Zebra Z4M™/Z6M™ Printers
User's Guide

Customer order # 11356L
Manufacturer part # 11356LB Rev. 1

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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced Radio/TV technician for help.

NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

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DECLARATION OF CONFORMITY

I have determined that the Zebra printers identified as the

Z4M™ and Z6M™

manufactured by:

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109 U.S.A.

have been shown to comply with the applicable technical standards of the FCC

for Home, Office, Commercial, and Industrial use

if no unauthorized change is made in the equipment,
and if the equipment is properly maintained and operated.

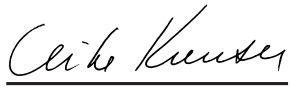


Table of Contents

Welcome

Hello!

- This user's guide provides all the information you need to operate the *Z*4M™ or *Z*6M™ printer.
- The *ZPL II® Programming Guide Volume I and Volume II* (part # 45540L) details how to create the perfect label format for your application. The guide explains how the optional ZBI™ extends the power of ZPL II by allowing custom programs to be written that operate within the printer, directly interfacing with bar code scanners, keyboard display devices, etc. The guide also contains information about the enhanced operating system features of your printer. There are three ways to obtain this guide: on the accessory CD-ROM (supplied with the printer), on our web site (www.zebra.com), or by ordering printed manuals from your distributor.
- The *ZebraNet® Networking: PrintServer II™ Installation and User's Guide* (part # 45537L) explains how you can quickly set up your printer on an IP network and experience ZebraLink™, our revolutionary real-time connectivity and control solution for Zebra printers (optional ZebraNet® PrintServer II required).
- The maintenance manual for your printer (part # 77259L) contains the information you need to maintain your printer.

Unpacking and Inspection

Carefully unpack and inspect the printer for shipping damage:

- Check all exterior surfaces.
- Raise the media access door and inspect the media compartment.

Save the carton and all packing material in case the printer needs to be shipped. Contact your authorized Zebra reseller for instructions.

Reporting Damage

If you discover shipping damage:

- Immediately notify the shipping company and file a damage report. *Zebra Technologies Corporation is not responsible for any damage incurred during the shipment of the equipment and will not repair this damage under warranty.*
- Keep the carton and all packing material for inspection.
- Notify your local Zebra reseller.

Storage

If you are not placing the printer into operation immediately, repackage it using the original packing materials. The printer may be stored under the following conditions:

- Temperature: –40° F to 140° F (–40° C to 60° C)
- Relative humidity: 5% to 85%, non-condensing

Media and Ribbon Requirements

Since print quality is affected by media and ribbon, printing speeds, and printer operating modes, it is very important to run tests for your applications.

We *strongly recommend* the use of Zebra Technologies Corporation-brand supplies for continuous high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the printer and to ensure against premature printhead wear.

- Continuous roll media, fanfold media, or card stock with optional perforations and registration holes may be used.
- Printhead life may be reduced by the abrasion of exposed paper fibers when using perforated media.
- The ribbon MUST be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear. (When printing in direct thermal mode, ribbon is not used and should not be loaded in the printer.)

Printer Power

The power supply in the printer automatically detects the applied line voltage and works in the 90 to 265 VAC range.

WARNING: For personnel and equipment safety, always use a three-prong plug with an earth ground connection.

NOTE: Depending on how your printer was ordered, a power cord may or may not be included. If one is not included, or if the one included is not suitable for your requirements, refer to "Power Line Cord Specifications" on page 85.

1. Make sure that the POWER switch (see Figure 1) is in the "off" (**O**) position before connecting the power cord.
2. Plug the female end of the power cord into the connector at the rear of the printer.
3. Plug the male end of the power cord into a live AC outlet.

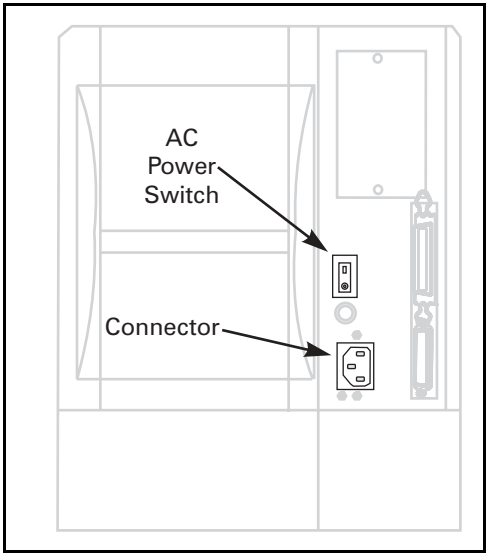


Figure 1

Printer Overview

Figure 2 shows the basic components of your printer. Depending on installed options, your printer may look slightly different.

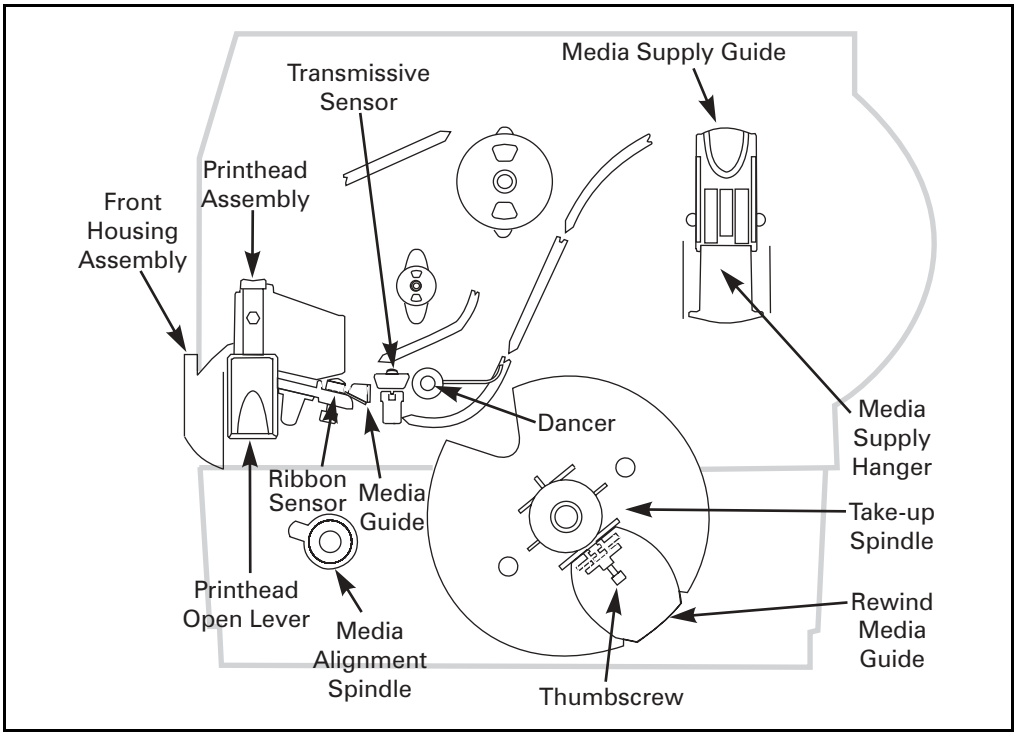


Figure 2

Calibrating the Printer

This chapter of the user's guide is *so* important that we've printed it on a different color paper! That way, it will be easy for you to find when you must calibrate (set up) the printer for your particular application.

Purpose

- To calibrate the printer.
- To verify that the printer is properly set up by printing a test label.

NOTE: This procedure must be performed when the printer is first installed or if it cannot properly detect the top of the label.

To calibrate the printer, you must perform the following procedures:

- Determine the **type of media** (labels) being used.
- Choose the **print method**.
- Position the **media sensor** (if necessary).
- **Configure the printer and software or driver** based on the label being used.
- Print a **test label**.

Types of Media

Non-Continuous Web Media

Non-continuous web media (refer to Figure 3) refers to individual labels that are separated by a gap, notch, or hole. When you look at the media, you can tell where one label ends and the next one begins.

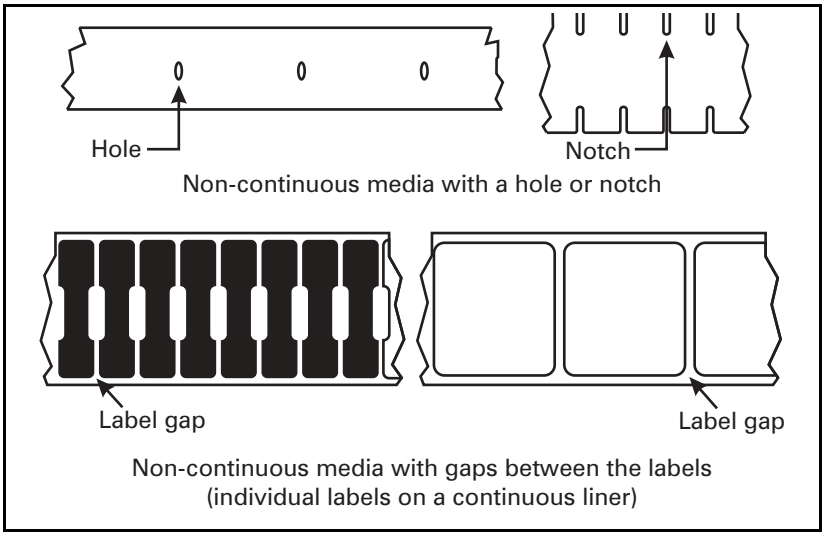


Figure 3

Non-Continuous Black Mark Media

Non-continuous black mark media has black marks printed on the back of the liner material that indicate the start and end of each label (refer to Figure 4).

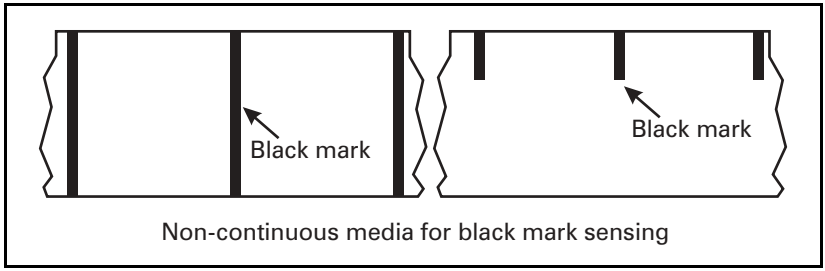


Figure 4

Continuous Media

Continuous media (refer to Figure 5) is one uninterrupted roll of material that allows the image to be printed anywhere on the label.

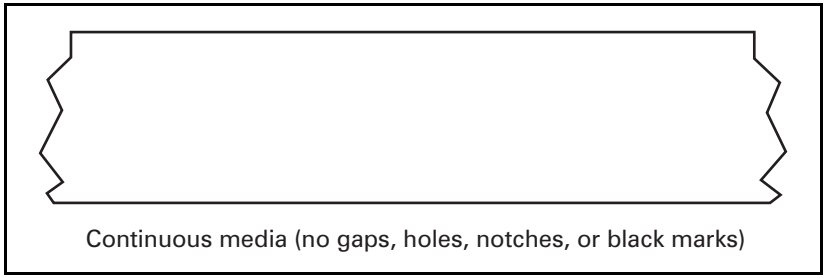


Figure 5

Choosing the Print Mode

- In **tear-off** mode, each label (or a strip of labels) can be torn off after it is printed.
- In **peel-off** mode, liner material is peeled away from the label as it is printed. After this label is removed from the printer, the next one is printed.
- In **cutter** mode, the printer automatically cuts the label after it is printed.
- In **rewind** mode, the media and/or liner are rewound onto a core as the labels are printed.

Loading the Media

Figure 6 illustrates one method of media loading. For more detailed instructions, as well as information about how to load the different types of media and the various printing modes, refer to the instructions that begin on page 22.

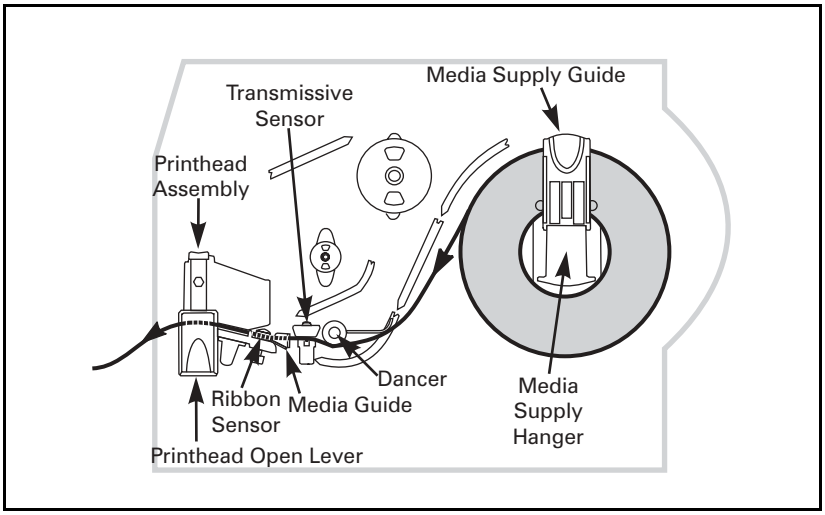


Figure 6

Positioning the Media Sensor

The correct positioning of the media sensor is important — it can make the difference between a perfect label and a call to Technical Support!

There are two media sensors in this printer: "reflective" and "transmissive."

Reflective Sensor

The reflective sensor detects the "start-of-label indicator" (the notch, hole, black mark, or gap between die-cut labels).

The reflective sensor must be positioned:

- directly under the notch, hole, or black mark, or
- anywhere along the width of the media if there is a gap between labels

The glow of the red light through the media helps you to accurately position the reflective sensor.

NOTE: If you are using continuous media, position the reflective sensor anywhere under the media so that the printer can detect an out-of-paper condition.

NOTE: The reflective sensor is compatible with most types of media. However, if you encounter difficulties with calibration, use the transmissive sensor. For details, see "Transmissive Sensor" on page 10.

Adjusting the Reflective Sensor

Refer to Figure 7.

1. Open the printhead assembly by pressing the printhead open lever.
2. Locate the reflective sensor positioning lever.
3. Move the reflective sensor positioning lever across the width of the media until the reflective sensor aligns with the start-of-label indicator. The glow of the red light assists in the proper placement of the reflective sensor.
4. Close the printhead assembly.

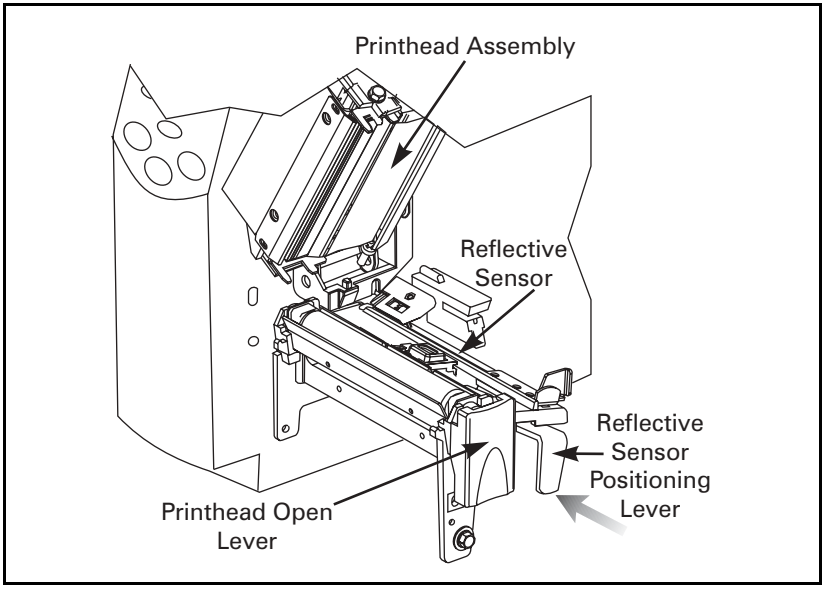


Figure 7

Transmissive Sensor

The transmissive sensor is in a fixed position and enabled via the front panel (refer to “SENSOR SELECT” on page 41 for details).

Loading the Ribbon

Refer to Figure 8.

For more detailed information, refer to the instructions that begin on page 34.

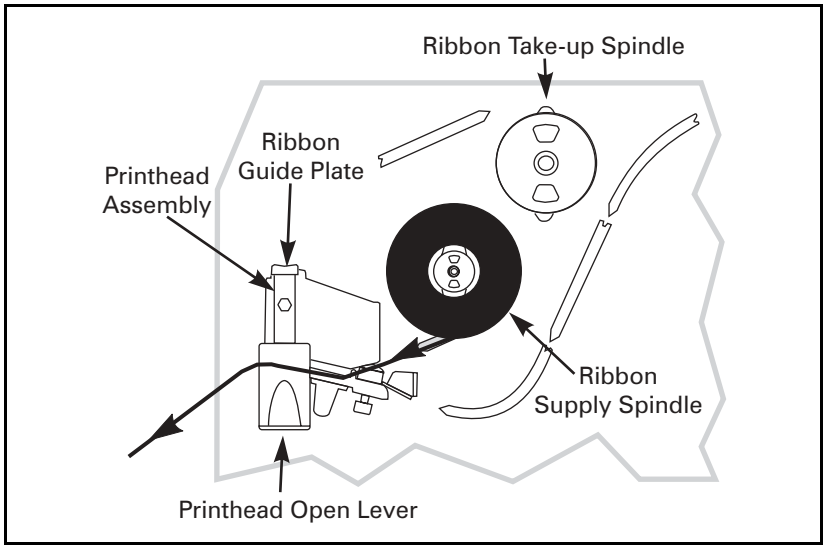


Figure 8

Auto Calibration

During auto calibration, the printer determines the label length and media/ribbon sensor settings.

Auto calibration occurs when the printer is turned on and each time the printer recovers from an error condition. (To clear an error, open and close the printhead assembly and then press the PAUSE key.) The printer begins auto calibration when all errors have been cleared.

The results of the auto calibration are stored in the printer's memory and are retained even if printer power is removed. These parameters remain in effect until the next calibration is performed.

NOTE: The auto calibration process does not take place if the ZPL command or front panel setting for "MEDIA POWER UP" or "HEAD CLOSE" is set either to "feed" or "no motion." In these cases, the printer assumes the media is correctly positioned and starts printing without auto calibrating.

Operator Controls

POWER Switch

The POWER switch is located at the back of the printer above the power cord. Turn on the printer.

Front Panel

For a more detailed explanation of the front panel keys and lights (shown in Figure 9), refer to the instructions that begin on page 19.

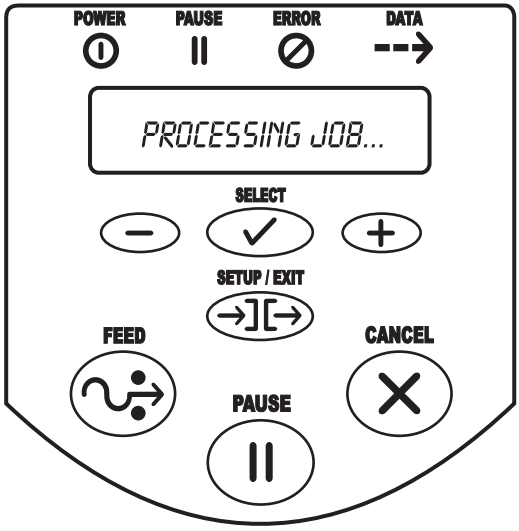


Figure 9

Configuring the Printer

The configuration procedure in Table 1 contains the information you need to get your printer up and running, *but it is not comprehensive*. Refer to page 37 for more information.

1. Press the SETUP/EXIT key at the "PRINTER READY" display to enter the configuration mode.

NOTE: You need to press the INCREMENT (+) key more than once to advance to some of the displays.

2. Press the INCREMENT (+) or DECREMENT (–) key to scroll to the setting you wish to change.
3. Press the SELECT key to toggle the functionality of the INCREMENT (+) and DECREMENT (–) keys.
4. Press the INCREMENT (+) or DECREMENT (–) keys to increase or decrease the value; answer "yes" or "no"; print a label; or select the digit you wish to change.
5. Press the SELECT key again to use the INCREMENT (+) and DECREMENT (–) keys to scroll to the desired menu item.

Table 1

Parameter	Selections/Explanation
PRINTER READY	You are ready to configure the printer
DARKNESS	0 to 30 (default setting is "10")
PRINT MODE	Tear-off, peel-off, liner take-up, cutter, rewind (default setting is tear-off)
MEDIA TYPE	Non-continuous, continuous (default setting is "non-continuous")
SENSOR TYPE	Web, mark (default setting is "web")
PRINT METHOD	Thermal transfer, direct thermal (default setting is "thermal transfer")

6. After you have configured the print method, press the SETUP/EXIT key to save the changes and exit the configuration mode.

Configuring the Software or Printer Driver

Many printer settings may also be controlled by your printer's driver or label preparation software. Refer to the driver or software documentation for more information.

Printing a Test Label

To print a test label:

1. Turn off the printer.
2. Press and hold the CANCEL key while turning on the printer.
3. Release the CANCEL key after the DATA light turns off (approximately five seconds).

A configuration label prints showing the printer's currently stored parameters (similar to the labels shown in Figure 10).

If you encounter any problems while you are configuring the printer or printing a test label, refer to "Troubleshooting" beginning on page 69. Otherwise, refer to See "Establishing Communication" beginning on page 17 to set up the communication parameters.

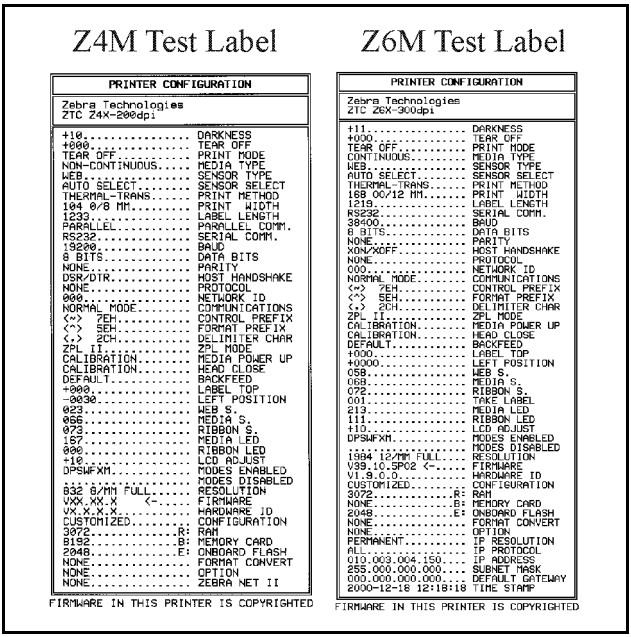


Figure 10

Establishing Communication

System Considerations

Interfaces

The method of interfacing this printer to a data source depends on the communication options installed in the printer. The standard interfaces are an RS-232/RS-422/RS-485 serial data port and an IEEE 1284 compliant bi-directional parallel port. The optional ZebraNet® PrintServer II enables printers to be connected to 10Base-T Ethernet networks.

Data Specifications

When communicating via an asynchronous serial data port (refer to Figure 11), the baud rate, number of data and stop bits, parity, and handshaking are user selectable (default settings are 9600 baud, 8 data bits, 1 stop bit, no parity, and XON/XOFF). Parity only applies to data transmitted by the printer since the parity of received data is ignored. Refer to page 46 to configure the communication parameters for the printer. The values selected must be the same as those used by the host equipment connected to the printer.

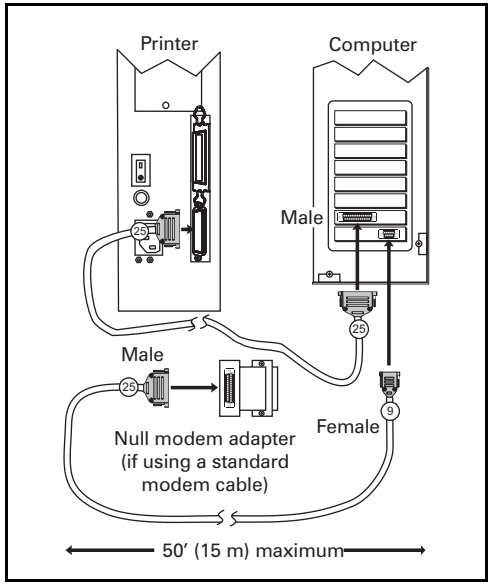


Figure 11

When communicating via the parallel port (refer to Figure 12), the previously mentioned parameters are not considered.

For serial and parallel pinout and technical information, refer to “Appendix” beginning on page 87.

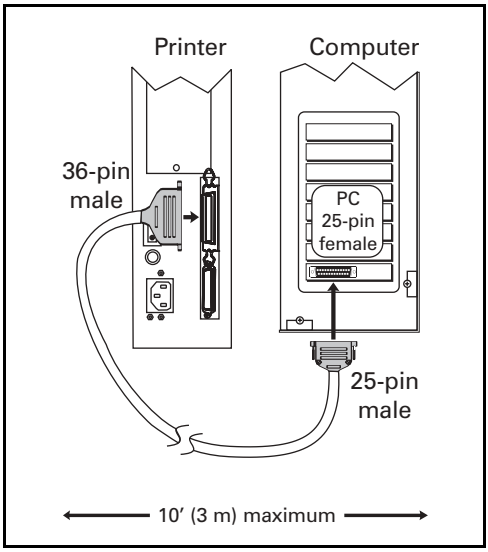


Figure 12

Cabling Requirements

Data cables must be fully shielded and fitted with metal or metalized connector shells. Shielded cables and connectors are required to prevent radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible.
- Do not bundle the data cables tightly with the power cords.
- Do not tie the data cables to power wire conduits.

NOTE: Zebra printers comply with FCC “Rules and Regulations,” Part 15, for Class B Equipment, using fully shielded data cables. Use of unshielded cables may increase radiated emission above the Class B limits.

NOTE: RS-422 and RS-485 applications should use twisted shielded pairs as recommended in the Appendix of the TIA/EIA.-485 Specification.

Front Panel

This section discusses the functions of the controls and indicators on the printer. Become familiar with each of these functions before operating the printer.

Front Panel Display

The front panel display (shown in Figure 13) communicates operational status and programming modes and parameters.

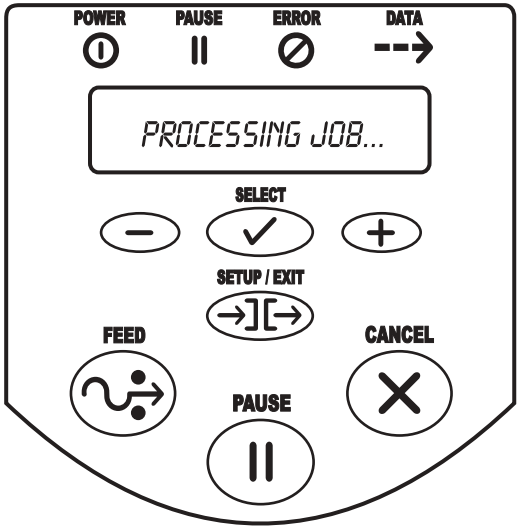


Figure 13

Front Panel Keys

Key	Function
FEED	Forces the printer to feed one blank label each time the key is pressed. • Printer not printing: one blank label immediately feeds. • Printing: one blank label feeds after the current batch of labels is complete.
PAUSE	Starts and stops the printing process: • Printer not printing: no printing occurs. (Press PAUSE again to resume printing.) • Printing: printing stops after the current batch is complete.
CANCEL	When in the pause mode, this key cancels print jobs. • Printer not printing: the next stored label format does not print. • Printing: the label format currently printing is cancelled. Press and hold for several seconds to cancel all print jobs in the printer's memory.
SETUP/EXIT	Enters and exits the configuration mode.
SELECT	Toggles the function of the INCREMENT (+) and DECREMENT (–) keys between the "scroll" and "change" modes. • Press once to use the INCREMENT (+) and DECREMENT (–) keys to change the values of the selection. • Press again to use the INCREMENT (+) and DECREMENT (–) keys to scroll through the menu items.
INCREMENT (+) ("scroll mode")	Scrolls to the next selection.
INCREMENT (+) ("change mode")	• Increases the value • Answers "yes" • Prints a label (when applicable)
DECREMENT (–) ("scroll mode")	Scrolls to the previous selection.
DECREMENT (–) ("change mode")	• Decreases the value • Selects the digit you wish to change • Answers "no"

Front Panel Lights

Light	Status	Indication
POWER	Off	The printer is off or no power is applied.
	On	The printer is on.
PAUSE	Off	Normal printer operation.
	On	The printer has stopped all printing operations.
	Flashing	In peel-off mode, the PAUSE light flashes when the label is available for removal, and when initializing FLASH or PCMCIA memory.
ERROR	Off	Normal printer operation (no errors).
	Slow flashing	“RIBBON IN” warning, “HEAD UNDER TEMP” warning, or “HEAD OVER TEMP” error.
	Fast flashing	“HEAD OPEN” error.
	On	“PAPER OUT”, “RIBBON OUT”, or “CUTTER JAM” errors.
DATA	Off	Normal printer operation (no data being received or processed).
	One flash	The CANCEL key is pressed and a format is successfully cancelled.
	Slow flashing	The printer is unable to accept more data from the host.
	Fast flashing	The printer is receiving data.
	On	A partial format has been received and there has been no subsequent data activity.

Roll Media Loading

Tear-off Mode

Refer to Figure 14.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and out the front of the printer.
8. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
9. Close the printhead assembly.
10. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

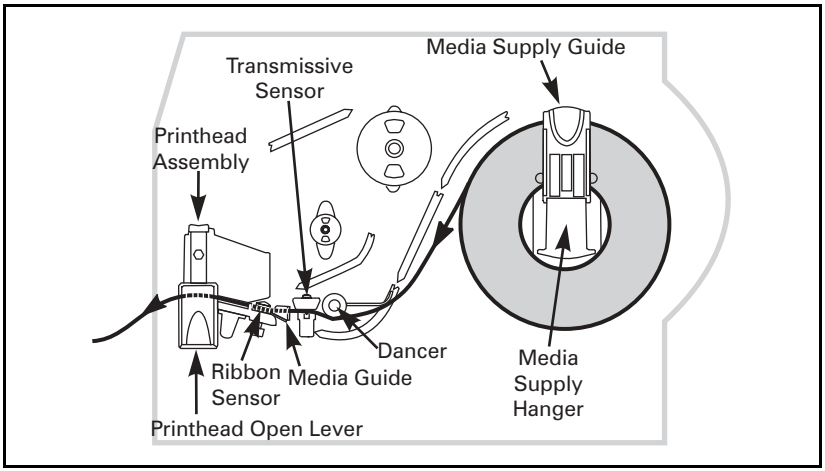


Figure 14

Cutter Mode

(Cutter option required)

Refer to Figure 15.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and through the cutter module.
8. Ensure that the media is against the back of the transmissive sensor. Then, slide in the media guide so that it just touches, but does not restrict, the edge of the media.
9. Close the printhead assembly.
10. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

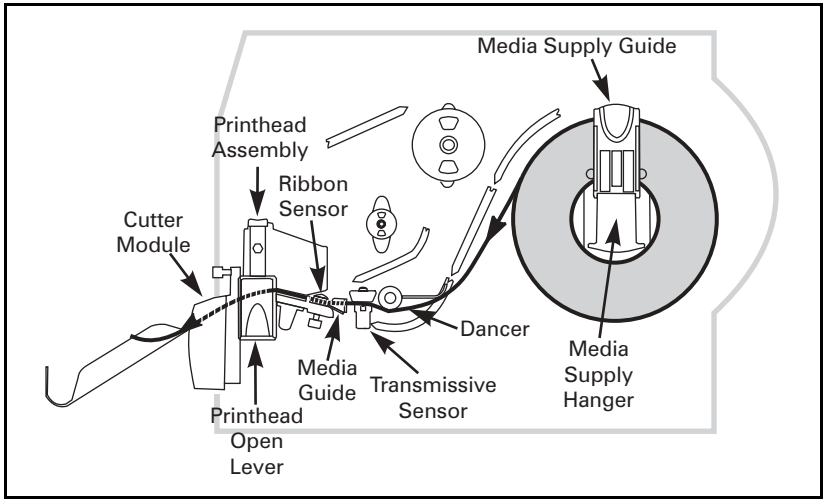


Figure 15

Value Peel-off Mode

(Value peel-off option required)

Refer to Figure 16.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and through the cutter module.
8. Pull approximately 12" (305 mm) of media through the front of the printer.
9. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
10. Pull down the value peel lever to open the value peel assembly.
11. Feed the liner over the tear-off/peel-off bar and behind the value peel assembly.
12. Close the printhead assembly.
13. Close the value peel assembly using the value peel lever.
14. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

Peeling starts automatically. Press the FEED key to test.

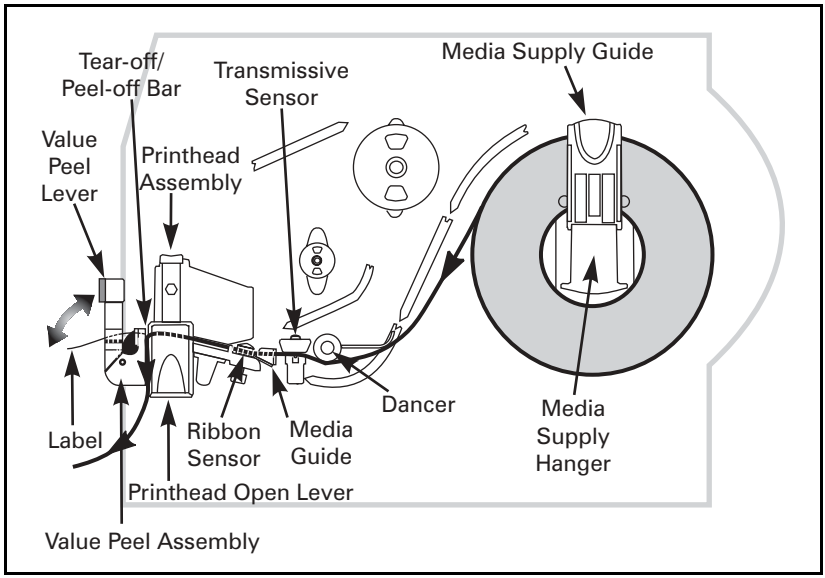

Tear-off/
Peel-off Bar
Transmissive
Sensor
Media Supply Guide
Value
Peel
Lever
Printhead
Assembly
Dancer
Media
Supply
Hanger
Label
Ribbon
Sensor
Media
Guide
Printhead Open Lever
Value Peel Assembly

Figure 16

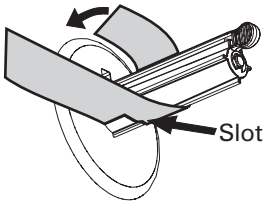
Liner Take-up Mode

(Liner take-up option required)

NOTE: This option is available on the Z4M printer only.

Refer to Figure 17.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, and under the ribbon sensor.
8. Pull approximately 18" (500 mm) of media through the front of the printer.
9. Remove the labels from the exposed media so that only the liner remains.
10. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
11. Pull down the value peel lever to open the value peel assembly.
12. Feed the media over the tear-off/peel-off bar and behind the value peel assembly.
13. Close the printhead assembly.
14. Close the value peel assembly using the value peel lever.
15. Slide the liner into the slot (see inset) in the spindle of the liner take-up (as shown in Figure 17). Make sure the liner is resting against the back plate of the spindle assembly.
16. Turn the spindle assembly counterclockwise a few times so that the liner is snug.



17. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

Peeling starts automatically. Press the FEED key to test.

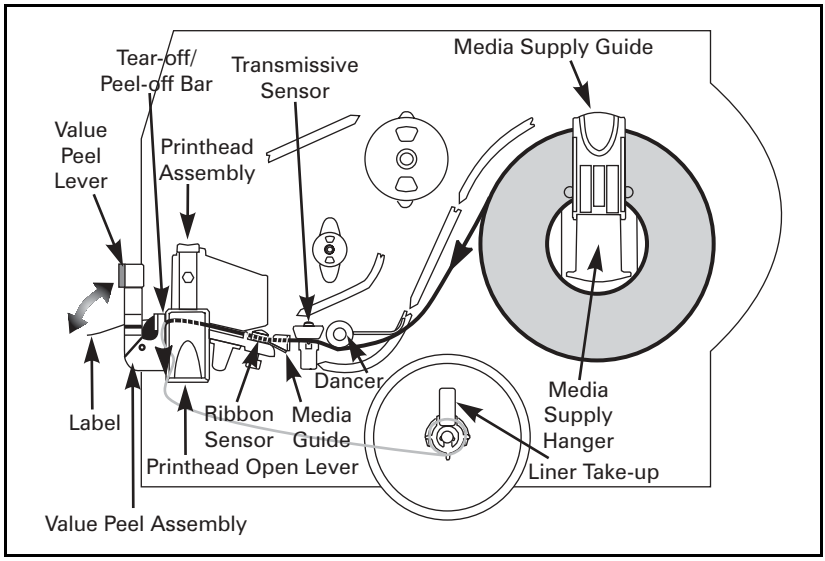
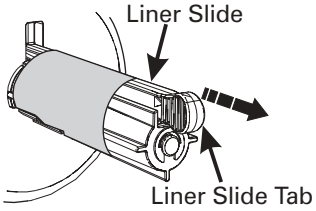


Figure 17

Liner Removal

1. Pull the liner slide toward you (see inset) until it stops (about a third of the way down the liner take-up spindle).
2. Slide the liner from the take-up spindle.



NOTE: The liner slide moves smoothly back into place on the liner take-up spindle once the liner has been removed.

Power Peel/Rewind (Peel Mode)

(Power peel/rewind option required)

Refer to Figure 18.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, and under the ribbon sensor.
8. Pull approximately 36" (915 mm) of media through the front of the printer.
9. Remove the labels from the first 18" of media so that only the liner remains.
10. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
11. Pull down the value peel lever to open the value peel assembly.
12. Feed the media over the tear-off/peel-off bar, and through the slot in the value peel assembly.
13. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
14. Slide an empty core onto the take-up spindle; wrap the liner around the core and turn the take-up spindle counterclockwise to wind up the excess liner material.

NOTE: The liner must be attached to the take-up spindle for the printer to operate properly. Make sure the edge of the liner is flush against the backplate of the take-up spindle (see “Rewind Media Alignment” on page 67 for details).

15. Slide the rewind media guide against the liner material and tighten the thumbscrew to lock it into position.

16. Close the printhead assembly.

17. Close the value peel assembly using the value peel lever.

18. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

Peeling starts automatically. Press the FEED key to test.

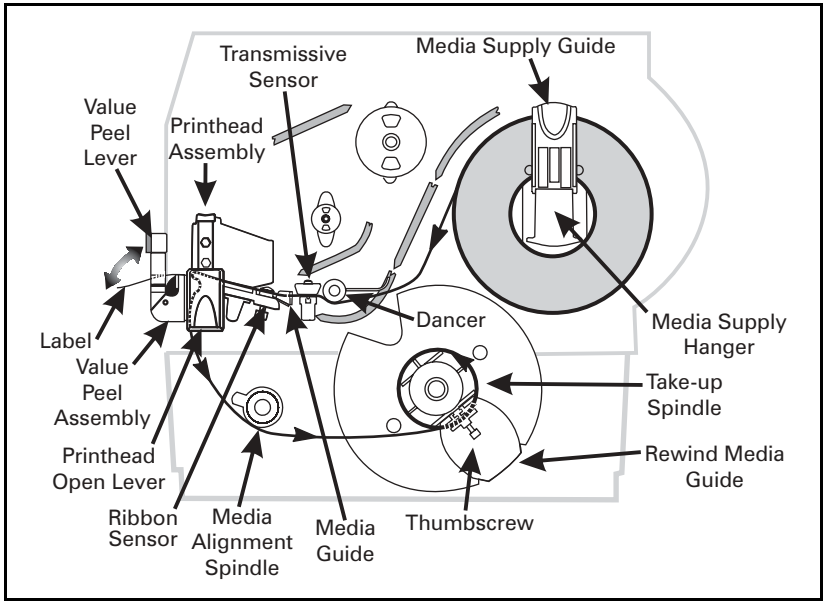


Figure 18

Liner Removal

1. Cut the liner material between the media alignment spindle and the take-up spindle.
2. Rotate the take-up spindle counterclockwise until the rewind media guide is in the "12 o'clock" position.
3. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
4. Slide the core with the liner material from the take-up spindle.

Power Peel/Rewind (Rewind Mode)

(Power rewind option required)

Refer to Figure 19.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Place the roll of media on the media supply hanger and orient the media properly.
5. Flip up the media supply guide.
6. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the roll.
7. Feed the media under the dancer, through the slot in the transmissive sensor, and under the ribbon sensor.
8. Pull approximately 36" (915 mm) of media through the front of the printer.
9. Remove the labels from the first 18" of media so that only the liner remains.
10. Ensure that the media is against the back of the transmissive sensor. Slide in the media guide so that it just touches, but does not restrict, the edge of the media.
11. Feed the media over the value peel assembly and through the rewind base assembly.
12. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
13. Slide an empty core onto the take-up spindle; wrap the media around the core and turn the take-up spindle counterclockwise to wind up the excess material.

NOTE: The liner must be attached to the take-up spindle for the printer to operate properly. Make sure the edge of the liner is flush against the backplate of the take-up spindle (see “Rewind Media Alignment” on page 67 for details).

14. Slide the rewind media guide against the media, and tighten the thumbscrew to lock it into position.

15. Close the printhead assembly.

16. If the printer is paused (the PAUSE light is on), press the PAUSE key to enable printing.

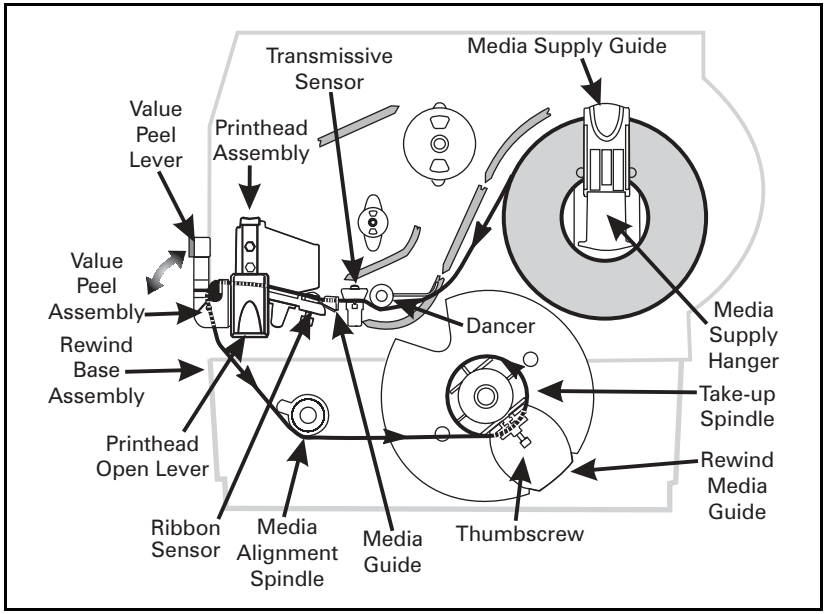


Figure 19

Media Removal

1. Cut the media between the media alignment spindle and the take-up spindle.
2. Rotate the take-up spindle counterclockwise until the rewind media guide is in the "12 o'clock" position.
3. Loosen the thumbscrew and slide out the rewind media guide to the end of the take-up spindle.
4. Slide the core with the roll of media from the take-up spindle.

Fanfold Media Loading

Fanfold media feeds through either the bottom or rear access slot.

Refer to Figure 20.

1. Press the printhead open lever. The printhead assembly springs up.
2. Flip down the media supply guide.
3. Slide out the media guide as far from the printer frame as possible.
4. Pass the fanfold media over the media supply hanger.
5. Flip up the media supply guide. Slide in the media supply guide so that it just touches, but does not restrict, the edge of the media.
6. Thread the media under the dancer, through the slot in the transmissive sensor, under the ribbon sensor, and out the front of the printer.
7. Ensure that the media is against the back of the transmissive sensor. Then, slide in the media guide so that it just touches, but does not restrict, the edge of the media.
8. Close the printhead assembly.

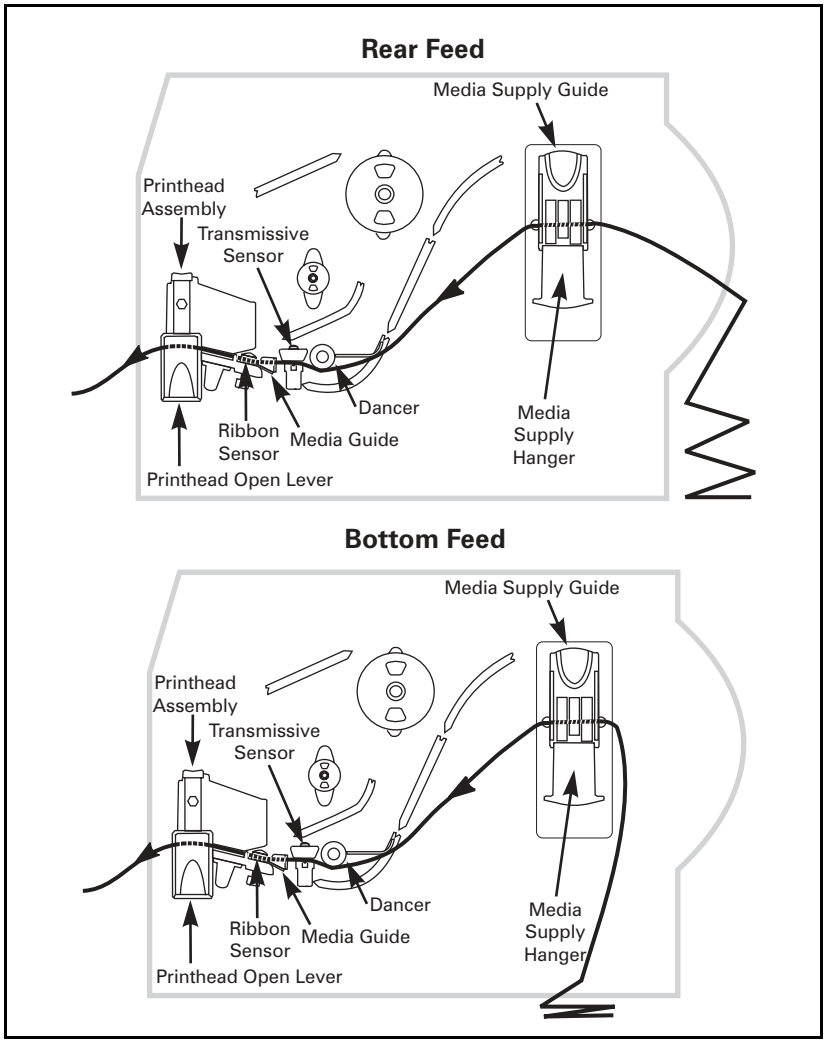

Rear Feed
Media Supply Guide
Printhead Assembly
Transmissive Sensor
Dancer
Media Supply Hanger
Ribbon Sensor
Media Guide
Printhead Open Lever
Bottom Feed
Media Supply Guide
Printhead Assembly
Transmissive Sensor
Dancer
Media Supply Hanger
Ribbon Sensor
Media Guide
Printhead Open Lever

Figure 20

Ribbon Loading

NOTE: The ribbon supply spindle in your printer is a “dual tension” variety. Most applications require the spindle to be in the “normal” position. The “low tension” position is recommended only when a wide ribbon is used and normal tension hampers the ribbon movement.

NOTE: To place this spindle in the “normal” position, firmly pull out the spindle end cap until it clicks into place as shown in Figure 21. To place the spindle in the “low tension” position, firmly push in the end cap until it clicks into place.

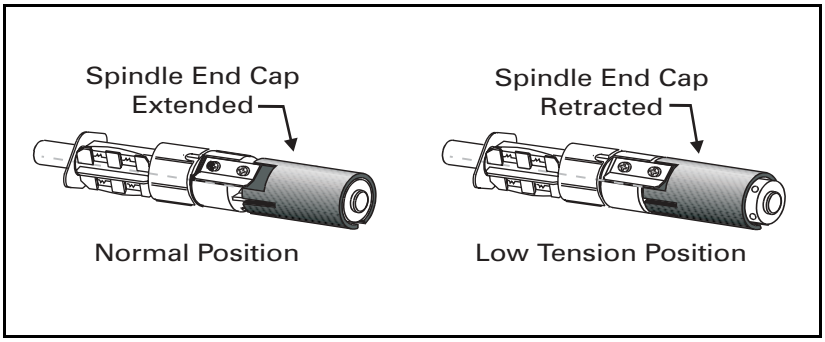


Figure 21

Loading the Ribbon

CAUTION: Always use ribbon that is wider than the media. The smooth liner of the ribbon protects the printhead from wear. (For direct thermal printing, do not load ribbon in the printer.)

Refer to Figure 22.

1. Press the printhead open lever. The printhead assembly springs up.
2. Orient the ribbon as shown. Push the ribbon roll completely onto the ribbon supply spindle.
3. Pull the end of the ribbon over the ribbon sensor, under the printhead assembly, and out the front of the printer.
4. Hold the ribbon snug and free of wrinkles and in line with the guide mark near the left edge of the ribbon guide plate. Close the printhead assembly.
5. Wind the ribbon clockwise onto the ribbon take-up spindle.

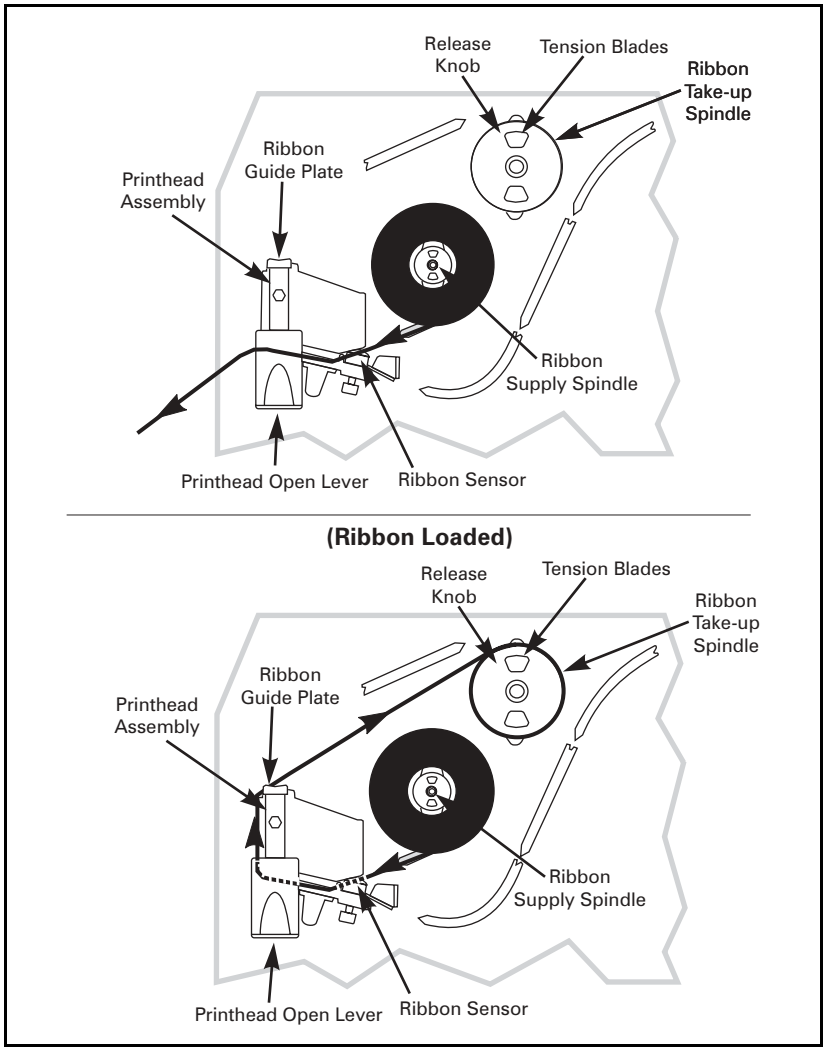

Release Knob
Tension Blades
Ribbon Take-up Spindle
Ribbon Guide Plate
Printhead Assembly
Ribbon Supply Spindle
Printhead Open Lever
Ribbon Sensor
(Ribbon Loaded)
Release Knob
Tension Blades
Ribbon Take-up Spindle
Ribbon Guide Plate
Printhead Assembly
Ribbon Supply Spindle
Printhead Open Lever
Ribbon Sensor

Figure 22

Ribbon Removal

To remove the ribbon:

1. If the ribbon has not run out, break it between the ribbon guide plate and the ribbon take-up spindle.
2. While turning the ribbon take-up spindle release knob counterclockwise, squeeze the ribbon against the ribbon take-up spindle tension blades.
3. When the tension blades collapse into the ribbon take-up spindle, hold the release knob and rotate the spent ribbon toward the rear of the printer. Then, slide off the ribbon.

Configuration

After you have installed the media and ribbon and the Power-On Self Test (POST) is complete, the front panel display shows “PRINTER READY.” (If the printer fails its POST, refer to page 75.) Use the front panel display and the four keys directly below it to set printer parameters for your application.

NOTE: Printers operating on an IP network can be quickly configured using ZebraLink™ WebView (optional ZebraNet® PrintServer II required). For information, refer to *ZebraNet Networking: PrintServer II Installation and User’s Guide*.

NOTE: Unless otherwise noted, all parameters are listed in the order they are displayed, starting with “DARKNESS.”

Entering the Setup Mode

To enter the programming mode, press the SETUP/EXIT key.

- Press the INCREMENT (+) or DECREMENT (–) key to scroll to the setting you wish to change.
- Press the SELECT key to toggle the functionality of the INCREMENT (+) and DECREMENT (–) keys.
- Press the INCREMENT (+) or DECREMENT (–) keys to increase or decrease the value; answer “yes” or “no”; print a label; or select the digit you wish to change.
- Press the SELECT key again to use the INCREMENT (+) and DECREMENT (–) keys to scroll to the desired menu item.

NOTE: An asterisk (*) in the upper left-hand corner of the display indicates that the value displayed is different than the currently stored value.

Changing Password-Protected Parameters

Certain parameters are password protected by factory default.

NOTE: You have the option of making *all* parameters password protected. See "PASSWORD LEVEL" on page 52 for details.

CAUTION: Do not change password-protected parameters unless you are sure you know what you are doing! If set incorrectly, these parameters could cause the printer to function in an unpredictable way.

The first attempt to change a password-protected parameter requires you to enter a four-digit password at the "ENTER PASSWORD" display. The DECREMENT (–) key changes the selected digit position. The INCREMENT (+) key increases the selected digit value. After entering the password, press the SELECT key. The parameter you wish to change is displayed. If the password was entered correctly, you can now change the value.

The default password value is 1234. The password can be changed using the **^KP** (Define Password) ZPL II instruction.

NOTE: Once the password has been entered correctly, it does not have to be entered again unless you leave and re-enter the programming mode using the SETUP/EXIT key.

NOTE: You can disable the password protection feature so that it no longer prompts you for a password by setting the password to ØØØØ via the **^KPØ** ZPL/ZPL II command. To re-enable the password-protection feature, send the ZPL/ZPL II command **^KPx**, where "x" can be any number that is one to four digits in length, except Ø.

Leaving the Setup Mode

You can leave the program mode at any time by pressing the SETUP/EXIT key. The "SAVE CHANGES" display appears. There are five choices, which are described below. Pressing the INCREMENT (+) or DECREMENT (–) key displays other choices and pressing the SELECT key selects the displayed choice.

- PERMANENT — Permanently saves the changes. Values are stored in the printer even when power is turned off.
- TEMPORARY — Saves the changes until you change them again or until power is turned off.
- CANCEL — Cancels all changes from the time you pressed the SETUP/EXIT key except for darkness and tear-off settings (if they were changed).
- LOAD DEFAULTS — Loads factory defaults.
- LOAD LAST SAVE — Loads values from the last permanent save.

Configuration and Calibration Sequence

Display Shows	Action/Explanation
PRINTER READY	Normal printer operation.
Setting Print Parameters	
DARKNESS	**Adjusting Print Darkness:** Press the INCREMENT (+) key to increase darkness. Press the DECREMENT (–) key to decrease darkness. **Default:** +10 **Range:** 0 to +30 Darkness settings are dependent upon a variety of factors, including ribbon type, media, and the condition of the printhead. You may adjust the darkness for consistent high-quality printing. If printing is too light, or if there are voids in printed areas, increase the darkness. If printing is too dark, or if there is spreading or bleeding of printed areas, decrease the darkness. The FEED Key Self Test on page 78 can also be used to determine the best darkness setting. Since the darkness setting takes effect immediately, you can see the results on labels that are currently printing. **CAUTION:** Set the darkness to the lowest setting that provides good print quality. Darkness set too high may cause ink smearing and/or it may burn through the ribbon. Darkness settings may also be changed by the driver or software settings.
TEAR OFF	**Adjusting the Tear-off Position:** Press the INCREMENT (+) key to increase the value, press the DECREMENT (–) key to decrease the value. Each press of the key adjusts the tear-off position by four dot rows. **Default:** +0 **Range:** –120 to +120 This parameter establishes the position of the media over the tear-off/peel-off bar after printing. The label and liner can be torn off or cut between labels.

Display Shows	Action/Explanation
PRINT MODE	**Selecting Print Mode:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Tear-off **Selections:** Tear-off, cutter, peel-off, liner take-up, rewind Print mode settings tell the printer the method of media delivery that you wish to use. Be sure to select a print mode that your hardware configuration supports as some selections displayed are for optional printer features.
MEDIA TYPE	**Setting Media Type:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Continuous **Selections:** Continuous, non-continuous This parameter tells the printer the type of media you are using. Selecting continuous media requires that you include a label length instruction in your label format (**^LLxxxx** if you are using ZPL or ZPL II). When non-continuous media is selected, the printer feeds media to calculate label length (the distance between two detections of the inter-label gap, webbing, or alignment notch or hole).
SENSOR TYPE	**Setting the Sensor Type:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Web **Selections:** Web, mark This parameter tells the printer whether you are using media with a web (gap/space between labels, notch, or hole) to indicate the separation between labels or if you are using media with a black mark printed on the back. If your media does not have black marks on the back, leave your printer at the default setting (web).
SENSOR SELECT	**Setting the Sensor Select:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Auto select **Selections:** Auto select, reflective, transmissive This parameter tells the printer the sensor you wish to use. “Auto select” is compatible with most types of media. However, if you encounter difficulties with calibration, refer to “Types of Media” on page 6 to help you choose the appropriate sensor for your media. (Select the reflective sensor with either continuous or non-continuous black mark media; choose the transmissive sensor if you are using non-continuous web media.)

Display Shows	Action/Explanation
PRINT METHOD	**Selecting Print Method:** Press the INCREMENT (+) key for the next value; press the DECREMENT (–) key for the previous value. **Default:** Thermal transfer **Selections:** Thermal transfer, direct thermal The print method parameter tells the printer the method of printing you wish to use: direct thermal (no ribbon) or thermal transfer (using thermal transfer media and ribbon). **NOTE:** Selecting direct thermal when using thermal transfer media and ribbon creates a warning condition, but printing continues.
PRINT WIDTH	**Setting Print Width:** Press the INCREMENT (+) key to increase the value, press the DECREMENT (–) key to decrease the value. To change the unit of measurement, press the DECREMENT (–) key until the unit of measurement is active, then press the INCREMENT (+) key to toggle to a different unit of measure (inches, mm, or dots). **Default; Range:** The default and range of acceptable values may vary depending on what printer you have. Refer to “Printing Specifications” on page 82 for further information about the ranges available for your model. Print width determines the printable area across the width of the label.

Listing Printer Information	
Display Shows	**Action/Explanation**
LIST FONTS	**List Fonts:** Press the INCREMENT (+) key to print a label listing all of the available fonts. This selection is used to print a label that lists all of the fonts currently available in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM, FLASH memory, font EPROMs, or font cards.
LIST BAR CODES	**List Bar Codes:** Press the INCREMENT (+) key to print a label listing all of the available bar codes. This selection is used to print a label that lists all of the bar codes currently available in the printer.
LIST IMAGES	**List Images:** Press the INCREMENT (+) key to print a label listing all of the available images. This selection is used to print a label that lists all of the images currently stored in the printer's RAM, FLASH memory, optional EPROM, or optional memory card.
LIST FORMATS	**List Formats:** Press the INCREMENT (+) key to print a label listing all of the available formats. This selection is used to print a label that lists all of the formats currently stored in the printer's RAM, FLASH memory, optional EPROM, or optional memory card.
LIST SETUP	**List Setup:** Press the INCREMENT (+) key to print a label listing the current printer configuration. This selection is used to print a label that lists the current printer configuration information. (Same as the CANCEL Key Self Test on page 76.)
LIST ALL	**List All:** Press the INCREMENT (+) key to print a label listing all of the available fonts, bar codes, images, formats, and the current printer configuration. This selection is used to print a label that lists the five previous selections, as described.

Display Shows	Action/Explanation
INITIALIZE CARD	**Initialize Memory Card** **CAUTION:** Perform this operation only when it is necessary to erase all previously stored information from the optional memory card. Press the SETUP/EXIT key to bypass this function. 1. Press the INCREMENT (+) key to select "YES." If your printer is set to require a password, you are prompted to enter the password. Enter the password and then press the SELECT key. 2. The display asks "INITIALIZE CARD?". Press the INCREMENT (+) key to select "YES." 3. The front panel LCD asks "ARE YOU SURE?". 4. Press the INCREMENT (+) key "YES" to begin initialization. *or* Press the DECREMENT (–) key "NO" to cancel the request and return to the "INITIALIZE CARD" prompt. 5. Press the SETUP/EXIT key followed by the SELECT key. If initialization is still in process, the front panel display flashes back and forth between the two phrases "CHECKING B: MEMORY" and "PRINTER IDLE." When initialization is complete, the printer automatically exits the configuration mode and the front panel displays "PRINTER READY." **NOTE:** Depending on the amount of memory in the memory card, initialization may take up to five minutes to complete.
INIT FLASH MEM	**Initialize Flash Memory** **CAUTION:** Perform this operation only when it is necessary to erase all previously stored information from the FLASH memory. Press the SETUP/EXIT key to bypass this function. 1. Press the INCREMENT (+) key to select "YES." If your printer is set to require a password, you are prompted to enter the password. Enter the password and then press the SELECT key. 2. The display asks "INITIALIZE FLASH?". Press the INCREMENT (+) key to select "YES." 3. The front panel LCD asks "ARE YOU SURE?". 4. Press the INCREMENT (+) key "YES" to begin initialization. *or* Press the DECREMENT (–) key "NO" to cancel the request and return to the "INITIALIZE FLASH" prompt. 5. Press the SETUP/EXIT key followed by the SELECT key. If initialization is still in process, the front panel display flashes back and forth between the two phrases "CHECKING E: MEMORY" and "PRINTER IDLE." When initialization is complete, the printer automatically exits the configuration mode and the front panel displays "PRINTER READY." **NOTE:** Depending on the amount of free FLASH memory, initialization may take up to one minute to complete.

Media and Ribbon Sensor Calibration

Performing the manual calibration procedure resets the sensitivity of the sensors to detect the media and ribbon you are using more accurately. With the sensors at their new sensitivity, the printer then performs the manual calibration. Changing the type of ribbon and/or media may require resetting the sensitivity of the media and ribbon sensors.

Display Shows	Action/Explanation
SENSOR PROFILE	**Sensor Profile:** Press the INCREMENT (+) key to print a media sensor profile. See Figure 23. The media sensor profile may be used to troubleshoot registration problems that may be caused when the media sensor detects preprinted areas on the media or experiences difficulty in determining web location. If the sensitivity of the media and/or ribbon sensors MUST be adjusted, use the manual calibration procedure.
MANUAL CALIBRATION	**Manual Calibration:** Press the INCREMENT (+) key to start the calibration procedure. This procedure is used to reset the sensitivity of the media and ribbon sensors. The manual calibration is then performed.

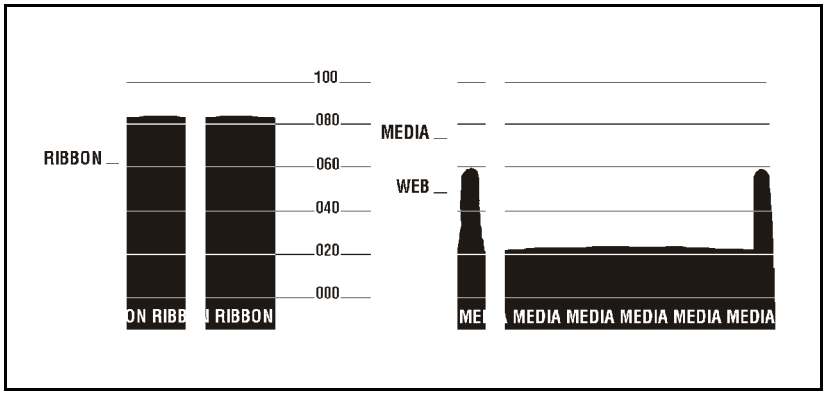


Figure 23

Setting Communication Parameters

Communication parameters must be set correctly for the printer to communicate with the host computer. These parameters make sure that the printer and host computer are "speaking the same language." All communication parameters are password protected.

Display Shows	Action/Explanation
SERIAL COMM	**Setting Serial Communications:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** RS-232 **Selections:** RS-232, RS-422/485, RS-485 multidrop Select the communications port that matches the one being used by the host computer.
BAUD	**Setting Baud:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** 9600 **Selections:** 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400 The baud setting of the printer must match the baud setting of the host computer for accurate communications to take place. Select the value that matches the one being used by the host computer.
DATA BITS	**Setting Data Bits:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** 7-bits **Selections:** 7-bits, 8-bits The data bits of the printer must match the data bits of the host computer for accurate communications to take place. Set the data bits to match the setting being used by the host computer. **NOTE:** Must be set to 8 data bits to use Code Page 850.

Display Shows	Action/Explanation
PARITY	**Setting Parity:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Even **Selections:** Even, odd, none The parity of the printer must match the parity of the host computer for accurate communications to take place. Select the parity that matches the one being used by the host computer.
HOST HANDSHAKE	**Setting Host Handshake:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** XON/XOFF **Selections:** XON/XOFF, DTR/DSR The handshake protocol of the printer must match the handshake protocol of the host computer for communications to take place. Select the handshake protocol that matches the one being used by the host computer.
PROTOCOL	**Setting Protocol:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** None **Selections:** None, Zebra, ACK_NACK Protocol is a type of error checking system. Depending on the selection, an indicator may be sent from the printer to the host computer signifying that data has been received. Select the protocol that is requested by the host computer. Further details on protocol can be found in the *ZPL II Programming Guide Volume I*. **NOTE:** Zebra is the same as ACK_NACK except that with Zebra the response messages are sequenced. **NOTE:** If Zebra is selected, printer must use DTR/DSR host handshake protocol.

Display Shows	Action/Explanation
NETWORK ID	**Setting Network ID:** Press the DECREMENT (–) key to move to the next digit position, press the INCREMENT (+) key to increase the value of the digit. **Default:** 000 **Range:** 000 - 999 Network ID is used to assign a unique number to a printer used in an RS-422/ RS-485 network. This gives the host computer the means to address a specific printer. If the printer is used in a network, you must select a network ID number. This does not affect TCP/IP or IPX networks.
COMMUNICATIONS	**Setting Communications Mode:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Normal mode **Selections:** Normal mode, diagnostics The communication diagnostics mode is a troubleshooting tool for checking the interconnection between the printer and the host computer. When “diagnostics” is selected, all data sent from the host computer to the printer is printed as straight ASCII hex characters. The printer prints all characters received including control codes, like CR (carriage return). A sample printout is shown in Figure 33 on page 79. **NOTES** on diagnostic printouts: • FE indicates a framing error. • OE indicates an overrun error. • PE indicates a parity error. • NE indicates noise. For any errors, check that your communication parameters are correct. Set the print width equal to or less than the label width used for the test. See page 42 for more information.

Selecting Prefix and Delimiter Characters

Prefix and delimiter characters are 2-digit hex values used within the ZPL/ZPL II formats sent to the printer. The printer uses the last prefix and delimiter characters sent to it, whether from a ZPL II instruction or from the front panel.

NOTE: DO NOT use the same hex value for the control, format, and delimiter character. The printer needs to see different characters to function properly.

Display Shows	Action/Explanation
CONTROL PREFIX	**Control Prefix Character:** Press the DECREMENT (–) key to move to the next digit position, press the INCREMENT (+) key to increase the value of the digit. **Default:** 7E (tilde - displayed as a black square) **Range:** 00-FF The printer looks for this 2-digit hex character to indicate the start of a ZPL/ZPL II control instruction.
FORMAT PREFIX	**Format Prefix Character:** Press the DECREMENT (–) key to move to the next digit position, press the INCREMENT (+) key to increase the value of the digit. **Default:** 5E (caret) **Range:** 00 - FF The printer looks for this 2-digit hex character to indicate the start of a ZPL/ZPL II format instruction.
DELIMITER CHAR	**Delimiter Character:** Press the DECREMENT (–) key to move to the next digit position, press the INCREMENT (+) key to increase the value of the digit. **Default:** 2C (comma) **Range:** 00 - FF The delimiter character is a 2-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. Refer to the *ZPL II Programming Guide Volume I* for more information.

Selecting ZPL Mode	
Display Shows	**Action/Explanation**
ZPL MODE	**Selecting ZPL Mode:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** ZPL II **Selections:** ZPL II, ZPL The printer remains in the selected mode until it is changed by this front panel instruction or by using a ZPL/ZPL II command. The printer accepts label formats written in either ZPL or ZPL II. This eliminates the need to rewrite any ZPL formats you already have. Refer to the *ZPL II Programming Guide Volume II* for more information on the differences between ZPL and ZPL II.
Power-Up and Head Close Parameters	
MEDIA POWER UP	**Media Power Up:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Feed **Selections:** Feed, calibration, length, and no motion This parameter establishes the action of the media when the printer is turned on. • Calibration: Recalibrates the media and ribbon sensors. • Feed: Feeds the label to the first web. • Length: Determines the length of the label. • No Motion: Media does not move.
HEAD CLOSE	**Head Close:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Feed **Selections:** Feed, calibration, length, no motion Determines the action of the media after the printhead has been opened and then closed. • Calibration: Recalibrates the media and ribbon sensors. • Feed: Feeds the label to the first web. • Length: Determines the length of the label. • No Motion: Media does not move.

Label Positioning Parameters	
Display Shows	**Action/Explanation**
BACKFEED	**Backfeed Sequence:** Press the INCREMENT (+) key or DECREMENT (–) key to display other choices. **Default:** Default (90%) **Selections:** Default, after, before, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, off This parameter establishes when and how much label backfeed occurs after a label is removed or cut in the peel-off or cutter modes. It has no effect in rewind or tear-off modes. This parameter setting can be superseded by the **~JS** instruction when received as part of a label format (refer to the *ZPL II Programming Guide Volume I*). **NOTE:** The difference between the value entered and 100% establishes how much backfeed occurs before the next label is printed. For example, a value of 40 means that 40% of the backfeed takes place after the label is removed or cut. The remaining 60% takes place before the next label is printed. A value of "before" means that all backfeed takes place before the next label is printed.
LABEL TOP	**Adjusting Label Top Position:** Press the INCREMENT (+) key to increase the value, press the DECREMENT (–) key to decrease the value. The displayed value represents dots. **Default:** +0 **Range:** –120 to +120 dot rows The label top position adjusts the print position vertically on the label. Positive numbers adjust the label top position further down the label (away from the printhead); negative numbers adjust the position up the label (toward the printhead).
LEFT POSITION	**Adjusting Left Position:** Press the DECREMENT (–) key to move to the next position, press the INCREMENT (+) key to change between + and – and to increase the value of the digit. The displayed value represents dots. **Default:** 0000 **Range:** –9999 to +9999 **NOTE:** For a negative value, enter the value before changing to the minus sign. This parameter establishes how far from the left edge of a label the format begins to print by adjusting horizontal positioning on the label. Positive numbers adjust the printing to the left by the number of dots selected; negative numbers shift printing to the right.

Display Shows	Action/Explanation
WEB S. MEDIA S. RIBBON S. TAKE LABEL S. MEDIA LED RIBBON LED	These parameters are automatically set during the calibration procedure. They should only be changed by a qualified service technician. Refer to the maintenance manual for more information on these parameters. Press the SELECT key repeatedly to skip these parameters.
LCD ADJUST	**LCD Display Adjustment:** Press the DECREMENT (–) key to decrease the value (reduce brightness), press the INCREMENT (+) key to increase the value (increase brightness). **Range:** 00 to 19 This parameter allows you to adjust the brightness of your display if your display is difficult to read.
FORMAT CONVERT	**Format Convert:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** None **Selections:** None, 150 V 300, 150 V 600, 200 V 600, 300 V 600 Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second is the dpi to which you would like to scale.
PASSWORD LEVEL	**Password Level:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Selected items **Selections:** Selected items, all items This parameter allows you to select whether certain Zebra-selected menu items (”selected items”) or all menu items (”all items”) are password protected.

Display Shows	Action/Explanation
IP RESOLUTION*	**IP Resolution:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Dynamic **Selections:** Dynamic, permanent Depending on the selection, allows either the user (”permanent”) or the server (”dynamic”) to select the IP address. For more information, refer to *ZebraNet Networking: PrintServer II Installation and User’s Guide*.
IP PROTOCOLS*	**IP Protocols:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** All **Selections:** All, gleaning only, RARP, BOOTP, DHCP, DHCP/BOOTP If “dynamic” was chosen in the previous parameter, this selection determines the method(s) by which the PrintServer II receives the IP address from the server. For more information, refer to *ZebraNet Networking: PrintServer II Installation and User’s Guide*.
IP ADDRESS*	**IP Address:** Press the DECREMENT (–) key to move to the next digit position, press the INCREMENT (+) key to increase the value of the digit. This parameter allows you to select the IP address if “permanent” was chosen in “IP RESOLUTION.” (If “dynamic” was chosen, the user cannot select the address.) For more information, refer to *ZebraNet Networking: PrintServer II Installation and User’s Guide*.
SUBNET MASK*	**Subnet Mask:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Permanent (user *must* set) **Selections:** Dynamic (user *may* set, but server can assign), permanent This parameter selects the part of the IP address that is considered to be part of the local network. It can be reached without going through the default gateway.
DEFAULT GATEWAY*	**Default Gateway:** Press the DECREMENT (–) key to move to the next digit position, press the INCREMENT (+) key to increase the value of the digit. This parameter allows you to select the IP address that the network traffic is routed through if the destination address is not part of the local network.

* ZebraNet® PrintServer II option required

Display Shows	Action/Explanation
LANGUAGE	**Selecting the Display Language:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** English **Selections:** English, Spanish, French, German, Italian, Norwegian, Portuguese, Swedish, Danish, Spanish 2, Dutch, Finnish, Japanese This parameter allows you to change the language used on the front panel display.
You have now completed the entire configuration and calibration sequence. You may either press the SELECT key or the SETUP/EXIT key.	
DARKNESS	You are now back at the first parameter in the configuration sequence. **NOTE:** If you pressed the SELECT key but are through programming the printer configuration, you may press the SETUP/EXIT key and continue with the "SAVE SETTINGS" function.
SAVE SETTINGS	**Save Settings:** Press the INCREMENT (+) or DECREMENT (–) key to display other choices. **Default:** Permanent **Selections:** Permanent, temporary, cancel, load defaults, load last save This display appears when you attempt to exit the configuration mode. • Permanent: Permanently saves the changes, even when printer power is turned off. • Temporary: Saves the changes until you change the values again or until power is turned off. • Cancel: Cancels all changes from the time you entered the configuration mode except for darkness and tear-off position (if they were changed). • Load defaults: Loads factory defaults. • Load last save: Loads the values from the last permanent save.
PRINTER READY	Press the SETUP/EXIT key to activate the displayed choice. You have exited the configuration and calibration sequence and are now ready for normal printer operation.

Routine Care and Adjustments

Cleaning

Table 2 provides a recommended cleaning schedule. Specific cleaning procedures are provided on the following pages.

Table 2

Area		Method	Interval
Printhead		Solvent*	**Direct Thermal Mode:** After every roll of media (or 500 feet of fanfold media). **Thermal Transfer Mode:** After every roll of ribbon or three rolls of media. *These intervals are intended as guidelines only. You may have to clean more often, depending upon your application and media.*
Platen roller		Solvent*	
Media sensors		Air blow	
Ribbon sensor		Air blow	
Media path		Solvent*	
Ribbon path		Solvent*	
Pinch roller. (Optional value peel-off option required. See Figure 26.)		Solvent*	
Cutter Module	If cutting continuous, pressure-sensitive media	Solvent*	After every roll of media (or more often, depending upon your application and media).
	If cutting tag stock or label liner material	Solvent* and air blow	After every two or three rolls of media.
Tear-off/peel-off bar		Solvent*	Once a month.
Take label sensor		Air blow	Once every six months.
* Zebra recommends using 90% isopropyl alcohol as the solvent.			

CAUTION: Use only the cleaning agents indicated. Zebra Technologies Corporation will not be responsible for damage caused by any other cleaning fluids used on the *Z*4M or *Z*6M printer.

Cleaning the Exterior

The exterior surfaces of the printer may be cleaned with a lint-free cloth. Do not use harsh or abrasive cleaning agents or solvents. If necessary, a mild detergent or desktop cleaner may be used sparingly.

Cleaning the Interior

Remove any accumulated dirt and lint from the interior of the printer using a soft bristle brush and/or vacuum cleaner.

Cleaning the Printhead and Platen Roller

Inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead. For best results, perform the following cleaning procedure after changing every roll of ribbon.

NOTE: The printer can remain on while you are cleaning the printhead. In this way all label formats, images, and all temporary parameter settings stored in the printer's internal memory are saved. In addition, also keep the value peel engaged while cleaning the platen roller (media must be unloaded to do this) to reduce the risk of bending the tear-off/peel-off bar.

To clean the printhead, refer to Figure 24 and follow these steps:

1. Open the printhead assembly.
2. Remove the media and ribbon (if loaded).
3. Using a swab soaked in solvent, wipe along the print elements from end to end. (The print elements are on the brown strip just behind the chrome strip on the printhead.) Allow sufficient time for the solvent to evaporate.
4. Manually rotate the platen roller and clean thoroughly with solvent and a pad.
5. Brush/vacuum any accumulated paper lint and dust away from the media and ribbon paths.
6. Reload media and/or ribbon, and close the printhead assembly.

NOTE: If print quality has not improved after performing this procedure, try cleaning the printhead with *Save-A-Printhead* cleaning film (see page 58 for details). This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller for more information.

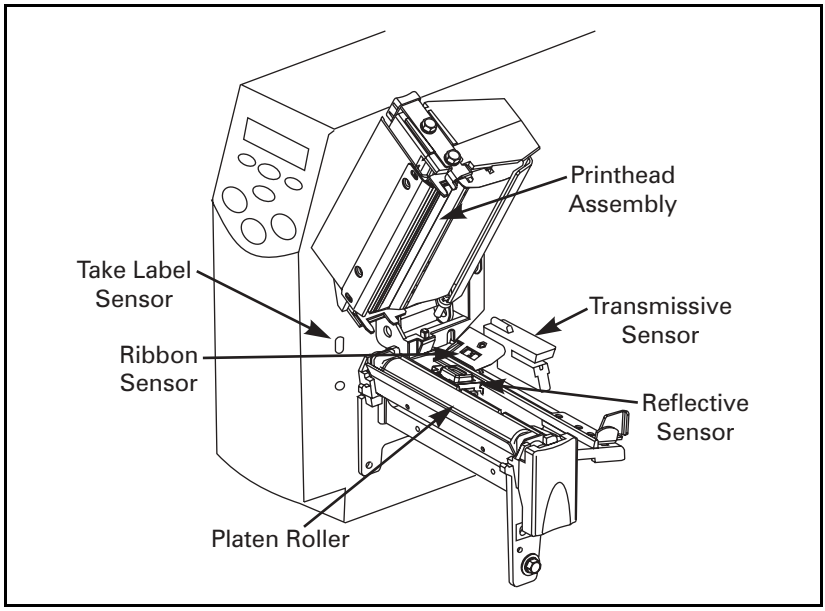


Figure 24

Cleaning the Sensors

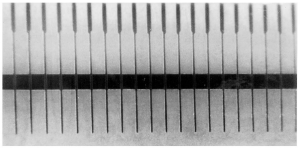
Brush or vacuum any accumulated paper lint and dust away from the printer sensors. Refer to Figure 24. The reflective sensor, transmissive sensor, and ribbon sensor should be cleaned on a regular basis to ensure proper operation of the printer. For printers with the value peel-off, liner take-up, power peel/rewind, and/or power rewind option(s) installed, clean the take label sensor as well.

Extend the Life of Your Printhead With *Save-A-Printhead* Cleaning Film

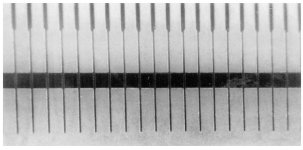
Challenge

The printhead is the most critical component in your printer, and possibly the most delicate. It is a consumable item just like the brakes on your car, which eventually wears over time. However, with ongoing careful attention and maintenance, you can extend the life of the printhead!

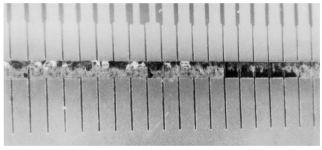
Below are photographs of three printheads. The first printhead is brand new. The second has printed over 1 million linear inches of thermal transfer labels and has been properly maintained. The third printhead has printed far fewer labels, but without proper care and maintenance, signs of abrasion and contamination build-up are evident.



New



Over 1 Million Inches (Properly Maintained)



Less Than 1 Million Inches (Without Proper Care)

Preventive Maintenance

For optimum performance, clean the printhead regularly after every roll of thermal transfer ribbon or after every roll of direct thermal labels. Take care when handling or cleaning the printhead by removing any jewelry that may scratch the printhead and use a grounding strap or anti-static mat to discharge static electricity that could damage the printhead.

To start, only use the pre-soaked (isopropyl alcohol) cleaning swabs provided in the preventive maintenance kit. First, turn off the printer and open the printhead. Lightly blow or brush away any loose dust and lint particles within the print mechanism (i.e., rollers, media/ribbon sensors, and printhead). NEVER use any hard, metallic, or abrasive objects — such as a screwdriver — to remove adhesives or other contaminants that may have built up on the printhead.

Next, press the swab tip against the printhead and swipe the print elements from end to end. Then, turn the platen rollers while wiping them from side to side. Repeat this step until the swab no longer shows dirt.

Avoid the Contributing Factors to Premature Printhead Failure

Abrasion: Over time, the movement of media/ribbon across the printhead wears through the protective ceramic coating, exposing and eventually damaging the print elements (dots).

In order to avoid abrasion:

- Clean your printhead frequently and use well-lubricated thermal transfer ribbons with backcoatings optimized to reduce friction.
- Minimize printhead pressure and burn temperature settings by optimizing the balance between the two.
- Ensure that the thermal transfer ribbon is as wide or wider than the label media to prevent exposing the elements to the more abrasive label material.

Ribbon Backcoating and Buildup: Printhead contamination from direct thermal media or thermal transfer ribbon may occur in applications requiring high burn settings, high head pressure, high speed, or high volume. This contamination builds up on the printhead elements, creating a barrier to the heat transformation required to produce high quality images. Contaminant buildup occurs gradually and results in poor print quality that may look like faded print or failed print element(s). This build up is very resistant to cleaning with the pre-soaked swabs and is difficult to remove.

In order to avoid ribbon backcoating and buildup:

- Use thermal transfer ribbons that have been specially cured to provide backcoat protection for high demand applications. These ribbons — sometimes referred to as anti-stick ribbons — also dissipate static and provide more lubrication.
- Follow the recommended Printhead Preventive Maintenance procedures.
- Use our *Save-a-Printhead* cleaning film to remove printhead contamination buildup quickly and easily.

Save-a-Printhead Cleaning Film

What is *Save-a-Printhead* cleaning film? A specially coated film that removes contamination buildup without damaging the printhead.

What are the benefits of *Save-a-Printhead* cleaning film?

- Extends the life of your printhead.
- Reduces maintenance downtime and the cost of replacing a printhead.
- An inexpensive, easy and quick way to remove contaminants without having to remove the printhead.

When should you use *Save-a-Printhead* cleaning film? When you see degrading print quality that looks like faded print or a failed print element(s) that cannot be corrected by cleaning with the pre-soaked cleaning swabs.

How to Use *Save-a-Printhead* Cleaning Film

1. Remove power from the printer.
2. Open the printhead, remove media and ribbon from the print mechanism.
3. Clean the printhead per the recommended Preventive Maintenance procedures.
4. Position the *Save-a-Printhead* film in the print path, placing the glossy side down away from the printhead (matte side up).
5. Close and latch the printhead.
6. Slowly pull the full length of the film through the print mechanism.
7. Clean the printhead per the recommended Preventive Maintenance procedures a second time.
8. Reload media and ribbon, close and latch the printhead.
9. Print labels and inspect for improved print quality. If quality has not improved, contact our Technical Support staff.

* Only one pass is required to remove contamination buildup.

* Each strip of film can be used up to 10 times.

* Discard the strip when residue buildup or other contamination is apparent.

NOTE: If a replacement printhead is needed, Zebra strongly recommends using a product from the Original Equipment Manufacturer (OEM) to ensure that your printer and part warranties remain intact, and that the product performs optimally.

How to Order Save-a-Printhead Cleaning Film Kits

There are five kits to accommodate the different width printers. Each kit contains three 10" long strips of film. Reference Table 3 to order the kit for your printer:

Table 3

Order kit number:	For Printers with Print Widths:
46902	3.0"-4.0"
44902	4.0"-5.0"
48902	5.0"-6.0"
38902	6.0"-7.0"
22902	8.0"-9.0"

Cleaning the Power Peel/Rewind Module

(Power peel/rewind option required)

Perform the following procedure if adhesive buildup begins to affect peel performance.

Refer to Figure 25.

1. Open the printhead assembly.
2. Close the value peel assembly (if open) to prevent bending the tear-off/peel-off bar during cleaning. Use a swab or cue tip soaked with a solvent to remove adhesive from the tear-off/peel-off bar.

CAUTION: Apply minimum force when cleaning the tear-off/peel-off bar! Excessive force can cause the tear-off/peel-off bar to bend, which could have a negative effect on peel performance.

3. Open the value peel assembly by pivoting the module toward you.
4. Manually rotate the pinch roller and clean thoroughly with solvent and a swab.

NOTE: When cleaning the tear-off/peel-off bar or the pinch roller, remove excess solvent with a pad to ensure the solvent has dried before printing.

5. Close the value peel assembly.
6. Close the printhead assembly.

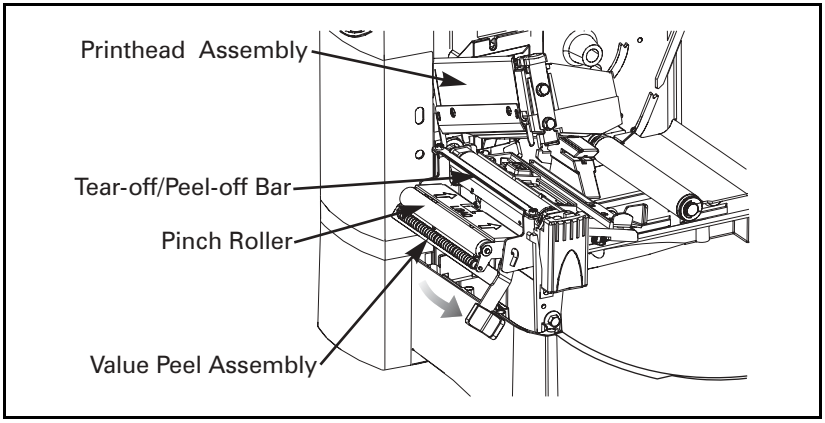


Figure 25

Cleaning the Value Peel-off Module

(Value peel-off option required)

Perform the following procedure if adhesive buildup begins to affect peel-off performance.

Refer to Figure 26.

1. Open the printhead assembly.
2. Close the value peel assembly (if open) to prevent bending the tear-off/peel-off bar during cleaning. Use a swab or cue tip soaked with a solvent to remove adhesive from the tear-off/peel-off bar.

CAUTION: Apply minimum force when cleaning the tear-off/peel-off bar! Excessive force can cause the tear-off/peel-off bar to bend, which could have a negative effect on peel performance.

3. Open the value peel assembly by pivoting the module toward you.
4. Manually rotate the pinch roller and clean thoroughly with solvent and a swab.

NOTE: When cleaning the tear-off/peel-off bar or the pinch roller, remove excess solvent with a pad to ensure the solvent has dried before printing.

5. Close the value peel assembly.
6. Close the printhead assembly.

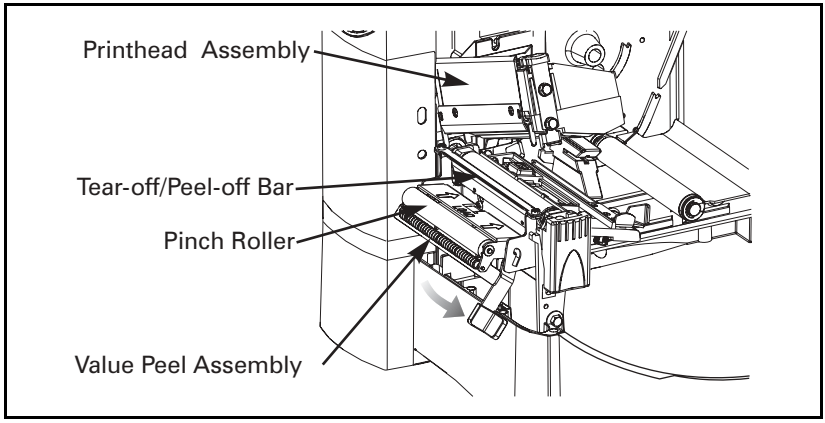


Figure 26

Cleaning the Cutter Module

(Cutter option required)

WARNING: For personnel safety, ALWAYS turn off and unplug the printer before performing this procedure.

Refer to Figure 27.

To clean adhesive off of the upper and lower cutter blades:

1. Remove the cutter shield by removing the thumbscrew and lock washer.
2. Use a swab moistened with solvent to wipe along the upper cutter blade.
3. To expose the lower cutter blade, turn the cutter motor thumbnut counterclockwise until you see the "V"-shaped lower cutter blade.
4. Clean the lower blade, following the instructions in step 2.
5. Replace the cutter shield.
6. When you have finished cleaning the cutter module, plug in and turn on the printer. The lower cutter blade returns to its correct operating position.

If the cutter continues to perform unsatisfactorily, contact an authorized service technician.

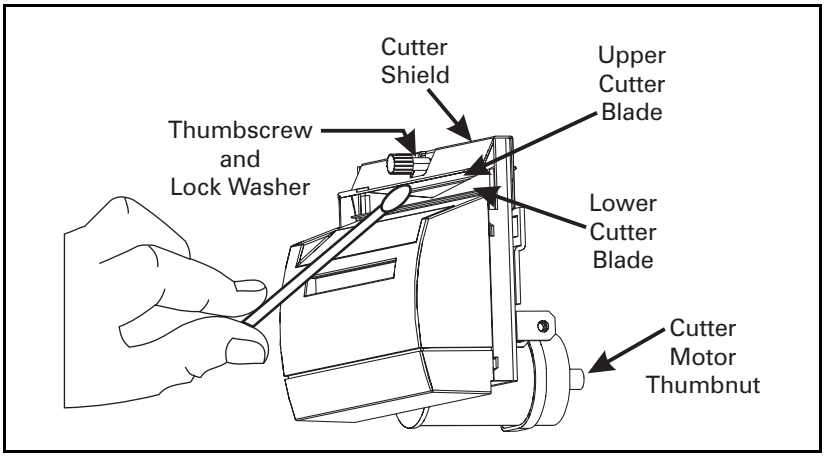


Figure 27

Lubrication

CAUTION: No lubricating agents of any kind should be used on this printer! Some commercially available lubricants will damage the finish and the mechanical parts if used.

Printhead Pressure Adjustment

This adjustment may be necessary if printing is too light on one side or if thick media is used.

Refer to Figure 28.

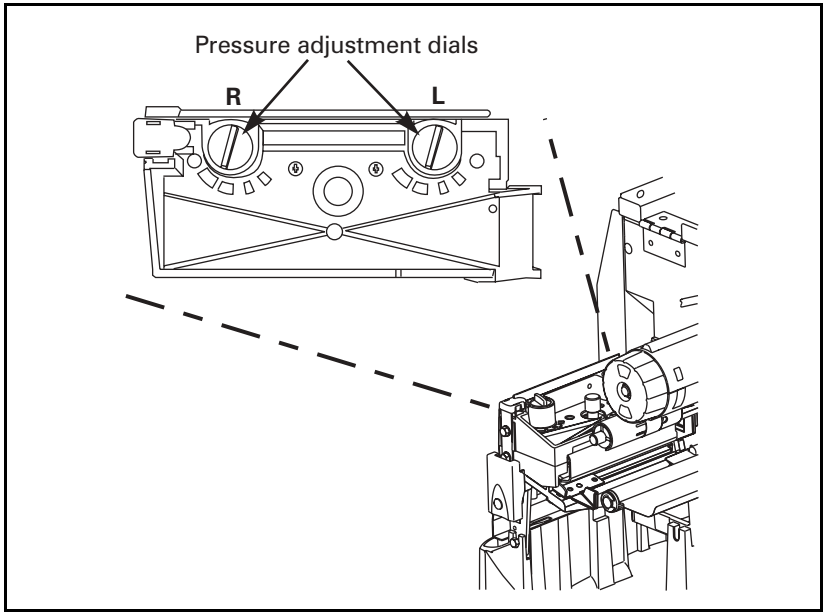


Figure 28

The pressure adjustment dials each have four possible settings designated by blocks of increasing size embossed on the print mechanism. The smallest block (fully counterclockwise) is considered “position 1” and the largest block (fully clockwise) is considered “position 4.”

Use Table 4 or Table 5 (depending upon which printer you have) to select the initial dial settings for your media.

Table 4

***Z*4M**		
Media Width	**Left Dial**	**Right Dial**
1" (25.4 mm)	3	1
2" (51 mm)	6	1
3" (76 mm)	3	2
3.5" and up (89 mm and up)	3	3

Table 5

***Z*6M**		
Media Width	**Left Dial**	**Right Dial**
2" (50 mm)	6	1
3" (75 mm)	6	2
4" (100 mm)	7	3
5" (125 mm)	7	4
5.5" and up (140 mm and up)	6	6

NOTE: Some media types require higher pressure to print well. For these media, increase both dials one position. If the media tends to shift to the left while printing, increase the right dial setting one position or decrease the left dial setting one position. If the media tends to shift to the right while printing, increase the left dial setting one position or decrease the right dial setting one position.

NOTE: In addition, if you have a Z6M printer with the Value Peel-off option, Zebra recommends setting the left dial to 7 and the right dial to 6 when using media that is 6" or wider.

Rewind Media Alignment

(Rewind option required)

NOTE: The media /backing should be installed flush against the backplate of the take-up spindle to prevent the media/backing from winding too loosely.

Perform the following adjustment if the media does not track properly onto the take-up spindle.

Refer to Figure 29.

1. Turn the adjustment dial clockwise to align the media/backing material toward the inboard (i.e., mainframe or electronics) side. This is the most likely adjustment.

or

2. Turn the dial counterclockwise to align the media/backing material toward the outboard (i.e., away from the mainframe or electronics) side.

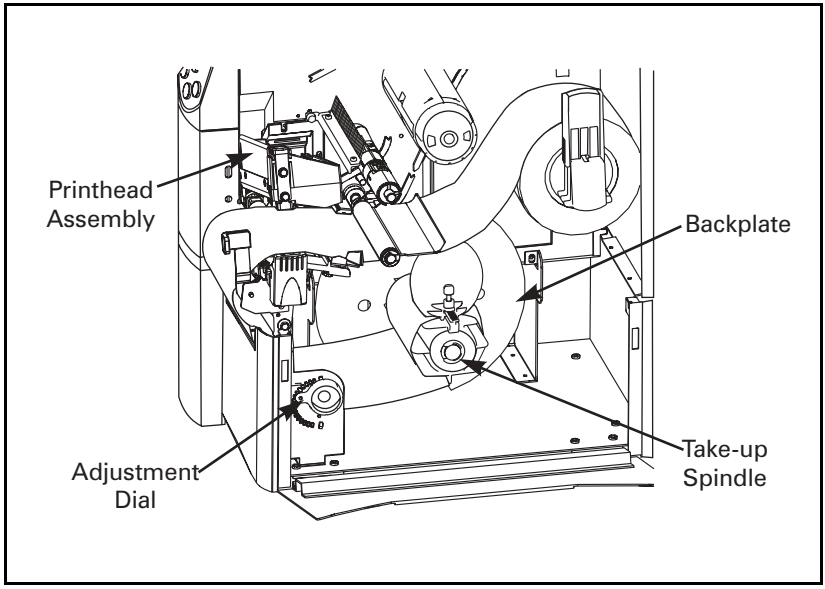


Figure 29

Fuse Replacement

A user-replaceable AC power fuse is located just below the AC power switch at the rear of the printer. The replacement fuse is a 3AG fast blow style rated at 5 Amp/250 VAC.

NOTE: Before replacing the fuse, turn off the AC power switch and unplug the AC power cord.

1. To replace the fuse, insert the tip of a flat blade screwdriver into the slot in the end of the fuse holder end cap.
2. Press in slightly on the end cap and turn the screwdriver slightly counterclockwise. This disengages the end cap from the fuse holder and permits removal of the fuse.
3. To install a new fuse, remove the old fuse and insert the new fuse into the fuse holder.
4. Push the end cap in slightly, then insert the tip of a flat blade screwdriver into the slot in the end cap and turn clockwise to engage it.

LCD Error Conditions and Warnings

Error condition — RIBBON OUT

Problem	Solution
In thermal transfer mode, the ribbon is not loaded *or* loaded incorrectly.	Load the ribbon correctly. See “Ribbon Loading” on page 34.
In thermal transfer mode, the ribbon sensor is not sensing correctly loaded ribbon.	Perform the media and ribbon sensor calibration (see page 45).
In direct thermal mode, when ribbon is not used:	Put the printer in direct thermal mode via the front panel and remove ribbon (if loaded).
	Ensure that the printer driver or software settings are correctly set (if applicable).

Error condition — PAPER OUT

Problem	Solution
The media is not loaded *or* loaded incorrectly.	Reload the media. Refer to “Roll Media Loading” beginning on page 22.
The media sensor is not positioned properly.	Check the position of the reflective sensor. See “Positioning the Media Sensor” on page 9.
The printer is set for non-continuous media, but continuous media is loaded.	Either load the correct media or set the printer for the correct media type via the front panel.
	Ensure that the printer driver or software settings are correctly set (if applicable).
	Calibrate the printer (see page 45).
The incorrect media sensor is being used.	Via the front panel, locate the “SENSOR SELECT” menu item (page 41) and manually select the correct sensing method.

Error condition — HEAD OPEN

Problem	Solution
The printhead is not fully closed.	Close the printhead.
The ribbon is loaded incorrectly; it is covering the head open sensor.	Correctly align the ribbon with the guide mark on the ribbon guide plate before closing the printhead assembly. See “Ribbon Loading” on page 34.

Error condition — RIBBON IN

Problem	Solution
Print method is incorrectly set.	Via the front panel, locate the “PRINT METHOD” menu item (page 42) and select thermal transfer mode.
	Ensure that the printer driver and/or software settings are correctly set (if applicable).
The ribbon is loaded.	Remove the ribbon and set the printer to direct thermal mode. (See “PRINT METHOD” on page 42.)
	Ensure that the printer driver and/or software settings are correctly set (if applicable).

Warning — HEAD OVER TEMP

Problem	Solution
The printhead is over temperature.	Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature.

Warning — HEAD UNDER TEMP

Problem	Solution
The printhead is under temperature.	Continue printing while the printhead reaches the correct operating temperature.
	The environment may be too cold for proper printing. Relocate the printer to a warmer area.

Warning — CUTTER JAM

Problem	Solution
Cutter blade is in the media path.	Turn off the printer power and unplug the printer. Inspect the cutter module for debris and clean as needed following the cleaning instructions on page 64.

*OUT OF MEMORY**

Problem	Solution
*There is not enough memory to perform the function shown on the second line of the error message.	Insufficient DRAM for the label length, downloaded fonts/ graphics, and images.
	Ensure that the device, such as FLASH memory or PCMCIA card, is installed and not write protected or full.
	Ensure that the data is not directed to a device that is not installed or available.

Print Quality Problems

General print quality issues

Problem	Solution
You are using an incorrect media and ribbon combination for your application.	Consult your authorized Zebra reseller/distributor for information and advice.
The printer is set at an excessive print speed to achieve optimal quality.	For optimal print quality, set the print speed to a lower setting via ZPL II, the driver, or the software.
The printer is set at an excessive darkness level to achieve optimal quality.	For optimal print quality, set the darkness level to a lower setting via the front panel, the driver, or the software.
The printhead is dirty.	Clean the printhead according to the instructions on page 56.
There is light printing (or no printing) on the left or right side of the label *or* the printed image is not sharp.	The pressure adjustment dials need to be adjusted. Follow the printhead pressure adjustment instructions on page 65.

Gray lines on blank labels with no consistent pattern

Problem	Solution
The printhead is dirty.	Clean the printhead according to the instructions on page 56.

Light, consistent vertical lines running through all of the labels

Problem	Solution
The printhead or platen roller is dirty.	Clean the printhead, platen roller, or both according to the instructions on page 56.

Intermittent creases on the left and right edges of the label

Problem	Solution
There is too much pressure on the printhead.	Reduce the printhead pressure. Refer to “Printhead Pressure Adjustment” on page 65.

Wrinkled ribbon

Problem	Solution
The ribbon is not loaded correctly.	Load the ribbon correctly. See “Ribbon Loading” on page 34.
The darkness setting is incorrect.	Set the darkness to the lowest possible setting for good print quality. See “DARKNESS” on page 40.
Incorrect printhead pressure or balance.	Set the pressure to the minimum required for good print quality. See “Printhead Pressure Adjustment” on page 65.
The media is not feeding correctly. It is “walking” from side to side.	Make sure that the media guide and media supply guide touch the edge of the media.

Calibration

Problem	Solution
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	Adjust the reflective sensor position. See page 10.
	Set the printer for the correct media type. See page 41.
	Ensure that the media guides are properly positioned.
	Via the front panel, locate the “SENSOR SELECT” menu item (page 41) and manually select the correct sensing method.
	Reload the media. Check the reflective sensor position (see page 10).
	Clean the platen roller according to the instructions on page 56.
“Auto Calibrate” failed.	Perform a manual calibration (see page 45).
	Load the media. Ensure that the reflective sensor is properly positioned (see page 10).

Communication Problems

A label format was sent to the printer but not recognized. The DATA light does not flash.

Problem	Solution
The printer does not respond to label requests.	Check the printer driver or software communications settings (if applicable).
	Verify the prefix and delimiter characters. See page 49.
	Confirm you are using the correct communication cable. See “Cabling Requirements” on page 18.
	Via the front panel, check the protocol setting. It should be set to the default “none.” See page 47.
	Ensure that the correct driver is being used (if applicable).

A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.

Problem	Solution
The host is set to EPP parallel communications.	Change the settings on the computer host to standard parallel communications.
The serial communication settings are incorrect.	Standard RS-232 cables are appropriate for lengths under 50 feet; RS-422 and RS-485 cables allow serial transmission up to 4000 feet. Check cable length and shielding, and confirm the appropriate RS-232, RS-422, or RS-485 setting is being used.
	Check the printer driver or software communications settings (if applicable).

A label format was sent to the printer but not recognized. The DATA light flashes but no printing occurs.

Problem	Solution
The prefix and delimiter characters set in the printer do not match the ones in the label format.	Verify the prefix and delimiter characters. See page 49.
Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings.

Printer Diagnostics

Power-On Self Test

A Power-On Self Test (POST) is performed automatically each time the printer is turned on. During this test sequence, the front panel lights and liquid crystal display (LCD) monitor the progress of the POST. If the printer fails any of these tests, the word "FAILED" is added to the display. If this occurs, notify an authorized Zebra reseller.

Additional Printer Self Tests

These self tests produce sample printouts and provide specific information that help determine the operating conditions for the printer.

Each self test is enabled by pressing a specific front panel key or combination of keys while turning the POWER switch on. Keep the key(s) depressed until the DATA light turns off (approximately five seconds). When the Power-On Self Test is complete, the selected self test starts automatically.

NOTE: When performing self tests, avoid sending a label format to the printer. In the case of a remote host, disconnect all data interface cables from the printer.

NOTE: When canceling a self test prior to its actual completion, always turn the printer power off and then back on to reset the printer.

NOTE: When performing these self tests while in the Peel-off mode, you must remove the labels as they become available.

NOTE: If your media is not wide enough or long enough, unexpected and/or undesired results may occur. Make sure that your print width is set correctly for the media you are using before you run any self tests, otherwise the test may print out on the platen roller. See page 42 for information on setting the print width.

CANCEL Key Self Test

This self test prints a listing of the configuration parameters currently stored in the printer's memory. See Figure 30. (Depending on the options ordered, your label may look different.)

1. Turn off the printer.
2. Press and hold the CANCEL key while turning on the power.
3. Release the CANCEL key after the DATA light turns off (approximately five seconds).

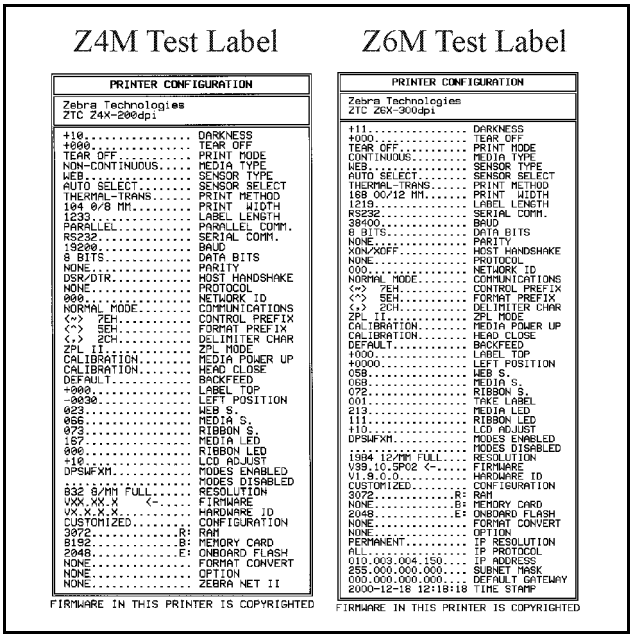


Figure 30

The configuration may be changed either temporarily (for specific label formats or ribbon and label stock) or permanently (by saving the new parameters in memory). Refer to page 14 for further information about the configuration procedure.

PAUSE Key Self Test

This self test can be used to provide the test labels required when making adjustments to the printer's mechanical assemblies. See the sample printout in Figure 31.

Figure 31

1. Turn off the printer.
2. Press and hold the PAUSE key while turning on the power.
3. Release the PAUSE key after the DATA light turns off (approximately five seconds).

- The initial self test prints 15 labels at 2" (51 mm) per second, then automatically pauses the printer. When the PAUSE key is pressed, an additional 15 labels print.
- Pressing the CANCEL key while the printer is paused alters the self test. When the PAUSE key is pressed, the printer prints 15 labels at 6" (152 mm) per second.
- Pressing the CANCEL key again while the printer is paused alters the self test again. When the PAUSE key is pressed, the printer prints 50 labels at 2" (51 mm) per second.
- Pressing the CANCEL key again while the printer is paused alters the self test a third time. When the PAUSE key is pressed, the printer prints 50 labels at 6" (152 mm) per second.
- Pressing the CANCEL key again while the printer is paused alters the self test a fourth time. When the PAUSE key is pressed, the printer prints 15 labels at the printer's maximum speed.
- To exit this self test at any time, press and hold the CANCEL key.

FEED Key Self Test

See Figure 32.

1. Turn off the printer.
2. Press and hold the FEED key while turning on the power.
3. Release the FEED key after the DATA light turns off (approximately five seconds).

The FEED Key Self Test prints out at various darkness settings above and below that of the darkness value shown on the configuration label. Examine these labels and determine which one has the best darkness setting for your application. This value can be entered into the printer by setting the darkness during the configuration procedure. Refer to page 40 for more information.

Figure 32

The value printed on that label is added to (plus) or subtracted from (minus) the darkness value specified on the configuration label. The resulting numeric value (0 to 30) is the best darkness value for that specific media/ribbon combination.

Communications Diagnostics Test

This test is controlled from the front panel display. Refer to page 48. A typical printout from this test is shown in Figure 33. Turn off the power to exit this self test.

NOTE: This label is inverted when printed.

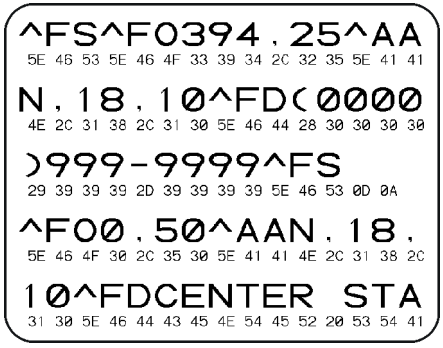


Figure 33

Loading Factory Defaults

1. Press the SETUP/EXIT key two times.
2. Use the INCREMENT (+) or DECREMENT (–) key to scroll through the “SAVE CHANGES” choices.
3. When “LOAD DEFAULTS” displays, press the SETUP/EXIT key.

NOTE: Printer specifications are subject to change without notice.

General Specifications

General Specifications		*Z*4M		*Z*6M	
Height		13.3"	338 mm	13.3"	338 mm
Width		10.9"	277 mm	13.4"	341 mm
Depth		18.7"	475 mm	18.7"	475 mm
Weight (without options)		32.4 lbs.	14.7 kg	34.7 lbs.	16 kg
Electrical		90-265 VAC, 48-62 Hz, 5 Amps (fused)		90-265 VAC, 48-62 Hz, 5 Amps (fused)	
Agency Approvals		UL 1950, CISPR 22 (class B), CSA 22.2 No. 950-95, EN60950, EN500824. Complies with FCC Class B and Canadian Doc Class A rules. Carries the CE mark of compliance.			
Temperature	Operating	40° to 104° F	5° to 40° C	40° to 104° F	5° to 40° C
	Storage	–40° to 140° F	–40° to 60° C	–40° to 140° F	–40° to 60° C
Relative Humidity	Operating	20% to 85%, non-condensing		20% to 85%, non-condensing	
	Storage	5% to 85%, non-condensing		5% to 85%, non-condensing	
Communication Interface		• RS-232/CCITT V.24 and RS-485 serial data interface; 600 to 38400 baud, parity, bits/character, and XON-XOFF or DTR/DSR handshake protocol required. • RS-485 serial data interface; 600 to 38400 baud, parity, bits/character (all selectable). XON/XOFF handshake protocol required. • 8-bit parallel data interface; supports IEEE 1284 bi-directional parallel communication in “nibble mode.” • Error detection CRC protocol.			

Printing Specifications

Printing Specifications		Z4M		Z6M	
Print resolution		203 dots/inch	8 dots/mm	203 dots/inch	8 dots/mm
		300 dots/inch	12 dots/mm	300 dots/inch	12 dots/mm
Dot size (width x length)	203 dots/inch	0.00492" x 0.00492"	0.125 mm x 0.125 mm	0.00492" x 0.00492"	0.125 mm x 0.125 mm
	300 dots/inch	0.0033" x 0.0039"	0.084 mm x 0.099 mm	0.0033" x 0.0039"	0.084 mm x 0.099 mm
Maximum print width		4.1"	104 mm	6.6"	168 mm
Minimum print length		1 dot row		1 dot row	
Maximum print length	203 dots/inch	105"	2667 mm	65"	1651 mm
	300 dots/inch	45"	1143 mm	29"	737 mm
Bar code modulus (“X”) dimension	203 dots/inch	5 mil to 50 mil		5 mil to 50 mil	
	300 dots/inch	3.3 mil to 33 mil		3.3 mil to 33 mil	
Programmable constant print speeds	203 dots/inch	Per second: 7", 8", 9", 10"	Per second: 178 mm, 203 mm, 229 mm, 254 mm	Per second: 7", 8", 9", 10"	Per second: 178 mm, 203 mm, 229 mm, 254 mm
	300 dots/inch	Per second: 2", 3", 4", 5", 6"	Per second: 51 mm, 76 mm, 102 mm, 127 mm, 152 mm	Per second: 2", 3", 4", 5", 6"	Per second: 51 mm, 76 mm, 102 mm, 127 mm, 152 mm
Thin film printhead with energy control					

Ribbon Specifications

Ribbon Specifications		Z4M		Z6M	
Ribbon must be wound with the coated side out					
Ribbon width *(Zebra recommends using ribbon at least as wide as the media to protect the printhead from wear.)*	Minimum	>1"	25.4 mm	>2"	60 mm
	Maximum	4.3"	109 mm	6.9"	174 mm
Standard lengths	2:1 media to ribbon roll ratio	984’	300 m	984’	300 m
	3:1 media to ribbon roll ratio	1476’	450 m	1476’	450 m
Ribbon core inside diameter		1"	25.4 mm	1"	25.4 mm

Media Specifications

Media Specifications			*Z*4M		*Z*6M	
Label length	Minimum	Tear-off	0.5"	13 mm	0.5"	13 mm
		Peel-off	1"	25.4 mm	1"	25.4 mm
		Rewind	0.5"	13 mm	0.5"	13 mm
		Cutter	1"	25.4 mm	1.5"	38.1 mm
	Maximum		39"	991 mm	39"	991 mm
Label width (maximum)			4.5"	114 mm	7.0"	178 mm
Total thickness (includes liner, if any)		Minimum	0.0023"	0.058 mm	0.0023"	0.058 mm
		Maximum	0.010"	0.25 mm	0.010"	0.25 mm
Core size			3"	76 mm	3"	76 mm
Maximum roll diameter			8"	203 mm	8"	203 mm
Inter-label gap		Minimum	0.079"	2 mm	0.079"	2 mm
		Preferred	0.118"	3 mm	0.118"	3 mm
		Maximum	0.157"	4 mm	0.157"	4 mm
Ticket/tag notch size (width x length)			0.236" x 0.12"	6 mm x 3 mm	0.236" x 0.12"	6 mm x 3 mm

Options

*Z*4M	*Z*6M
• Cutter	• Cutter
• Value peel-off	• Value peel-off
• Liner take-up	• PCMCIA card
• PCMCIA card	• 1 MB or 2 MB FLASH
• 1 MB or 2 MB FLASH	• 300 dpi printhead
• 300 dpi printhead	• Power Rewind
• Power Rewind	

Zebra Programming Language (ZPL II)

*Z*4M/*Z*6M ZPL II Features	
• Downloadable graphics (with data compression)	• Programmable quantity with print pause
• Bit image data transfer and printing, mixed text/graphics	• Communicates in printable ASCII characters
• Format inversion	• Controlled via mainframe, mini, PC, portable data terminal
• Mirror image printing	• In-Spec OCR-A and OCR-B
• Four-position field rotation (0°, 90°, 180°, 270°)	• UPC/EAN (nominal 100% magnification [6 dots/mm printheads only])
• Slew command	• Serialized fields

Bar codes

*Z*4M/*Z*6M Bar Code Features	
• Code 11	• LOGMARS
• Code 39 (supports ratios of 2:1 to 3:1)	• Plessey
• Code 49 (2-dimensional bar code)	• EAN-8, EAN-13, EAN EXTENSIONS
• Code 93	• UPC-A, UPC-E, UPC EXTENSIONS
• Code 128 (supports serialization in all subsets and UCC case codes)	• MSI
• Codabar (supports ratios of 2:1 to 3:1)	• PDF-417 (2-dimensional bar code)
• Codablock	• Micro-PDF-417
• Interleaved 2 of 5 (supports ratios of 2:1 to 3:1; modulus 10 check digit)	• POSTNET
• Industrial 2 of 5	• MaxiCode
• Standard 2 of 5	• Datamatrix
• QR Code	• Check digit calculation where applicable

AC Power Cord

Since many areas of the world have specific power requirements, an AC power cord may not be included with your printer. The power cord *must* meet your local electrical requirements.

WARNING: For personnel and equipment safety, always use a three-prong plug with an earth ground connection to the AC power source.

Power Line Cord Specifications

- The overall length must be less than 9.8' (3.0 m).
- It must be rated for at least 5A, 250 VAC.
- The chassis ground (earth) MUST be connected to ensure safety and reduce electromagnetic interference. The ground connection is handled by the third wire (earth) in the power cord (see Figure 34).

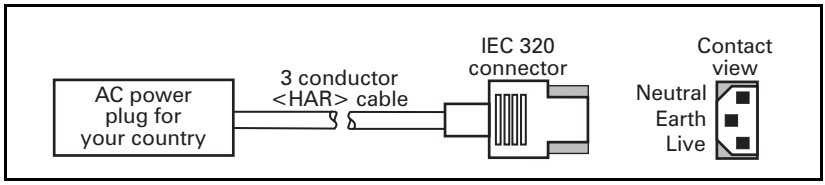


Figure 34

- The AC power plug and IEC 320 connector must bear the certification mark of at least one of the known international safety organizations shown in Figure 35.

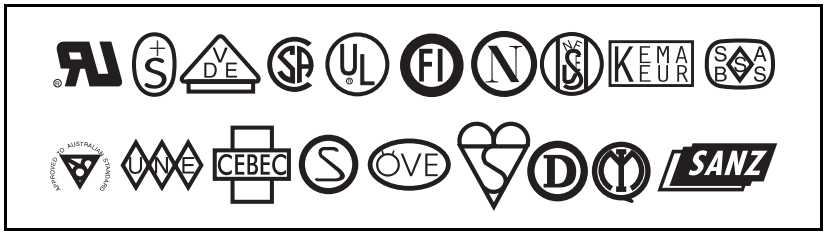


Figure 35

Printer Interface Technical Information

Serial Data Communications

Table 6 illustrates the pin connections on the DB-25 connector at the rear of the printer.

Table 6

Pin No.	Description
1	Chassis ground
2	TXD (transmit data) output from the printer
3	RXD (receive data) input to the printer
4	RTS (request to send) output from the printer
5	Not used
6	DSR (data set ready) input to the printer
7	RS-232 signal ground
8	Not used
9	+5v @ 1A source
10	Not used
11	RS-485 signal ground
12	Not used
13	RS-485 input A(-)
14	RS-485 output A(-)
15	Not used
16	RS-485 input B(+)
17 and 18	Not used
19	RS-485 output B(+)
20	DTR (data terminal ready) output from the printer
21-25	Not used

RS-232 Interface

This printer is configured as Data Terminal Equipment (DTE). The serial data cable used to connect the printer to the host computer is one of two styles:

- **9-pin to 25-pin cable** – (null modem cable) must have a 9-pin "D" type (DB-9S) connector on the end that is plugged into the serial port at the computer and a 25-pin "D" type (DB-25P) connector on the other end that is plugged into the connector at the rear of the printer. Figure 36 shows the required cable connections.

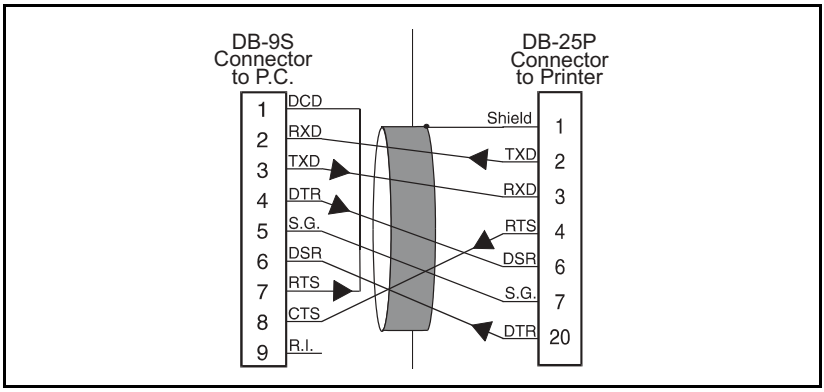


Figure 36

- **25-pin to 25-pin cable** – (null modem cable) must have a 25-pin "D" type (DB-25S) connector on the end that is plugged into the serial port at the computer and a 25-pin "D" type (DB-25P) connector on the other end that is plugged into the connector at the rear of the printer. Figure 37 shows the required cable connections.

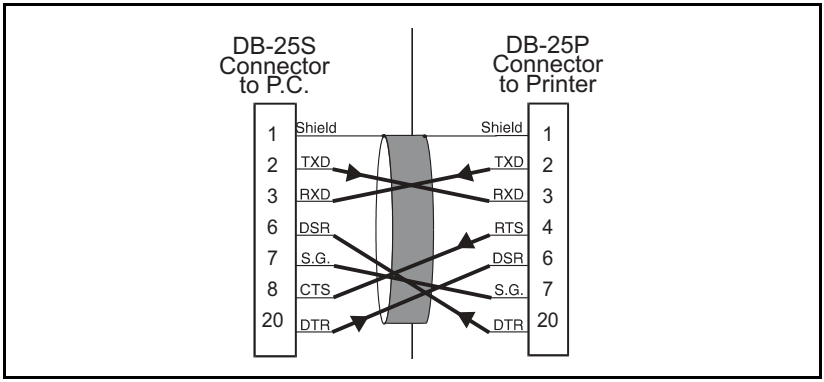


Figure 37

Hardware Control Signal Descriptions

For all RS-232 input and output signals, the *Z*4M and *Z*6M printers follow both the Electronics Industries Association (EIA) RS-232 and the Consultative Committee for International Telegraph and Telephone (CCITT) V.24 standard signal level specifications.

When DTR/DSR handshaking is selected, the Data Terminal Ready (DTR) control signal output from the printer controls when the host computer may send data. DTR ACTIVE (positive voltage) permits the host to send data. When the printer places DTR in the INACTIVE (negative voltage) state, the host must not send data.

NOTE: When XON/XOFF handshaking is selected, data flow is controlled by the ASCII Control Codes DC1 (XON) and DC3 (XOFF). The DTR Control lead has no effect.

Request to send (RTS) is a control signal from the printer that is connected to the clear to send (CTS) input at the host computer. RTS is always ACTIVE (positive voltage) when the printer is on.

CAUTION: This printer complies with FCC "Rules and Regulations", Part 15 for Class B Equipment, using fully shielded six-foot data cables. Use of longer cables or unshielded cables may increase radiated emissions above the Class B limits.

RS-485 Interface

Figure 38 illustrates the pin connections on the DB-25 connector at the rear of the printer that are used for the RS-485 communication protocol.

NOTE: XON/XOFF handshaking must be used for RS-485 communications.

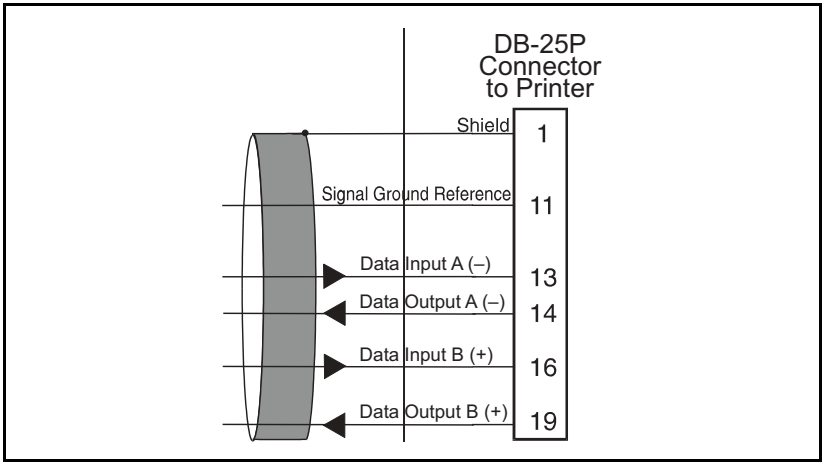


Figure 38

Parallel Data Communications

Table 7 illustrates the pin connections on the bi-directional parallel connector at the rear of the printer.

Table 7

Pin No.	Description
1	nStrobe/HostClk
2-9	Data Bits 1-8
10	nAck/PtrClk
11	Busy/PtrBusy
12	PError/AckDataReq
13	Select/Xflag
14	nAutoFd/HostBusy
15	Not used
16 and 17	Ground
18	+5v @1A
19-30	Ground
31	ninit
32	nFault/nDataAvail
33 and 34	Not used
35	+5v through a 3.3 KW resistor
36	nSelectin/1284 active

Parallel Interface

The 8-bit parallel data interface supports IEEE 1284 bi-directional parallel communications in “nibble mode.” The parallel interface provides a means of communication that is typically faster than the previously mentioned serial interface methods. In this method, the bits of data that make up a character are sent all at one time over several wires in the cable, one bit per wire.

Parallel Cabling Requirements

An IEEE-1284 compatible bi-directional parallel data cable is required when this communication method is used. The required cable must have a standard 36-pin parallel connector on one end that is plugged into the mating connector located at the rear of the printer. The other end of the cable connects to the printer connector at the host computer.

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Warranty Information

Effective November 1, 2001

All Zebra products are sold with warranties. Refer to the User's Guide for warranty information specific to each product. Here is some general information:

Printer Products

Printers. All printers (excluding printheads) are warranted against defect in material or workmanship for twelve (12) months from the purchase date.

Proof of purchase or shipment date is required to validate the warranty period. The warranty becomes void if the equipment is modified, improperly installed or used, damaged by accident or neglect, or if any parts are improperly installed or replaced by the user.

NOTE: Products returned must be packaged in the original or comparable packing and shipping container. In the event equipment is not so packaged, or if shipping damage is evident, it will not be accepted for service under warranty. Surface transportation charges for return to customers in the continental United States is paid by Zebra. Otherwise, Zebra pays CPT (carriage paid to) nearest airport; customer pays customs, duties, taxes, and freight from airport to destination. If Zebra determines that the product returned for warranty service or replacement is not defective as herein defined, the customer will pay all handling and transportation costs.

Printheads. Since printhead wear is part of normal operation, the original printhead is covered by a limited warranty as indicated below. Warranty period begins on purchase date.

Printhead	Warranty Period
Barcode label printer printheads	6 months
Card printer printheads	12 months

To qualify for this warranty, the printhead must be returned to the factory or to an authorized service center. Customers are not required to purchase Zebra supplies (media and/or ribbons) for warranty qualification. However, if it is determined that the use of other manufacturer supplies has caused any defect in the printhead for which a warranty claim is made, the user is responsible for Zebra's labor and material charges required to repair the defect. The warranty becomes void if the printhead is physically worn or damaged; also if it is determined that failure to follow the preventive maintenance schedule listed in the User's Guide has caused defect in the thermal printhead for which a warranty claim is made.

Software. Software is warranted to be free of defects in material and workmanship for 30 days from the date of purchase. In the event of notification within the warranty period of defects, Zebra will replace the defective diskette or documentation.

Batteries. Mobile printer batteries are warranted to be free of defects in material and workmanship for 90 days from date of purchase. In the event of notification within the warranty period, Zebra will replace the defective battery provided there has not been damage resulting from user abuse.

Parts. All parts, maintenance kits, options kits, and accessories are warranted to be free of defects in material and workmanship for 90 days (except where otherwise noted) from date of purchase. This warranty becomes void if the item is modified, improperly installed or used, or damaged by accident or neglect.

Supplies Products

Supplies are warranted to be free from defect in material and workmanship for a period of six (6) months for media and twelve (12) months for ribbon from the date of shipment by Zebra. This is provided the user has complied with storage guidelines, handling, and usage of the supplies in Zebra printers.

Zebra's sole obligation under these warranties is to furnish parts and labor for the repair or possible replacement of products found to be defective in material or workmanship during the warranty period. Zebra may in its discretion issue a credit for any such defective products in such amount as it deems reasonable.

Warranty Exclusions & Conditions Statement

The warranties provided above are the only warranties applicable. No other warranties, expressed or implied, are given. Zebra does not make any IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE in connection with its sale of products or services. While Zebra's desire is to be responsive to specific needs and questions, Zebra does not assume responsibility for any specific application to which any products are applied including, but not limited to, compatibility with other equipment. All statements, technical information or recommendations relating to Zebra products are based upon tests believed to be reliable yet do not constitute a guaranty or warranty.

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Printer Software and Firmware License Agreement

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