set 'active' and remains active as long as data flow continues. Once the received data flow stops and the Host Timeout Value (see Section 4.1.5) is exceeded, the detection process will be repeated; in addition, should the data flow stop before a complete label format is received, the format will be ignored and must be sent to the printer again.

☑ **Note:** To change an active port immediately, cycle the printer power 'On' and 'Off'.

Parallel Port:

The parallel port interface has two menu selectable modes of operation: uni-directional or bi-directional. Uni-directional mode is forward channel communication and requires a Centronics® cable with a 36 pin male connector. Bi-directional mode is IEEE 1284 Compliant, using forward and reverse channel communications. In this mode, data can be sent to the host provided it is also IEEE 1284 Compliant and has supporting software. This mode requires an IEEE 1284 cable with a Centronics® 36 pin male connector.

Serial Port:

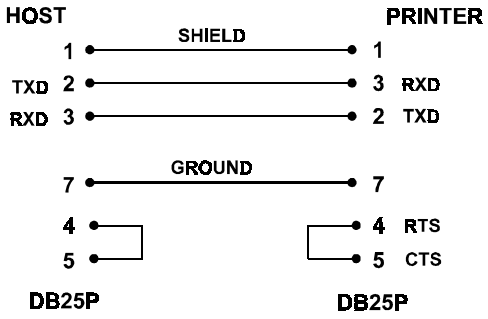
The serial port interface supports RS-232C and, if equipped, RS-422 communications. The following list of printer serial port settings are menu selectable and must be set to match the host computer serial port settings; see Section 4.1.5.

- Baud Rate (communication speed)
- Word Length
- Word Parity
- Number of Stop Bits
- Handshaking Protocol

In addition to these settings, the serial interface cable must a have specific pin configuration (pin-out) for proper data exchange. The different serial cables, their respective pin configurations, suggested applications and part numbers are shown on the next page (contact your reseller for ordering information).

Serial Interface Cable Listing (all models except as noted)

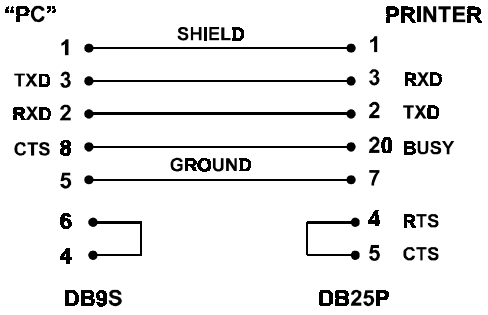
Null Modem (MXM)



Part Number 556000

Cable used for typical connection to other DCE equipment with Xon/Xoff flow control.

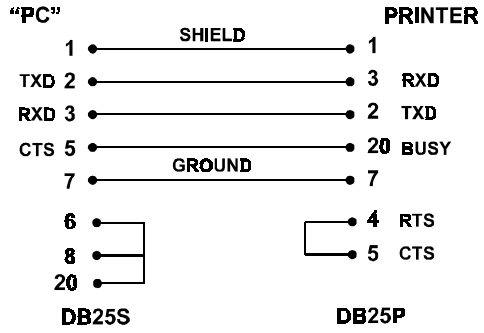
"PC" (DB9P) to Printer



Part Number 417 106

Cable used for connection to a PC compatible with DB9P communication ports. Flow control can be either Xon/Xoff or CTS/DTR.

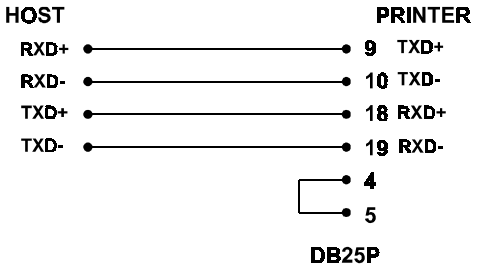
"PC" (DB25P) to Printer



Part Number 417 105

Cable used for connection to a PC compatible with DB25 communication ports. Flow control can be either Xon/Xoff or CTS/DTR.

RS-422 Connection*



The diagram above is provided only as a reference.

*This is an optional interface; however, it is unavailable for the ***mi-4206*** and ***mi-4206*** models.

3.1 Loading Media

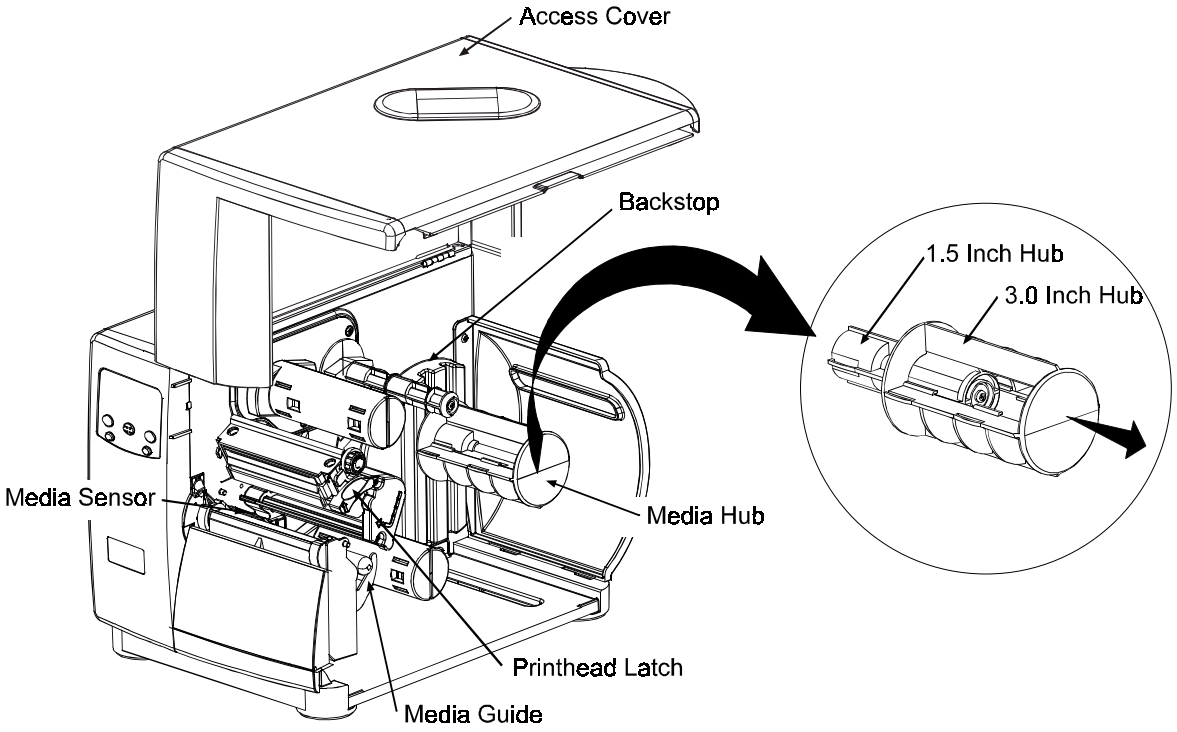
The following procedures explain the preliminary media loading steps.

❶ Raise the Access Cover.

❷ Rotate the Printhead Latch forward to raise the printhead.

❸ Slide the Media Guide out away from the frame and then lower it to the down position.

❹ The Media Hub can accept two different core sizes: 3.0-inch (76mm) and 1.5-inch (38mm). To use media with 1.5-inch cores, first remove the 3.0-inch Hub by grasping it firmly and pulling outward. The larger hub will slide off the smaller inner hub. Store the removed hub in a safe place for future use.

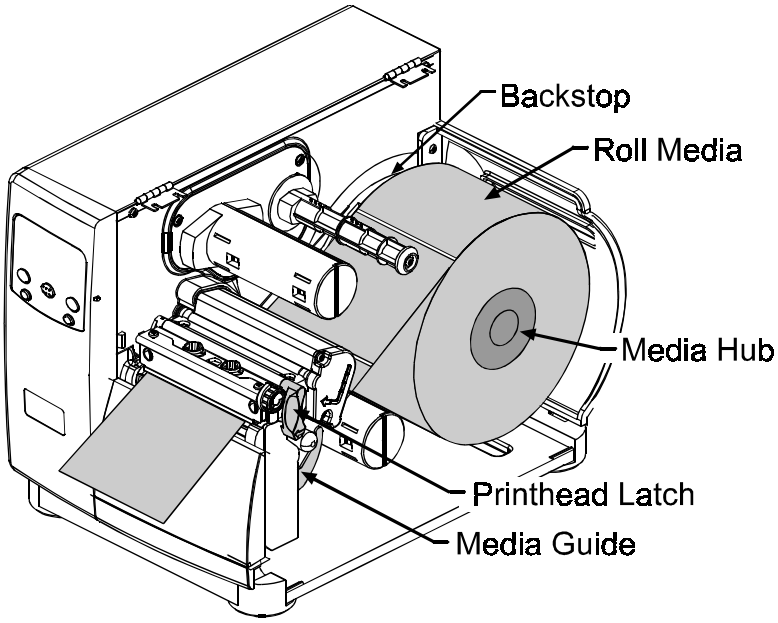


☞ Depending upon the type of media and printer options, several loading configurations are possible. All methods are detailed in the following subsections.

3.1.1 Roll Media

❶ Place the Media onto the hub and slide it over against the Backstop.

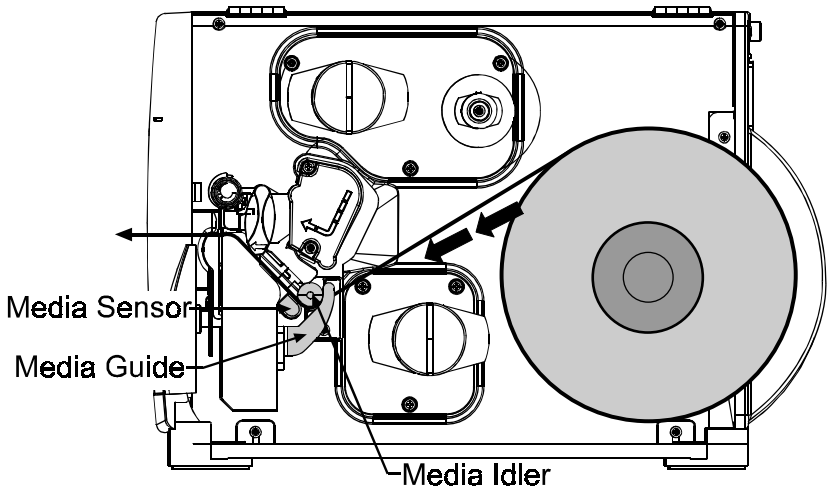
❷ Route the media through the printer as shown below: under the Media Idler, through the Media Sensor, and out the front of the printer.



❸ Raise and slide the Media Guide over to rest lightly against the media's edge.

❹ Slide the Media Sensor into position; see Section 5.0 for details.

❺ Lower the printhead by rotating the Printhead Latch to the locked position. Close the Access Cover.



☞ If you are printing with thermal transfer media, see Section 3.3 for ribbon loading instructions.

☞ If you have a thermal transfer printer but will be printing on direct thermal labels, see Section 4.1.1 for instructions to select direct thermal media in the Media Settings menu.

3.1.2 Fan-Fold Media

❶ Bring the media in through the Bottom or the Rear Media Slot.

❷ Depending upon the entry point, route the media as shown below.

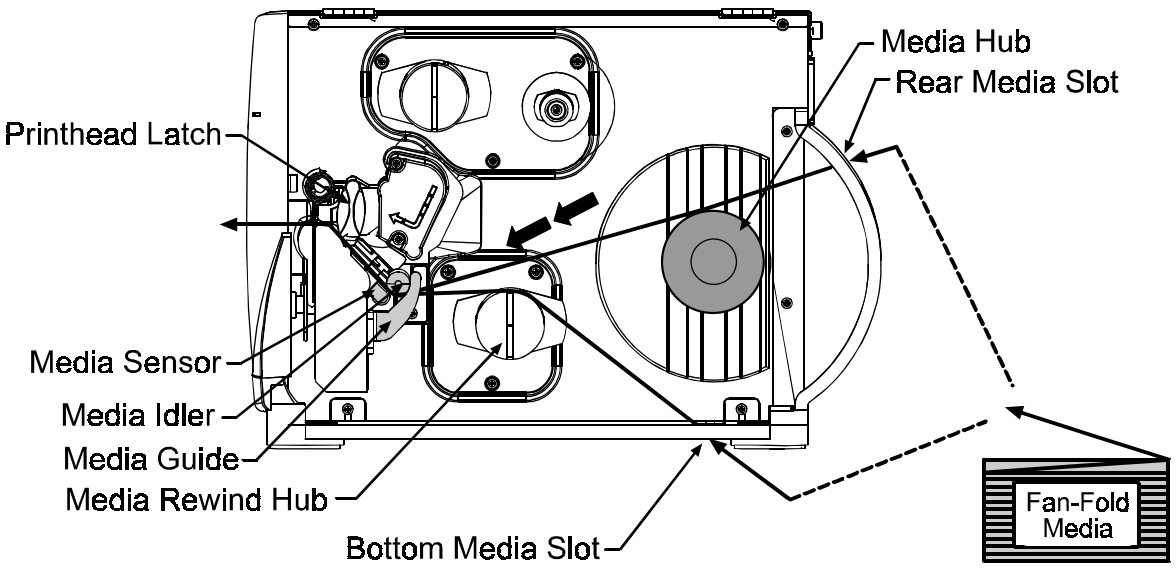
Rear Media Slot: route the media over the Media Hub.
Bottom Media Slot: route the media over the Media Rewind Hub.

❸ Continue routing the media under the Media Idler, through the Media Sensor and out the front of the printer.

❹ Raise and slide the Media Guide over to rest lightly against the edge of the media.

❺ Ensure the Media Sensor is correctly positioned; see Section 5.0 for details.

❻ Lower the printhead by rotating the Printhead Latch to the locked position. Close the Access Cover.



☞ If you are printing with thermal transfer media, see Section 3.3 for ribbon loading instructions.

☞ If you have a thermal transfer printer but will be printing on direct thermal labels, see Section 4.1.1 for instructions to select direct thermal media in the Media Settings menu.

3.2 Loading the Internal Media Rewinder

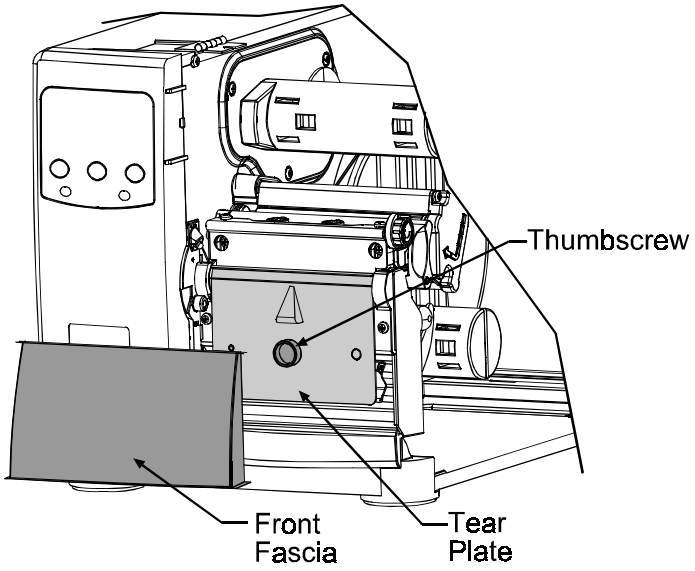
With the Internal Media Rewinder option, the printer can wind labels and backing material. In addition, if equipped with the Peel and Present option, labels can be separated automatically. The following subsections illustrate both set-ups.

3.2.1 Winding Labels

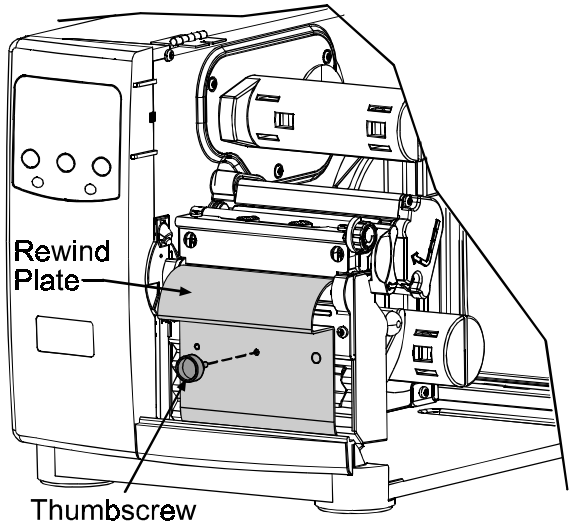
☑ **Note:** When winding labels, the outer diameter of the wound stock cannot exceed 6".

❶ Remove the Front Fascia.

❷ Remove the Tear Plate by first removing the Thumbscrew.



❸ Position the Rewind Plate on the printer and install and tighten the Thumbscrew.



❹ If installed, remove the Rewind Retainer and Media Clip from the Media Rewind Hub.

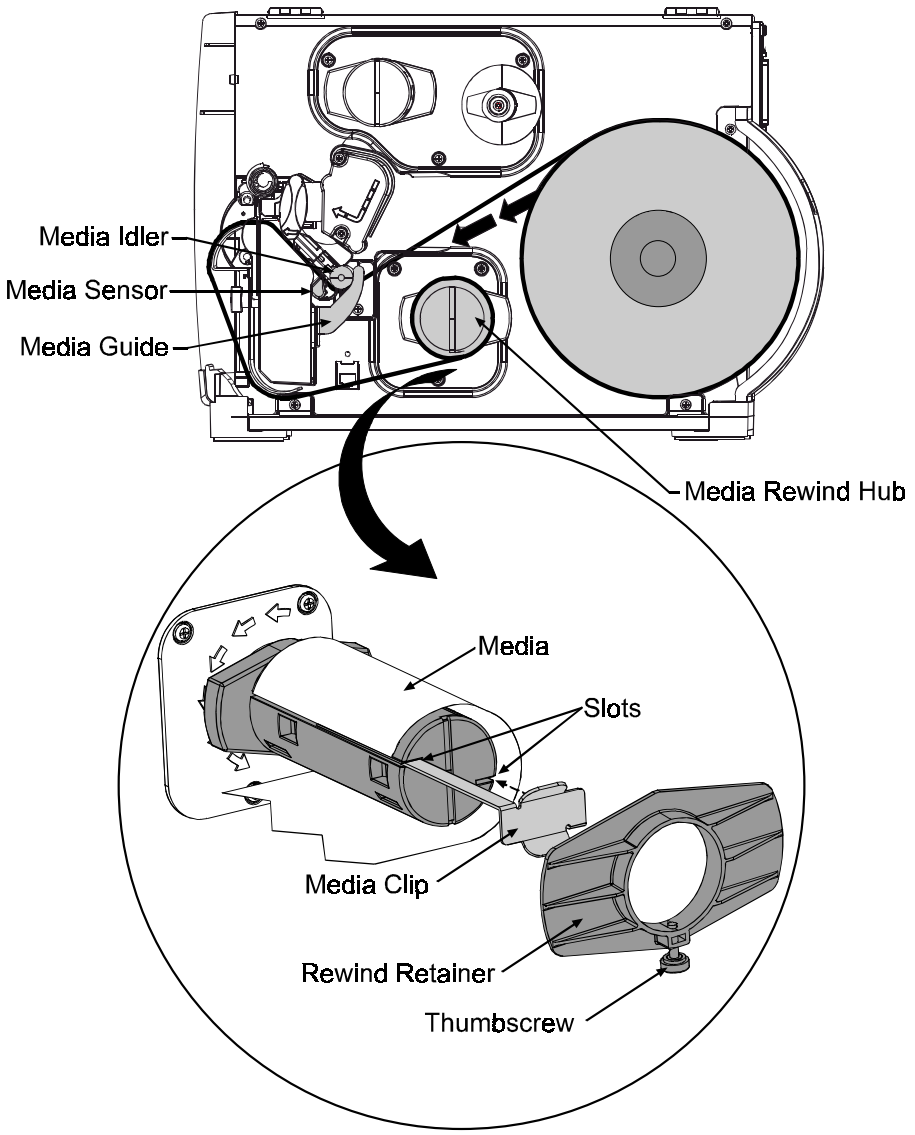
❺ With media loaded as described in Section 3.1, press the FEED key to advance approximately 20 inches (51 cm) of media.

(Continued next page)

❻ Route the media back to the Media Rewind Hub as shown below.

❼ Insert the media's leading edge into a Slot on the Media Rewind Hub then insert the Media Clip into a Slot to secure.

❽ Slide the Rewind Retainer onto the Media Rewind Hub to rest lightly against the outside edge of the media and tighten the Thumbscrew to secure. Manually rotate the hub to remove slack in the media.



☞ After finishing, close the Access Cover, then push and hold the FEED key for 4 seconds to secure the backing material and calibrate the TOF.

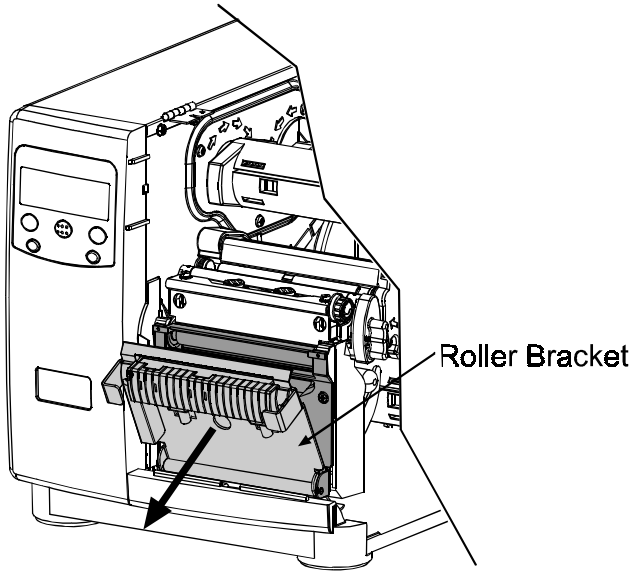
Removal:

Remove the Rewind Retainer and Media Clip. Grasp the end of the hub. While pulling outwardly, squeeze the hub together to collapse it and slide off the wound labels.

3.2.2 Winding with the Peel and Present Option

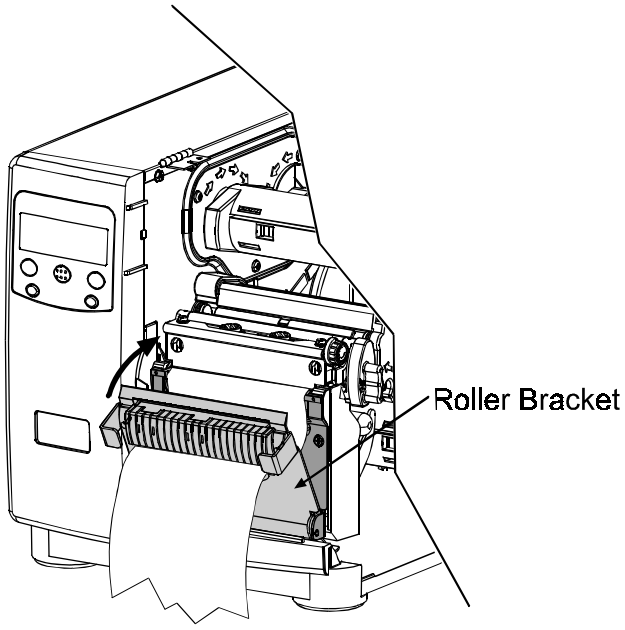
To remove labels automatically from the backing material (on-demand printing) ensure that the Peel and Present Mechanism is attached to the printer and complete the following loading steps.

❶ Pull outward on the Latch and allow the Roller Bracket to swing down.



❷ Load media and advance approximately 20 inches (51 cm) of media from the front of the printer. Remove all labels from the Backing Material.

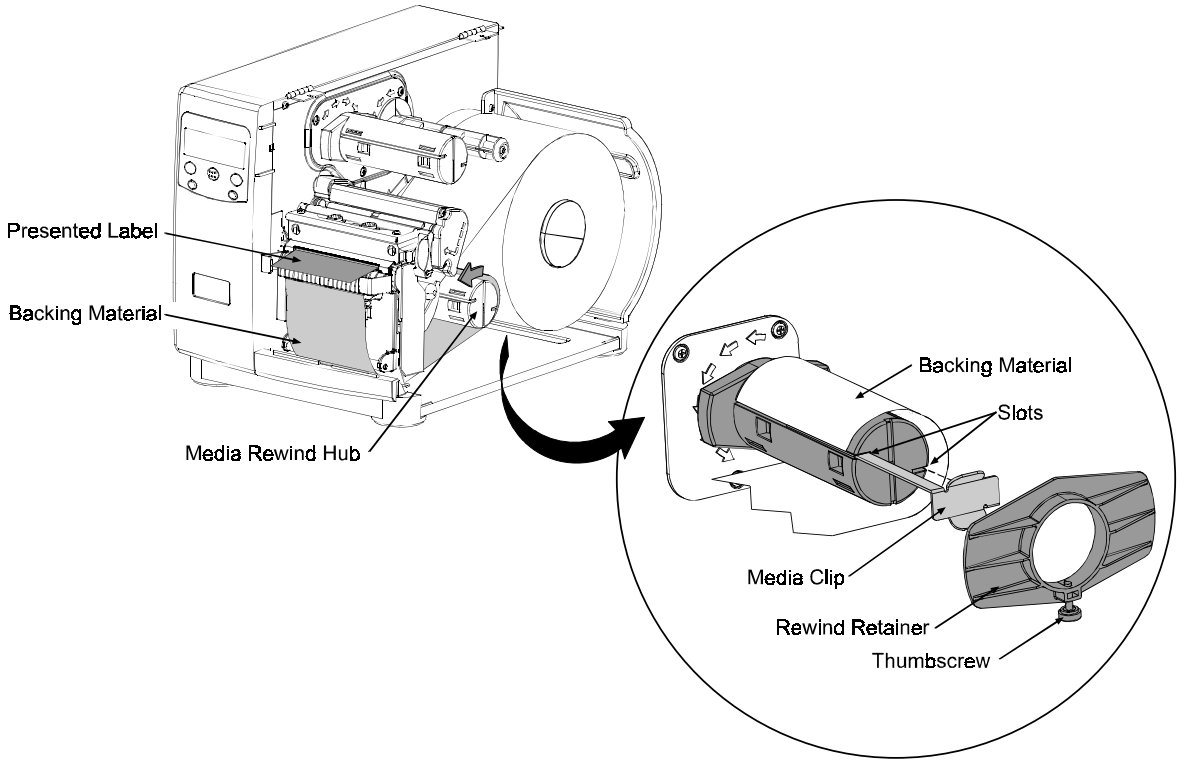
❸ Route the Backing Material through the Roller Bracket as shown. Raise the Roller Bracket up to its latched position.



(Continued next page)

❹ If installed, remove the Media Clip and the Rewind Retainer from the Media Rewind Hub. Route the Backing Material around the Media Rewind Hub, as shown.

❺ Insert the leading edge of the Backing Material into a Slot on the Rewind Hub and then insert the Media Clip into the Slot on the Rewind Hub to secure. Slide the Rewind Retainer onto the Media Rewind Hub. Rotate the Rewind Hub to remove any slack in the backing.



☞ After finishing, close the Access Cover, then push and hold the FEED key for four seconds to secure the backing material and calibrate the TOF.

☑ **Note:** After loading media, enable the Present Sensor for on-demand printing (see Section 4.1.3).

Removal:

Remove the Rewind Retainer and Media Clip. Grasp the hub. Pull the hub outward and squeeze to collapse it. Now slide off the backing material.

3.3 Loading Ribbon

☑ **Note:** Always use ribbon that is slightly wider than the media backing material; this helps protect against printhead wear.

To produce an image on thermal transfer media, ribbon is passed against the media surface. To load ribbon:

❶ Raise the Access Cover.

❷ Rotate the Printhead Latch forward to raise the printhead.

❸ Depending upon the directional arrows of the Ribbon Supply Hub (see the next page for examples), mount the ribbon so that it is dispensed in the appropriate direction for the ribbon type.

❹ Slide the ribbon on completely to rest against the flange.

❺ Route the ribbon under the Ribbon Roller then out the front of the printer.

❻ Continue routing the ribbon up to and around the Ribbon Take-Up Hub, as shown. Wind the ribbon around several times in a clockwise direction to secure it in place.

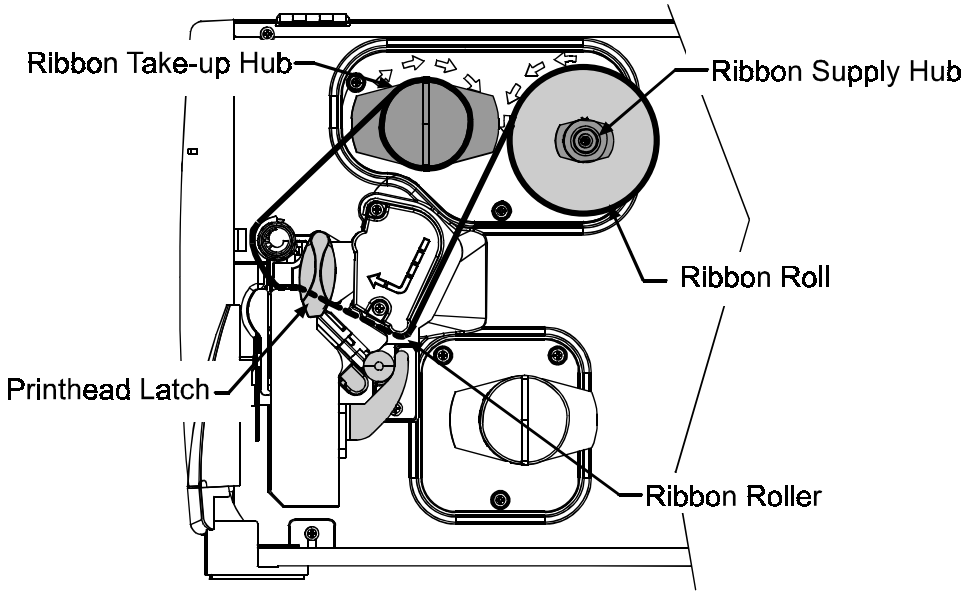
❼ Lower the printhead by rotating the Printhead Latch to the locked position. Close the Access Cover.

❽ With the printer 'On' press and hold the FEED button for four seconds to position the media for printing; see Section 5.1 for details.

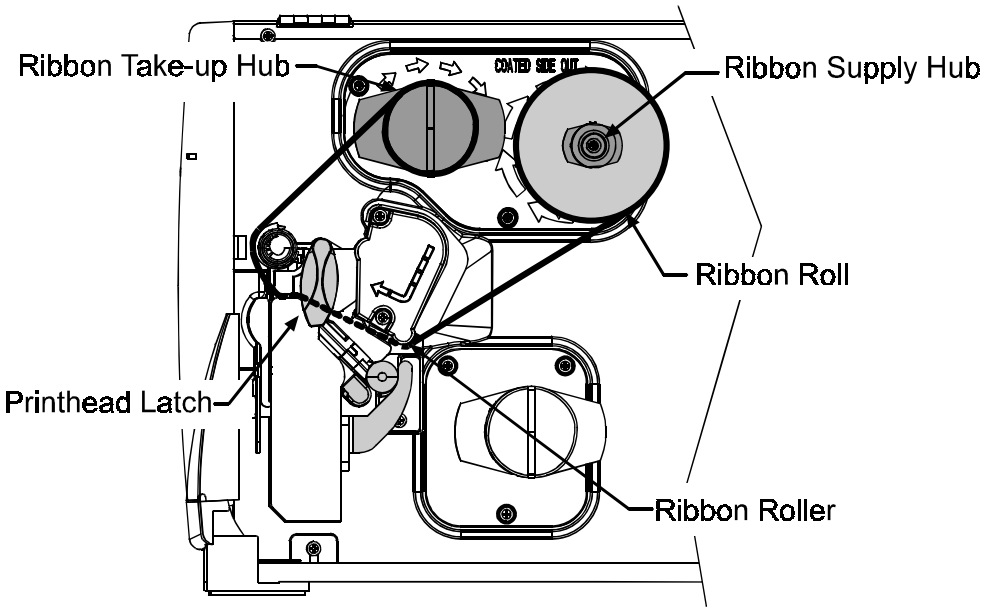
Removal:

Pull the empty core from the Ribbon Supply Hub and discard it. Grasp the Ribbon Take-Up Hub. Pull the hub outward and squeeze to collapse it. Now pull off the used ribbon.

☑ **Note:** Ribbon rolls are available with ink layer wound either “coating side in” or “coating side out”. Directional arrows near the Ribbon Supply Hub determine the correct coating configuration for use in the printer.



‘Coating Side In’ Routing Path



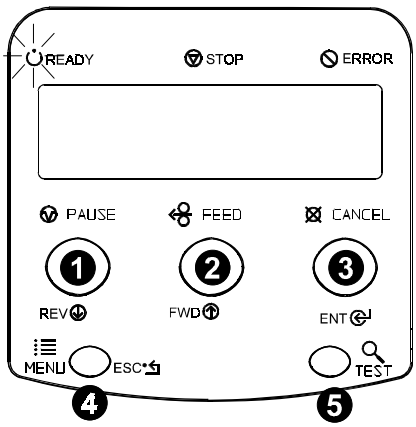
‘Coating Side Out’ Routing Path

4 Using the Front Panel

4.0 Operating the Front Panel

The front panel is equipped with five keys, 3 indicator lights and a Liquid Crystal Display (LCD). The key functions differ depending upon the selected mode of the printer. The selectable modes are Ready, Menu and Quick Test.

4.0.1 **Ready Mode:** Normal Operation (Ready Light 'On')



❶ **PAUSE**

The PAUSE key temporarily suspends printing. Pressing again returns the printer to normal operation.

❷ **FEED**

The FEED key advances one label, and clears any corrected faults.

Pressing and holding for 4 seconds will reset the expected label length for gap and reflective modes.

❸ **CANCEL**

The CANCEL key 'pauses' the printer and then prompts for confirmation. If yes, the current job is cancelled. The printer remains paused.

Pressing and holding for 4 seconds will reset the printer and clear temporary host settings (soft reset).

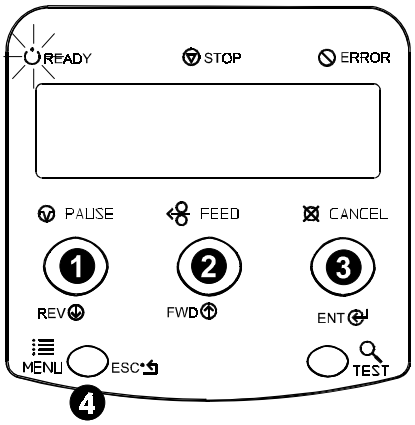
❹ MENU

The MENU key toggles between the Ready and Menu Modes. In the Ready mode, pressing and holding 4 seconds will change the display contrast.

❺ **TEST**

The TEST key enters (or exits) the Quick Test Menu.

4.0.2 **Menu Mode:** Configuration (Ready Light 'Flashing')



❶ REV

The DOWN ARROW key scrolls to the previous menu item on the same menu level. It also, decrements numerical values in most menu selections.

❷ FWD

The UP ARROW key scrolls to the next menu item. It also increments numerical values in most menu selections.

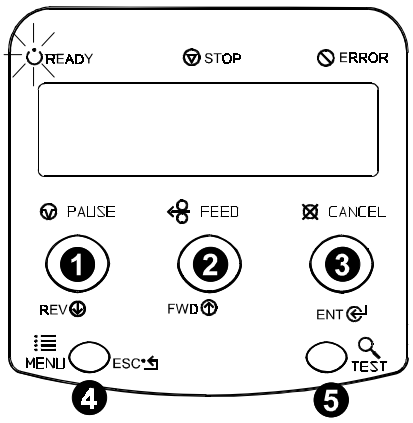
❸ ENT

The ENTER key selects the function, item or displayed value (selection is indicated with an '*' or '§' for "bootables" which require a reset to become effective). It also moves between selections in multiple parameter fields.

❹ ESC

The ESCAPE key moves to the previous menu level, and finally back to the READY mode.

4.0.3 **Quick Test Mode:** Print Test Labels



❶ REV

The DOWN ARROW key scrolls to the previous test function.

❷ FWD

The UP ARROW key scrolls to the next test function.

❸ ENT

The ENTER key will change the selected test label quantity of 2, 100, 1000, or 9999 (except the 'Configuration Label', this quantity is always one). Holding down the key scrolls quantities.

❹ ESC

The ESCAPE key will exit the Quick Test Mode without printing.

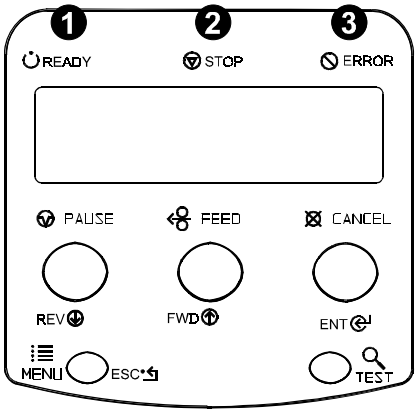
❺ **TEST**

The TEST key will print the selected test label at the selected quantity.

During test label printing, this key can also perform as a cancel key (the printer will prompt for confirmation before cancellation occurs).

☑ **Notes:** The test functions are disabled while processing data from communications interfaces until the Host Timeout value expires.

4.0.4 Indicator Lights



❶ READY

'On' indicates READY Mode.

'Slow Flashing' indicates Menu Mode.

'Fast Flashing' indicates data is being received and processed.

❷ STOP

'On' indicates a 'Paused' state.

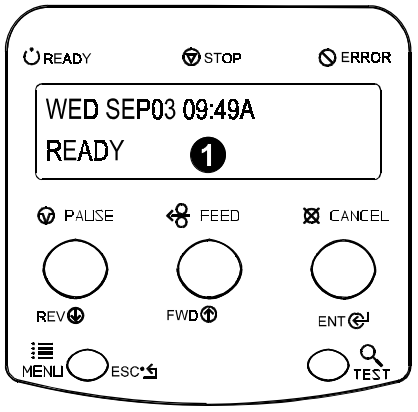
❸ ERROR

'Slow Flashing' indicates a *Warning*.

'Fast Flashing' indicates a *Fault.*

See Section 6.1 for a list of these messages.

4.0.5 LCD (Display)



❶ Liquid Crystal Display

The display provides several types of information:

- Following a brief power-up sequence, the READY message.
- The time and date, if the printer has received it from one of the following: the host, the front panel setting, or the Time and Date option.
- A label counter during a batch print job.
- Any prompt, condition, downloading, warning, or fault message.
- The Menu System when in the Menu Mode.

4.0.6 Resetting the Printer

Depending upon the method used, there are three reset levels possible:

4.0.6.1 Soft Reset

To reset the printer and clear any temporary host settings:

❶ With the printer 'On', press and hold the CANCEL key for approximately four seconds.

4.0.6.2 Level 1 Reset

To return the printer to the factory default settings:

❶ Turn 'Off' the printer.

❷ Press and hold the PAUSE and CANCEL keys while turning 'On' the printer; continue to depress the keys until the 'SYSTEM RESET' message flashes.

> ☑ **Note:** This reset can also be executed using the menu system: System Settings/Set Factory Defaults. See Section 4.1 for a listing of the factory default settings.

4.0.6.3 Level 2 Reset

To return the printer to the factory default settings, and clear all the calibration and adjustment parameters:

❶ Turn 'Off' the printer.

❷ Press and hold the PAUSE, FEED, and CANCEL keys while turning 'On' the printer; continue to depress the keys until the 'SYSTEM RESET' message flashes.

> ☑ **Note:** After executing a Level 2 Reset, the ribbon and media calibrations must be performed; see Sections 5.1 and 5.2. See Section 4.1 for a listing of the factory default settings.

4.1 Navigating the Menu System

Printer operation can be controlled through the user interface, allowing the operator access to these six menu system branches:

- Media Settings
- Print Control
- Printer Options
- System Settings
- Communications
- Diagnostics

While in the menu system, the current selection will be indicated with the '*' symbol next to the displayed item on the LCD, and selections designated with the '§' symbol will require a printer reset before becoming effective. Changes made can be saved so that, in the event that power is lost or removed, the new settings will be retained. A reset will be automatically invoked when exiting the menu system and answering 'Yes' to the 'Save Changes' prompt.

The same functional commands from the host computer may, in some cases, override the printer's menu settings. In addition, as a security feature for the prevention of accidental or unauthorized changes, the menu system has a password protection feature.

☑ **Note:** In the following subsections, the factory default settings are denoted with the '✧' symbol. Selections denoted with the '♦' symbol can only be changed through the menu system - all other selections can be overridden by host software commands. Consult the *Programmer's Manual* for specific information.

(Continued next page)

From Ready Mode, press the MENU key to enter the Menu Mode. Depending upon the configuration of the printer, the following is a list of the possible Enter and Exit Prompts.

☑ **Note:** While in the Menu Mode, the printer will stop processing new DPL (or bitmapped) data.

MENU MODE	*Enter/Exit Prompt Description:*
ENTER PASSWORD 0 0 0 0	*You are attempting to enter the Menu Mode. Security has been enabled and now the correct user-definable password is required for access the Menu Mode functions.*
KEEP HOST CHANGES? ENTER = YES	*You are now entering the Menu Mode. Host commands have affected the configuration of the printer. Pressing ENTER will save these changes; otherwise, the printer will revert to previously saved settings.*
SAVE CHANGES? ENTER = YES	*You are now exiting the Menu Mode, but have made changes to the printer's settings. Pressing ENTER will reconfigure your printer according to these changes; otherwise, the printer will revert to previously saved settings.*

4.1.1 Media Settings

MEDIA TYPE	*Selects the printing method.*
DIRECT THERMAL	*For use with heat sensitive media.*
✧THERMAL TRANSFER	*For use with media requiring a ribbon to create an image.*
SENSOR TYPE	*Selects the top-of-form (TOF) sensing method for the media.*
✧GAP	*The printer recognizes the TOF by sensing gaps in the media.*
CONTINUOUS	*No TOF sensing. The LABEL LENGTH setting determines the length.*
REFLECTIVE	*The printer recognizes the TOF by sensing reflective (black) marks on the media.*
LABEL LENGTH **✧04.00in (0-99.99)**	*When the Sensor Type is set to Continuous, this value is used to determine the TOF.*
MAXIMUM LABEL LENGTH **✧16.00in (0-99.99)**	*Sets the maximum length between TOF marks (gap or black stripe). If this limit is exceeded, a top of form fault is declared.*
LABEL WIDTH	*Sets the maximum limit for the printable surface width. Objects extending beyond this limit will not print; see Appendix C for the default values.*
SENSOR CALIBRATION ♦	*Adjusts the printer to sense your media.*
PERFORM CALIBRATION	*The user follows steps to allow the printer to calculate the empty, gap or mark, and paper values to set the media sensor.*
ADVANCED ENTRY	*The user directly inputs the best values to adjust the media sensor.*
SENSOR LEVELS	*Sets threshold values for the media sensor parameters. Manual entry for paper, gap/mark, and empty thresholds.*
SENSOR GAIN	*Observe A/D reading and set SENSOR GAIN. Adjusts the sensitivity of the sensor for custom label stock.*

4.1.2 Print Control

HEAT **✧10 (0-30)**	*Controls the 'burn-time' of the printhead. This is the equivalent of Heat Setting on most label software programs. See Section 2.1 for more on print quality control.*
PRINT SPEED	*Controls the rate of label movement during the printing process; see Appendix C.*
FEED SPEED	*Controls the rate of label movement between printing areas; see Appendix C.*
REVERSE SPEED	*Controls the rate of label movement during backup positioning for start of print, cutting or present distance; see Appendix C.*
ROW OFFSET **✧00.00in (0-99.99)**	*Shifts the vertical start of print position. This is the user setting for row adjustment.*
COLUMN OFFSET **✧00.00 in (0-99.99)**	*Shifts the horizontal, left-justified start of print position to the right without shifting the Label Width termination point to the right. This is the user setting for Column Adjust.*
PRESENT DISTANCE **✧0.00 in (0-4.00)**	*Sets the label stop position past the start of print. When the next label format is received, the printer will automatically backfeed to the start position. If a quantity of more than one label is printed without a present sensor enabled, or if the present distance is set to zero, the printer will operate without reversing.*

(Continued next page)

CUSTOM ADJUSTMENTS ♦	*These factory adjustments independently change the listed parameters to finely tune the printer and compensate for slight mechanical differences sometimes evident when multiple printers share label formats. In addition, each of the following adjustments has no factory default setting and restoring factory defaults will NOT affect these settings.*
DARKNESS XX (1-64)	*Controls the printhead strobe time to fine-tune the HEAT setting.*
ROW ADJUST XXX DOTS (0-128)	*Shifts the vertical start of print position upward in dots to fine-tune the ROW OFFSET setting; see Appendix C.* ☑ ***Note:*** *A Positioning Calibration must be performed before this parameter takes effect; see Section 5.1.*
COLUMN ADJUST XXX DOTS (0-128)	*Shifts both the horizontal start of print position and the LABEL WIDTH termination point to the right in dots to fine-tune the COLUMN OFFSET setting; see Appendix C.*
PRESENT ADJUST XXX DOTS (0-128)	*Adjusts the label stopping position in dots to fine-tune the PRESENT DISTANCE setting; see Appendix C.*

4.1.3 Printer Options

MODULES	*Memory available for user storage of graphics, fonts and label formats. (The physical presence of the respective memory module must be detected to show the function selections for that module in the menu system.) See Appendix C for a listing of all possible modules.*
PRINT DIRECTORY	*Prints a label directory of selected, or of all available modules, the available space on these modules, the files present, and the type of module and files.*
PRINT FILE	*The user may select from a list of available files for sample printing.*
FORMAT MODULE	*The user may select from a list of available modules for formatting – all data will be erased.*
DELETE FILE	*The user may select from a list of available files for deleting (protected modules will not appear). Bytes will NOT be retrieved until the module that contained the deleted file is packed.*
PACK MODULE	*Packing the module removes files marked as deleted and defragments existing file structures to recover space.*
PRESENT SENSOR	*Used for on-demand label dispensing, where a printed label blocking the sensor will inhibit further printing until removed. (The physical presence of the Present Sensor must be detected to show the ENABLE/DISABLE selections.)*
ENABLED	*Enables the sensor for on-demand printing.*
✧DISABLED	*Disables the sensor.*
NOT INSTALLED	*No sensor is detected.*

(Continued next page)

CUTTER	*Used to cut media into separate labels. (The physical presence of a cutter must be detected to show the ENABLE/DISABLE selections.)*
ENABLED	*Enables the cutter for label cutting.*
✧DISABLED	*Disables the cutter.*
NOT INSTALLED	*No cutter is detected.*

4.1.4 System Settings

INTERNAL MODULE **✧1024 KB**	*Sets the number of 1K blocks allocated for the internal RAM 'D' module. Available memory dependent upon model; see Appendix C.*
DEFAULT MODULE **✧D**	*Sets the default module used to store files when no other module is specified; see Appendix C.*
SCALEABLE FONT CACHE **✧312 KB**	*Sets the number of 1K blocks allocated for the scaleable font engine. Available memory dependent upon model; see Appendix C.*
SINGLE BYTE SYMBOLS	*Selects the code page used to print single byte fonts unless otherwise specified in DPL.*
✧PC_850 MULTILINGUAL	*61 selectable sets are standard; see the Programmer's Manual for details.*
DOUBLE BYTE SYMBOLS	*When equipped with the ILPC option, this selects the code page used to print double byte fonts unless otherwise specified in DPL; see the Programmer's Manual for details.*
JIS	*Japanese Industry Standard*
SHIFT JIS	*Shift Japanese Industry Standard*
EUC	*Extended UNIX Code*
✧UNICODE	*Unicode (including Korean)*
GB	*Government Bureau Industry Standard; Chinese (PRC)*
BIG 5	*Taiwan encoded*
TIME AND DATE	*Allows the user to set Time and Date.*

(Continued next page)

MEDIA COUNTERS	*Internal record of inches printed and time of use.*
ABSOLUTE COUNTER	*Shows the number of inches printed and number of hours the printer has been powered 'On' since being set at the factory. Not resettable by the user.*
RESETTABLE COUNTER	*The number of operational hours and inches printed from the date last reset. User may reset.*
RESET COUNTER	*Resets the resettable counters to zero.*
PRINT CONFIGURATION	*Prints the effective configuration of the system. In addition, if settings were changed that require a reset to become effective, this will be indicated with the '§' symbol.* *A '•' symbol next to the printed item indicates that it was changed via the host but not saved in non-volatile memory.*

CONFIGURATION LEVEL	*To upgrade the application program version (resident software) of the printer, the hardware and software compatibility levels must match for the update to be accepted. This information is displayed here and can also be found printed on the configuration label.*
PRINTER KEY	*Each printer has a unique KEY number in the following form:* *vvvv-wwxx-yyyyyy-zzz* *where:* *vvvv – represents the model number of the application loaded* *wwxx – represents the configuration level, where:* *ww – represents the hardware compatibility level of the main board* *xx – represents the software compatibility level (see below)* *yyyyyy – is a manufacturing date code* *zzz – is a unique time stamp*
UPGRADE PRINTER CODE	*The application version may only be updated with a configuration level of equal or lesser value than the software compatibility level; however, the printer's software compatibility level can be increased by purchasing and entering the proper upgrade code here.*

(Continued next page)

SET FACTORY DEFAULTS	*Parameters in this menu listing with the '✧' symbol are the designated defaults.*
SET FACTORY DEFAULTS	*Overwrite the current settings with the factory default settings or, if selected, will restore the Factory Setting File.* ☑ ***Note:*** *The reset will be automatic. All menu settings will be restored except CUSTOM ADJUSTMENTS and the media and ribbon sensor calibration parameters.*
FORMAT ATTRIBUTES	*Affects the manner in which overlapping text and graphics are treated as the label is printed. Consult the Programmer's Manual for details.*
TRANSPARENT	*Intersecting text strings, images, and bar codes will not be printed. (An odd number of overlapping objects will print.)*
✧XOR	*Intersecting text strings, images, and bar codes print on top of one another.*
OPAQUE	*Interacting text strings, images, and bar codes are obliterated by those formatted last. Each character cell is treated as opaque.*
IMAGING MODE ♦	*Instructs the printer whether to pre-image the label format.* ☑ ***Note:*** *This selection can affect the accuracy of time-stamped labels and label throughput.*
✧MULTIPLE LABEL	*The printer images multiple labels as memory permits, achieving the fastest throughput; however if time-stamping, the time will reflect the moment the label is imaged rather than when actually printed.*
SINGLE LABEL	*The printer images the next label only after the previous label has been successfully printed; this single processing provides more accurate time-stamps with a minor cost to label throughput.*

(Continued next page)

System Settings (continued)

PAUSE MODE	*When enabled, PAUSE MODE suspends printing between each label until the PAUSE key is pressed.*
ENABLED	*Printer requires operator to press the PAUSE key after each label.*
✧DISABLED	*Printer completes label batch without pausing between labels.*
SECURITY ♦	*Provides the user with the ability to password protect all printer settings made through the operator panel.*
SELECT SECURITY	*Enable or disable the menu system's security feature.*
ENABLED	*Password protected.*
✧DISABLED	*No protection.*
MODIFY PASSWORD	*Modify the password required to access the menu system when security is enabled.*
UNITS OF MEASURE	*Selects the measurement system in which the system's settings are represented in the menu system and on configuration labels.*
METRIC	*Metric standard: Lengths in millimeters; Counters in centimeters.*
✧IMPERIAL	*Inch standard: Lengths and Counters given in inches.*

(Continued next page)

☑ **Note:** The following menu selections will only appear according to the model of your printer.

PLUS EMULATION	*This instructs the firmware to process specific DPL data as would the Prodigy Plus® printer.*	***mi-4206, mi-4208 & mi-4212*** *Models*
ENABLED	*The column position, bar code height, line width, and column offset commands are interpreted as 200 DPI calculations. This calculation is slightly smaller than the actual 203 DPI value.*	
✧DISABLED	*Label formats interpreted normally.*	
ALLEGRO EMULATION	*This instructs the firmware to process specific DPL data as would the Allegro® printer.*	
ENABLED	*The row position is calculated based on 194 DPI. This calculation is slightly smaller than the actual 203 DPI value.*	
✧DISABLED	*Label formats interpreted normally.*	

DPI EMULATION	*For users who want to print DPL files intended for a 203 DPI printer.*	***mi-4406*** *Model*
✧DISABLED	*Label formats interpreted as intended for 406 DPI.*	
203 DOTS PER INCH	*Label formats interpreted as intended for 203 DPI.*	

DPI EMULATION	*For users who want to print DPL files intended for a 203 or 300 DPI printer.*	***mi-4604*** *Model*
✧DISABLED	*Label formats interpreted as intended for 600 DPI.*	
300 DOTS PER INCH	*Label formats interpreted as intended for 300 DPI.*	
203 DOTS PER INCH	*Label formats interpreted as intended for 203 DPI.*	

(Continued next page)

SOP EMULATION	*Provides backward compatibility with start of print position commands in label formats designed for other printers.*
110 (PRODPLUS)	*Emulates the Prodigy Plus® printer.*
220 (ALLEGRO)	*Emulates the Allegro® printer.*
250 (PRODIGY)	*Emulates the Prodigy™ printer.*
✧DISABLED	*No emulation, natural start of print position.*
BACK AFTER PRINT	*When the cutter and present sensor are enabled, this setting determines the timing of the label back up.*
✧ENABLED	*Commands the printer to immediately back up the label after the cut operation is complete or after the present sensor is clear. Provides the advantage of faster throughput.*
DISABLED	*The printer will not initiate repositioning until the next label is ready to print. May help prevent the curling of the label edge.*
MENU LANGUAGE ♦	*Selects the language in which the menu system messages and configuration label are shown. Only languages that are resident will be available.*
✧ENGLISH	*English*
FRENCH	*French*
ITALIAN	*Italian*
GERMAN	*German*
SPANISH	*Spanish*
USER DEFINED	*User defined, downloaded language(s).*

4.1.5 Communications

SERIAL PORT A♦	*Controls the communications settings for Serial Port A.*
BAUD RATE	*Determines the serial communication rate.*
38400	*38400 bits per second*
28800	*28800 bits per second*
19200	*19200 bits per second*
✧9600	*9600 bits per second*
4800	*4800 bits per second*
2400	*2400 bits per second*
1200	*1200 bits per second*
PROTOCOL	*Sets the data flow control (handshaking) method.*
✧BOTH	*Uses both handshaking methods.*
SOFTWARE	*XON/XOFF*
HARDWARE	*CTS/DTR*
NONE	*No flow control is used.*
PARITY	*Sets Word parity*
✧NONE	*No parity*
ODD	*Odd parity*
EVEN	*Even parity*
DATA BITS	*Sets Word length*
7	*Seven bit Word length*
✧8	*Eight bit Word length*
STOP BITS	*Sets the number of stop bits*
✧1	*One stop bit*
2	*Two stop bits*
SERIAL PORT B♦	*Same as Serial Port A, for optional wireless connection. If not installed, this displays "NOT INSTALLED" when accessed.*

(Continued next page)

PARALLEL PORT A♦	*Controls the communications settings for Parallel Port A.*
PORT DIRECTION	*Determines if messages are sent from the printer to the host via the parallel port.*
✧UNI-DIRECTIONAL	*One-way printer communication.*
BI-DIRECTIONAL	*Enables IEEE 1284 back-channel operation.*
PARALLEL PORT B♦	*Same as Parallel Port A, for optional Ethernet connection. If not installed, this displays "NOT INSTALLED" when accessed.*
HOST SETTINGS	*Settings which affect all communications with a host.*
HOST TIMEOUT ✧03 SEC (1-60)	*The number of seconds a communications port must be idle before the printer may process data from a different port. This value is also used to "timeout" an image / label download.*
CONTROL CODES ♦	*Allows the operator to change the prefix of the software commands interpreted by the printer.*
✧STANDARD CODES	*Hex 01 = SOH command; Hex 02 = STX command; count-by = ^; Hex 1B = ESC; Hex 0x0D = Carriage Return*
ALTERNATE CODES	*Hex 5E = SOH command; Hex 7E = STX command; count-by = @; Hex 1B = ESC; Hex 0x0D = Carriage Return*
ALTERNATE CODES 2	*Hex 5E = SOH command; Hex 7E = STX command; count-by = @; Hex 1B = ESC; Hex 0x7C = Carriage Return*
ALTERNATE CODES 3	*Hex 5E = SOH command; Hex 23 = STX command; count-by = @; Hex 1B = ESC; Hex 0x0D = Carriage Return*

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FEEDBACK CHARACTERS	*Returns a Hex 1E, [RS], after each label successfully prints, and a Hex 1F, [US], after each batch of labels is printed.*
ENABLED	*Feedback characters are sent to the host.*
✧DISABLED	*No feedback characters are sent.*

ESC SEQUENCES	*Allows data containing invalid ESC control code sequences to be processed.*
✧ENABLED	*Normal printer operating mode.*
DISABLED	*ESC sequences are ignored and the data is processed. Bitmapped font downloads are disabled in this mode.*

HEAT COMMAND	*Allows the user to disable the DPL Heat Command, providing compatibility with other printers.*
✧ENABLED	*Normal printer operating mode.*
DISABLED	*DPL Heat Commands are ignored. The heat value is controlled via the menu setting (see Print Control, Section 4.1.2).*

SPEED COMMANDS	*Allows the user to disable the DPL speed commands (Print, Feed, and Reverse).*
✧ENABLED	*Normal printer operating mode.*
DISABLED	*DPL speed commands are ignored. The print, feed and backup speeds are controlled via the menu setting (see Print Control, Section 4.1.2).*

4.1.6 Diagnostics

HEX DUMP MODE	*Most commonly used for trouble shooting. Prints data and instructions received from the host rather than interpreting them (see Section 6.2).*
ENABLE	*Prints raw ASCII data received from the host rather than executing the commands.*
✧DISABLE	*Executes and prints label formats (normal operating mode).*
OPTIONS TESTING	*Tests currently installed options*
TEST PRESENT SENSOR	*Performs a functional test of the Present Sensor circuitry.*
TEST CUTTER	*Performs a functional test of the optional cutter mechanism and circuitry.*
PERFORM TEST 1 TIME	*The cutter will cycle 1, 10 or 100 times (selectable). The results of each attempt will be displayed.*
PRINT TEST RATE (MIN) **✧0 (0-120)**	*The number of minutes to delay between the printing of batches of labels.*
SENSOR READINGS	*Analog Sensor readings are displayed.*
THR TRAN RIBM 24V → 255 255 255 255	*Live sensor values are displayed. View can be toggled with forward and reverse keys. Maximum values are shown in this example: thermistor sensor, transmissive (gap) media sensor (TRAN is replaced with REFL when the SENSOR TYPE is set to 'reflective'), ribbon sensor, 24 volt power supply sensor.*
← PS HD RANK 255 255 255	*Present sensor, head down sensor, printhead ranking resistor.*
RIBBON SENSOR LIMITS	*Displays ribbon sensor ADC low and high values used for motion detection. A Level 2 reset is required to change these values.*
RIBBON ADC LOW HIGH 070 104	*Approximate default values are shown here (actual values will vary).*

4.2 Understanding the Display Messages

The printer generates and displays four different types of information (if not in the menu system or Quick Test Mode):

- User Prompts and Condition Messages
- Application Update Messages (see Section 5.6.3)
- Fault Messages (see Section 6.1)
- Warning Messages (see Section 6.1)

4.2.1 The User Prompts and Condition Messages

User Prompts indicate a required user operation. When outside the menu system, Condition Messages indicate a current printer operation or state, as follows:

User Prompts and Condition Messages		
Displayed Message	**Description**	**Condition(s)**
CLEARING FAULTS	The printer is trying to clear a fault condition.	Occurs when the FEED key is pressed after the correction of a fault.
CALIBRATING	A calibrated feed operation is being performed.	The FEED key was pressed and held four seconds, or during a label feed when the TOF was expected but the media sensor did not detect one.
CANCEL PRINT JOB? ENTER KEY = YES	The CANCEL or TEST key was pressed during a batch job.	The current print batch will be cancelled if ENTER is pressed; the remaining labels will not be printed.
ENTER PASSWORD xxxx	Security protection is enabled on the printer. Provide the correct user-definable password to proceed.	You are attempting to enter Menu Mode; however, a password entry is required for access.

(Continued next page)

User Prompts and Condition Messages (continued)		
Displayed Message	**Description**	**Condition(s)**
KEEP HOST CHANGES? ENTER = YES	You are now entering the Menu Mode and existing host changes have affected the menu settings.	Pressing ENTER will save these host changes to the menu; otherwise, the printer will revert to previously saved settings.
PAUSED	The printer is paused or offline.	The printer is in a paused condition.
XXXX OF XXXX PRINTING	The print job is being processed.	Batch status indication, updated with each label printed.
READY	READY Mode.	Normal operating mode. The printer is ready to receive and process label formats.
REMOVE LABEL	The Present Sensor option is enabled and a printed label is awaiting removal.	A label blocks the Present Sensor; remove it to continue printing.
SAVE CHANGES ENTER KEY = YES	You are now exiting the menu, but have made changes to the settings of the printer. Pressing 'ENTER' will save these changes; if not, the printer will revert to previously saved settings.	Menu changes have affected the configuration of the printer. ☑ **Note:** If changes have been made that require a reset, the printer will automatically invoke that reset.

(Continued next page)

User Prompts and Condition Messages (continued)		
Displayed Message	**Description**	**Condition(s)**
SYSTEM INITIALIZING	Normal power-up / soft reset condition.	Follows the 'SYSTEM RESET IN PROGRESS' message after a reset or power-up.
SYSTEM RESET IN PROGRESS	Normal power-up / soft reset condition.	Occurs when the user resets the printer via the host or Front Panel.
UNCALIBRATED	The media calibration is not set.	Perform calibration. See Section 5.2.

4.3 Printing from the Quick Test Mode

This section explains the functions of the resident Quick Tests, accessible by pressing the TEST key on the Front Panel.

☑ **Notes:** With the exception of the Configuration Label, all Quick Test labels require 4-inch (102mm) wide media to capture all format information. When using less than full width media, change the Label Width setting to the width of the material to avoid printing on the platen (see Section 4.1.2).

During any Quick Test Label run, pressing the ESC key or the TEST key will stop printing.

4.3.1 Print Quality Label

The Print Quality Label provides an indication of overall print quality at a pre-selected heat and speed setting. This format consists of compliant bar codes in fence and ladder orientations, assorted font sizes, and graphic fill patterns. These can be used to ensure conformance, as well as aesthetics. To print a Print Quality Label:

❶ Press the TEST key.

❷ Use the FWD key to scroll to 'Print Quality Label'.

❸ Use the ESC key to select a quantity; see Section 4.0.3.

❹ Press the TEST key to start printing.

4.3.2 Configuration Label

The Configuration Label provides valuable printer database information, as detailed in Section 4.1.

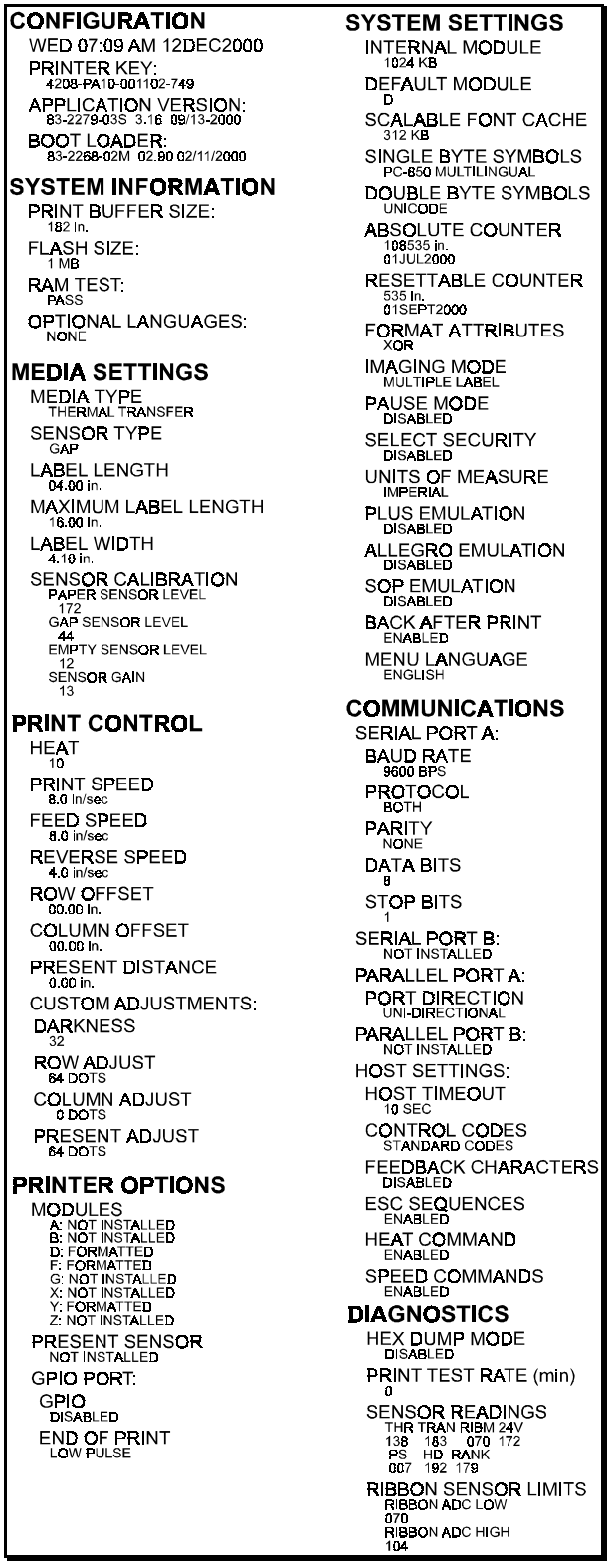
☑ **Note:** The Configuration Label content can vary with the application version and model of the printer. To print all label information, the media cannot be less than 2 inches wide (51mm) and the Label Width setting must match the width of the media being used (see Section 4.1.2).

To print a Configuration Label:

❶ Press the **TEST** key.

❷ Use the FWD key to scroll to 'Print Configuration'.

❸ Press the **TEST** key to start printing.



CONFIGURATION
WED 07:09 AM 12DEC2000
PRINTER KEY:
4208-PA10-001102-749
APPLICATION VERSION:
83-2279-03S 3.16 09/13-2000
BOOT LOADER:
83-2268-02M 02.90 02/11/2000

SYSTEM INFORMATION
PRINT BUFFER SIZE:
182 In.
FLASH SIZE:
1 MB
RAM TEST:
PASS
OPTIONAL LANGUAGES:
NONE

MEDIA SETTINGS
MEDIA TYPE
THERMAL TRANSFER
SENSOR TYPE
GAP
LABEL LENGTH
04.00 in.
MAXIMUM LABEL LENGTH
16.00 In.
LABEL WIDTH
4.10 in.
SENSOR CALIBRATION
PAPER SENSOR LEVEL
172
GAP SENSOR LEVEL
44
EMPTY SENSOR LEVEL
12
SENSOR GAIN
13

PRINT CONTROL
HEAT
10
PRINT SPEED
8.0 In/sec
FEED SPEED
8.0 in/sec
REVERSE SPEED
4.0 in/sec
ROW OFFSET
00.00 In.
COLUMN OFFSET
00.00 In.
PRESENT DISTANCE
0.00 in.
CUSTOM ADJUSTMENTS:
DARKNESS
32
ROW ADJUST
64 DOTS
COLUMN ADJUST
0 DOTS
PRESENT ADJUST
64 DOTS

PRINTER OPTIONS
MODULES
A: NOT INSTALLED
B: NOT INSTALLED
D: FORMATTED
F: FORMATTED
G: NOT INSTALLED
X: NOT INSTALLED
Y: FORMATTED
Z: NOT INSTALLED
PRESENT SENSOR
NOT INSTALLED
GPIO PORT:
GPIO
DISABLED
END OF PRINT
LOW PULSE

SYSTEM SETTINGS
INTERNAL MODULE
1024 KB
DEFAULT MODULE
D
SCALABLE FONT CACHE
312 KB
SINGLE BYTE SYMBOLS
PC-850 MULTILINGUAL
DOUBLE BYTE SYMBOLS
UNICODE
ABSOLUTE COUNTER
108535 in.
01JUL2000
RESETTABLE COUNTER
535 In.
01SEPT2000
FORMAT ATTRIBUTES
XOR
IMAGING MODE
MULTIPLE LABEL
PAUSE MODE
DISABLED
SELECT SECURITY
DISABLED
UNITS OF MEASURE
IMPERIAL
PLUS EMULATION
DISABLED
ALLEGRO EMULATION
DISABLED
SOP EMULATION
DISABLED
BACK AFTER PRINT
ENABLED
MENU LANGUAGE
ENGLISH

COMMUNICATIONS
SERIAL PORT A:
BAUD RATE
9600 BPS
PROTOCOL
BOTH
PARITY
NONE
DATA BITS
8
STOP BITS
1
SERIAL PORT B:
NOT INSTALLED
PARALLEL PORT A:
PORT DIRECTION
UNI-DIRECTIONAL
PARALLEL PORT B:
NOT INSTALLED
HOST SETTINGS:
HOST TIMEOUT
10 SEC
CONTROL CODES
STANDARD CODES
FEEDBACK CHARACTERS
DISABLED
ESC SEQUENCES
ENABLED
HEAT COMMAND
ENABLED
SPEED COMMANDS
ENABLED

DIAGNOSTICS
HEX DUMP MODE
DISABLED
PRINT TEST RATE (min)
0
SENSOR READINGS
THR TRAN RIBM 24V
138 183 070 172
PS HD RANK
007 192 179
RIBBON SENSOR LIMITS
RIBBON ADC LOW
070
RIBBON ADC HIGH
104

4.3.3 Quick Ribbon Test Label

The Ribbon Test Label features a compliant picket-fence bar code that can be used to verify thermal transfer and print quality functions. To print a Quick Ribbon Test Label:

❶ Press the **TEST** key.

❷ Use the FWD key to scroll to 'Ribbon Test Label'.

❸ Use the ESC key to select a quantity; see Section 4.0.3.

❹ Press the **TEST** key to start printing.

4.3.4 Dot Test Pattern Label

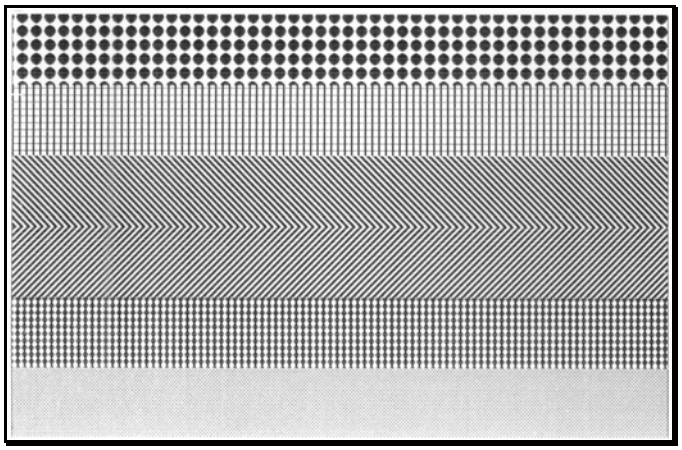
The Dot Test Pattern Label tests the printhead to determine the condition of each thermal element. Pattern examples are shown below. To print a Dot Test Pattern Label:

❶ Press the **TEST** key.

❷ Use the FWD key to scroll to 'Dot Test Pattern'.

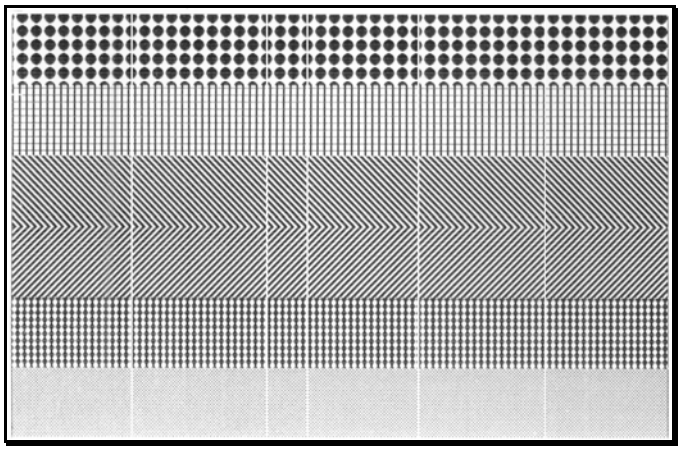
❸ Use the ESC key to select a quantity; see Section 4.0.3.

❹ Press the **TEST** key to start printing.



Good Test Pattern Label:

Even pattern consistency indicates the printhead is operating normally.



Faulty Test Pattern Label:

Streaks indicate a dirty or faulty printhead. See Section 5.5.1 for cleaning instructions.

4.3.5 Validation Label

The Validation Label is another useful tool for evaluating overall print quality. To generate a Validation Label:

❶ Press the TEST key.

❷ Use the FWD key to scroll to 'Validation Label'.

❸ Use the ESC key to select a quantity; see Section 4.0.3.

❹ Press the TEST key to start printing.

4.3.6 User Defined Label

The User Defined Label will reprint the last label printed (unless the printer was powered-off between the printing of the last label and the request to print a user defined label). This label is recalled from the print buffer and can be any of the Quick Test labels, a label format from the host, or a label format recalled from a memory module.

5 Maintenance and Adjustments

☞ The correct hardware adjustments, regular maintenance, and calibrations found in this section will help ensure the continued peak performance of your printer.

5.0 Media Sensor Adjustment

The laterally adjustable Media Sensor detects the presence of media and the top-of-form of all media types except continuous stock, which is set through programming. For proper detection, the Sensor Eye Mark should be positioned as noted in the table below. If messages such as 'Out Of Stock' or 'Top of Form Fault' appear, the sensor position may need adjustment.

Media Type*	Sensor Type	Sensor Eye Mark Position
Standard die-cut	Gap	Near the middle of the label
Circular die-cut	Gap	Directly over the apex
Notched	Gap	Directly over the notch
Reflective	Reflective	Directly over the black mark
Continuous	Continuous	Near the middle of the label

*See Section 7 for an explanation of the media requirements.

To adjust the Media Sensor position:

❶ With the printer powered 'On', media loaded, and the access cover open, rotate the Printhead Latch forward to raise the printhead.

❷ Pass the media through the Media Sensor then position the Sensor Eye Mark over the label's TOF mark (see drawing next page) by grasping and moving the Slide Tab 'in' or 'out'.

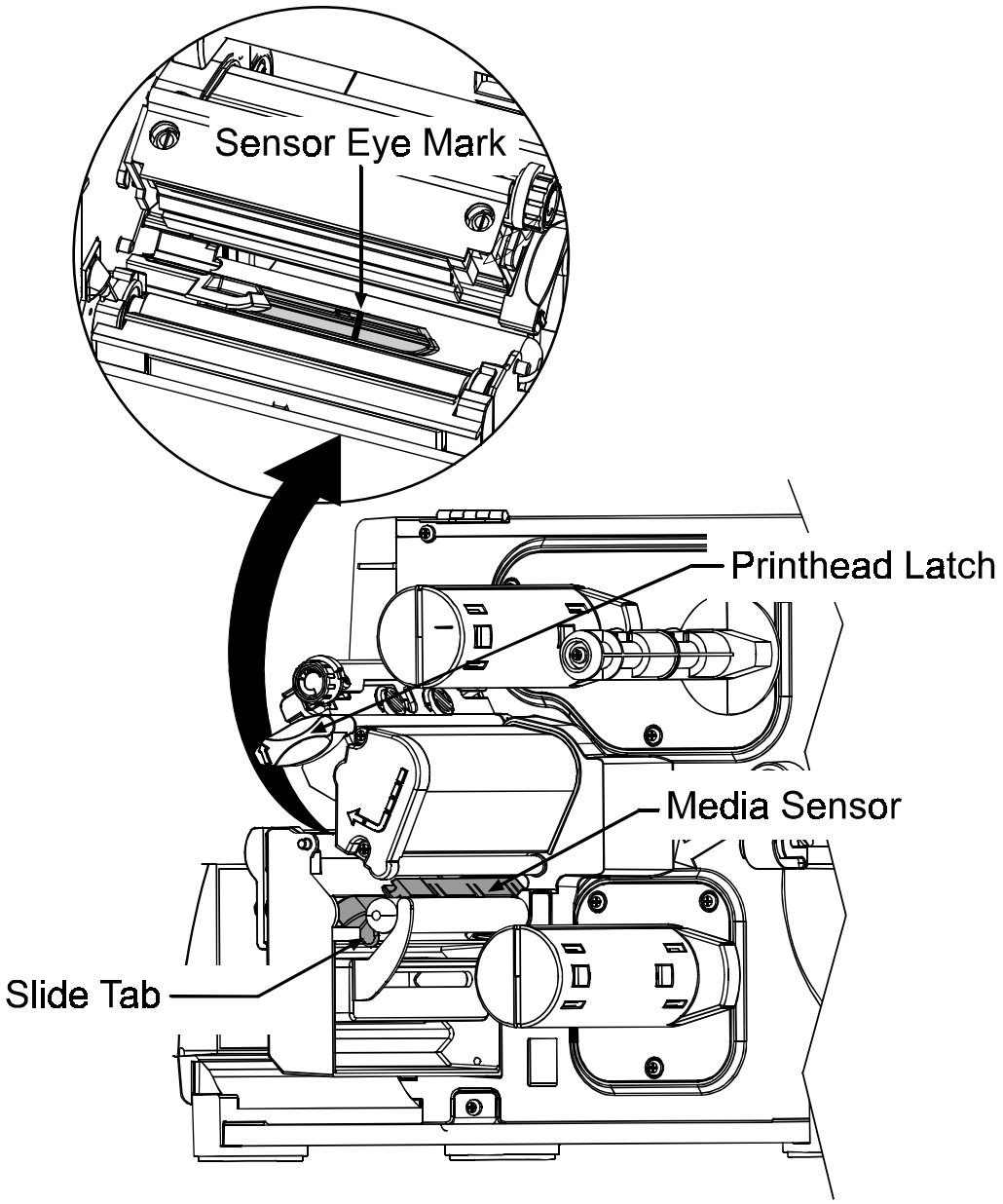
❸ Lower the printhead by rotating the Printhead Latch to the locked position. Close the Access Cover.

(Continued next page)

❹ Enter the Media Settings menu and verify that the correct 'Sensor Type' is selected; see Section 4.1.1.

❺ Exit the menu and return to READY mode.

❻ Press and hold the FEED key until 2-3 labels are advanced (approximately 4 seconds) to set the TOF; see Section 5.1. If 'Uncalibrated', 'Top of Form Fault', or 'Position Error' is displayed go to Section 5.2.



☑ **Note:** Changes to the start of print position can be made using the Print Control/Row Adjust or Row Offset (see Section 4.1.2).

5.1 Positioning Calibration

The Positioning Calibration sets the printer's TOF, calculates the label length, and calibrates the ribbon sensor on printers equipped with the thermal transfer option. Perform this procedure for:

Die-cut and reflective media –

- After changing media.
- After a Media Sensor Calibration.
- When a 'Position Fault' message is displayed.
- When a 'Ribbon Fault' message is displayed while ribbon is installed.

Continuous media –

- When a 'Ribbon Fault' message appears while ribbon is installed.

To perform a Positioning Calibration:

With media and ribbon (for thermal transfer equipped models) loaded, press and hold the FEED key for approximately 4 seconds or until 2-3 labels advance. Upon completion, the 'Ready' message will be displayed.

☑ **Notes:** If 'Uncalibrated' is displayed, first calibrate the Media Sensor; see Section 5.2.

If a 'Ribbon Fault' is displayed, first perform a Level 2 reset before calibrating; see Section 4.0.6. (Ribbon sensor calibration must be performed with a ribbon installed and with the printer configured for the thermal transfer printing; see Section 4.1.1.)

5.2 Media Sensor Calibration

Media Sensor calibration should be performed during initial printer setup, if switching media types, or if an 'Uncalibrated' message is displayed. To ensure that each label is detected correctly and reliably, two different methods are available to calibrate the printer: Standard and Advanced Entry.

5.2.1 Standard Calibration

The first calibration method is appropriate for most media types. The printhead is raised for visual access to the media. Sensor readings are displayed to provide an indication of the sensor's best position over the media, a position that becomes critical when using reflective or notched stock with a small TOF mark.

(Continued next page)

☑ **Note:** If the label stock contains preprinted information, position the sensor over an unmarked label area.

Three Media Sensor readings are required:

Empty: Nothing in the sensor.

Mark or Gap: Only the backing material, notch, or reflective mark in the sensor.

Paper: The label (with the backing material attached) in the sensor.

To perform a Standard Calibration:

Step	Operator Action	Displayed Message	Comment
1	Turn 'On' the printer.	READY	Wait until 'Ready' is displayed.
2	Press the MENU key to enter Menu Mode. Raise the printhead for visual access to the Media Sensor and load label media.	MENU MODE MEDIA SETTINGS	See Section 4.0.2 for details.
3	Press the ENT key to enter the Media Settings menu.	MEDIA SETTINGS MEDIA TYPE	See Section 4.1.1 for details.
4	Press the FWD key.	MEDIA SETTINGS SENSOR TYPE	See Section 4.1.1 for details.
5	Press the ENT key. Use the FWD key to scroll to the desired sensor type and press the ENT key to enable the selection.	SENSOR TYPE *GAP	See Section 4.1.1 for details. The enabled selection will be indicated with an *.

(Continued next page)

Standard Calibration (continued)

Step	Operator Action	Displayed Message	Comment
6	Press the ESC key. Use the FWD key to scroll to 'Sensor Calibration'.	MEDIA SETTINGS SENSOR CALIBRATION	See Section 4.1.1 for details. Press the ESC key to abort this procedure.
7	Press the ENT key.	SENSOR CALIBRATION PERFORM CALIBRATION	See Section 4.1.1 for details.
8	Press the ENT key. Ensure no label media is in the Media Sensor then press any key.	REMOVE LABEL STOCK PRESS ANY KEY <yyy>	Sets the parameter for the 'out of stock' condition. Where 'yyy' is a numerical value representing the current sensor reading.

(Continued next page)

Standard Calibration (continued)

Step	Operator Action	Displayed Message	Comment
9	Proceed according to the media type: **Die-cut stock:** remove approximately six inches of label material from the backing (liner) and place the backing under the Sensor Eye Mark. **Notched stock:** place the notched area in the sensor and adjust the Sensor Eye Mark over the notch. **Reflective media:** place the black mark (face down) in the sensor and adjust the Sensor Eye Mark over the black mark. Press any key to continue.	SCAN BACKING PRESS ANY KEY <yyy> *-OR-* SCAN MARK PRESS ANY KEY <yyy>	Sets the parameter for the 'gap' or 'mark' value. Where 'yyy' is a numerical value representing the current sensor reading. If the 'Sensor Type' is set to 'Continuous', this step is skipped, going directly into Step 10.
	☑ **Note:** After the Media Sensor has been adjusted, do not readjust the position.		

(Continued next page)

Standard Calibration (continued)

Step	Operator Action	Displayed Message	Comment
10	Place the label (and backing) under the Sensor Eye Mark. Press any key to continue.	SCAN PAPER PRESS ANY KEY <yyy>	Calculates the parameter settings for the 'Paper' value. Where 'yyy' is a numerical value representing the current sensor reading.
11	Depending upon the 'Sensor Type' selection, observe the display for the calibration message.	GAP MODE CALIBRATION COMPLETE *-OR-* REFLECTIVE MODE CALIBRATION COMPLETE *-OR-* CONTINUOUS MODE CALIBRATION COMPLETE	The calibration was successful. See 'Calibration Problems' (next page) for other possible messages.
12	Exit upon successful calibration: Back out of the menu tree by repeatedly pressing the ESC key. Press and hold the FEED key, approximately 4 seconds, to calibrate the label position.	POSITION FAULT	The label position must be set before continuing.
13	The printer is now ready to begin printing.	READY	

5.2.1.1 Calibration Problems

If problems occur during calibration, one of the following messages will be displayed. The 'Comment' column addresses the most likely cause and the corrective action to be taken (if any) for each situation.

Displayed Message	Action	Comment
GAP MODE WARNING LOW BACKING	Press any key.	The printer measured only a small difference between the 'empty' and 'gap' readings. Transparent backing or notched type media typically gives this indication. In this case, there may be a slight delay in the 'Out of Stock' indication, after the media supply is emptied.

Or:

Displayed Message	Action	Comment
GAP MODE CANNOT CALIBRATE	Press any key.	Only a small difference or no change in low sensor readings was detected. Ensure that nothing is stuck in the media sensor. Retry calibration. If the problem persists, perform the 'Advanced Entry Calibration'; see Section 5.2.2. If in reflective mode – REFLECTIVE MODE will be displayed instead of GAP MODE.

Or:

Displayed Message	Action	Comment
GAP MODE FAULTY SENSOR	Press any key.	Consistently high readings were received which could indicate a faulty sensor. Ensure that no labels are stuck in the media sensor. Retry calibration. If the problem persists, call for service. When in reflective mode – REFLECTIVE MODE will be displayed instead of GAP MODE.

5.2.1.2 Preprinted Labels

In some cases, due to the color(s) of certain preprinted label information, the media sensor may have trouble differentiating between the preprinted areas and liner. If the printer continues to experience TOF faults after performing the Standard Calibration, enter the menu system, go to Media Settings/Sensor Calibration/Advanced Entry/Sensor Gain, and try decreasing the sensor's sensitivity, as follows:

Gap Sensing – Lower the displayed Gain Setting by one or two points, (remember to press the ENTER key to select the item) then exit the menu system after saving the changes.

Reflective Sensing – Raise the displayed Gain Setting by one or two points, (remember to press the ENTER key to select the item) then exit the menu system after saving the changes.

5.2.2 Advanced Entry Calibration

The second calibration method is the Advanced Entry Calibration. **This method overrides all previous calibration settings and should be used only if the Standard Calibration method has failed.** The procedure has two parts:

1) Sensor Gain: Different algorithms are used for sampling, to produce different measurements for the media.

2) Sensor Levels: At a selected gain, values are directly input for 'Paper', 'Mark' or 'Gap', and 'Empty' variables.

To perform an Advanced Entry Calibration:

Step	Operator Action	Displayed Message	Comment
1	Turn 'On' the printer.	READY	
2	Press the MENU key to enter Menu Mode. Raise the printhead assembly for visual access to the Media Sensor and media.	MENU MODE MEDIA SETTINGS	See Section 4.0.2 for details.

(Continued next page)

Advanced Entry Calibration (continued)

Step	Operator Action	Displayed Message	Comment
3	Press the ENT key to enter the Media Settings menu.	MEDIA SETTINGS MEDIA TYPE	See Section 4.1.1 for details.
4	Press the FWD key.	MEDIA SETTINGS SENSOR TYPE	See Section 4.1.1 for details.
5	Press the ENT key. Use the FWD key to scroll to the desired sensor type and press the ENT key to enable the selection.	SENSOR TYPE *GAP	When enabled, the selection will be indicated by an '*'.
6	Press the ESC key. Use the FWD key to scroll to 'Sensor Calibration'. Press the ENT key.	MEDIA SETTINGS SENSOR CALIBRATION	Press the ESC key to abort this procedure.
7	Use the FWD key to scroll to 'Advanced Entry'. Press the ENT key.	SENSOR CALIBRATION ADVANCED ENTRY	See Section 4.1.1 for details.
8	Press the ENT key.	ADVANCED ENTRY SENSOR GAIN	See Section 4.1.1 for details.
9	Place the label under the Sensor Eye Mark and lower the printhead. Using the FWD key increment the Gain Number. Press the ENT key to select the new setting and then record the sensor reading (the 'yyy' value). Repeat this process for each of the Gain Numbers. These are the **Label Values**.	GAIN TRAN <yyy> *00 <0 - 31> *-OR-* GAIN REFL <yyy> *00 (0 - 31)	Ensure that an unmarked label area (free of preprinting) is under the Sensor Eye Mark.

(Continued next page)

Advanced Entry Calibration (continued)

Step	Operator Action	Displayed Message	Comment
10	Proceed according to media type: **Die-cut stock:** remove approximately six inches of label material from the backing and place the backing under the Sensor Eye Mark. Lower the printhead. **Notched stock:** place the notched area in the sensor and adjust the Sensor Eye Mark over the notch. Lower the printhead. **Reflective stock:** place the black mark (face down) in the sensor and adjust the Sensor Eye Mark over the mark. Lower the printhead. Using the FWD key increment the Gain Number. Press the ENT key to select the new setting and then record the sensor reading (the 'yyy' value). Repeat this process for each of the Gain Numbers, recording each value. These are the **TOF Values**.	GAIN TRAN <yyy> *00 (0 - 31) *-OR-* GAIN REFL <yyy> *00 (0 - 31)	Where 'yyy' is a numerical value representing the current sensor reading. ☑ **Note:** After the Media Sensor has been adjusted, do not readjust the position.

(Continued next page)

Advanced Entry Calibration (continued)

Step	Operator Action	Displayed Message	Comment
11	Using the Gain Number data collected from Steps 9 and 10, subtract each Label Value from the TOF Value. From the resulting list of Difference Values, select the largest number. Its associated Gain Number is the best selection for the media. See the example from ***mi-4212*** below.	GAIN TRAN <yyy> *00 (0 - 31) *-OR-* GAIN REFL <yyy> *00 (0 - 31)	Where 'yyy' is a numerical value representing the current sensor reading. Both sensor readings must be above 20.

Gain Number	Label Value	TOF Value	Difference Value
00	255	254	1
01	251	240	11
02	241	213	28
03	231	182	49
04	219	150	69
05	212	119	93
06	200	88	112
07	189	58	131
08	178	32	146
09	167	20	147
10	156	17	139
11	146	16	130
12	136	15	121
13	126	15	111
…	…	…	…
30	116	14	102
31	112	14	98

Example from the data compiled in the table above: Gain Algorithm Number 8 should be used because it has the highest difference value (146) where both the Label Value and the TOF Value is above 20.

(Continued next page)

Advanced Entry Calibration (continued)

Step	Operator Action	Displayed Message	Comment
12	Using the FWD key, select the Gain Number as determined in Step 11. Press the ENT key to enable the entry.	GAIN TRAN <yyy> *08 (0 - 31) *-OR-* GAIN REFL <yyy> *08 (0 - 31)	When enabled, the selection will be indicated with an '*'.
13	Using the 'Gain Number' set in Step 12, complete the following steps: ❶ Place the label under the Media Sensor. Record the sensor reading and label it "P" (paper). ❷ Place the backing, mark, or notch under the Media Sensor. Record the sensor reading and label it "G" or "M" (gap or mark, respectively). ❸ Remove all media. Record the sensor reading and label it "E".	GAIN TRAN <yyy> *08 (0 - 31) *-OR-* GAIN REFL <yyy> *08 (0 - 31)	Where 'yyy' is a numerical value representing the current sensor reading.
14	Press the ESC key. And then press the FWD key.	ADVANCED ENTRY SENSOR LEVELS	

(Continued next page)

Advanced Entry Calibration (continued)

Step	Operator Action	Displayed Message	Comment
15	Press the ENT key. Using the FWD or the REV key set the 'Paper' level to the value determined in the previous step. Press the ENT key to set the entry and advance the menu. Repeat for the 'Mark' or 'Gap' and 'Empty' levels.	PAPER SENSOR LEVEL P*178 G*136 E*014 ↓ GAP SENSOR LEVEL P*178 G*32 E*014 *-OR-* MARK SENSOR LEVEL P*178 G*32 E*014 ↓ EMPTY SENSOR LEVEL P*178 G*32 E*011	
16	Press the ESC key to back out of the menu and then press the ENT key to save the settings and return to the Main Menu and Ready Mode.	SAVE CHANGES? ENTER KEY = YES	From Ready Mode, press and hold the FEED key, approximately 4 seconds, to calibrate the label position.

5.3 Printhead Adjustments

To ensure even and consistent print quality across a wide range of media types, widths and thickness, the printhead assembly is equipped with two adjustments: the Leveling Cam and the Burn Line.

5.3.1 Leveling Cam Adjustment

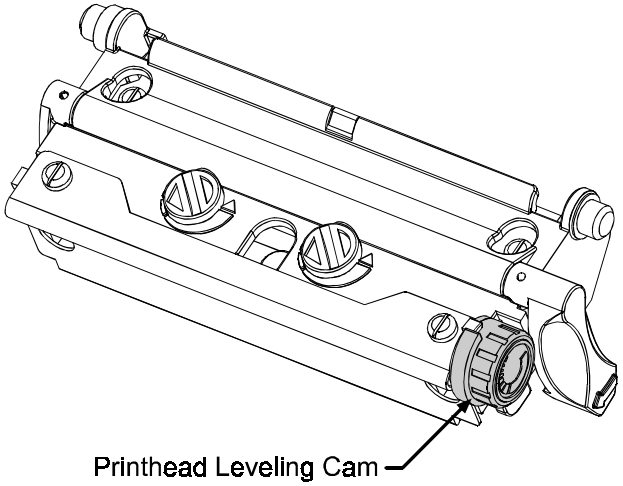
The Printhead Leveling Cam raises and lowers the right side of the printhead assembly. Perform this adjustment when using media that is less than the full width of the Platen Roller.

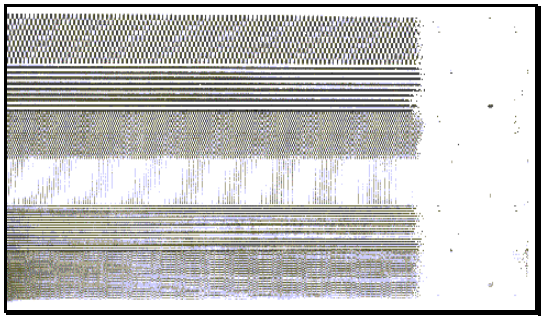
❶ Load the printer with media.

❷ Download a label format or use a Quick Test label.

❸ Begin printing and examine the right side of the label.

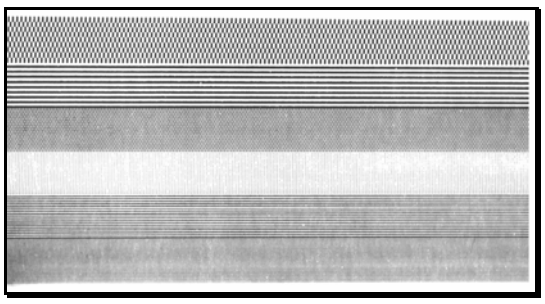
❹ Rotate the Printhead Leveling Cam clockwise or counter-clockwise until even print is achieved across the width of the label (see examples below).





Leveling Cam Adjustment (too much):

An over-adjustment produces an image that gradually fades across the label. To correct, decrease the setting of the Printhead Leveling Cam.



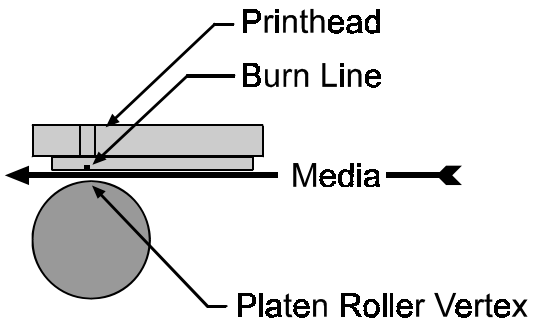
Correct Leveling Cam Adjustment:

The correct adjustment produces a complete image with even contrast across the label (see note below).

☑ **Note:** An incorrect cam adjustment (too little) can cause ribbon wrinkling and label tracking problems, in addition to excessive Platen Roller and Printhead wear.

5.3.2 Burn Line Adjustment

The Burn Line is the row of thermal elements extending the length of the printhead that creates the image on the media. At the factory, the printhead is adjusted to strict compliance requirements using 6.5-mil (.0065 inch) media, enabling the printer to maintain print quality for a majority of media.



Depending upon the printing option, the printhead alignment is different. The burn line on thermal transfer equipped printers is positioned forward of the platen roller vertex to allow the wax/ink to separate easily from the ribbon base film and adhere to the label while hot. Conversely, the burn line on direct thermal only models is positioned closer to the vertex for more efficient heat transfer.

When media with a different thickness or rigidity is used (e.g., heavy tag stock), an adjustment may be needed *if* the print quality has been adversely affected. Generally, thicker media requires a slight forward adjustment of the printhead while thinner media requires a backward adjustment to compensate for the change in the burn line to vertex relationship.

To adjust the Burn Line of the printhead:

❶ With the printer loaded with media (and ribbon, if thermal transfer printing), lower and rotate the Printhead Latch to the locked position.

❷ Loosen the two Locking Screws.

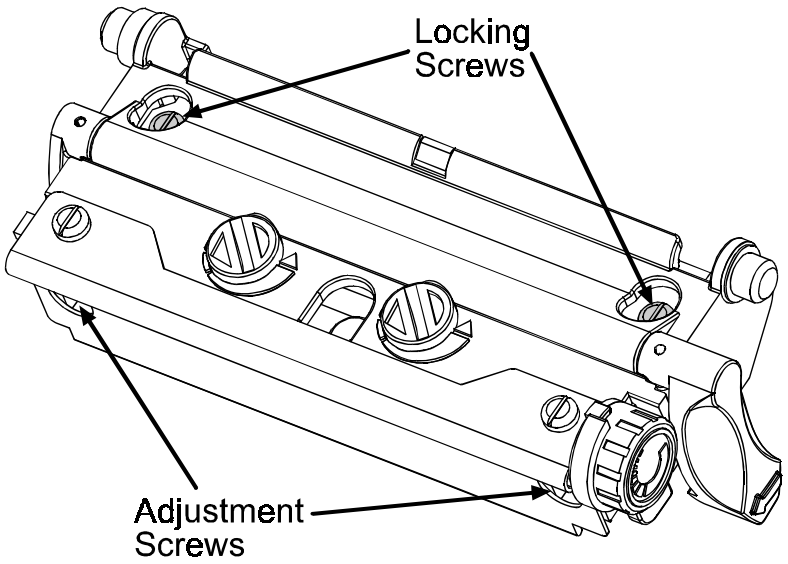
❸ Turn the Adjustment Screws counter-clockwise until the Burn Line is past the Platen Roller vertex. Print a Validation Label from the Quick Test menu. The label should look light and uneven.

❹ Tighten the Locking Screws just until they are 'snug'– tight enough to remove any play in the printhead assembly, yet loose enough to allow the Adjustment Screws to move the printhead.

(Continued next page)

❺ Turn each Adjustment Screws clockwise about ¼ a turn (or 1/8 a turn for finer adjustments). Print another Validation Label and examine the print quality. Repeat this step until labels with even print contrast (darkness) and acceptable print quality are produced.

❻ Tighten the Locking Screws. Print a final Quick Test label to verify the adjustment.

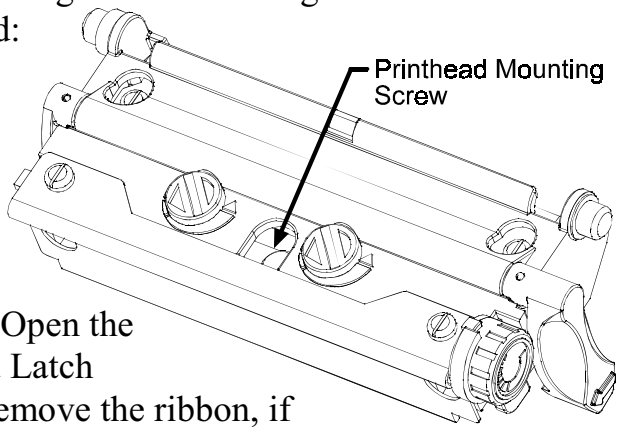


☑ **Note:** When the Locking Screws are 'snug', turning the Adjustment Screws counter-clockwise will not move the printhead outward. If you have adjusted the printhead too far inward, restart the entire procedure.

5.4 Printhead Replacement

☑ **Note:** The printhead is fragile; use extreme care when handling. Never use a sharp object on the printhead surface. If you have any questions or concerns regarding this procedure, contact a qualified technician or our Technical Support.

Locating pins eliminate the need for an alignment following the installation of a new printhead. To replace the printhead:



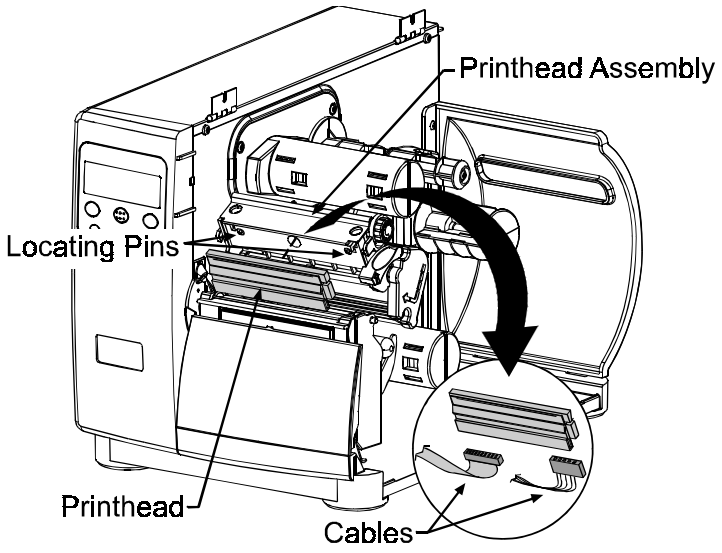
❶ Touch a metal part of the printer's frame to discharge any static electricity that may be present on your body.

❷ Turn 'Off' and unplug the printer. Open the Access Cover, rotate the Printhead Latch forward and raise the printhead. Remove the ribbon, if installed.

❸ Lower and rotate the Printhead Latch to the locked position.

❹ Loosen the Printhead Mounting Screw (it will remain captivated in the assembly). Rotate the Printhead Latch forward to the unlocked position.

❺ Raise the assembly. While carefully holding the Printhead, disconnect the two Cables and then remove the old Printhead.



❻ While carefully holding the new Printhead, connect both Cables.

❼ Position the Printhead onto the Locating Pins in the Printhead Assembly and secure in place with the Printhead Mounting Screw. (Do not over-tighten this screw.)

❽ Clean the Printhead; see Section 5.5.1.

❾ Reload ribbon, if removed. Lower and rotate the Printhead Latch to the locked position. Plug in and turn 'On' the printer.

5.5 Cleaning Schedule

A clean printer operates efficiently. The following list of cleaning items and table below provides the recommended schedule and technique for cleaning the various parts of your printer safely and effectively.

- Isopropyl alcohol
- Cotton swabs
- A clean, lint-free cloth
- Soft-bristle brush
- Soapy water/mild detergent
- Compressed air

CAUTION

For your continued safety and to avoid damage, always turn 'Off' and unplug the printer before cleaning.

Isopropyl alcohol is a flammable liquid; always take proper precautions when using this solvent.

Recommended Cleaning Schedule		
Area	**Method**	**Interval**
Printhead	Using a cotton swab dampened with isopropyl alcohol, clean the printhead from end to end, removing all build-up. See Section 5.5.1. **WARNING!** Before cleaning, allow time for the printhead to cool.	Clean after each roll or box of labels, or after each roll of ribbon.
Platen Roller	Using a cotton swab dampened with isopropyl alcohol, rotate the platen and remove all build-up. See Section 5.5.2.	Clean after each roll or box of labels, or after each roll of ribbon.
Media Path / Tear Plate	Compressed air / soft-bristle brush and isopropyl alcohol. Remove all build-up along the path that the ribbon and paper follow through the printer.	As needed, based on a weekly visual inspection.
Media Sensor	Compressed air, isopropyl alcohol if needed. Remove all build-up.	Monthly or as needed.
Interior	Soft-brush or compressed air. Remove all build-up. See Section 5.5.3.	As needed.
Exterior	Mild detergent. Remove all build-up. See Section 5.5.3.	As needed.

5.5.1 Cleaning the Printhead

If print quality declines (e.g., non-compliant bar codes, print dropouts, or streaks: see Section 4.3.4), the typical cause is debris build-up on the printhead. Furthermore, when the build-up is not removed it may lead to element failure, greatly reducing the life of the printhead. To clean the printhead:

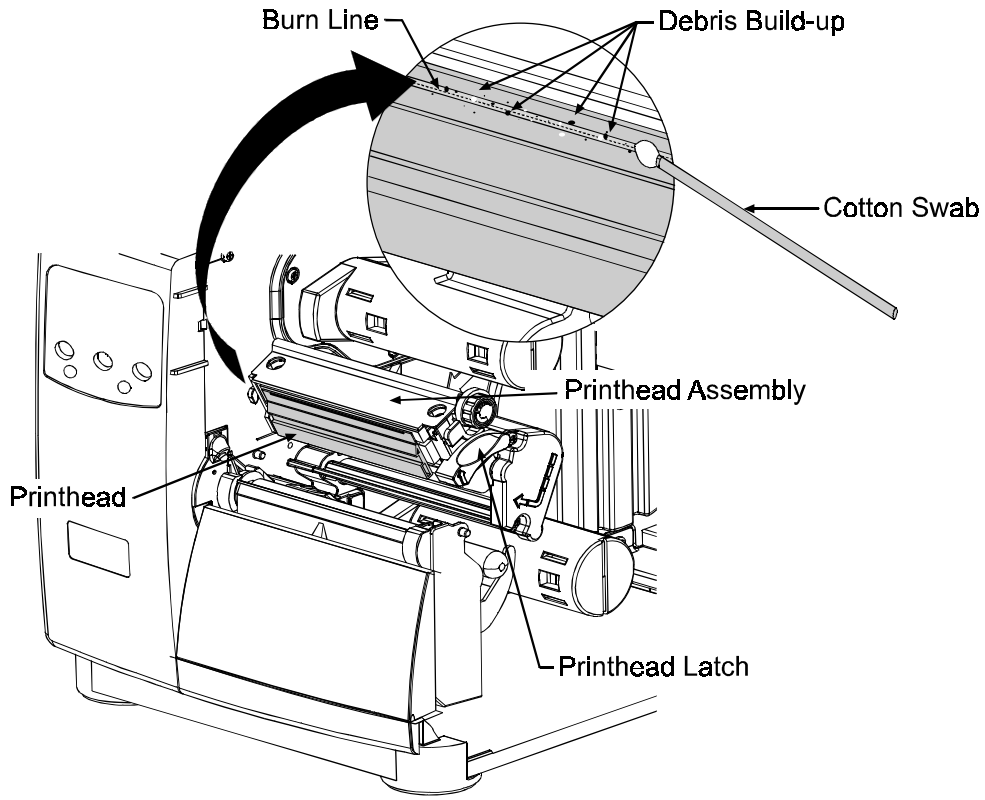
❶ Turn 'Off' and unplug the printer.

❷ Open the access cover. Unlock the Printhead Latch and raise the Printhead Assembly. Move media and ribbon away from the printhead as necessary.

❸ Gently wipe off all debris build-up on the Printhead surface, paying close attention to the burn line, using a cotton swab moistened, not soaked, with isopropyl alcohol. Allow the printhead to dry.

❹ Replace the ribbon and media. Lower and rotate the Printhead Latch to the locked position.

❺ Close the cover. Plug in and turn 'On' the printer. Feed several labels to normalize tracking.



CAUTION NEVER use a sharp object to clean the Printhead.

5.5.2 Cleaning the Platen Roller

A platen roller contaminated with grit, label adhesive, or ink can cause a decline in print quality and, in extreme cases, cause labels to stick and wrap around the roller. To clean the platen roller:

❶ Turn 'Off' and unplug the printer.

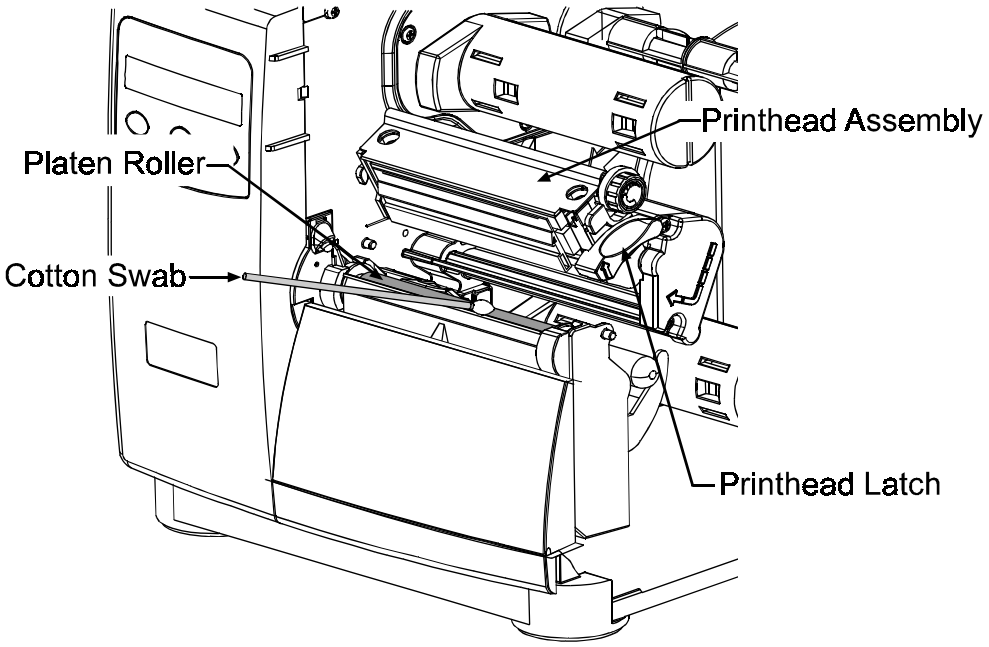
❷ Open the access cover. Unlock the Printhead Latch and raise the Printhead Assembly. Remove media and ribbon.

❸ Using a Cotton Swab dampened with isopropyl alcohol, clean the Platen Roller; manually rotate the roller and repeat, cleaning the entire surface. Allow the Platen Roller to dry.

❹ Replace ribbon and media.

❺ Lower the Printhead Assembly and lock the Printhead Latch.

❻ Close the access cover. Plug in and turn 'On' the printer. Feed several labels to normalize tracking.



CAUTION

NEVER use a sharp object to clean the Platen Roller.

5.5.3 Cleaning Interior and Exterior Surfaces

Interior Surfaces: During operation, dust particles from the media build-up inside the printer. Then, as the media is pulled through the printer, the particles can become attached and cause voids on the printed labels. To prevent this, turn 'Off' and unplug the printer. Remove all media. Using a soft bristle brush or compressed air, clean out the interior of the printer.

Exterior Surfaces: The outer surfaces of the printer should be cleaned using a general-purpose cleanser. Never use abrasive cleansers or solvents. To clean, turn 'Off' and unplug the printer. Using a soft cloth or sponge dampened with the cleanser, wipe the exterior surfaces until clean.

5.6 Updating the Application Version

The printer stores its application program in Flash memory on the Main PCB. A feature is included that allows updates to this program through any printer interface port. Updates can be found on our web site. There are two modes in which the firmware of the printer can be updated: (1) the Ready Mode, or (2) the Download Mode.

WARNING Should an error occur during the file download (see Section 5.6.3), the update is aborted. If this process did not reach 'Erasing Flash' or ' Updating Software', the previous program is left intact; otherwise, a successful download must be completed before the printer is operable.

☑ **Note:** After updating from 2.xx to 3.xx firmware for the first time, you must also download the EFIGS menu language file. The DOS Copy command requires the /b parameter because this file contains binary code).

Before beginning an update, identify the current version of the printer's application program by printing a Configuration Label (see Section 4.3.2). Compare that version string to those filenames available from our web site and then download the desired file onto your computer's hard drive.

Proceed with the printer update accordingly:

- If the current application version is 2.091 or greater, refer to Section 5.6.1 or Section 5.7.2.
- If the current application version is 2.08 or less, start with Section 5.6.2.

5.6.1 Updating from the Ready Mode

Update Procedure for Application Version 2.091 or greater			
Step	**Displayed Message**	**Operator Action**	**Comment(s)**
1.	READY	Using the DOS copy command (where 'filename' is the program to be loaded and 'lpt1' is the selected interface port), enter the following: copy filename lpt1:	As an example, this would be entered as: copy 4212tb10_0304.zs lpt1: (where 'lpt1' is the host computer's port; however, this selection can differ to include a serial or other port, as the printer is equipped). The Ready Indicator will flash while the data is received.
2.	UPGRADING SOFTWARE	No action required.	The new application program is being stored and verified.
3.	4212 3.04 07/26/2000	No action required.	The printer has reset automatically and is now displaying the new firmware version.
4.	READY	No action required.	The new application is now running. ☑ **Note:** If 'Uncalibrated' or 'Position Fault' is displayed, the printer will have to be calibrated (see Section 5.2).

5.6.2 Updating from the Download Mode

Required Update Procedure for Application Version 2.08 or earlier*			
Step	**Displayed Message**	**Operator Action**	**Comment(s)**
1	BOOT-PA10 02.09 2/11/00	Press and hold the PAUSE and TEST keys while turning 'On' the printer to enter the Download Mode.	The Boot Loader version is displayed. ☑ **Note:** This information will vary with the printer model and Boot Loader version.
2	UPDATE SOFTWARE SEND SOFTWARE	Using the DOS copy command, copy the filename to the printer (see Step 2 in Section 5.6.1).	The printer is ready to accept the new application version. ☑ **Note:** The parallel port (LPT1) must be used to write to the printer.
3	UPDATE SOFTWARE READING IMAGE	No action required.	The printer is receiving the new image (program).
4	ERASING FLASH SOFTWARE IMAGE	No action required.	The program has been received and verified; now memory is being cleared of the previous application.
5	WRITING FLASH SOFTWARE IMAGE	No action required.	The new program is being written into Flash memory. Upon completion, the printer will automatically reset, starting the new application; however, before continuing, the printer must be re-calibrated; see Section 5.2.

*This can also be used as an alternate download method for all other version levels.

5.6.3 Application Update Problems

☑ **Note:** If experiencing trouble when attempting to download the file to the printer, try the following alternate methods:

1) Use the download procedure in Section 5.6.2.

2) Windows® users – try restarting the computer in MS-DOS mode.

The following is list of possible error messages when downloading:

Application Update Error Messages	
Displayed Message	**Descriptions / Causes / Solutions**
DECOMPRESSION ERROR	The printer detected an error during the decompression and transfer of file data from cache storage into the Flash memory. Confirm the version and retry the download; however, if the problem continues call for service.
ERROR ERASING FLASH	The printer could not successfully erase Flash memory. The possible cause is defective Flash memory. Try the download again; however, if the problem continues call for service.
ERROR WRITING FLASH	The printer could not successfully write the program into Flash memory. A possible cause is defective Flash memory. Try the download again; however, if the problem continues call for service.
HARDWARE MISMATCH DATA REJECTED	Application Firmware downloaded was not compatible with the printer's Main PCB (i.e., firmware used was for a different series model and not supported by this boot loader version). See Section 4.1.4 – Configuration Level.
INVALID SOFTWARE DATA REJECTED	The printer detected an error in the download. The possible causes include: • An invalid or corrupted file was downloading; try saving the file to the host and then download again. • A communications error. Recheck cabling and port setting.
SOFTWARE MISMATCH DATA REJECTED	Reserved for future use. If this message is consistent, call for service.

5.7 Updating the Boot Loader Program

The printer stores the Boot Loader Program in Flash memory on the Main PCB. A feature allows updates to this program via the printer's interface port. Updates can be found on our web site.

WARNING

If power is lost while "Upgrading Software" is displayed, the printer will become non-functional and must be returned to the factory for programming or the main board replaced.

☑ **Note:** Only printers with an Application Version of 2.09 or greater can update the Boot Loader Program.

Before beginning the Boot Loader update, identify the printer's current version. Print a Configuration Label (see Section 4.3.2) and compare that version string to those available from our web site. Download the desired version onto your computer's hard drive. To update the Boot Loader Program:

Boot Loader Update Procedure			
Step	**Displayed Message**	**Operator Action**	**Comment(s)**
1	READY	Using the DOS copy command (where 'filename' is the program to be loaded and 'lpt1' is the selected interface port), enter the following: copy filename lpt1:	As an example, this would be entered as: copy boottb99_0209.bs lpt1: (where 'lpt1' is the host computer's output port; however, your selection can differ to include a serial or other port, as the printer is equipped). The Ready Indicator will flash while the data is received.
2	UPGRADING SOFTWARE	No action required.	The new application program is being stored and verified.
3	4212 3.04 07/26/2000	No action required.	The printer has reset automatically.
4	READY	No action required.	The new application is now running. ☑ **Note:** If 'Uncalibrated' or 'Position Fault' is displayed, the printer will have to be calibrated (see Section 5.2).

6 Troubleshooting

6.0 General Troubleshooting

If a problem arises with the printer, the information in this section will help you resolve it. Use this guide as a starting point in troubleshooting. If you have questions, or if problems persist, contact a qualified service technician or our Technical Support Representative. The following are problems that will not necessarily generate a message (see Section 6.1 for Fault and Warning Messages).

If experiencing this problem…	Try this solution…
Cannot communicate through the parallel port:	Be sure the parallel cable is connected and is the correct type for the application. Try setting the 'Parallel Port Direction' to Uni-Directional; some host computers are not bi-directional compatible. See Section 4.1.5.
Display is blank, but the READY indicator is 'On':	The display contrast may set too low. Press and hold the MENU key for 10 seconds or until the display reappears.
Erratic printing (instead of the label format, strange characters are printed):	• The printer may be in 'hex dump mode'; see Section 6.2. Enter the Diagnostics menu and disable this mode; see Section 4.1.6. Exit the menu, save changes and return to the 'READY' mode. • If using the serial port for communicating, check both the host and printer port configuration; the printer may be set for 8 data bits while the host is set for 7 bits (or vice versa).

(Continued next page)

If experiencing this problem…	Try this solution…
Intellifont™ will not print:	Intellifont™ format is Little/Big Endian specific. The printer uses Big Endian. Refer to your font supplier for information.
Light print on the right side (facing the printer) of the label:	• The Printhead Leveling Cam may be incorrectly adjusted; see Section 5.3.1. • The Platen Roller may be dirty or worn; see Section 5.5.2.
Missing information in the printed label:	• Check the label format for character placement outside the dimensions of the label; all row/column values must allow enough space for the height/length of the characters and bar codes to be printed within the format size. • The available memory may have been exceeded by the memory requirement of the label format. Try reducing the memory allocated to either the internal module or scaleable font caches; see System Settings/Memory Settings – Section 4.1.4.
Missing print on left or right side of the label:	Information may be formatted outside the label dimensions. Check your software program label size or check the values in the menu for Print Control / Column Offset and Print Control / Custom Adjustments / Column Offset; see Section 4.1.2.

(Continued next page)

If experiencing this problem…	Try this solution…
No power (all indicator lights are 'Off"):	• Verify that the AC power cord has been made at both the outlet and the printer; also, ensure the power switch is 'On'. • Verify that the AC outlet is functioning, or try moving the printer to another AC circuit. • The AC cord may be damaged; replace it. • The power switch may be defective or the line fuse blown; call for service.
Nothing is printing (labels advance normally, but no image is printed):	Begin by examining the used ribbon for an image: **If there is an image on the used ribbon:** • Verify that the ribbon was properly loaded per Section 3.3. • If it was properly loaded, the wrong ribbon coating configuration was used. Clean the printhead (see Section 5.5.1); then replace the ribbon with one that has the coating on the correct side, per Section 3.3. **If there is no image on the used ribbon:** • Run a Quick Test label; see Section 4.3. If an image printed, then check the protocol and port settings for both the printer and host. These must match. • The heat setting may be too low. Make an adjustment in the software program or through the Front Panel. • The media/ribbon combination may be incorrect. Contact a Media Representative. • The printhead or printhead cable(s) may be loose; power 'Off' and reconnect; see Section 5.4 for cable locations.

(Continued next page)

If experiencing this problem…	Try this solution…
Nothing happens when trying to print using a software program:	• Ensure that the printer is at READY. • Observe the Front Panel, if the READY light does not flash as you send the format check the protocol and port settings between the printer and host. • Ensure the I/O cable meets the requirements found in Section 3.0.1.
Poor print quality:	• The printhead may need cleaning; see Section 5.5.1. • Adjust these settings through the Front Panel or by host commands, Heat, Print Speed and Darkness; see Sections 2.1 and 4.1.2. • The media/ribbon combination may not be compatible; see Section 2.1. • The Printhead Leveling Cam may be incorrectly adjusted; see Section 5.3.1. • The Platen Roller may be dirty or worn; see Section 5.5.2. • The Printhead Burn Line may need adjusting; see Section 5.3.2.
Skips labels when printing:	• The printer may need calibration; see Section 5.1 and 5.2. • The Media Sensor may be slightly out of position; readjust the position; see Section 5.0. • The label format may be too close (within 1/8″ of the edge) to the start of the next label. Try reducing or moving the format slightly.
Unable to print rotated text:	• The characters may be formatted outside the label dimensions. Ensure the row/column values provide enough room for the height of the characters or bar code to be printed. See the *Programmer's Manual* for details.

6.1 Fault and Warning Messages

When the printer detects a problem or the potential for a problem, a message is displayed and the Error Indicator (see Section 4.0.4) will be illuminated. There are two types of indications:

- Fault Indication – the indicator 'fast flashes' with message.
- Warning Indication – the indicator 'slow flashes' with message.

The Fault and Warning Messages are listed in the following two tables, including a brief description of each and possible solution(s).

☑ **Note:** After the printer enters a fault condition, the fault must be corrected and then FEED key must be pressed to clear the condition.

Fault Messages:

Displayed Message	Description	Possible Solution(s)
ADC FAULT	The printer has detected an analog to digital circuit converter failure.	Try cycling the printer power 'Off' and 'On'. If the fault does not clear, call for service.
CUTTER FAULT	The printer has detected a cutter mechanism fault.	Try cycling the printer power 'Off' and 'On'. **WARNING!** Use extreme care: Turn 'Off' and unplug power before examining the cutter. Make sure the cutter option is properly installed. Carefully examine the cutter for obstructions.
DMA FAULT	The printer has detected a Direct Memory Access failure.	Try cycling the printer power 'Off' and 'On'. If the fault does not clear, call for service.

(Continued next page)

Fault Messages (continued):

Displayed Message	Description	Possible Solution(s)
OUT OF STOCK	The printer cannot detect media.	1) Reload media. 2) Ensure that the labels are passing through the Media Sensor. 3) Readjust the Media Sensor over the TOF mark; see Section 5.0. 4) Calibrate the printer; see Section 5.2.
POSITION FAULT	The printer has determined that the media is not correctly positioned to print.	Press and hold the FEED key for 4 seconds; see Section 5.1. Calibration may also be needed. See Section 5.2.
PRINT ENGINE FAULT	The printer has detected a problem in the print logic.	Try cycling the printer power 'Off' and 'On'. If the fault does not clear, call for service.
RAM FAULT	The system has detected a RAM failure.	Try cycling the printer power 'Off' and 'On'. If the fault does not clear, call for service.

(Continued next page)

Fault Messages (continued):

Displayed Message	Description	Possible Solution(s)
RIBBON FAULT	The ribbon sensor detects no or only sporadic ribbon supply hub movement; or the sensor values may have changed. ☑ **Note:** The ribbon sensor calibration will only take effect after a Level 2 reset has cleared the previously set values; see Section 4.0.6.	1) Ensure that ribbon is correctly loaded with the printhead locked down. 2) Check the ribbon supply and ribbon take up hubs for obstructions that may be stopping movement. 3) Ensure that the ribbon supply core fits snugly on the ribbon supply hub. 4) Ensure that the media and paper combination is correct. 5) Perform a Level 2 Reset (Section 4.0.6) and then a Positioning Calibration (Section 5.1).
STROBE TIMING FAULT	The printer has detected a problem applying the printhead heat strobe.	Try cycling the printer power 'Off' and 'On'. If the fault does not clear, call for service.
TEMPERATURE FAULT	The printer has shutdown to allow the printhead temperature to cool.	Turn 'Off' the printer until cool to prevent permanent damage due to an excessive printhead temperature.

(Continued next page)

Fault Messages (continued):

Displayed Message	Description	Possible Solution(s)
TOP OF FORM FAULT	The printer could not find the TOF mark within the maximum label length setting or it found a TOF in an unexpected place.	**If media is moving:** 1) Press the FEED key. It may be necessary to re-calibrate the printer; see Section 5.2. 2) The Media Sensor may be out of position. Readjust its position; see Section 5.0. 3) The media may not be properly loaded. Reload media and ensure that the Media Guide is positioned properly; see Section 3.1. 4) The label may be longer than the default value for maximum length. Check the Media Settings / Maximum Label Length; see Section 4.1.1. 5) The Media Sensor may be obstructed. Check and carefully remove any obstruction (labels, paper dust, adhesive, etc). **If media is not moving:** The printhead may not be latched; close and lock the printhead.
24V OUT OF TOLERANCE	The printer has detected a drop in the 24-volt power supply.	Try cycling the printer power 'Off' and 'On'. If the fault does not clear, call for service.

Warning Messages:

Displayed Message	Description	Action
DOT FAILURE	The printer has detected burned-out printhead elements.	Replace the printhead when print quality becomes unacceptable or if the printed bar codes are non-compliant.
GAP MISSED	The printer missed detecting a label gap.	Readjust the media sensor and recalibrate.
GOODBYE	Power has been removed and shutdown is in progress.	The printer power switch was turned 'Off', the line fuse has blown, or AC line voltage has been lost.
HOST CHANGES PENDING	The host has pending configuration changes that will not take effect until a 'host reset command' is issued.	To save changes, send a host reset command (in DPL) or to discard changes perform a soft reset; see Section 4.0.6.
LOW VOLTAGE	The printer has detected a low operating voltage.	A possible low or fluctuating line voltage level. Try moving the printer to another outlet. If this condition persists call for service.
RIBBON LOW	Ribbon will soon need replacement.	Replace ribbon when needed.
RTC RAM FAILURE	The printer was unable to save settings in permanent memory.	If the condition persists, possible faulty Main PCB. Call for service.

(Continued next page)

Warning Messages (continued):

Displayed Message	Description	Action
TEMPERATURE PAUSE	A high printhead temperature has been detected.	Allow printhead to cool.
WARNING RESOLVED	The previous warning condition has been corrected.	No further action is necessary.

6.2 Hex Dump Mode

The hex dump mode is a useful tool for diagnosing problems, including communication and DPL™ syntax errors, allowing a comparison of input strings (sent by host) to output data (received by printer). To decode this information, the *Programmer's Manual* is an essential reference. This output can be used for debugging the label format. And by repeatedly sending a format, this mode can uncover handshaking problems (if they exist). Handshaking problems are identified by sections of missing data in the character string.

To begin, go to the Diagnostics menu and enable Hex Dump Mode; see Section 4.1.6. Exit the menu, save changes and returning to the 'READY' mode. Now all data sent to the printer will now be output in hexadecimal code, along with the printable ASCII equivalents.

The figure below is a sample Hex Dump Label. After sending a label format to the printer, the hex code output will be immediate. As a final note, many software programs use bit mapping to construct the label, making diagnosis difficult. Contact a our Technical Support Representative with any questions.

```
0000  02 4C 0D 44 31 31 0D 31  ^L D11 1
0008  36 31 31 30 30 30 30 33  61100003
0010  32 30 30 30 31 30 46 4F  200010FO
0018  4E 54 20 36 3A 20 41 4C  NT 6: AL
0020  4C 20 56 41 4C 49 44 20  L VALID
0028  20 20 20 20 20 20 20 20
0030  20 20 20 0D 31 36 31 31     1611
0038  30 30 30 30 32 38 30 30  00002800
0040  30 31 30 20 20 20 20 20  010
0048  20 20 20 43 48 41 52 41     CHARA
0050  43 54 45 52 53 3A 0D 31  CTERS:.1
0058  36 31 31 30 30 30 30 32  61100002
0060  34 30 30 30 31 30 23 24  400010#$
0068  25 26 28 29 2A 2B 2E 2D  %&()*+.-
```

☑ **Note:** To exit the hex dump mode, re-enter the Diagnostics Menu and disable the Hex Dump Mode, exit the menu, then save the changes to return to the 'READY' mode.

7 Specifications

7.0 Printer Specifications

Bar Codes

(See the *Programmer's Manual* for details. See Appendix B for visual samples.)

Code 39, Interleaved 2 of 5, Code 128 (subsets A, B and C), Codabar, LOGMARS, UPC-A, UPC-E, UPC 2 & 5 digit addendums, EAN-8, EAN-13, EAN 2 & 5 digit addendums, UPC Random Weight, Code 93, Plessey, Universal Shipping Container Symbology, Code 128 MOD 43, Postnet, USS/EAN-128 Random Weight, Telepen, USD-8 (Code 11), UPS MaxiCode (modes 2 & 3), PDF417, Data Matrix, QR Code, Aztec*, and MicroPDF417*.

Fonts

9 Bit-Mapped Fonts, rotatable 0, 90, 180, 270 degrees
CG Triumvirate™ Scalable Font
CG Triumvirate™ Condensed Bold Scalable Font

Communications

Interfaces:	EIA RS-232/DB-25 Serial, and IEEE 1284 Compliant Parallel
Serial Data Rates:	1200, 2400, 4800, 9600, 19.2K, and 38.4K baud.
Handshaking:	Xon/Xoff; CTS/DTR
Parity:	Even, Odd, or None
Stop Bits:	1 or 2
Data Bits:	7 or 8

Electrical

Input Voltage:	90 – 132 or 180 – 264 VAC @ 47–63 Hz, auto-ranging.
Power Consumption:	Typical Operating: 90 Watts / Standby: 10 Watts
Grounding:	Unit must be connected to a properly grounded receptacle.

*Requires application program version 3.16 or greater.

Environmental Requirements

Operating Temperature:	32° F – 100° F (0° C to 38° C)
Storage Temperature:	0° F –140° F (-17° C to 60° C)
Humidity:	10% – 95% non-condensing
Dust:	Non-conducting, non-corrosive
Electromagnetic Radiation:	Moderate RF fields can be tolerated

Mechanical

Height:	12.70" (322.6 mm)
Width:	12.62" (320.6 mm)
Depth:	18.60" (472.5 cm)
Weight:	45 lbs. (20.5 kg)

Printing Specifications

Printing Type:	Direct Thermal or optional Thermal Transfer
Print Speed:	2 – 6 IPS (51 – 152 mmps) ***mi-4206*** 2 – 8 IPS (51 – 203 mmps) ***mi-4208*** 2 – 12 IPS (51 – 305 mmps) ***mi-4212*** 2 – 8 IPS (51 – 203 mmps) ***mi-4308*** 2 – 6 IPS (51 – 152 mmps) ***mi-4406*** 2 – 4 IPS (51 – 102 mmps) ***mi-4604***
Printhead Resolution:	203 DPI (8.0 dots/mm) **mi-*4206, mi-4208, mi-4212*** 300 DPI (11.8 dots/mm) ***mi–4308*** 406 DPI (16.0 dots/mm) ***mi-4406*** 600 DPI (23.6 dots/mm) ***mi-4604***
Nominal Dot Size:	.0043” X .0052” (.11 mm x .13 mm) ***mi-4206, mi-4208, mi-4212*** .0027” X .0043” (.07 mm X .11 mm) ***mi-4308*** .0013” X .0018” (.05 mm X .07 mm) ***mi-4406*** .0008” X .0015” (.03 mm X .06 mm) ***mi-4604***
Printhead Protection Type:	Thermistor Sensor. Temporary shutdown of printing occurs upon over-temperature detection; printing resumes automatically after cool-down.
Maximum Print Width:	4.10” (104.0 mm) ***mi-4206, mi-4208, mi-4212*** 4.16” (105.7 mm) ***mi-4308*** 4.10” (104.0 mm) ***mi-4406*** 4.16” (105.7 mm) ***mi-4604***

(Continued next page)

Print Length Range:	.25” – 99” (6.4 mm – 2514.6 mm) ***mi-4206, mi-4208, mi-4212, mi-4308*** .25” – 84” (6.4 mm – 2133.6 mm) ***mi-4406*** .25” – 55” (6.4 mm – 1397 mm) ***mi-4604***
With optional Cutter:	1.25” – 99” (31.8 mm – 2514.6 mm) ***mi-4206, mi-4208, mi-4212, mi-4308*** 1.25” – 84” (31.8 mm – 2133.6 mm) ***mi-4406*** 1.25” – 55” (31.8 mm – 1397 mm) ***mi-4604***
Print Justification:	Left
Flash Memory:	1 MB ***mi-4206, mi-4208*** 2 MB ***mi-4212, mi-4308, mi-4406, mi-4604***
SDRAM Memory:	8 MB ***mi-4206, mi-4208*** 16 MB ***mi-4212, mi-4308, mi-4406, mi-4604***

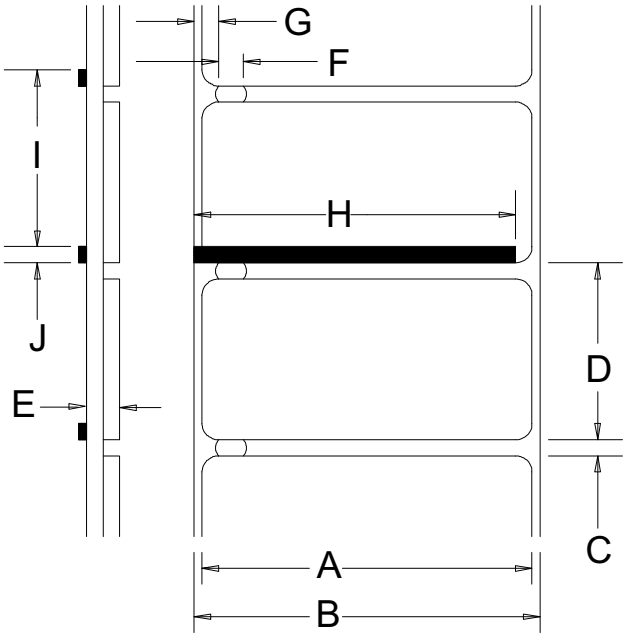
Media and Ribbon

Media Types:	Roll-Fed, Die-Cut, Continuous, and Fan-Fold. Flat on the printable side with no more than .0007” (.018 mm) protrusions on the opposite side.
Maximum Media Width:	4.65” (118.1 mm)
Minimum Media Width:	1” (25.4 mm)
Media Thickness:	.0025” - .01” (.06 mm – .25 mm)
Media Roll Capacity:*	8” (203.2 mm) outer diameter
Media Core:	1.5” or 3.0” (38 mm – 76.2 mm) inner diameter
Ribbon Core:	1.010” ± .006” (25.6 mm ± .2 mm) inner diameter. Core not to protrude beyond ribbon edge.
Ribbon Width Range:**	1.0” – 4.5” (25.4 mm – 114.3 mm)
Ribbon Length:**	1968’ (600 meters) maximum

*Labels wound out only.

**Coated side in or out depending upon the Ribbon Supply Hub in the printer; the ribbon width to slightly exceed label width (including backing material).

(Continued next page)



Designator	Description	Max.†	Min.†
A	Label width:	4.65	1.00
B	Backing width:	4.65	1.00
C	Gap between labels	.250	.100
D	Label length	99.99	.250
E	Media thickness	.0100	.0025
F	Width for sensor opening	.500	.200
G	Distance from the edge of the media to the media sensor aperture (left justified)	2.250	.200
H	Reflective sensor mark width‡	4.65	.500
I	Distance between reflective (black) marks	99.99	.500
J	Reflective sensor mark length	.250	.100

†Units of measure are in inches.

‡The reflective black mark must be carbon based and placed on the backside of the stock. The reflectance of the mark shall be less than 10% at wavelengths of 950 and 640 nm.

Approved Media

To achieve optimum print quality and maximum printhead life, we recommend the use of our brand media and ribbons. These supplies are specially formulated for use in our printers; use of other supplies may affect the print quality, performance, and life of the printer or its components.

For a current list of approved media and ribbons for use in direct thermal and thermal transfer applications contact your Media Representative.

Consult Section 2.1 for an overview of the different media and ribbon types.

A Appendix A

ASCII Control Code Chart

	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
Ctrl @	NUL	0	00		32	20	@	64	40	`	96	60
Ctrl A	SOH	1	01	!	33	21	A	65	41	a	97	61
Ctrl B	STX	2	02	“	34	22	B	66	42	b	98	62
Ctrl C	EXT	3	03	#	35	23	C	67	43	c	99	63
Ctrl D	EOT	4	04	$	36	24	D	68	44	d	100	64
Ctrl E	ENQ	5	05	%	37	25	E	69	45	e	101	65
Ctrl F	ACK	6	06	&	38	26	F	70	46	f	102	66
Ctrl G	BEL	7	07	‘	39	27	G	71	47	g	103	67
Ctrl H	BS	8	08	(	40	28	H	72	48	h	104	68
Ctrl I	HT	9	09	)	41	29	I	73	49	i	105	69
Ctrl J	LF	10	0A	*	42	2A	J	74	4A	j	106	6A
Ctrl K	VT	11	0B	+	43	2B	K	75	4B	k	107	6B
Ctrl L	FF	12	0C	,	44	2C	L	76	4C	l	108	6C
Ctrl M	CR	13	0D	-	45	2D	M	77	4D	m	109	6D
Ctrl N	SO	14	0E	.	46	2E	N	78	4E	n	110	6E
Ctrl O	SI	15	0F	/	47	2F	O	79	4F	o	111	6F
Ctrl P	DLE	16	10	0	48	30	P	80	50	p	112	70
Ctrl Q	DC1	17	11	1	49	31	Q	81	51	q	113	71
Ctrl R	DC2	18	12	2	50	32	R	82	52	r	114	72
Ctrl S	DC3	19	13	3	51	33	S	83	53	s	115	73
Ctrl T	DC4	20	14	4	52	34	T	84	54	t	116	74
Ctrl U	NAK	21	15	5	53	35	U	85	55	u	117	75
Ctrl V	SYN	22	16	6	54	36	V	86	56	v	118	76
Ctrl W	ETB	23	17	7	55	37	W	87	57	w	119	77
Ctrl X	CAN	24	18	8	56	38	X	88	58	x	120	78
Ctrl Y	EM	25	19	9	57	39	Y	89	59	y	121	79
Ctrl Z	SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
Ctrl [	Esc	27	1B	;	59	3B	[	91	5B	{	123	7B
Ctrl \	FS	28	1C	<	60	3C	\	92	5C	|	124	7C
Ctrl]	GS	29	1D	=	61	3D	]	93	5D	}	125	7D
Ctrl ^	RS	30	1E	>	62	3E	^	94	5E	~	126	7E
Ctrl _	US	31	1F	?	63	3F	_	95	5F		127	7F

(Continued next page)

ASCII Control Code Chart (continued)

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
Ç	128	80	á	160	A0		192	C0	Ó	224	E0
ü	129	81	í	161	A1		193	C1	ß	225	E1
é	130	82	ó	162	A2		194	C2	Ô	226	E2
â	131	83	ú	163	A3		195	C3	Ò	227	E3
ä	132	84	ñ	164	A4		196	C4	õ	228	E4
à	133	85	Ñ	165	A5		197	C5	Õ	229	E5
å	134	86	a	166	A6	ã	198	C6	µ	230	E6
ç	135	87	°	167	A7	Ã	199	C7	þ	231	E7
ê	136	88	¿	168	A8		200	C8	Þ	232	E8
è	137	89	®	169	A9		201	C9	Ú	233	E9
è	138	8A		170	AA		202	CA	Û	234	EA
ï	139	8B	1/2	171	AB		203	CB	Ù	235	EB
î	140	8C	1/4	172	AC		204	CC	´y	236	EC
ì	141	8D	¡	173	AD		205	CD	´Y	237	ED
Ä	142	8E		174	AE		206	CE		238	EE
Å	143	8F	–	175	AF		207	CF		239	EF
É	144	90		176	B0	Ò	208	D0		240	F0
Æ	145	91		177	B1	D	209	D1	±	241	F1
Æ	146	92	2	178	B2	Ê	210	D2		242	F2
ô	147	93	3	179	B3	Ë	211	D3	3/4	243	F3
ö	148	94	´	180	B4	È	212	D4		244	F4
ò	149	95	Á	181	B5		213	D5		245	F5
û	150	96	Â	182	B6	Í	214	D6	÷	246	F6
ù	151	97	À	183	B7	Î	215	D7	¸	247	F7
ÿ	152	98	©	184	B8	Ï	216	D8	°	248	F8
Ö	153	99	1	185	B9		217	D9	¨	249	F9
Ü	154	9A		186	BA		218	DA	·	250	FA
Ø	155	9B	»	187	BB		219	DB		251	FB
£	156	9C		188	BC		220	DC		252	FC
Ø	157	9D	¢	189	BD		221	DD		253	FD
x	158	9E	¥	190	BE	Ì	222	DE		254	FE
f	159	9F		191	BF		223	DF	€	255	FF

B Appendix B

Available Fonts and Bar Codes

All character fonts and bar codes available with the printer are described in this section. Each font and bar code has a name associated with it for use in programming. Human-readable fonts have numeric names, while bar code fonts have alpha names. Consult the *Programmer's Manual* for detailed information.

Fonts

Fonts 0 through 8 use the slash zero (Ø) convention for distinguishing between the number zero and the letter O. The slash can be removed with the 'Z' label-formatting command. These fonts are non-proportional (monospaced): each character takes the same amount of space for printing.

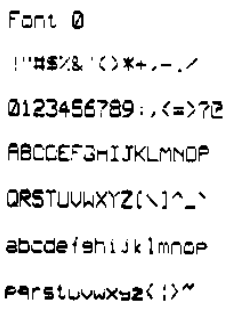
The Triumvirate font number 9 is a proportional font: each character will take up a different amount of space when printed.

Font	Valid ASCII Characters
0	32-127
1	32-168, 171, 172, 225
2	32-168, 171, 172, 225
3	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
4	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
5	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
6	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
7	32-126
8	32, 48-57, 60, 62, 67, 69, 78, 83, 84, 88, 90
9	32-126, 128-169, 171-173, 181-184, 189, 190, 198, 199, 208-216, 222, 224-237, 241, 243, 246-250

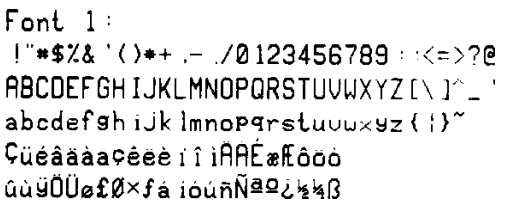
The table below lists the font sizes; the numbers indicate the number of dots.

Font	Height	Width	Spacing
0	7	5	1
1	13	7	2
2	18	10	2
3	27	14	2
4	36	18	3
5	52	18	3
6	64	32	4
7	32	15	5
8	28	15	5

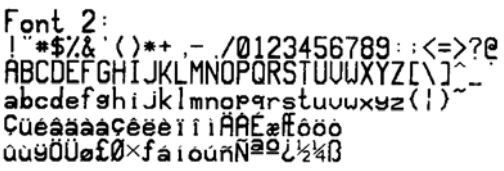
Font 0: 96-character alphanumeric, upper and lower case.



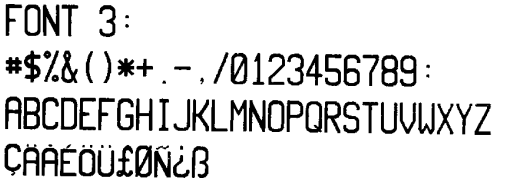
Font 1: 145-character upper and lower case alphanumeric with descenders and ascenders.



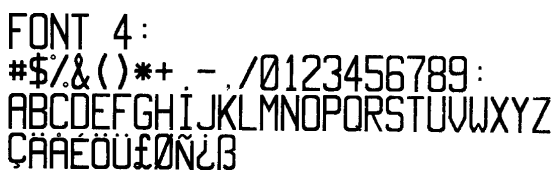
Font 2: 138-character alphanumeric, upper and lower case.



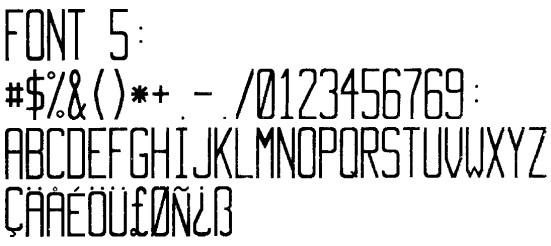
Font 3: 62-character alphanumeric, uppercase.



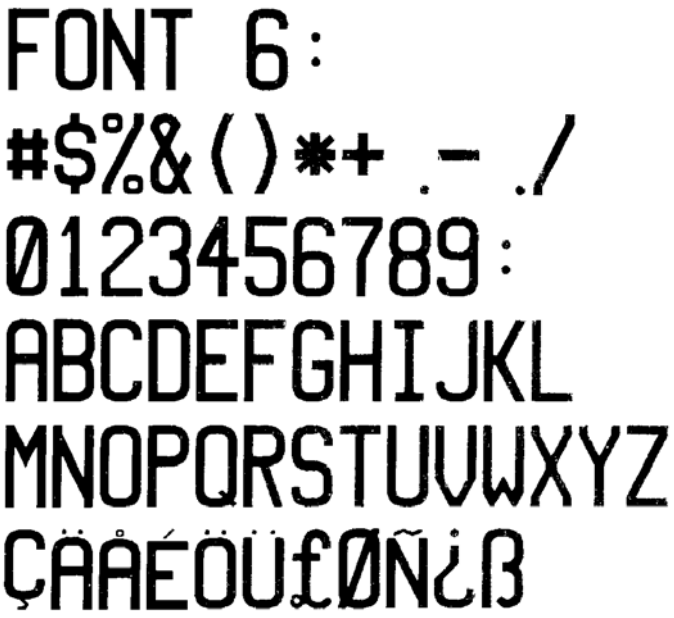
Font 4: 62-character alphanumeric, uppercase.



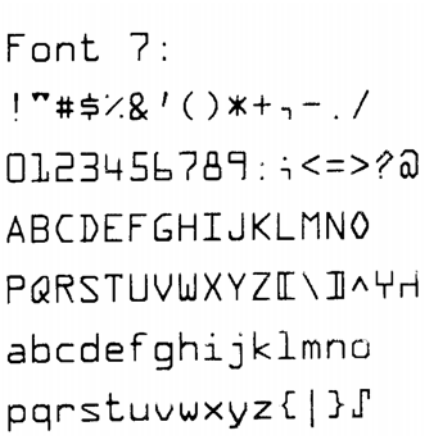
Font 5: 62-character alphanumeric, uppercase.



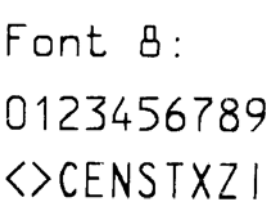
Font 6: 62-character alphanumeric, uppercase.



Font 7: OCR-A, size I.



Font 8: OCR-B, size III.



Font 9: Internal Triumvirate font. The number in the bar code height field sets the point sizes. Larger point sizes can be obtained by increasing the height and width multipliers.

Bar Code Summary Data

Bar Code fonts have alpha names (left column in the table below). Uppercase alpha names will print barcodes with human-readable interpretations. Lowercase alpha names will print barcodes only. The table is followed by visual samples.

Bar Code ID	Type	Length	Checksum	Valid ASCII Characters, decimal value representation
A	Code 3 of 9	Varies	No	32, 36, 37, 42, 43, 45-57, 65-90
B	UPC-A	11	Yes	48-57 Numeric only. Option V used in the 6th & 7th position
C	UPC-E	6	Yes	48-57 Numeric only
D	Interleaved 2 of 5 (I 2 of 5)	Varies	No	48-57 Numeric only
E	Code 128	Varies	M-103	32-127
F	EAN-13	12	Yes	48-57 Numeric only. Option V used in the 7th & 8th position
G	EAN-8	7	Yes	48-57 Numeric only
H	HBIC	Varies	M-43	32, 36-39, 42, 43, 45-57, 65-90
I	Codabar	Varies	No	36, 43, 45-58, 65-68
J	Interleaved 2 of 5 with a modulo 10 checksum	Varies	M-10	48-57 Numeric only
K	Plessey	Up to 14	M-10	48-57 Numeric only. Option + is Last Character for Second M-11 Checksum
L	Interleaved 2 of 5 with a modulo 10 checksum & shipping bearer bars	13	M-10	48-57 Numeric only
M	2 digit UPC addendum	2	Yes	48-57 Numeric only
N	5 digit UPC addendum	5	Yes	48-57 Numeric only
O	Code 93	Varies	No	35-38, 42-58, 65-90, 97-122
p	Postnet	Varies	Yes	48-57 Numeric only
Q	UCC/EAN Code 128	19	Yes	48-57 Numeric only
R	UCC/EAN Code 128 K-Mart NON EDI barcode	18	Yes	48-57 Numeric only
S	UCC/EAN Code 128 Random Weight	34 +	Yes	48-57 Numeric only
T	Telepen	Varies	Yes	Alphanumeric
U	UPS MaxiCode	84	Yes	Alphanumeric
v	FIM	1	No	A, B, C, D
z	PDF-417	Varies	Yes	All
WG	USD-8 (Code 11)	Varies	Yes	45, 48-57
W1c	DataMatrix	Varies	Yes	All 8-bit values
W1d	QR Code – Auto format	Varies	Yes	Alphanumeric
W1D	QR Code – Manual format	Varies	Yes	Single byte or Kanji double byte
W1f	Aztec*	Varies	Yes	All
W1z	MicroPDF417*	Varies	Yes	All

*Requires application program version 3.16 or greater.

Bar Code A: Code 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

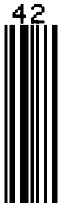
Bar Code H: Health Industry Bar Code (HBIC)

Bar Code I: Codabar

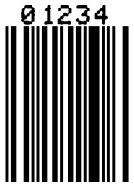
Bar Code J: Interleaved 2 of 5 w/modulo 10 checksum

Bar Code K: Plessey

Bar Code L: Interleaved 2 of 5 w/modulo 10 checksum and shipping bearer bars



Bar Code M: 2 Digit UPC addendum

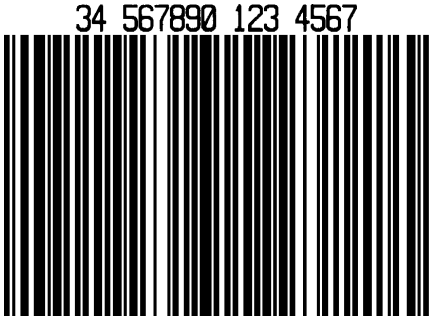


Bar Code N: 5 Digit UPC addendum

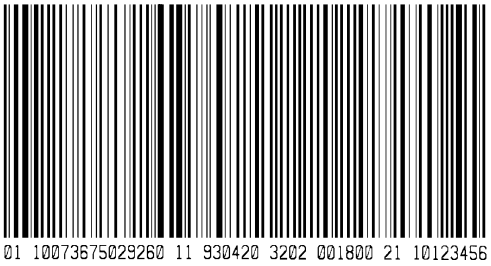
Bar Code O: Code 93

Bar Code p: Postnet

Bar Code Q: UCC/EAN Code 128

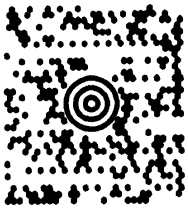


Bar Code R: UCC/EAN Code 128 KMART NON EDI



Bar Code S: UCC/EAN Code 128 Random Weight

Bar Code T: Telepen



Bar Code u: UPS MaxiCode

Bar Code v: FIM

Bar Code z: PDF-417

Bar Code WG: USD-8

Bar Code W1c: DataMatrix

Bar Code W1d: QR Code

Bar Code W1f: Aztec

Bar Code W1z: MicroPDF417

C Appendix C

Module Assignments

Memory Module			
Designator	**Module Size**	**Volatile***	**Location / Use**
A	Future Option	N/A	N/A
B	Future Option	N/A	N/A
D	1024 KB (default size)	Yes	Main PCB SDRAM – user addressable for graphics, fonts, and label formats
F	4 MB	No	Optional Flash Card – user addressable for graphics, fonts, and label formats
G	256 KB	No	Main PCB Flash – user addressable for graphics, fonts, and label formats (not available on the ***mi-4206*** & ***mi-4208*** models).
Y	64 KB	No	Main PCB Flash – reserved for EFIGS
Z	4 MB	No	Optional Flash Card – reserved for ILPC

*When power is removed from the printer, stored data will be lost.

Print Resolutions and Maximum Label Widths

Resolutions and Widths				
Model	**Printhead Resolution**	**Maximum Print Width**		**Factory Default Setting**
		Inches	**Millimeters**	
mi-4206, mi-4208, & mi-4212	203 dots/inch (8 dots/mm)	4.10	104	4.10
mi-4308	300 dots/inch (11.8 dots/mm)	4.16	105.7	4.16
mi-4406	406 dots/inch (16 dots/mm)	4.10	111.8	4.10
mi-4604	600 dots/inch (23.6 dots/mm)	4.16	108.2	4.16

Speed Settings and Defaults

mi-4206				
Function	**Speed Range**		**Default Setting**	
	IPS	**MMPS**	**IPS**	**MMPS**
Print	2-6	51 – 152	6.0	152
Feed	2-8	51 – 203	6.0	152
Reverse	2-4	51 – 102	4.0	102

mi-4208				
Function	**Speed Range**		**Default Setting**	
	IPS	**MMPS**	**IPS**	**MMPS**
Print	2-8	51 – 203	8.0	203
Feed	2-8	51 – 203	8.0	203
Reverse	2-4	51 – 102	4.0	102

mi-4212				
Function	**Speed Range**		**Default Setting**	
	IPS	**MMPS**	**IPS**	**MMPS**
Print	2-12	51 – 305	8.0	203
Feed	2-12	51 – 305	8.0	203
Reverse	2-4	51 – 102	4.0	102

mi-4308				
Function	**Speed Range**		**Default Setting**	
	IPS	**MMPS**	**IPS**	**MMPS**
Print	2-8	51 – 203	6.0	152
Feed	2-10	51 – 254	6.0	152
Reverse	2-4	51 – 102	4.0	102

mi-4406				
Function	**Speed Range**		**Default Setting**	
	IPS	**MMPS**	**IPS**	**MMPS**
Print	2-6	51 – 152	5.0	127
Feed	2-6	51 – 152	6.0	152
Reverse	2-4	51 – 102	4.0	102

mi-4604				
Function	**Speed Range**		**Default Setting**	
	IPS	**MMPS**	**IPS**	**MMPS**
Print	2-4	51 – 102	3.0	76
Feed	2-4	51 – 102	4.0	102
Reverse	2-4	51 – 102	4.0	102

D Appendix D

GPIO Port Description

With the optional GPIO PCB, the printer can easily be programmed to interface with most applicator devices. The GPIO functions are enabled and configured using the menu system of the printer (see Section 4.1.3). These parameters are stored in non-volatile memory and saved for subsequent power-ups.

When the GPIO is enabled, the printer will not print a label unless the Start of Print signal is active. When a label is ready to print and the printer is waiting for the Start of Print signal the printer will display "WAITING FOR SIGNAL".

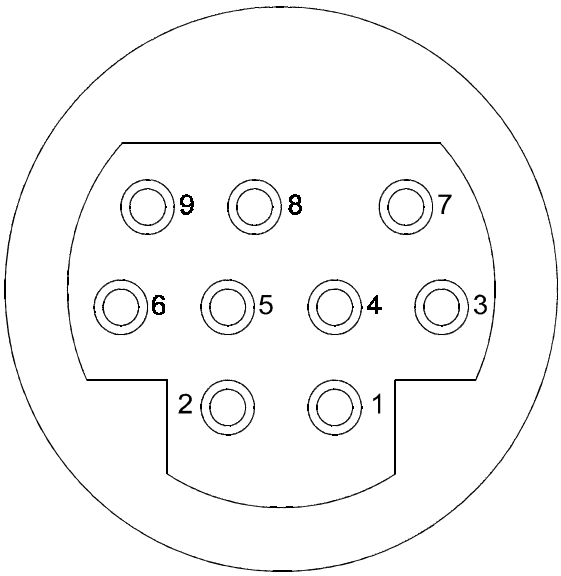
GPIO Port Connections

The external connection (see next page) is a 9-pin Mini-DIN Female connector (e.g., a KYCON KMDG-9S-BS). Each pin function is detailed in the table below:

GPIO Pin Functions				
Pin #	**Signal Name**	**Signal State**	**Signal Direction***	**Description**
1	VCC	+5 VDC	Output	Printer +5 VDC
2	Ribbon Fault	Low	Output	Goes low when the printer detects a ribbon fault.
3	Paper Fault	Low	Output	Goes low when the printer detects a label movement fault.
4	Printer Fault	Low	Output	Goes low when any printer fault is detected.
5	Spare	Reserved	Output	N/A
6	End of Print	Programmable	Output	Programmable
7	Spare	Reserved	Input	N/A
8	Start of Print Signal	Low	Input	When ready to print a label, the Applicator should set this signal low for at least 50ms or until the End of Print signal goes not active.
9	Signal Ground	Ground	N/A	N/A

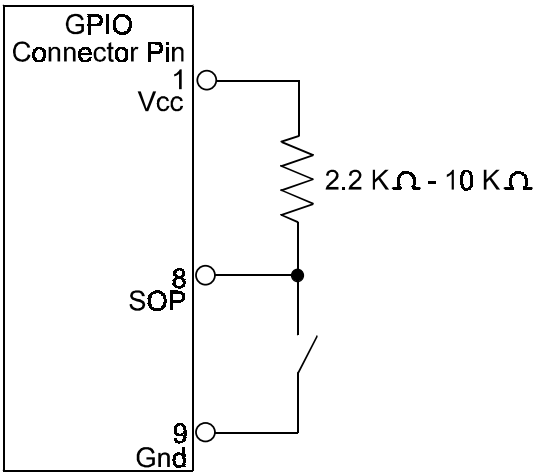
*Signal direction is given relative to the printer.

GPIO Pin Configuration
(as viewed from the rear of the printer)



External Start of Print Control

Connections for an external Start of Print control can be made (1) directly to Pin 8 using a TTL-level input or (2) with an interface circuit similar to the one shown right. For additional interfacing data, see the table below.



GPIO Port Specifications*	
V_{in} max	5.5 VDC maximum input into any pin
V_{IH}	3.8 VDC minimum (high level input voltage)
V_{IL}	1.65 VDC maximum (low level input voltage)
I_{OH}	-8 mA typical, - 25 mA maximum (high level output current)
I_{OL}	8 mA typical 25 mA maximum (low level output current)
V_{OH}	I_{OH} = -8 mA, minimum 3.8 VDC
V_{OL}	I_{OL} = 8 mA, maximum .44 VDC

*See the SN74AHC244 data sheet for more information.

E Appendix E

Menu System Multi-Language Support

This printer provides the user with the ability to download new menu system languages and/or replace the provided translations. A Microsoft® Excel Spreadsheet defines the menu dictionary – the user adds a new language column or modifies an existing column in the spreadsheet, clicks on the 'Generate DPL file(s)' radio button and sends the generated DPL file(s) to the printer.

Here are the highlights and restrictions of the feature:

- The printer can register up to 10 different display languages, including EFIGS.
- The EFIGS languages and any additional languages are stored on Module Y: a 64KB Flash Module located on the Main PCB.
- It is okay to download menu files generated for a lesser firmware revision to new firmware – any messages that are not defined are displayed in English.
- For the procedures below, the printer will accept the menu downloads from any available port.
- The language creation programs support Windows® 95, Windows® 98, Windows® NT, and Windows® 2000.

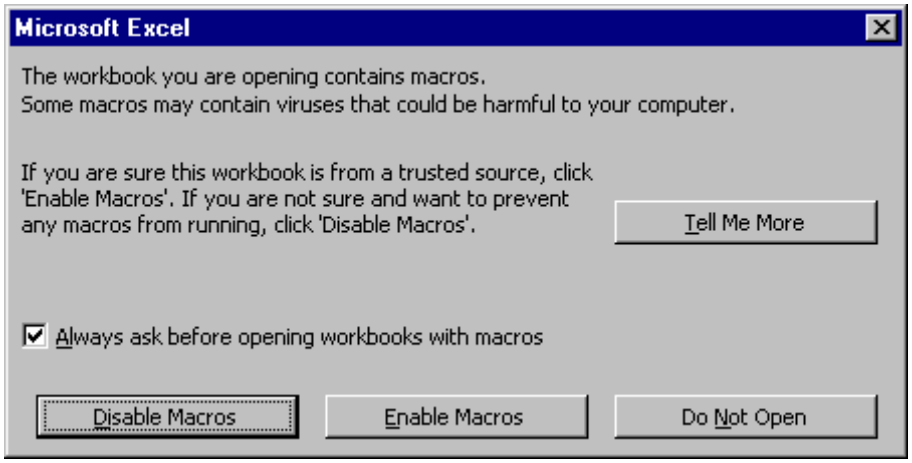
Required Software	Comment
Printer Application Version 3.0 or greater*	Must reside in the target printer. (See Section 5.6 for details.)
Microsoft® Excel 97	Must be purchased by user.
Img2dl.exe**	Program used during the process to create DPL file.
Gemmsgxls.xls**	Menu Dictionary

*These files are available on our website.

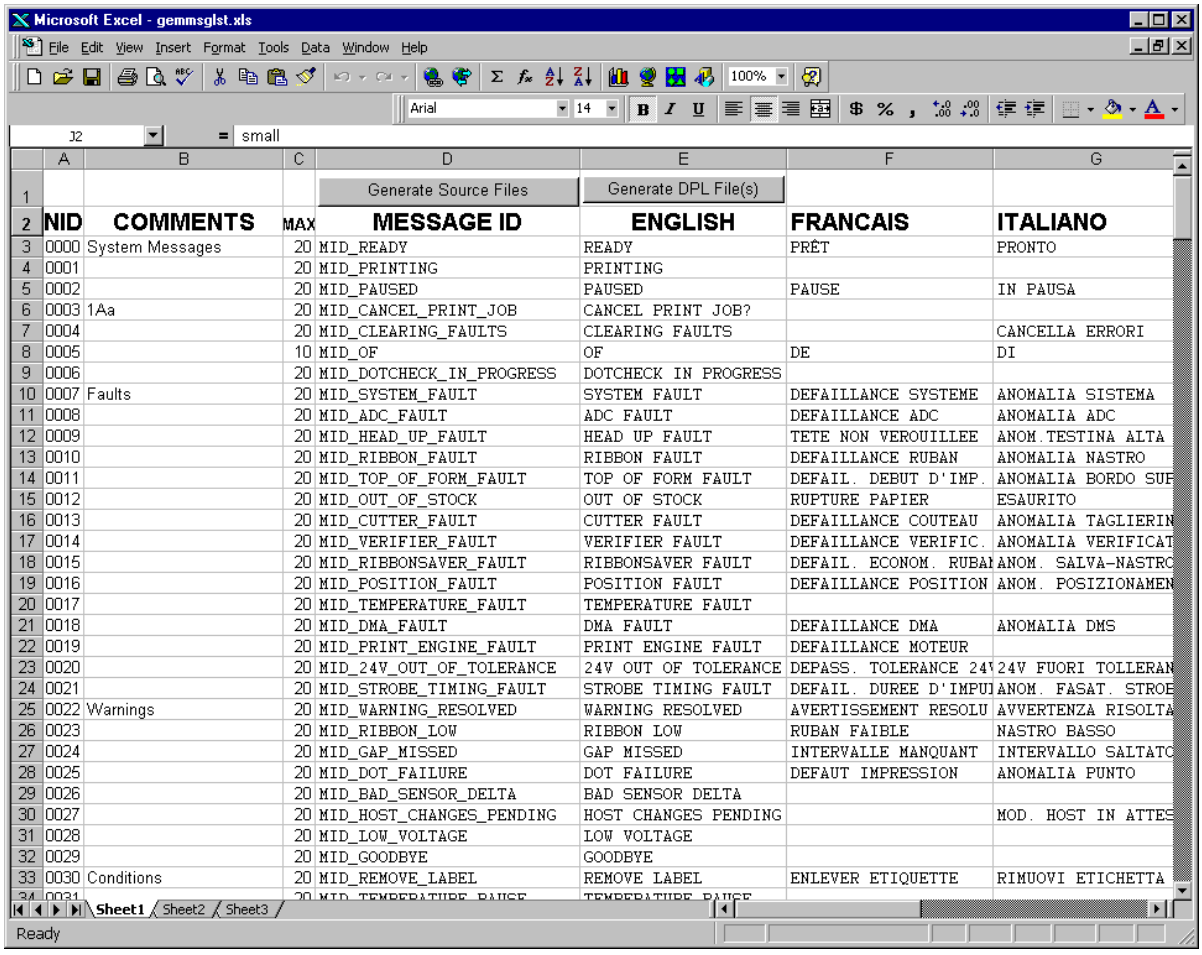
**We recommend that the Img2dl.exe and Gemmsgxls.xls files reside in the same directory.

Creating a Menu Language:

1) Invoke Excel and open the gemmsglst.xls file. Excel opens the file and the following screen appears.



2) Click the "Enable Macro" box and the following appears.



NID	COMMENTS	MAX	MESSAGE ID	ENGLISH	FRANCAIS	ITALIANO
0000	System Messages	20	MID_READY	READY	PRÊT	PRONTO
0001		20	MID_PRINTING	PRINTING		
0002		20	MID_PAUSED	PAUSED	PAUSE	IN PAUSA
0003	1Aa	20	MID_CANCEL_PRINT_JOB	CANCEL PRINT JOB?		
0004		20	MID_CLEARING_FAULTS	CLEARING FAULTS		CANCELLA ERRORI
0005		10	MID_OF	OF	DE	DI
0006		20	MID_DOTCHECK_IN_PROGRESS	DOTCHECK IN PROGRESS		
0007	Faults	20	MID_SYSTEM_FAULT	SYSTEM FAULT	DEFAILLANCE SYSTEME	ANOMALIA SISTEMA
0008		20	MID_ADC_FAULT	ADC FAULT	DEFAILLANCE ADC	ANOMALIA ADC
0009		20	MID_HEAD_UP_FAULT	HEAD UP FAULT	TETE NON VEROUILLEE	ANOM.TESTINA ALTA
0010		20	MID_RIBBON_FAULT	RIBBON FAULT	DEFAILLANCE RUBAN	ANOMALIA NASTRO
0011		20	MID_TOP_OF_FORM_FAULT	TOP OF FORM FAULT	DEFAIL. DEBUT D'IMP.	ANOMALIA BORDO SUF
0012		20	MID_OUT_OF_STOCK	OUT OF STOCK	RUPTURE PAPIER	ESAURITO
0013		20	MID_CUTTER_FAULT	CUTTER FAULT	DEFAILLANCE COUTEAU	ANOMALIA TAGLIERIN
0014		20	MID_VERIFIER_FAULT	VERIFIER FAULT	DEFAILLANCE VERIFIC.	ANOMALIA VERIFICAT
0015		20	MID_RIBBONSAVER_FAULT	RIBBONSAVER FAULT	DEFAIL. ECONOM. RUBA	ANOM. SALVA-NASTRO
0016		20	MID_POSITION_FAULT	POSITION FAULT	DEFAILLANCE POSITION	ANOM. POSIZIONAMEN
0017		20	MID_TEMPERATURE_FAULT	TEMPERATURE FAULT		
0018		20	MID_DMA_FAULT	DMA FAULT	DEFAILLANCE DMA	ANOMALIA DMS
0019		20	MID_PRINT_ENGINE_FAULT	PRINT ENGINE FAULT	DEFAILLANCE MOTEUR	
0020		20	MID_24V_OUT_OF_TOLERANCE	24V OUT OF TOLERANCE	DEPASS. TOLERANCE 24	24V FUORI TOLLERAN
0021		20	MID_STROBE_TIMING_FAULT	STROBE TIMING FAULT	DEFAIL. DUREE D'IMPU	ANOM. FASAT. STROB
0022	Warnings	20	MID_WARNING_RESOLVED	WARNING RESOLVED	AVERTISSEMENT RESOLU	AVVERTENZA RISOLTA
0023		20	MID_RIBBON_LOW	RIBBON LOW	RUBAN FAIBLE	NASTRO BASSO
0024		20	MID_GAP_MISSED	GAP MISSED	INTERVALLE MANQUANT	INTERVALLO SALTATO
0025		20	MID_DOT_FAILURE	DOT FAILURE	DEFAUT IMPRESSION	ANOMALIA PUNTO
0026		20	MID_BAD_SENSOR_DELTA	BAD SENSOR DELTA		
0027		20	MID_HOST_CHANGES_PENDING	HOST CHANGES PENDING		MOD. HOST IN ATTES
0028		20	MID_LOW_VOLTAGE	LOW VOLTAGE		
0029		20	MID_GOODBYE	GOODBYE		
0030	Conditions	20	MID_REMOVE_LABEL	REMOVE LABEL	ENLEVER ETIQUETTE	RIMUOVI ETICHETTA

(Continued next page)

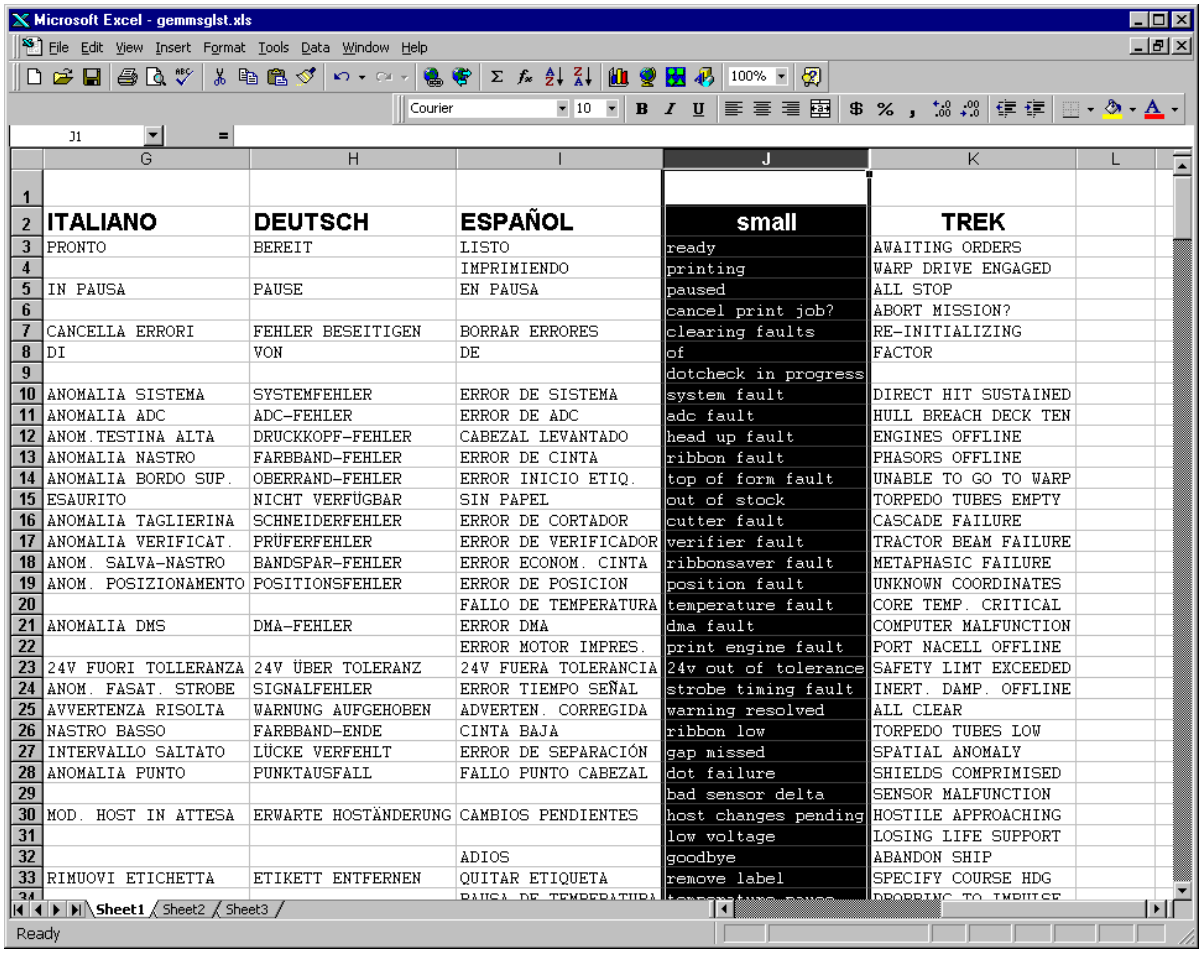
3) Click On Column J and enter your new language, or modify an existing one.

Tips:

A) Message Size – When entering new messages, reference the 'MAX' column: this is the maximum number of characters allowed for this field. Warnings are displayed when the number of characters is exceeded or when trying to modify the MAX value. Beware that "cutting" and "pasting" fields could defeat this warning system.

B) Two Line Messages – Some of the message are displayed as two lines. These are indicated in the comment fields.

C) Comments – This field can be modified with no effect.



	G	H	I	J	K	L
1						
2	**ITALIANO**	**DEUTSCH**	**ESPAÑOL**	**small**	**TREK**	
3	PRONTO	BEREIT	LISTO	ready	AWAITING ORDERS	
4			IMPRIMIENDO	printing	WARP DRIVE ENGAGED	
5	IN PAUSA	PAUSE	EN PAUSA	paused	ALL STOP	
6				cancel print job?	ABORT MISSION?	
7	CANCELLA ERRORI	FEHLER BESEITIGEN	BORRAR ERRORES	clearing faults	RE-INITIALIZING	
8	DI	VON	DE	of	FACTOR	
9				dotcheck in progress		
10	ANOMALIA SISTEMA	SYSTEMFEHLER	ERROR DE SISTEMA	system fault	DIRECT HIT SUSTAINED	
11	ANOMALIA ADC	ADC-FEHLER	ERROR DE ADC	adc fault	HULL BREACH DECK TEN	
12	ANOM.TESTINA ALTA	DRUCKKOPF-FEHLER	CABEZAL LEVANTADO	head up fault	ENGINES OFFLINE	
13	ANOMALIA NASTRO	FARBBAND-FEHLER	ERROR DE CINTA	ribbon fault	PHASORS OFFLINE	
14	ANOMALIA BORDO SUP.	OBERRAND-FEHLER	ERROR INICIO ETIQ.	top of form fault	UNABLE TO GO TO WARP	
15	ESAURITO	NICHT VERFÜGBAR	SIN PAPEL	out of stock	TORPEDO TUBES EMPTY	
16	ANOMALIA TAGLIERINA	SCHNEIDERFEHLER	ERROR DE CORTADOR	cutter fault	CASCADE FAILURE	
17	ANOMALIA VERIFICAT.	PRÜFERFEHLER	ERROR DE VERIFICADOR	verifier fault	TRACTOR BEAM FAILURE	
18	ANOM. SALVA-NASTRO	BANDSPAR-FEHLER	ERROR ECONOM. CINTA	ribbonsaver fault	METAPHASIC FAILURE	
19	ANOM. POSIZIONAMENTO	POSITIONSFEHLER	ERROR DE POSICION	position fault	UNKNOWN COORDINATES	
20			FALLO DE TEMPERATURA	temperature fault	CORE TEMP. CRITICAL	
21	ANOMALIA DMS	DMA-FEHLER	ERROR DMA	dma fault	COMPUTER MALFUNCTION	
22			ERROR MOTOR IMPRES.	print engine fault	PORT NACELL OFFLINE	
23	24V FUORI TOLLERANZA	24V ÜBER TOLERANZ	24V FUERA TOLERANCIA	24v out of tolerance	SAFETY LIMT EXCEEDED	
24	ANOM. FASAT. STROBE	SIGNALFEHLER	ERROR TIEMPO SEÑAL	strobe timing fault	INERT. DAMP. OFFLINE	
25	AVVERTENZA RISOLTA	WARNUNG AUFGEHOBEN	ADVERTEN. CORREGIDA	warning resolved	ALL CLEAR	
26	NASTRO BASSO	FARBBAND-ENDE	CINTA BAJA	ribbon low	TORPEDO TUBES LOW	
27	INTERVALLO SALTATO	LÜCKE VERFEHLT	ERROR DE SEPARACIÓN	gap missed	SPATIAL ANOMALY	
28	ANOMALIA PUNTO	PUNKTAUSFALL	FALLO PUNTO CABEZAL	dot failure	SHIELDS COMPRIMISED	
29				bad sensor delta	SENSOR MALFUNCTION	
30	MOD. HOST IN ATTESA	ERWARTE HOSTÄNDERUNG	CAMBIOS PENDIENTES	host changes pending	HOSTILE APPROACHING	
31				low voltage	LOSING LIFE SUPPORT	
32			ADIOS	goodbye	ABANDON SHIP	
33	RIMUOVI ETICHETTA	ETIKETT ENTFERNEN	QUITAR ETIQUETA	remove label	SPECIFY COURSE HDG	

4) When editing has been completed, highlight all of the columns you desire to create (more than one language may be selected) by pressing the letter above the column.

5) Press the Generate DPL File(s) radio button. A file will be generated for each of the selected columns and Excel will provide confirmation. (Example: small.ls)

(Continued next page)

6) Download the generated files to the printer – one method is the DOS copy command:

```
copy small.ls lpt1: /b
```

7) Reset the printer by pressing and holding the CANCEL key for approximately four seconds.

8) Verify the operation by printing a Configuration Label (see Section 4.3.2). The new font selection will be printed on the label under SYSTEM INFORMATION / OPTIONAL LANGUAGES or select the new language in the SYSTEM SETTINGS / MENU LANGUAGE in the printer's menu.

   This is the only method to determine whether the download was successful. If the menu system displays the new language selection, but all displayed messages remain in English an error has occurred. Re-check the process. Contact our Technical Support if problems continue and be prepared to provide the Gemmsglst.xls and the DPL download file you have created. Other possible error messages are as follows:

Menu Language Error Message	Description
Please select the entire column(s) or the desired language(s), by clicking on the column letter(s)	After pressing the Generate DPL File(s) radio button, the languages to convert were not correctly selected.
Message text may not exceed MAX=xx designated characters for this MID	The entered message exceeds the number of characters specified in column C. You may not modify this number.

Advance File Handling Information

- The standard printer leaves the factory with EFIGS loaded into module Y. At this point, Module Y is LOCKED and will only accept additional Language Downloads.

- After downloading a language update, Module Y is left UNLOCKED until the printer is reset or power is cycled. In this state, Module Y will accept font, image and label format downloads. The module will also honor the Clear Module request. Therefore, following an update it is recommended that a reset be performed to lock the module; otherwise, a software package may 'Clear All Modules' thus destroying the new menu language(s).

- Module Y can be UNLOCKED by sending this DPL string: <STX>KpY0.

(Continued next page)

- To restore the factory generated EFIGS image, download the file *832296.01A to the printer. This file is located on our web site. The letter at the end of the file name (e.g., A) specifies the revision. The latest revision will be available on the web site.

- Downloading the same language twice will automatically delete the first occurrence, but will not free the memory space. Use the Pack Module feature (see Section 4.1.3) or reload the FIGS file to free the space.

- Deletion of the selected language will set the printer to English.

- The total number of languages that the printer can now accept is limited to 10, but this number is dependent upon the size of each language translation. The translation size will vary with the number of messages that are translated for that particular language. Current complete language files are about 7,000 bytes each but with product growth, the total number of languages is expected to drop to seven.

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Glosssary of Terms

alphanumeric Consisting of alphabetic, numeric, punctuation and other symbols.

backing material The silicon-coated paper carrier material to which labels with adhesive backing are affixed. Also referred to as "liner".

bar code A representation of alphanumeric information in a pattern of machine-readable marks. The basic categories are divided into one-dimensional (UPC, Code 39, Postnet, etc.) and two-dimensional barcodes (Data Matrix, MaxiCode, PDF417, etc.).

boot loader The resident program that loads the application from Flash memory, decompresses it into the SRAM, and starts operations.

calibration The process through which sensor readings are entered into the printer for correct sensor function (e.g., detection of a given media type) and TOF positioning.

character set The entire complement of alphanumeric symbols contained in a given font.

checksum An alphanumeric error detection method used in many bar code symbologies for informational security.

continuous media An uninterrupted roll or box of label or tag stock media that contains no gap, notch, or mark to separate individual labels or tags.

core diameter The inside diameter measurement of the cardboard core at the center of a ribbon or media roll.

cutter A mechanical device (e.g., rotary or guillotine) used to cut labels or tags following printing.

defaults The functional setting values returned following a factory reset of the printer.

diagnostics Programs used to locate and diagnose hardware problems.

die-cut media Media that has been cut into a pattern using a press, where the excess paper is removed leaving individual labels, with gaps between them, attached to a backing material.

direct thermal The printing method that uses a heat sensitive media and only the heat of the thermal printhead to create an image on the label.

direct thermal media Media coated with special chemicals that react and darken with the application of heat.

DPI (dots per inch) A measurement of print resolution, rated in the number of thermal elements contained in one inch of the printhead. Also referred to as "resolution".

DPL programming commands used specifically for control of and label production. A complete listing of commands can be found in the *Programmer's Manual.*

EFIGS English, French, Italian, German, Spanish, and other multi-language support as programmed for the printer's menu system and configuration label.

fan-fold Media that is folded and stacked.

feed speed The speed at which the media moves under the printhead in non-printed areas and between labels.

Flash memory Non-volatile memory (does not require printer power to maintain data) that can be erased and reprogrammed, used to hold the printer's operating program.

font A set of alphanumeric characters that share a particular typeface.

gap A space between die-cut or notched labels used to sense the top-of-form.

IPS (inches per second) Imperial measurement of printer speeds.

label A paper or synthetic printing material, typically with a pressure sensitive adhesive backing.

label length The distance from the top of the label to the bottom of the label as it exits the printer.

label repeat The distance from the top of one label to the top of the next label.

label tracking Undesirable lateral (side to side) movement of the media as it travels under the printhead.

label width The left to right measurement of the label as it exits the printer.

media Generalized term for all types of printing stocks, including: roll fed, continuous, die-cut, reflective, and fanfold.

media hub Device in the printer used to support roll media.

media sensor An electronic device equipped with photosensors to detect media and the top-of-form on die-cut, notched or reflective media.

MMPS (millimeters per second) Metric measurement of printer speeds.

notched stock Media, typically tag stock, with holes or notches in the material that is used to signal the top-of-form. The printer must be set to 'gap' to use this media type.

perforation small cuts extending through the label and backing material to facilitate their separation. Also referred to as "perf".

print speed The speed at which the media moves under the printhead during the printing process.

reflective media Media imprinted with carbon-based black marks on the underside of the material, which is used to signal the top-of-form when the 'reflective' sensor is enabled.

registration Repeatable top to bottom alignment of printed labels.

reverse speed The backward rate of media motion into the printer during tear-off, peel and present and cutting modes for positioning the label at the start of print position.

ribbon An extruded polyester tape with several layers of material, one of which is ink-like, used to produce an image on the label. Also referred to as “foil”.

ribbon wrinkle An undesirable overlapping of the ribbon during the printing process that leads to voids on the printed label. Typically caused by an improper printhead leveling cam adjustment.

roll media A form of media that is wound upon a cardboard core.

start of print The position on the label where the printing actually begins.

tag stock A heavy paper or synthetic printing material, typically featuring a notch or black mark and without an adhesive backing.

thermal transfer The printing method that creates an image by transferring ink from a ribbon onto the media using the heat from the thermal printhead.

TOF (top-of-form) The start of a new label.

void An undesirable blank space in a printed image.

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