Declaration of Conformity

We have determined that the Zebra printers identified as the

105SLPlus™

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.
Compliance Information

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

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 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 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.

Canadian DOC Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
Contents

Declaration of Conformity .................................................. 3

Compliance Information ..................................................... 4

About This Document .......................................................... 9

Who Should Use This Document ......................................... 10
How This Document Is Organized ......................................... 10
Document Conventions ....................................................... 11

1 • Introduction .................................................................. 13

Printer Components ........................................................... 14
Control Panel ......................................................................... 15
Control Panel Display .......................................................... 17
Navigating in the Display ...................................................... 17
Changing Password-Protected Parameters ................................. 20
Default Password Value ........................................................ 20
Disable the Password Protection Feature ................................. 20
Operating Parameters on the Control Panel ............................... 21

2 • Printer Setup and Operation ............................................. 37

Handling the Printer ............................................................. 38
Unpack and Inspect the Printer .............................................. 38
To Store the Printer ............................................................. 38
To Ship the Printer .............................................................. 38
Select a Location for the Printer ............................................ 39
Select a Data Communication Interface .................................... 40
Data Cables ........................................................................ 42
Connect the Printer to a Power Source ................................... 43
Power Cord Specifications ..................................................... 44
Install the Control Panel Keypad Cover ................................... 46
# Contents

Types of Media ............................................. 47  
Ribbon Overview .......................................... 49  
When to Use Ribbon ....................................... 49  
Coated Side of Ribbon ..................................... 49  
Select a Print Mode ....................................... 51  
Load the Ribbon ........................................... 54  
Load the Media ............................................. 59  

3 • Printer Configuration and Adjustment .................. 81  
Changing Printer Settings ................................ 82  
Print Settings ............................................... 83  
Maintenance and Diagnostic Tools ......................... 89  
Network Settings .......................................... 96  
Language Settings ......................................... 100  
Sensor Settings ........................................... 102  
Port Settings ............................................... 103  
Calibrate the Ribbon and Media Sensors Manually .... 106  
Remove Used Ribbon ...................................... 112  
Remove Media or Liner from the Rewind Spindle ....... 113  
Adjust Transmissive Media Sensors ....................... 115  
  Upper Media Sensor ..................................... 115  
  Lower Media Sensor .................................... 118  
Adjust Printhead Pressure and Toggle Position .......... 119  
  Toggle Position Adjustment ............................. 119  
  Printhead Pressure Adjustment ......................... 121  

4 • Routine Maintenance ................................. 123  
Replacing Printer Components ........................... 124  
Ordering Replacement Parts ................................ 124  
Recycling Printer Components ........................... 124  
Lubrication .................................................. 124  
Cleaning Schedule and Procedures ......................... 125  
  Clean the Exterior ....................................... 125  
  Clean the Media Compartment ......................... 126  
  Clean the Printhead and Platen Roller ................. 126  
  Clean the Sensors ........................................ 128  
  Clean the Snap Plate .................................... 130  
  Clean the Cutter .......................................... 134  

5 • Troubleshooting ....................................... 135  
Printing Issues ............................................ 136  
Error Messages ............................................ 139  
Calibration Problems ...................................... 144
# Contents

Communications Problems .................................................. 145  
Ribbon Problems .............................................................. 146  
Miscellaneous Issues .......................................................... 147  
Printer Diagnostics ............................................................. 148  
  Power-On Self Test ......................................................... 148  
  CANCEL Self Test ............................................................ 149  
  PAUSE Self Test ............................................................... 150  
  FEED Self Test ............................................................... 151  
  FEED + PAUSE Self Test ................................................... 154  
  CANCEL + PAUSE Self Test ................................................. 154  
  Communication Diagnostics Test ......................................... 155  
  Sensor Profile ............................................................... 156  

## 6 • Specifications .......................................................... 159  

Features ............................................................................. 160  
  Standard Features ........................................................... 160  
  Optional Features ............................................................ 160  
  Zebra Programming Language (ZPL) .................................... 161  
  Bar Codes ........................................................................ 161  
General Specifications .......................................................... 162  
  Physical Specifications ....................................................... 162  
  Electrical Specifications ..................................................... 162  
  Environmental Conditions for Operation and Storage ............ 162  
Print Specifications .............................................................. 163  
Media Specifications ............................................................. 164  
Ribbon Specifications ........................................................... 165  

Glossary ............................................................................. 167  

Index ................................................................................. 171
About This Document

This section provides you with contact information, document structure and organization, and additional reference documents.

Contents

- Who Should Use This Document .................................................. 10
- How This Document Is Organized .................................................. 10
- Document Conventions ................................................................. 11
Who Should Use This Document

This User Guide is intended for use by any person who needs to perform routine maintenance, upgrade, or troubleshoot problems with the printer.

How This Document Is Organized

The User Guide is set up as follows:

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction on page 13</td>
<td>This section provides a high-level overview of the printer and its components.</td>
</tr>
<tr>
<td>Printer Setup and Operation on page 37</td>
<td>This section assists the technician with initial setup and operation of the printer.</td>
</tr>
<tr>
<td>Printer Configuration and Adjustment on page 81</td>
<td>This section assists you with configuration of and adjustments to the printer.</td>
</tr>
<tr>
<td>Routine Maintenance on page 123</td>
<td>This section provides routine cleaning and maintenance procedures.</td>
</tr>
<tr>
<td>Troubleshooting on page 135</td>
<td>This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.</td>
</tr>
<tr>
<td>Specifications on page 159</td>
<td>This section provides the features of and specifications for this printer.</td>
</tr>
<tr>
<td>Glossary on page 167</td>
<td>The glossary provides a list of common terms.</td>
</tr>
</tbody>
</table>
Document Conventions

Table 1 shows the way that certain information is conveyed in this document.

### Table 1 • Document Conventions

**Alternate Color**

If you are viewing this guide online, you can click the blue text used for cross-references or hyperlinks to jump directly to other sections in the guide or to web sites on the internet.

**LCD Display Examples**

Text from a printer’s Liquid Crystal Display (LCD) appears in Arial font.

**Command Line Examples, File Names, and Directories**

Command line examples, file names, and directories appear in Courier New font. For example:

- Type `ZTools` to get to the Post-Install scripts in the `/bin` directory.
- Open the `Zebra<version number>.tar` file in the `/root` directory.

**Icons and Advisory Words**

The following icons and advisory words are used to draw your attention to certain areas of text.

- **Caution** • Warns you of the potential for electrostatic discharge.
- **Caution** • Warns you of a potential electric shock situation.
- **Caution** • Warns you of a situation where excessive heat could cause a burn.
- **Caution** • Advises you that failure to take or avoid a specific action could result in physical harm to you.
- **Caution** • Advises you that failure to take or avoid a specific action could result in physical harm to the hardware.
- **Important** • Advises you of information that is essential to complete a task.
- **Note** • Indicates neutral or positive information that emphasizes or supplements important points of the main text.
- **Example** • Provides an example, often a scenario, to better clarify a section of text.
1

Introduction

This section provides a high-level overview of the printer and its components.

Contents
- Printer Components .............................................................. 14
- Control Panel ............................................................... 15
- Control Panel Display .......................................................... 17
- Types of Media ................................................................. 47
- Ribbon Overview ................................................................. 49
  - When to Use Ribbon ......................................................... 49
  - Coated Side of Ribbon ...................................................... 49
Printer Components

Figure 1 shows the components inside the media compartment of your printer. Depending on printer model and the installed options, your printer may look slightly different. Familiarize yourself with these components before continuing with the printer setup procedure.

1. Platen roller
2. Control panel
3. Printhead assembly
4. Printhead-open lever
5. Ribbon take-up spindle
6. Ribbon supply spindle
7. Media supply guide
8. Media supply hanger
Control Panel

All controls and indicators for the printer are located on the control panel (Figure 2).

![Control Panel Diagram]

**Figure 2 • Control Panel**

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image" alt="POWER light" /></td>
<td><strong>POWER light</strong></td>
<td>On when the printer is on.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><img src="image" alt="PAUSE light" /></td>
<td><strong>PAUSE light</strong></td>
<td>On when the printer is paused.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><img src="image" alt="ERROR light" /></td>
<td><strong>ERROR light</strong></td>
<td>Off Normal operation—no printer errors.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>On A printer error exists. Check the display for more information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><img src="image" alt="DATA light" /></td>
<td><strong>DATA light</strong></td>
<td>Off Normal operation. No data being received or processed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>On The printer is processing data or is printing. No data is being received.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Blinking The printer is receiving data from or sending status information to the host computer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><img src="image" alt="display" /></td>
<td>The <strong>display</strong> shows the printer’s operating status and allows the user to navigate the menu system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td><img src="image" alt="PLUS (+) button" /></td>
<td>The <strong>PLUS (+) button</strong> changes the parameter values. Common uses are to increase a value, to scroll through choices, or to change values while entering the printer password.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td><img src="image" alt="PREVIOUS button" /></td>
<td>The <strong>PREVIOUS button</strong> navigates to the previous parameter in the menus.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td><img src="image" alt="MINUS (-) button" /></td>
<td>The <strong>MINUS (-) button</strong> changes the parameter values. Common uses are to decrease a value, to scroll through choices, or to change the cursor position while entering the printer password.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td><img src="image" alt="SETUP/EXIT button" /></td>
<td>The <strong>SETUP/EXIT button</strong> enters and exits configuration mode.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|   | The **NEXT/SAVE button**  
|---|---  
| 10 | • When in Setup Mode, the **NEXT/SAVE button** navigates to the next parameter in the menus.  
|   | • When exiting Setup Mode, the **NEXT/SAVE button** initiates various options. (See *Exit Setup Mode* on page 19.)  
|   | The **CALIBRATE button**  
| 11 | • When the printer is paused and in non-continuous mode, the **CALIBRATE button** initiates a SHORT CAL calibration, which sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.  
|   | • If the printer is in continuous mode or is not paused, this button has no effect.  
|   | The **PAUSE button** starts or stops printer operation when pressed.  
| 12 | The **FEED button** forces the printer to feed one blank label each time the button is pressed.  
| 13 | The **CANCEL button** cancels print jobs when the printer is paused.
Control Panel Display

The control panel includes a display, where you can view the printer’s status or change its operating parameters. In this section, you will learn how to navigate through the menu system and change values for menu items.

After the printer completes the power-up sequence, it moves to the Idle Display (Figure 3).

**Figure 3 • Idle Display**

![Idle Display](image)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The printer’s current status</td>
</tr>
<tr>
<td>2</td>
<td>Information that you set through <em>Idle Display on page 95</em></td>
</tr>
</tbody>
</table>

Navigating in the Display

Table 2 shows the options available for navigating through the parameters in the display.

**Table 2 • Navigation**

<table>
<thead>
<tr>
<th>Enter Setup Mode</th>
<th>At the Idle Display (Figure 3), press SETUP to enter Setup Mode. The printer displays the first parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scroll through the Parameters</td>
<td>To scroll through the parameters, press PREVIOUS or NEXT/SAVE.</td>
</tr>
</tbody>
</table>
### Table 2 • Navigation (Continued)

#### Perform an action

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="list-formats-1.png" alt="Image" /></td>
<td>+ indicates that an action can be performed.</td>
</tr>
<tr>
<td><img src="print-button.png" alt="Image" /></td>
<td>Press <strong>PLUS (+)</strong> to perform the specified action.</td>
</tr>
</tbody>
</table>

#### Change Parameter Values

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="darkness.png" alt="Image" /></td>
<td>- and + indicate that a value can be changed.</td>
</tr>
<tr>
<td><img src="parameter-change.png" alt="Image" /></td>
<td>Press <strong>PLUS (+)</strong> or <strong>MINUS (-)</strong> to scroll through the accepted values.</td>
</tr>
</tbody>
</table>
Table 2 • Navigation (Continued)

Exit Setup Mode

1. At the Idle Display (Figure 3), press SETUP to enter Setup Mode. The printer displays the first parameter.

2. While in Setup Mode, press SETUP(EXIT to exit the operating parameters. The LCD displays SAVE CHANGES.

3. To return to the parameters, plus PREVIOUS. OR
   Press PLUS (+) or MINUS (-) to scroll through the exit options:
   - PERMANENT—Stores values in the printer even when power is turned off.
   - TEMPORARY—Saves the changes until power is turned off.
   - CANCEL—This option cancels all changes made since you entered Setup mode, except for changes made to DARKNESS, TEAR OFF, COMMUNICATION, and LANGUAGE settings, which go into effect as soon as they are made.
   - LOAD DEFAULTS—Use this option to restore all settings other than the network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.
   - LOAD LAST SAVE—Loads the values from the last permanent save.
   - DEFAULT NET—Use this option to restore all print server and network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.

4. Press NEXT/SAVE to select the displayed choice and exit Setup Mode.

When the configuration and calibration sequence finishes, the printer returns to the Idle Display.
Changing Password-Protected Parameters

Certain parameters, including the communication parameters, are password-protected by factory default.

**Caution** • Do not change password-protected parameters unless you have a complete understanding of the parameters’ functions. If the parameters are set incorrectly, the printer may function unpredictably.

The first time that you attempt to change a password-protected parameter, the printer displays **ENTER PASSWORD**. Before you can change the parameter, you must enter the four-digit numeric password. After you have entered the password correctly, you do not have to enter it again unless you leave Setup mode by pressing **SETUP/EXIT** or by turning off (O) the printer.

**To enter a password for a password-protected parameter, complete these steps:**

1. At the password prompt, use **MINUS (-)** to change the selected digit position.
2. When you have selected the digit that you wish to change, use **PLUS (+)** to increase the selected digit value. Repeat these two steps for each digit of the password.
3. After entering the password, press **SELECT**.
   
   The parameter you selected to change is displayed. If the password was entered correctly, you can change the value.

**Default Password Value**

The default password value is **1234**. The password can be changed using the Zebra Programming Language (ZPL) command **^KP** (Define Password) or using the printer’s web pages (ZebraNet wired or wireless print server required).

**Disable the Password Protection Feature**

You can disable the password protection feature so that it no longer prompts you for a password by setting the password to **0000** via the **^KP** ZPL command. To re-enable the password-protection feature, send the ZPL command **^KPx**, where x can be any number from 1 to 9999.
Operating Parameters on the Control Panel

Items in this menu are shown in the order in which they appear when you press the RIGHT ARROW. For more information about these settings, see Print Settings on page 83.

Adjust the Print Darkness
Set the darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, bar codes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely.

See Print Darkness on page 83 for more information.

Select the Print Speed
Select the speed for printing a label (given in inches per second). Slower print speeds typically yield better print quality.

See Print Speed on page 83 for more information.

Adjust the Tear-Off Position
If necessary, adjust the position of the media over the tear-off bar after printing.

See Tear-Off Position on page 84 for more information.

Select the Print Mode
Select a print mode that is compatible with your printer options.

See Print Mode on page 84 for more information.
Introduction

Control Panel Display

Set the Media Type
Select the type of media that you are using.
See Media Type on page 85 for more information.

Select the Media Sensor
Select the media sensor that is appropriate for the media that you are using.
See Sensor Type on page 102 for more information.

Select the Print Method
Specify if ribbon is being used. Thermal Transfer media requires ribbon for printing while Direct Thermal media does not.
To determine if you need to use ribbon, see When to Use Ribbon on page 49.
See Print Method on page 85 for more information.

Adjust the Print Width
Specify the width of the labels being used.
See Print Width on page 85 for more information.

Set the Maximum Label Length
Set the maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length plus the interlabel gap. If you set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate.
See Maximum Label Length on page 86 for more information.
Set Supplies Low Warning
When this feature is enabled, the printer provides warnings when the media or ribbon is reaching near the end of the roll.
See Supplies Low Warning on page 89 for more information.

Set Early Warning for Maintenance
When this feature is enabled, the printer provides warnings when the printhead needs to be cleaned.
See Early Warning for Maintenance on page 89 for more information.

Set Printhead Cleaning Interval*
When Early Warning for Maintenance is enabled, set this value to the length of the media or ribbon roll that you are using.
See Printhead Cleaning Interval on page 89 for more information.
* This parameter appears only if Early Warning for Maintenance is enabled.

Reset Printhead Cleaning Counter for Early Warning*
- If you received the message WARNING CLEAN PRINTHEAD, clean the printhead, and then press PLUS to select YES to reset the Early Warning for Maintenance printhead cleaning counter.
- If you have not cleaned the printhead, press MINUS to select NO.
* This parameter appears only if Early Warning for Maintenance is enabled.

Set Printhead Life Expectancy*
When Early Warning for Maintenance is enabled, set this value to the number of inches of media that the printhead is expected to print.
See Printhead Life Expectancy on page 89 for more information.
* This parameter appears only if Early Warning for Maintenance is enabled.
Reset New Printhead Counter for Early Warning*

- If you received the message WARNING REPLACE HEAD, replace the printhead, and then press PLUS (+) to select YES to reset the Early Warning for Maintenance printhead replacement counter.
- If you have not replaced the printhead, press MINUS (-) to select NO.

* This parameter appears only if Early Warning for Maintenance is enabled.

View the Non-Resettable Counter

This parameter displays the total length of media that the printer has printed.

See Non-Resettable Counter on page 90 for more information.

View User-Controlled Counter 1

This parameter displays the total length of media that the printer has printed since this counter was last reset.

See User-Controlled Counters on page 90 for more information.

View User-Controlled Counter 2

This parameter displays the total length of media that the printer has printed since this counter was last reset.

See User-Controlled Counters on page 90 for more information.

Print Counter Readings

Prints a label that lists the odometer readings for the following:
- the non-resettable counter
- the two user-controlled counters
- the Early Warning for Maintenance counters, which indicate when the printhead was last cleaned and the printhead life (If the Early Warning for Maintenance feature is disabled, the counters related to it do not print.)

See Print Counter Readings on page 90 for more information.
Print Font List
This option prints a label that lists the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory.
See *Print Information* on page 91 for more information.

Print Bar Code List
This option prints a label that lists the available bar codes in the printer. Bar codes may be stored in RAM or Flash memory.
See *Print Information* on page 91 for more information.

Print Image List
This option prints a label that lists the available images stored in the printer’s RAM, Flash memory, or optional memory card.
See *Print Information* on page 91 for more information.

Print Format List
This option prints a label that lists the available formats stored in the printer’s RAM, Flash memory, or optional memory card.
See *Print Information* on page 91 for more information.

Print Configuration Label
This option prints a configuration label (see Figure 13 on page 149), which lists the current printer configuration.
See *Print Information* on page 91 for more information.
Print Network Configuration Label

This option prints a configuration label (see Figure 14 on page 149), which lists the settings for any print server that is installed.

See Print Information on page 91 for more information.

Print All Labels

This option prints labels that list the available fonts, bar codes, images, formats, and the current printer and network configurations.

See Print Information on page 91 for more information.

Initialize Flash Memory

This option erases all previously stored information from Flash memory.

1. If prompted for a password, enter the printer password. For instructions, see Changing Password-Protected Parameters on page 20.

   The display shows INITIALIZE FLASH?

2. Press PLUS (+) to select YES.

   The display shows ARE YOU SURE?.

3. Do you want to continue?

   • Press MINUS (-) to select NO to cancel the request and return to the INITIALIZE FLASH prompt.

   • Press PLUS (+) to select YES and begin initialization.

   When initialization is complete, the control panel displays INITIALIZING COMPLETED.

   Note • Initializing memory can take several minutes.

   See Initialize Flash Memory on page 91 for more information.

Print a Sensor Profile

Use this menu item to print a sensor profile.

See Print a Sensor Profile on page 91 for more information.
Calibrate the Media and Ribbon Sensors
Use this menu item to adjust the sensitivity of the media and ribbon sensors.
See Media and Ribbon Sensor Calibration on page 94 for more information. For instructions on how to perform a calibration procedure, see Calibrate the Ribbon and Media Sensors Manually on page 106.

Set Parallel Communications
Select the communications port that matches the one being used by the host computer.
See Parallel Communications on page 103 for more information.

Set Serial Communications
Select the communications port that matches the one being used by the host computer.
See Parallel Communications on page 103 for more information.

Set the Baud Rate
Select the baud value that matches the one being used by the host computer.
See Baud Rate on page 104 for more information.

Set the Data Bits Value
Select the data bits value that matches the one being used by the host computer.
See Data Bits on page 104 for more information.
Set the Parity Value
Select the parity value that matches the one being used by the host computer.
See Parity on page 104 for more information.

Set the Host Handshake Protocol Value
Select the handshake protocol that matches the one being used by the host computer.
See Host Handshake on page 105 for more information.

Set the Zebra Protocol Value
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.
See Protocol on page 105 for more information.

Set the Network ID
This parameter assigns a unique number to the printer when the printer is operating in an RS422/485 multi-drop network environment (an external RS422/485 adapter is required). This gives the host computer the means to address a specific printer. This does not affect TCP/IP or IPX networks. Set a unique network ID number for this printer.
See Network ID on page 105 for more information.

Enable Communication Diagnostics Mode
Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer.
See Communication Diagnostics Mode on page 94 for more information.
Set the Control Character Value
Set the control prefix character to match what is used in your label formats.
See Control Character on page 100 for more information.

Set the Format Command Prefix Value
Set the format command prefix character to match what is used in your label formats.
See Command Character on page 101 for more information.

Set the Delimiter Character Value
Set the delimiter character to match what is used in your label formats.
See Delimiter Character on page 101 for more information.

Set the ZPL Mode
Select the ZPL mode that matches what is used in your label formats.
See ZPL Mode on page 101 for more information.

Set the Power-Up Action
Set the action for the printer to take during the power-up sequence.
See Power-Up Action on page 92 for more information.
Set the Head-Close Action
Set the action for the printer to take when you close the printhead.
See Head-Close Action on page 92 for more information.

Set the Backfeed Sequence
This parameter sets when label backfeed occurs after a label is removed in some print modes. It has no effect in Rewind mode. This setting is superseded by ~JS when received as part of a label format.
See Backfeed Sequence on page 87 for more information.

Adjust the Label Top Position
This parameter adjusts the print position vertically on the label. Positive numbers adjust the label top position farther down the label (away from the printhead) by the specified number of dots. Negative numbers adjust the position up the label (toward the printhead).
See Label Top Position on page 87 for more information.

Adjust the Label Left Position
If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.
See Label Left Position on page 87 for more information.

Set the Head Test Count*
The printer periodically performs a test of the printhead functionality. This parameter establishes how many labels are printed between these internal tests.
See Head Test Count on page 87 for more information.
Set the Reprint Mode

When reprint mode is enabled, you can reprint the last label printed either by issuing certain commands or by pressing the **LEFT ARROW** on the control panel.

See *Reprint Mode on page 88* for more information.

View Sensor Settings

The following parameters are automatically set during the calibration procedure and should be changed only by a qualified service technician.

Select Format Conversion Scaling Factor

Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second, the dpi to which you would like to scale.

See *Format Conversion on page 94* for more information.
Select the Idle Display
Select the information shown on the printer’s display when the printer is idle.
See Idle Display on page 95 for more information.

Set the Real-Time Clock (RTC) Date
This parameter allows you to set the date to display in the Idle Display.
See RTC Date on page 95 for more information.

Set the Real-Time Clock (RTC) Time
This parameter allows you to set the date to display in the Idle Display.
See RTC Time on page 95 for more information.

Run the Specified ZBI Program*
• To run the ZBI program selected by the previous menu item, press PLUS (+).
• If you did not replace the ribbon, press MINUS (-) to select CANCEL, or press the LEFT ARROW or RIGHT ARROW to move to another parameter.
See Run a ZBI Program on page 95 for more information.
* This menu item appears only if ZBI is enabled on your printer and no ZBI program is running.

Select the Primary Network Device
This parameter determines which device should be considered primary in the active device selection.
See Primary Network on page 96 for more information.
**View if IP Settings Are Loaded from the Printer or Print Server**

This parameter tells whether to use the printer’s or the print server’s LAN/WLAN settings at power-up. The default is to use the printer’s settings.

See *Load from External Device on page 96* for more information.

**View the Active Print Server***

This menu item displays which print server is being used. This tells which device's settings such as IP protocol and IP address are being displayed under those menu items.

*This menu item, which cannot be modified from the control panel, appears only if a wired or wireless print server is installed in your printer.*

**Set the IP Resolution Method***

This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. If a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.

See *IP Protocol on page 97* for more information.

*This menu item appears only if a wired or wireless print server is installed in your printer.*

**Set the Printer’s IP Address***

View and, if necessary, change the printer’s IP address.

Changes are saved only if IP PROTOCOL is set to PERMANENT. To allow any saved changes to take effect, use *RESET NETWORK on page 35* to reset the print server.

See *IP Address on page 97* for more information.

*This menu item appears only if a wired or wireless print server is installed in your printer.*
Set the Subnet Mask*

View and, if necessary, change the subnet mask.

Changes are saved only if IP PROTOCOL is set to PERMANENT.
To allow any saved changes to take effect, use RESET NETWORK on page 35 to reset the print server.

See Subnet Mask on page 98 for more information.

* This menu item appears only if a wired or wireless print server is installed in your printer.

Set the Default Gateway*

View and, if necessary, change the default gateway.

Changes are saved only if IP PROTOCOL is set to PERMANENT.
To allow any saved changes to take effect, use RESET NETWORK on page 35 to reset the print server.

See Default Gateway on page 98 for more information.

* This menu item appears only if a wired or wireless print server is installed in your printer.

View the MAC Address*

View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).

See MAC Address on page 98 for more information.

* This menu item, which cannot be modified from the control panel, appears only if a wired or wireless print server is installed in your printer.

View the ESSID Value*

The Extended Service Set Identification (ESSID) is an identifier for your wireless network. This setting, which cannot be modified from the control panel, gives the ESSID for the current wireless configuration.

See ESSID on page 99 for more information.

* This menu item, which cannot be modified from the control panel, appears only if a wireless print server is installed in your printer.
Reset the Network Settings*

This option resets the wired or wireless print server. You must reset the print server to allow any changes to the network settings to take effect.

See Reset Network on page 99 for more information.

* This menu item appears only if a wired or wireless print server is installed in your printer.

Specify the Password Level

This parameter allows you to select whether certain factory-selected menu items or all menu items are password protected.

See Password Level on page 95 for more information.
Select the Display Language

If necessary, change the language that the printer displays.

See Language on page 100 for more information.

**Note** • The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.
This section assists the technician with initial setup and operation of the printer.

Contents

Handling the Printer ................................................................. 38
Unpack and Inspect the Printer .................................................. 38
To Store the Printer ................................................................. 38
To Ship the Printer ................................................................. 38
Select a Location for the Printer ................................................. 39
Select a Data Communication Interface ..................................... 40
Data Cables ................................................................................. 42
Connect the Printer to a Power Source ..................................... 43
Power Cord Specifications .......................................................... 44
Install the Control Panel Keypad Cover ..................................... 46
Select a Print Mode ................................................................. 51
Load the Ribbon ........................................................................ 54
Load the Media .......................................................................... 59
Handling the Printer

This section describes how to handle your printer.

Unpack and Inspect the Printer

Important • Zebra Technologies is not responsible for any damage incurred during the shipment of the equipment and will not repair this damage under warranty.

When you receive the printer, do the following:

1. Immediately unpack the printer.
2. Check all exterior surfaces for damage.
3. Raise the media door, and inspect the media compartment for damage to components.
4. If you discover shipping damage during inspection, do the following:
   • Immediately notify the shipping company, and file a damage report.
   • Keep all packaging material for shipping company inspection.
   • Notify your authorized Zebra reseller.

To Store the Printer

If you are not placing the printer into immediate operation, repackage it using the original packing materials. You may store the printer under the following conditions:

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

To Ship the Printer

Save all packing materials in case you need to ship the printer in the future.

To ship the printer, do the following:

1. Turn off (O) the printer, and disconnect all cables.
2. Remove any media, ribbon, or loose objects from the printer interior.
3. Close the printhead.
4. Carefully pack the printer into the original container or a suitable alternate container to avoid damage during transit. A shipping container can be purchased from Zebra if the original packaging has been lost or destroyed.
Select a Location for the Printer

Select a location for the printer that meets these conditions:

- **Surface**: The surface where the printer will be located must be solid, level, and of sufficient size and strength to hold the printer.

- **Space**: The area where the printer will be located must include enough space for ventilation and for accessing the printer components and connectors. To allow for proper ventilation and cooling, leave open space on all sides of the printer.

  **Caution** • Do not place any padding or cushioning material behind or under the printer because this restricts air flow and could cause the printer to overheat.

- **Power**: The printer should be within a short distance of an appropriate power outlet that is easily accessible.

- **Data communication interfaces**: The printer must be within range of your WLAN radio (if applicable) or within an acceptable range for other connectors to reach your data source (usually a computer). For more information on maximum cable lengths and configuration, see Table 4 on page 41.

- **Operating conditions**: Your printer is designed to function in a wide range of environmental and electrical conditions, including a warehouse or factory floor. Table 3 shows the temperature and relative humidity requirements for the printer when it is operating.

### Table 3 • Operating Temperature and Humidity

<table>
<thead>
<tr>
<th>Mode</th>
<th>Temperature</th>
<th>Relative Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Transfer</td>
<td>41° to 104°F (5° to 40°C)</td>
<td>20 to 85% non-condensing</td>
</tr>
<tr>
<td>Direct Thermal</td>
<td>32° to 104°F (0° to 40°C)</td>
<td></td>
</tr>
</tbody>
</table>
Select a Data Communication Interface

You may connect your printer to a computer using one or more of the available connections. The standard connections are shown in Figure 4. A ZebraNet wired or wireless print server option or a parallel port may also be present on your printer.

![Figure 4 • Communication Interfaces](image)

<table>
<thead>
<tr>
<th>Serial port</th>
<th>Internal wired Ethernet print server</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB port</td>
<td>Parallel port</td>
</tr>
</tbody>
</table>

Table 4 on page 41 provides basic information about data communication interfaces that you can use to connect your printer to a computer. You may send label formats to the printer through any data communication interface that is available. Select an interface that is supported by both your printer and your computer or your Local Area Network (LAN).

**Caution** • Ensure that the printer power is off (O) before connecting data communications cables. Connecting a data communications cable while the power is on (I) may damage the printer.
### Table 4 • Data Communication Interfaces

<table>
<thead>
<tr>
<th>Interface</th>
<th>Standard or Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| RS-232 Serial              | Standard           | **Limitations and Requirements**  
• Maximum cable length of 50 ft (15.24 m).  
• You may need to change printer parameters to match the host computer.  
• You need to use a null-modem adaptor to connect to the printer if using a standard modem cable. |
|                            |                    | **Connections and Configuration**  
The baud rate, number of data and stop bits, the parity, and the XON/XOFF or DTR control must match those of the host computer. |
| USB                       | Standard           | **Limitations and Requirements**  
• Maximum cable length of 16.4 ft (5 m).  
• No printer parameter changes required to match the host computer. |
|                            |                    | **Connections and Configuration**  
No additional configuration is necessary. |
| 8-bit Parallel data interface | Standard           | **Limitations and Requirements**  
• Maximum cable length of 10 ft (3 m).  
• Recommended cable length of 6 ft (1.83 m).  
• No printer parameter changes required to match the host computer.  
• A wired or wireless print server (if installed) takes up this port on the printer. |
|                            |                    | **Connections and Configuration**  
No additional configuration is necessary. |
| Wired Ethernet print server | Option             | **Limitations and Requirements**  
• Can print to the printer from any computer on your LAN.  
• Can communicate with the printer through the printer’s web pages.  
• The printer must be configured to use your LAN.  
• A parallel connection or a wireless print server (if installed) takes up this port on the printer. |
|                            |                    | **Caution**  
Be careful not to plug a USB cable into a wired Ethernet print server connector on the printer because doing so will damage the Ethernet connector. |
|                            |                    | **Connections and Configuration**  
Refer to the ZebraNet Wired and Wireless Print Servers User Guide for configuration instructions. A copy of this manual is available at http://www.zebra.com/manuals or on the user CD that came with your printer.  

**Note**  
To use this connection, you may need to remove a factory-installed plug that is designed to keep someone from accidentally plugging a USB connector into this port. |
Data Cables

You must supply all data cables for your application.

Ethernet cables do not require shielding, but all other data cables must be fully shielded and fitted with metal or metallized connector shells. Unshielded data cables may increase radiated emissions above the regulated limits.

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.
Connect the Printer to a Power Source

The AC power cord must have a three-prong female connector on one end that plugs into the mating AC power connector at the rear of the printer. If a power cable was not included with your printer, refer to Power Cord Specifications on page 44.

**Caution •** For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific three-conductor grounded plug configuration.

To connect the printer to a power source, complete these steps:

1. Plug the female end of the A/C power cord into the A/C power connector on the back of the printer.

2. Plug the male end of the A/C power cord into an appropriate power outlet.
3. Turn on (I) the printer.

The printer boots up and performs a self-test.

**Power Cord Specifications**

**Caution** • For personnel and equipment safety, always use an approved three-conductor power cord specific to the region or country intended for installation. This cord must use an IEC 320 female connector and the appropriate region-specific, three-conductor grounded plug configuration.

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, see Figure 5 and refer to the following guidelines:

- The overall cord length must be less than 9.8 ft. (3 m).
- The cord must be rated for a minimum of 10 A, 250 V.
- The chassis ground (earth) **must** be connected to ensure safety and reduce electromagnetic interference.
AC power plug for your country—This should bear the certification mark of at least one of the known international safety organizations (Figure 6).

2 3-conductor HAR cable or other cable approved for your country.

3 IEC 320 connector—This should bear the certification mark of at least one of the known international safety organizations (Figure 6).

4 Length ≤ 9.8 ft. (3 m). Rating 10 Amp minimum, 250 VAC.
Install the Control Panel Keypad Cover

A protective cover for the control panel keypad is provided with your printer (Figure 7). Install this optional cover if your printer will operate in a moist or dirty environment. This will help to protect the keypad from damage.

Figure 7 • Control Panel Keypad Cover

To install the control panel keypad cover, complete these steps:

1. Remove the paper backing from the control panel keypad cover to expose the adhesive.

2. Carefully align the cover over the keypad. Press to make the cover adhere to the printer.
Types of Media

Important • Zebra strongly recommends the use of Zebra-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 prevent premature printhead wear. To purchase supplies, go to http://www.zebra.com/howtobuy.

Your printer can use various types of media:

• *Standard media*—Most standard media uses an adhesive backing that sticks individual labels or a continuous length of labels to a liner. Standard media can come on rolls or in a fanfold stack (Table 5).

• *Tag stock*—Tags are usually made from a heavy paper. Tag stock does not have adhesive or a liner, and it is typically perforated between tags. Tag stock can come on rolls or in a fanfold stack (Table 5).

Table 5 • Roll and Fanfold Media

<table>
<thead>
<tr>
<th>Media Type</th>
<th>How It Looks</th>
<th>Description</th>
</tr>
</thead>
</table>
| Non-Continuous Roll Media | ![Roll Media](image) | Roll media is wound on a 3-in. (76-mm) core. Individual labels or tags are separated by one or more of the following methods:  
  • *Web media* separates labels by gaps, holes, or notches.  
  ![Web media](image)  
  • *Black mark media* uses pre-printed black marks on the back side of the media to indicate label separations.  
  ![Black mark media](image)  
  • *Perforated media* has perforations that allow the labels or tags to be separated from each other easily. The media may also have black marks or other separations between labels or tags.  
  ![Perforated media](image) |
### Table 5 • Roll and Fanfold Media (Continued)

<table>
<thead>
<tr>
<th>Media Type</th>
<th>How It Looks</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Continuous</strong></td>
<td></td>
<td>Fanfold media is folded in a zigzag pattern. Fanfold media can have the same label separations as non-continuous roll media. The separations would fall on or near the folds.</td>
</tr>
<tr>
<td><strong>Fanfold Media</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Continuous</strong></td>
<td></td>
<td>Roll media is wound on a 3-in. (76-mm) core. Continuous roll media does not have gaps, holes, notches, or black marks to indicate label separations. This allows the image to be printed anywhere on the label. Sometimes a cutter is used to cut apart individual labels.</td>
</tr>
<tr>
<td><strong>Roll Media</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ribbon Overview

Ribbon is a thin film that is coated on one side with wax, resin, or wax resin, which is transferred to the media during the thermal transfer process. The media determines whether you need to use ribbon and how wide the ribbon must be.

When ribbon is used, it 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 to Use Ribbon

Thermal Transfer media requires ribbon for printing while Direct Thermal media does not. To determine if ribbon must be used with a particular media, perform a media scratch test.

To perform a media scratch test, complete these steps:

1. Scratch the print surface of the media rapidly with your fingernail.

2. Did a black mark appear on the media?

<table>
<thead>
<tr>
<th>If a black mark...</th>
<th>Then the media is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does not appear on the media</td>
<td>Thermal transfer. A ribbon is required.</td>
</tr>
<tr>
<td>Appears on the media</td>
<td>Direct thermal. No ribbon is required.</td>
</tr>
</tbody>
</table>

Coated Side of Ribbon

Ribbon can be wound with the coated side on the inside or outside (Figure 8). This printer can only use ribbon that is coated on the outside. If you are unsure which side of a particular roll of ribbon is coated, perform an adhesive test or a ribbon scratch test to determine which side is coated.
Adhesive Test

If you have labels available, perform the adhesive test to determine which side of a ribbon is coated. This method works well for ribbon that is already installed.

To perform an adhesive test, complete these steps:

1. Peel a label from its liner.
2. Press a corner of the sticky side of the label to the outer surface of the roll of ribbon.
3. Peel the label off of the ribbon.
4. Observe the results. Did flakes or particles of ink from the ribbon adhere to the label?

<table>
<thead>
<tr>
<th>If ink from the ribbon...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhered to the label</td>
<td>The ribbon is coated on the outside and can be used in this printer.</td>
</tr>
<tr>
<td>Did not adhere to the label</td>
<td>The ribbon is coated on the inside and cannot be used in this printer.</td>
</tr>
<tr>
<td></td>
<td>To verify this, repeat the test on the other surface of the roll of ribbon.</td>
</tr>
</tbody>
</table>

Ribbon Scratch Test

Perform the ribbon scratch test when labels are unavailable.

To perform a ribbon scratch test, complete these steps:

1. Unroll a short length of ribbon.
2. Place the unrolled section of ribbon on a piece of paper with the outer surface of the ribbon in contact with the paper.
3. Scratch the inner surface of the unrolled ribbon with your fingernail.
4. Lift the ribbon from the paper.
5. Observe the results. Did the ribbon leave a mark on the paper?

<table>
<thead>
<tr>
<th>If the ribbon...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left a mark on the paper</td>
<td>The ribbon is coated on the outside and can be used in this printer.</td>
</tr>
<tr>
<td>Did not leave a mark on the paper</td>
<td>The ribbon is coated on the inside and cannot be used in this printer.</td>
</tr>
<tr>
<td></td>
<td>To verify this, repeat the test on the other surface of the roll of ribbon.</td>
</tr>
</tbody>
</table>
Select a Print Mode

Use a print mode that matches the media being used and the printer options available (Table 6).

Table 6 • Print Modes and Printer Options

<table>
<thead>
<tr>
<th>Print Mode</th>
<th>When to Use/Printer Options Required</th>
<th>Printer Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tear-Off (default setting)</td>
<td>Use for most applications. This mode can be used with any printer options and most media types.</td>
<td>The printer prints label formats as it receives them. The printer operator can tear off the printed labels any time after they print.</td>
</tr>
</tbody>
</table>

- Tear-Off mode for fanfold media (bottom feed)
- Tear-Off mode for roll media
- Tear-Off mode for fanfold media (rear feed)
### Table 6 • Print Modes and Printer Options

<table>
<thead>
<tr>
<th>Print Mode</th>
<th>When to Use/Printer Options Required</th>
<th>Printer Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peel-Off</td>
<td>Use when the printer has the Rewind option if you want to remove the labels from the liner one label at a time.</td>
<td>The printer peels the label from the liner during printing and then pauses until the label is removed. The liner winds onto the rewind spindle.</td>
</tr>
<tr>
<td><strong>Red solid lines = media, Blue dotted lines = backing only</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rewind</td>
<td>Use when the printer has the Rewind option if you want to save the labels without separating them or removing them from their backing.</td>
<td>The printer prints without pausing between labels. The media is wound onto the rewind spindle after printing.</td>
</tr>
</tbody>
</table>
**Table 6 • Print Modes and Printer Options**

<table>
<thead>
<tr>
<th>Print Mode</th>
<th>When to Use/Printer Options Required</th>
<th>Printer Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutter</td>
<td>Use when the printer has a cutter option if you want the labels to be cut apart.</td>
<td>The printer prints a label and then cuts it free.</td>
</tr>
</tbody>
</table>
Load the Ribbon

Use the instructions in this section to load ribbon (if used) in your printer. Ribbon is used only with thermal transfer labels. For direct thermal labels, do not load ribbon in the printer. To determine if ribbon must be used with a particular media, see When to Use Ribbon on page 49.

**Caution** • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

**Important** • Use ribbon that is wider than the media to protect the printhead from wear. Ribbon must be coated on the outside. See Coated Side of Ribbon on page 49 for more information.

**To load ribbon, complete these steps:**

1. Raise the media door.

2. Align the arrow (1) on the ribbon take-up spindle knob with the notch (2) in the ribbon take-up spindle.
3. Align the segments of the ribbon supply spindle.

4. Position the ribbon with the loose end unrolling clockwise.

5. Place the roll of ribbon on the ribbon supply spindle. Push the roll back as far as it will go.

6. A ribbon leader makes ribbon loading and unloading easier. Does your roll of ribbon have paper or something else attached to the end to serve as a ribbon leader?

<table>
<thead>
<tr>
<th>If…</th>
<th>Then…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Continue with the next step.</td>
</tr>
</tbody>
</table>
| No   | a. Tear off a strip of media (labels and liner) about 6–12 in. (150–305 mm) long from the roll.  
    b. Peel a label from the media strip.  
    c. Use this label (1) to attach the end of the ribbon (2) to the media strip (3). The media strip acts as a leader. |
7. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

Rotate the printhead-open lever (1) to the open position.

8. Thread the ribbon over the media dancer assembly (1) and under the ribbon guide roller (2).
9. Push the ribbon leader forward until it passes under the printhead assembly (1), over the snap plate (2), and then over the platen roller (3).

10. Bring the ribbon leader over the upper ribbon roller (1) and then toward the ribbon take-up spindle (2).

11. Wind the ribbon leader and attached ribbon counterclockwise around the ribbon take-up spindle.
12. Rotate the spindle counterclockwise several turns to wind the ribbon and remove any slack.

13. Is media already loaded?

<table>
<thead>
<tr>
<th>If...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>a. Continue with <em>Load the Media on page 59</em>.</td>
</tr>
<tr>
<td>Yes</td>
<td>a. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.</td>
</tr>
<tr>
<td></td>
<td>b. Close the media door.</td>
</tr>
</tbody>
</table>
Load the Media

1. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

Open the printhead assembly by rotating the printhead-open lever (1).

2. Loosen the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).
3. Slide the outer media guide (1) all the way out.
4. Insert media into the printer. Follow the instructions for roll or fanfold media, as appropriate.

**Roll Media**

a. Remove and discard any tags or labels that are dirty or that are held by adhesives or tape.

b. Pull out the media supply guide as far as it goes.

**Fanfold Media**

a. Thread the fanfold media through the bottom or rear slot.

b. Pull out the media supply guide as far as it goes.
c. Place the roll of media on the media supply hanger. Push the roll back as far as it will go.

d. Slide in the media supply guide until it touches the edge of the roll.

5. Thread the media under the media dancer assembly roller (1), the media guide roller (2), and then the upper media sensor (3).

**Important** • Make sure that you thread the media under these components. If you thread the media over them, the media obstructs the ribbon sensor and causes a false RIBBON OUT error.

c. Drape the media over the media supply hanger.

d. Slide in the media supply guide until it touches the edge of the media.
6. Push the media forward until it passes under the printhead assembly (1), under the snap plate (2), and then over the platen roller (3).

7. In which print mode will your printer be operating? (For more information on print modes, see Select a Print Mode on page 51.)

<table>
<thead>
<tr>
<th>If using…</th>
<th>Then…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tear-Off mode</td>
<td>Continue with Final Steps for Tear-Off Mode on page 65.</td>
</tr>
<tr>
<td>Peel-Off mode</td>
<td>Continue with Final Steps for Peel-Off Mode on page 67.</td>
</tr>
</tbody>
</table>
### If using…

<table>
<thead>
<tr>
<th>Mode</th>
<th>Then…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rewind mode</td>
<td>Continue with <em>Final Steps for Rewind Mode</em> on page 72.</td>
</tr>
<tr>
<td>Cutter mode</td>
<td>Continue with <em>Final Steps for Cutter Mode</em> on page 77.</td>
</tr>
</tbody>
</table>

![Rewind mode diagram](image1)

![Cutter mode diagram](image2)
**Final Steps for Tear-Off Mode**

8. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.

9. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).
10. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.

11. Close the media door.

12. Set the printer to Tear-Off mode (for more information, see Print Mode on page 84).

13. If desired, perform the CANCEL Self Test on page 149 to verify that your printer is able to print.
Final Steps for Peel-Off Mode

8. Remove the rewind plate (if installed) from the front of the printer. Store it on the two mounting screws on the inside of the printer base.
9. Extend approximately 36 in. (920 mm) of media out of the printer. Remove and discard the labels from this exposed media.

10. Remove the hook from the rewind spindle.

11. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.

**Note** • A core is not required.
12. Wind the media liner counterclockwise around the rewind spindle.

![Diagram showing wind direction]

a. Reinstall the hook. Insert the short end of the hook into the hole in the center of the adjusting nut (1). Insert the long end of the hook into the small hole on the guide plate (2).

![Diagram showing hook installation]

b. Rotate the spindle counterclockwise several turns to wind the media liner over the hook and remove any slack.

![Diagram showing spindle rotation]

13. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.

![Diagram showing media alignment]
14. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).

15. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.

The backing winds on the rewind spindle or core.
16. Close the media door.

17. Set the printer to Peel-Off mode (for more information, see *Print Mode on page 84*).

18. If desired, perform the *CANCEL Self Test on page 149* to verify that your printer is able to print.
Final Steps for Rewind Mode

8. Remove the rewind plate from its storage location inside the printer.

9. Position the rewind plate so that the lip on the attached hook plate points down.

10. Insert the hook plate lip 1/2 in. (13 mm) into the lower slot in the side plate.

11. Align the upper end of the rewind plate with the matching upper slot in the side plate.

12. Slide in the rewind plate until it stops against the printer’s main frame.

<table>
<thead>
<tr>
<th>1</th>
<th>Upper slot</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Lower slot</td>
</tr>
<tr>
<td>3</td>
<td>Rewind plate</td>
</tr>
<tr>
<td>4</td>
<td>Lip</td>
</tr>
<tr>
<td>5</td>
<td>Adjustable hook plate</td>
</tr>
</tbody>
</table>
13. Extend approximately 36 in. (920 mm) of media out of the printer. Remove and discard the labels from this exposed media.

14. Remove the hook from the rewind spindle.

15. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.

**Note** • A core is not required.
16. Wind the media liner counterclockwise around the rewind spindle.

![Diagram of winding media liner]

a. Reinstall the hook. Insert the short end of the hook into the hole in the center of the adjusting nut (1). Insert the long end of the hook into the small hole on the guide plate (2).

![Diagram of reinstalling hook]

b. Rotate the spindle counterclockwise several turns to wind the media liner over the hook and remove any slack.

![Diagram of winding media liner over hook]

17. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.

![Diagram of aligning media]

---

If the text is meant to be read naturally, the content is as follows:

16. Wind the media liner counterclockwise around the rewind spindle.

![Diagram of winding media liner]

a. Reinstall the hook. Insert the short end of the hook into the hole in the center of the adjusting nut (1). Insert the long end of the hook into the small hole on the guide plate (2).

![Diagram of reinstalling hook]

b. Rotate the spindle counterclockwise several turns to wind the media liner over the hook and remove any slack.

![Diagram of winding media liner over hook]

17. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.

![Diagram of aligning media]
18. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).

19. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.

The media winds on the rewind spindle or core.
20. Close the media door.

21. Set the printer to Rewind mode (for more information, see Print Mode on page 84).

22. If desired, perform the CANCEL Self Test on page 149 to verify that your printer is able to print.
Final Steps for Cutter Mode

8. **Caution** • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

Thread the media forward until it passes under the printhead assembly (1), under the snap plate (2), and through the cutter assembly (3).

9. Align the media with the inner media guide (1). Slide in the outer media guide (2) until it just touches the edge of the media.
10. Tighten the thumb screw (not visible from this angle) that is located on the bottom of the outer media guide (1).

11. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.

The media winds on the rewind spindle or core.
12. Close the media door.

13. Set the printer to Cutter mode (for more information, see Print Mode on page 84).

14. If desired, perform the CANCEL Self Test on page 149 to verify that your printer is able to print.
This section assists you with configuration of and adjustments to the printer.

Contents

Changing Printer Settings .................................................. 82
Print Settings .................................................................. 83
Maintenance and Diagnostic Tools .......................................... 89
Network Settings ................................................................ 96
Language Settings ............................................................. 100
Sensor Settings ................................................................. 102
Port Settings .................................................................. 103
Calibrate the Ribbon and Media Sensors Manually .................... 106
Remove Used Ribbon .......................................................... 112
Remove Media or Liner from the Rewind Spindle ....................... 113
Adjust Transmissive Media Sensors .......................................... 115
  Upper Media Sensor ....................................................... 115
  Lower Media Sensor ..................................................... 118
Adjust Printhead Pressure and Toggle Position ......................... 119
  Toggle Position Adjustment ............................................. 119
  Printhead Pressure Adjustment ......................................... 121
Changing Printer Settings

This section presents the printer settings that you can change and identifies the tools for changing them. These tools include the following:

- ZPL and Set/Get/Do (SGD) commands (See the Zebra® Programming Guide for more information.)
- The printer’s control panel display (See Control Panel Display on page 17 for more information.)
- The printer’s web pages when the printer has an active wired or wireless print server connection (See the ZebraNet Wired and Wireless Print Servers User Guide for more information.)

Copies of the referenced manuals are available at http://www.zebra.com/manuals or on the user CD that came with your printer.

This section contains the following subsections:

- Print Settings on page 83
- Maintenance and Diagnostic Tools on page 89
- Network Settings on page 96
- Language Settings on page 100
- Port Settings on page 103
## Print Settings

### Table 7 • Print Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Print Darkness** | Set the darkness to the lowest setting that provides good print quality. If you set the darkness too high, the label image may print unclearly, bar codes may not scan correctly, the ribbon may burn through, or the printhead may wear prematurely. If desired, use the *FEED Self Test* on page 151 to determine the best darkness setting.  
  *Accepted values:* 0.0 – 30.0  
  *Related ZPL command(s):* `^MD, ~SD`  
  *SGD command used:* `print.tone`  
  *Control panel menu item:* [DARKNESS on page 21](#)  
  *Printer web page:* View and Modify Printer Settings > General Setup > Darkness |
| **Print Speed**   | Select the speed for printing a label (given in inches per second). Slower print speeds typically yield better print quality.  
  *Accepted values:*  
  - 203 dpi: 2–12 ips  
  - 300 dpi: 2–9 ips  
  *Related ZPL command(s):* `^PR`  
  *SGD command used:* `media.speed`  
  *Control panel menu item:* PRINT SPEED on page 21  
  *Printer web page:* View and Modify Printer Settings > General Setup > Print Speed |
### Tear-Off Position

If necessary, adjust the position of the media over the tear-off bar after printing.
- Higher numbers move the media out (the tear line moves closer to the leading edge of the next label).
- Lower numbers move the media in (the tear line moves closer to the edge of the label just printed).

<table>
<thead>
<tr>
<th>1</th>
<th>Media direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Factory-set tear line location at position 000</td>
</tr>
</tbody>
</table>

**Accepted values:** -120 to 120

**Related ZPL command(s):**~TA

**SGD command used:** none

**Control panel menu item:** TEAR OFF on page 21

**Printer web page:** View and Modify Printer Settings > General Setup > Tear Off

### Print Mode

Select a print mode that is compatible with your printer options.

<table>
<thead>
<tr>
<th>Accepted values:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEAR OFF—The printer prints label formats as it receives them. The printer operator can tear off the printed labels any time after they print.</td>
</tr>
<tr>
<td>PEEL—The printer peels the label from the liner during printing and then pauses until the label is removed. The liner winds onto the rewind spindle.</td>
</tr>
<tr>
<td>REWIND—The printer prints without pausing between labels. The media is wound onto the rewind spindle after printing.</td>
</tr>
<tr>
<td>CUTTER—The printer prints a label and then cuts it free.</td>
</tr>
</tbody>
</table>

**Related ZPL command(s):** ^MM

**SGD command used:** media.printmode

**Control panel menu item:** PRINT MODE on page 21

**Printer web page:** View and Modify Printer Settings > General Setup > Print Mode
### Media Type
Select the type of media that you are using.

- If you select CONTINUOUS, you must include a label length in your label format (\(^\mathrm{LL}\) if you are using ZPL).
- If you select NON-CONTINUOUS for various non-continuous media, the printer feeds media to calculate the label length.

See *Types of Media on page 47* for more information.

- **Accepted values:** CONTINUOUS, NON-CONTINUOUS
- **Related ZPL command(s):** \(^\mathrm{MN}\)
- **SGD command used:** none
- **Control panel menu item:** MEDIA TYPE on page 22
- **Printer web page:** View and Modify Printer Settings > Media Setup > Media Type

### Print Method
Specify if ribbon is being used. Thermal Transfer media requires ribbon for printing while Direct Thermal media does not.

To determine if you need to use ribbon, see *When to Use Ribbon on page 49*.

- **Accepted values:** THERMAL TRANS, DIRECT THERMAL
- **Related ZPL command(s):** \(^\mathrm{MT}\)
- **SGD command used:** none
- **Control panel menu item:** PRINT METHOD on page 22
- **Printer web page:** View and Modify Printer Settings > Media Setup > Print Method

### Print Width
Specify the width of the labels being used.

**Note** • Setting the width too narrow can result in portions of a label format not being printed on the media. Setting the width too wide wastes formatting memory and can cause the printer to print off of the label and onto the platen roller. This setting can affect the horizontal position of the label format if the image was inverted using the \(^\mathrm{POI}\) ZPL II command.

- **Accepted values:** minimum: 2 dots
  maximum: 203 dpi: 832 dots
  300 dpi: 1248 dots
- **Related ZPL command(s):** \(^\mathrm{PW}\)
- **SGD command used:** none
- **Control panel menu item:** PRINT WIDTH on page 22
- **Printer web page:** View and Modify Printer Settings > Media Setup > Print Width
Maximum Label Length

Set the maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length plus the interlabel gap. If you set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate.

For example, if the label length is 6.0 inches (152 mm) including the interlabel gap, set the parameter for at least 7.0 inches (178 mm).

Accepted values: 0 to the maximum label length supported by the printer

Related ZPL command(s): ^ML

SGD command used: none

Control panel menu item: MAXIMUM LENGTH on page 22

Printer web page: View and Modify Printer Settings > Media Setup > Maximum Length
### Table 7 • Print Settings (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Accepted values</th>
<th>Related ZPL command(s)</th>
<th>SGD command used</th>
<th>Control panel menu item</th>
<th>Printer web page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backfeed Sequence</td>
<td>This parameter sets when label backfeed occurs after a label is removed in some print modes. It has no effect in Rewind mode. This setting is superseded by ~JS when received as part of a label format.</td>
<td>• AFTER (backfeed occurs immediately after the last label is completed)</td>
<td>~JS</td>
<td>none</td>
<td>BACKFEED on page 30</td>
<td>View and Modify Printer Settings &gt; Advanced Setup &gt; Backfeed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OFF (no backfeed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• BEFORE (backfeed occurs before the forward motion of the first label)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DEFAULT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Related ZPL command(s): ~JS</td>
<td>SGD command used: none</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Label Top Position</td>
<td>This parameter adjusts the print position vertically on the label. Positive numbers adjust the label top position farther down the label (away from the printhead) by the specified number of dots. Negative numbers adjust the position up the label (toward the printhead).</td>
<td>-120 to 120</td>
<td>^LT</td>
<td>none</td>
<td>LABEL TOP on page 30</td>
<td>View and Modify Printer Settings &gt; General Setup &gt; Label Top</td>
</tr>
<tr>
<td></td>
<td>Accepted values: -120 to 120</td>
<td>SGD command used: none</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Related ZPL command(s): ^LT</td>
<td>Control panel menu item: LABEL TOP on page 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGD command used: none</td>
<td>Printer web page: View and Modify Printer Settings &gt; General Setup &gt; Label Top</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Label Left Position</td>
<td>If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.</td>
<td>-9999 to 9999</td>
<td>^LS</td>
<td>none</td>
<td>LEFT POSITION on page 30</td>
<td>View and Modify Printer Settings &gt; Advanced Setup &gt; Left Position</td>
</tr>
<tr>
<td></td>
<td>Accepted values: -9999 to 9999</td>
<td>SGD command used: none</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Related ZPL command(s): ^LS</td>
<td>Control panel menu item: LEFT POSITION on page 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGD command used: none</td>
<td>Printer web page: View and Modify Printer Settings &gt; Advanced Setup &gt; Left Position</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Test Count</td>
<td>The printer periodically performs a test of the printhead functionality. This parameter establishes how many labels are printed between these internal tests.</td>
<td>Accepted values: 0000 (disables the test) to 9999</td>
<td>^JT</td>
<td>none</td>
<td>HEAD TEST COUNT on page 30</td>
<td>View and Modify Printer Settings &gt; Advanced Setup &gt; Head Test Count</td>
</tr>
<tr>
<td></td>
<td>Accepted values: 0000 (disables the test) to 9999</td>
<td>SGD command used: none</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Related ZPL command(s): ^JT</td>
<td>Control panel menu item: HEAD TEST COUNT on page 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGD command used: none</td>
<td>Printer web page: View and Modify Printer Settings &gt; Advanced Setup &gt; Head Test Count</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 7 • Print Settings (Continued)

<table>
<thead>
<tr>
<th>Reprint Mode</th>
<th>When reprint mode is enabled, you can reprint the last label printed by pressing and holding PAUSE + CANCEL on the printer’s control panel.</th>
</tr>
</thead>
</table>
|              | Accepted values:  
|              | • ON  
|              | • OFF  
|              | Related ZPL command(s): ^JZ  
|              | SGD command used: none  
|              | Control panel menu item: REPRINT MODE on page 31  
|              | Printer web page: N/A  

## Maintenance and Diagnostic Tools

### Table 8 • Maintenance and Diagnostic Tools

<table>
<thead>
<tr>
<th><strong>Supplies Low Warning</strong></th>
<th>When this feature is enabled, the printer provides warnings when the media or ribbon is reaching near the end of the roll.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accepted values:</strong></td>
<td>MEDIA DISABLED, MEDIA ENABLED</td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong></td>
<td>^JH</td>
</tr>
<tr>
<td><strong>SGD command used:</strong></td>
<td>none</td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong></td>
<td>SUPPLIES WARNING on page 23</td>
</tr>
<tr>
<td><strong>Printer web page:</strong></td>
<td>View and Modify Printer Settings &gt; General Setup &gt; Early Warning (Media)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Early Warning for Maintenance</strong></th>
<th>When this feature is enabled, the printer provides warnings when the printhead needs to be cleaned.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accepted values:</strong></td>
<td>MAINT. OFF, MAINT. ON</td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong></td>
<td>^JH</td>
</tr>
<tr>
<td><strong>SGD command used:</strong></td>
<td>none</td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong></td>
<td>EARLY WARNING MAINTENANCE on page 23</td>
</tr>
<tr>
<td><strong>Printer web page:</strong></td>
<td>View and Modify Printer Settings &gt; General Setup &gt; Early Warning (Maintenance)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Printhead Cleaning Interval</strong></th>
<th>When Early Warning for Maintenance is enabled, set this value to the length of the media or ribbon roll that you are using.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>When the printhead reaches the set length, WARNING CLEAN PRINTHEAD appears on the control panel display. If the alert function is enabled, the printer generates an alert.</td>
</tr>
<tr>
<td><strong>Accepted values:</strong></td>
<td>0 M/0 FT to 450M/1476 FT in 50 M increments</td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong></td>
<td>^JH</td>
</tr>
<tr>
<td><strong>SGD command used:</strong></td>
<td>none</td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong></td>
<td>HEAD CLEANING on page 23</td>
</tr>
<tr>
<td><strong>Printer web page:</strong></td>
<td>View and Modify Printer Settings &gt; General Setup &gt; Head Cleaning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Printhead Life Expectancy</strong></th>
<th>When Early Warning for Maintenance is enabled, set this value to the number of inches of media that the printhead is expected to print.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>When the printhead reaches the set length, WARNING REPLACE HEAD appears on the control panel display. If the alert function is enabled, the printer generates an alert.</td>
</tr>
<tr>
<td><strong>Accepted values:</strong></td>
<td>0 M/0 FT to 450M/1476 FT in 50 M increments</td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong></td>
<td>^JH</td>
</tr>
<tr>
<td><strong>SGD command used:</strong></td>
<td>none</td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong></td>
<td>HEAD LIFE on page 23</td>
</tr>
<tr>
<td><strong>Printer web page:</strong></td>
<td>View and Modify Printer Settings &gt; General Setup &gt; Head Life</td>
</tr>
</tbody>
</table>
### Table 8 • Maintenance and Diagnostic Tools (Continued)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>ZPL Command(s)</th>
<th>SGD Commands</th>
<th>Control Panel Menu Item</th>
<th>Printer Web Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Resettable Counter</strong></td>
<td>The non-resettable counter gives the total length of media that the printer has printed. You can use firmware commands to change the unit of measure for this counter.</td>
<td>^MA (for changing unit of measure)</td>
<td>odometer.media_marker_count1, odometer.media_marker_count2</td>
<td>NONRESET CNTR on page 24</td>
<td>none</td>
</tr>
<tr>
<td><strong>User-Controlled Counters</strong></td>
<td>Two user-controlled counters give the total length of media that the printer has printed since the last time the counter was reset. You can use firmware commands to change the unit of measure and reset the counters.</td>
<td>^MA (for changing unit of measure), ~RO (for resetting counters)</td>
<td>none</td>
<td>RESET CNTR1 on page 24, RESET CNTR2 on page 24</td>
<td>none</td>
</tr>
<tr>
<td><strong>Print Counter Readings</strong></td>
<td>Prints a label that lists the odometer readings for the following:</td>
<td>~HQ</td>
<td>none</td>
<td>PRINT METERS on page 24</td>
<td>none</td>
</tr>
</tbody>
</table>
## Table 8 • Maintenance and Diagnostic Tools (Continued)

<table>
<thead>
<tr>
<th>Print Information</th>
<th>Print the specified information on one or more labels.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• FONTS—Prints the available fonts in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM or Flash memory.</td>
</tr>
<tr>
<td></td>
<td>• BAR CODES—Prints the available bar codes in the printer. Bar codes may be stored in RAM or Flash memory.</td>
</tr>
<tr>
<td></td>
<td>• IMAGES—Prints the available images stored in the printer’s RAM, Flash memory, or optional memory card.</td>
</tr>
<tr>
<td></td>
<td>• FORMATS—Prints the available formats stored in the printer’s RAM, Flash memory, or optional memory card.</td>
</tr>
<tr>
<td></td>
<td>• SETUP—Prints the printer configuration label.</td>
</tr>
<tr>
<td></td>
<td>• NETWORK—Prints the settings for any print server that is installed.</td>
</tr>
<tr>
<td></td>
<td>• ALL—Prints the previous six labels.</td>
</tr>
</tbody>
</table>

*Related ZPL command(s):* Printer configuration: ~WC  
Network: ~WL  
Others: ^WD

*SGD command used:* none

*Control panel menu item:*  
LIST FONTS on page 25  
LIST BAR CODES on page 25  
LIST IMAGES on page 25  
LIST FORMATS on page 25  
LIST SETUP on page 25  
LIST NETWORK on page 26  
LIST ALL on page 26

*Printer web page:* View and Modify Printer Settings > Print Listings on Label

<table>
<thead>
<tr>
<th>Print a Sensor Profile</th>
<th>Shows the sensor settings compared to actual sensor readings.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To interpret the results of the sensor profile, see <em>Sensor Profile</em> on page 156.</td>
</tr>
</tbody>
</table>

*Related ZPL command(s):* ~JG

*SGD command used:* none

*Control panel menu item:* SENSOR PROFILE on page 26

*Printer web page:* View and Modify Printer Settings > Print Listings on Label

<table>
<thead>
<tr>
<th>Initialize Flash Memory</th>
<th>This option erases all previously stored information from Flash memory.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Caution</strong> • This option completely erases the Flash memory.</td>
</tr>
</tbody>
</table>

*Related ZPL command(s):* ^JB

*SGD command used:* none

*Control panel menu item:* INIT FLASH MEM. on page 26

*Printer web page:* View and Modify Printer Settings > Advanced Setup > Format Memory
### Power-Up Action

Set the Power-Up Action

Set the action for the printer to take during the power-up sequence.

- **CALIBRATE** adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web.
- **FEED**—feeds the labels to the first registration point.
- **LENGTH** determines the label length using current sensor values, and feeds the media to the next web.
- **NO MOTION** tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web.
- **SHORT CAL** sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.

**Accepted values:**

- CALIBRATE
- FEED
- LENGTH
- NO MOTION
- SHORT CAL

**Related ZPL command(s):** ^MF

**SGD command used:** none

**Control panel menu item:** MEDIA POWER UP on page 29

**Printer web page:** View and Modify Printer Settings > Calibration

### Head-Close Action

Set the Head-Close Action

Set the action for the printer to take when you close the printhead.

- **CALIBRATE** adjusts sensor levels and thresholds, determines the label length, and feeds the media to the next web.
- **FEED**—feeds the labels to the first registration point.
- **LENGTH** determines the label length using current sensor values, and feeds the media to the next web.
- **NO MOTION** tells the printer not to move the media. You must manually ensure that the web is positioned correctly, or press feed to position the next web.
- **SHORT CAL** sets the media and web thresholds without adjusting sensor gain, determines the label length, and feeds the media to the next web.

**Accepted values:**

- CALIBRATE
- FEED
- LENGTH
- NO MOTION
- SHORT CAL

**Related ZPL command(s):** ^MF

**SGD command used:** none

**Control panel menu item:** HEAD CLOSE on page 30

**Printer web page:** View and Modify Printer Settings > Calibration
Table 8 • Maintenance and Diagnostic Tools (Continued)

<table>
<thead>
<tr>
<th>Load Defaults</th>
<th>Load Printer or Print Server Defaults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• FACTORY—Restores all printer settings other than the network settings back to the factory defaults. Use care when loading defaults because you will need to reload all settings that you changed manually.</td>
</tr>
<tr>
<td></td>
<td>• NETWORK—Reinitializes the printer’s wired or wireless print server. With a wireless print server, the printer will also reassociate with your wireless network.</td>
</tr>
<tr>
<td></td>
<td>• LAST SAVED—Loads settings from the last permanent save.</td>
</tr>
<tr>
<td></td>
<td>Accepted values: • FACTORY • NETWORK • LAST SAVED</td>
</tr>
<tr>
<td></td>
<td>Related ZPL command(s): Factory: ^JUF Network: ^JUN Last saved: ^JUR</td>
</tr>
<tr>
<td></td>
<td>SGD command used: none</td>
</tr>
<tr>
<td></td>
<td>Control panel menu item: Available as options when exiting Setup Mode. See Exit Setup Mode on page 19.</td>
</tr>
<tr>
<td></td>
<td>Control panel key(s): Factory: Hold FEED + PAUSE during printer power-up to reset the printer parameters to factory values. Network: Hold CANCEL + PAUSE during printer power-up to reset the network parameters to factory values. Last saved: N/A</td>
</tr>
<tr>
<td></td>
<td>Printer web page: Factory: View and Modify Printer Settings &gt; Restore Default Configuration Network: Print Server Settings &gt; Reset Print Server Last saved: View and Modify Printer Settings &gt; Restore Saved Configuration</td>
</tr>
</tbody>
</table>
## Table 8 • Maintenance and Diagnostic Tools (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Accepted values</th>
<th>Related ZPL command(s)</th>
<th>SGD command used</th>
<th>Control panel menu item</th>
<th>Control panel key(s)</th>
<th>Printer web page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media and Ribbon Sensor Calibration</td>
<td>Calibrate the printer to adjust the sensitivity of the media and ribbon sensors. For complete instructions on how to perform a calibration procedure, see <em>Calibrate the Ribbon and Media Sensors Manually</em> on page 106.</td>
<td>N/A</td>
<td><code>~JC</code></td>
<td>none</td>
<td>MEDIA AND RIBBON CALIBRATE on page 27</td>
<td>Hold PAUSE + FEED + CANCEL for 2 seconds to initiate calibration.</td>
<td>The calibration procedure cannot be initiated through the web pages. See the following web page for settings that are set during sensor calibration: View and Modify Printer Settings &gt; Calibration</td>
</tr>
<tr>
<td>Communication Diagnostics Mode</td>
<td>Use this diagnostics tool to cause the printer to output the hexadecimal values for all data received by the printer. For more information, see <em>Communication Diagnostics Test</em> on page 155.</td>
<td>DISABLED, ENABLED</td>
<td><code>~JD</code> to enable, <code>~JE</code> to disable</td>
<td>none</td>
<td>COMMUNICATIONS on page 28</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Format Conversion</td>
<td>Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second, the dpi to which you would like to scale.</td>
<td>NONE, 150 → 300, 150 → 600, 200 → 600, 300 → 600</td>
<td>none</td>
<td>none</td>
<td>FORMAT CONVERT on page 31</td>
<td></td>
<td>none</td>
</tr>
</tbody>
</table>
### Idle Display
Select the information shown on the printer’s display when the printer is idle.

*Accepted values:*
- FIRMWARE (FW) VERSION
- MM/DD/YY 24 HR
- M/DD/YY 12 HR
- DD/MM/YY 24 HR
- DD/MM/YY 12 HR

*Related ZPL command(s):* none

*SGD command used:* none

*Control panel menu item:* IDLE DISPLAY on page 32

*Printer web page:* N/A

### RTC Date
This parameter allows you to set the date to display in the Idle Display.

*Related ZPL command(s):* ^ST

*SGD command used:* none

*Control panel menu item:* RTC DATE on page 32

*Printer web page:* none

### RTC Time
This parameter allows you to set the time to display in the Idle Display.

*Related ZPL command(s):* ^ST

*SGD command used:* none

*Control panel menu item:* RTC TIME on page 32

*Printer web page:* none

### Password Level
This parameter allows you to select whether certain factory-selected menu items or all menu items are password protected.

*Accepted values:*
- SELECTED ITEMS
- ALL ITEMS

*Related ZPL command(s):* none

*SGD command used:* none

*Control panel menu item:* PASSWORD LEVEL on page 35

*Printer web page:* none

### Run a ZBI Program
If you have ZBI 2.0 installed, you may choose to run a ZBI program that you have downloaded to your printer.

*Accepted values:* N/A

*Related ZPL command(s):* ^JI, ~JI

*SGD command used:* zbi.control.run

*Control panel menu item:* Run the Specified ZBI Program* on page 32

*Printer web page:* Directory Listing
# Network Settings

## Table 9 • Network Settings

<table>
<thead>
<tr>
<th>Primary Network</th>
<th>Select the Primary Network Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>This parameter determines which device should be considered primary in the active device selection.</td>
<td></td>
</tr>
</tbody>
</table>
| **Accepted values:** | • WIRED  
| | • WIRELESS  |
| **Related ZPL command(s):** | ^NC  |
| **SGD command used:** | ip.primary_network  |
| **Control panel menu item:** | PRIMARY NETWORK on page 32  |
| **Printer web page:** | none  |

<table>
<thead>
<tr>
<th>Load from External Device</th>
<th>View if IP Settings Are Loaded from the Printer or Print Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>This parameter tells whether to use the printer’s or the print server’s LAN/WLAN settings at power-up. The default is to use the printer’s settings.</td>
<td></td>
</tr>
</tbody>
</table>
| **Accepted values:** | • YES  
| | • NO  |
| **Related ZPL command(s):** | ^NP  |
| **SGD command used:** | none  |
| **Control panel menu item:** | LOAD FROM EXT? on page 33  |
| **Printer web page:** | none  |

<table>
<thead>
<tr>
<th>Active Print Server</th>
<th>View the Active Print Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>This menu item displays which print server is being used. This tells which device’s settings such as IP protocol and IP address are being displayed under those menu items.</td>
<td></td>
</tr>
</tbody>
</table>
| **Accepted values:** | • WIRELESS indicates that the wireless print server is active.  
| | • INTERNAL WIRED indicates that the internal wired print server is active.  
| | • EXTERNAL WIRED indicates that an external wired print server is active.  
| | • NONE indicates that one of the network options is installed but is not active. When NONE is shown for this menu item, the device-specific items such as IP protocol and IP address will not display.  |
| **Related ZPL command(s):** | none  |
| **SGD command used:** | none  |
| **Control panel menu item:** | ACTIVE PRINTSRVR on page 33  |
| **Printer web page:** | none  |
### Table 9 • Network Settings (Continued)

<table>
<thead>
<tr>
<th>IP Protocol</th>
<th>Set the IP Resolution Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This parameter tells if the user (permanent) or the server (dynamic) selects the IP address. If a dynamic option is chosen, this parameter tells the method(s) by which the wired or wireless print server receives the IP address from the server.</td>
</tr>
<tr>
<td></td>
<td><strong>Accepted values:</strong></td>
</tr>
<tr>
<td></td>
<td>• ALL</td>
</tr>
<tr>
<td></td>
<td>• GLEANING ONLY</td>
</tr>
<tr>
<td></td>
<td>• RARP</td>
</tr>
<tr>
<td></td>
<td>• BOOTP</td>
</tr>
<tr>
<td></td>
<td>• DHCP</td>
</tr>
<tr>
<td></td>
<td>• DHCP &amp; BOOTP</td>
</tr>
<tr>
<td></td>
<td>• PERMANENT</td>
</tr>
<tr>
<td></td>
<td><strong>Related ZPL command(s):</strong> ^ND</td>
</tr>
<tr>
<td></td>
<td><strong>SGD command used:</strong> Wired: <code>internal_wired.ip.protocol</code></td>
</tr>
<tr>
<td></td>
<td><code>external_wired.ip.protocol</code></td>
</tr>
<tr>
<td></td>
<td>Wireless: <code>wlan.ip.protocol</code></td>
</tr>
<tr>
<td></td>
<td><strong>Control panel menu item:</strong> IP PROTOCOL on page 33</td>
</tr>
<tr>
<td></td>
<td><strong>Printer web page:</strong> View and Modify Printer Settings &gt; Network Communications Setup &gt; TCP/IP Settings &gt; IP Protocol</td>
</tr>
</tbody>
</table>

### IP Address

<table>
<thead>
<tr>
<th>View or Set the Printer’s IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>View and, if necessary, change the printer’s IP address.</td>
</tr>
<tr>
<td>Changes to this setting are saved only if IP PROTOCOL is set to PERMANENT. To allow any saved changes to take effect, reset the print server (see Reset Network on page 99).</td>
</tr>
<tr>
<td><strong>Accepted values:</strong> 000 to 255 for each field</td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong> ^ND</td>
</tr>
<tr>
<td><strong>SGD command used:</strong> Wired: <code>internal_wired.ip.addr</code></td>
</tr>
<tr>
<td><code>external_wired.ip.addr</code></td>
</tr>
<tr>
<td>Wireless: <code>ip.addr</code>, <code>wlan.ip.addr</code></td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong> IP ADDRESS on page 33</td>
</tr>
<tr>
<td><strong>Printer web page:</strong> View and Modify Printer Settings &gt; Network Communications Setup &gt; TCP/IP Settings &gt; IP Address</td>
</tr>
</tbody>
</table>
### Table 9 • Network Settings (Continued)

<table>
<thead>
<tr>
<th>Subnet Mask</th>
<th>View or Set the Subnet Mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>View and, if necessary, change the subnet mask. This menu item appears only if a wired or wireless print server is installed on your printer. To save changes to this setting, set IP PROTOCOL to PERMANENT, and then reset the print server (see <em>Reset Network</em> on page 99).</td>
<td></td>
</tr>
<tr>
<td><strong>Accepted values:</strong> 000 to 255 for each field</td>
<td></td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong> ^ND</td>
<td></td>
</tr>
<tr>
<td><strong>SGD command used:</strong> Wired: internal_wired.ip.netmask external_wired.ip.netmask Wireless: wlan.ip.netmask</td>
<td></td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong> SUBNET MASK on page 34</td>
<td></td>
</tr>
<tr>
<td><strong>Printer web page:</strong> View and Modify Printer Settings &gt; Network Communications Setup &gt; TCP/IP Settings &gt; Subnet Mask</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Default Gateway</th>
<th>View or Set the Default Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>View and, if necessary, change the default gateway. This menu item appears only if a wired or wireless print server is installed on your printer. To save changes to this setting, set IP PROTOCOL to PERMANENT, and then reset the print server (see <em>Reset Network</em> on page 99).</td>
<td></td>
</tr>
<tr>
<td><strong>Accepted values:</strong> 000 to 255 for each field</td>
<td></td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong> ^ND</td>
<td></td>
</tr>
<tr>
<td><strong>SGD command used:</strong> Wired: internal_wired.ip.gateway external_wired.ip.gateway Wireless: wlan.ip.gateway</td>
<td></td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong> DEFAULT GATEWAY on page 34</td>
<td></td>
</tr>
<tr>
<td><strong>Printer web page:</strong> View and Modify Printer Settings &gt; Network Communications Setup &gt; TCP/IP Settings &gt; Default Gateway</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAC Address</th>
<th>View the MAC Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>View the Media Access Control (MAC) address of the print server that is installed in the printer (wired or wireless).</td>
<td></td>
</tr>
<tr>
<td><strong>Accepted values:</strong> N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Related ZPL command(s):</strong> none</td>
<td></td>
</tr>
<tr>
<td><strong>SGD command used:</strong> Wired: internal_wired.mac_addr external_wired.mac_addr Wireless: wlan.mac_addr</td>
<td></td>
</tr>
<tr>
<td><strong>Control panel menu item:</strong> MAC ADDRESS on page 34</td>
<td></td>
</tr>
<tr>
<td><strong>Printer web page:</strong> none</td>
<td></td>
</tr>
</tbody>
</table>
Table 9 • Network Settings (Continued)

<table>
<thead>
<tr>
<th>ESSID</th>
<th>View the ESSID Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Extended Service Set Identification (ESSID) is an identifier for your wireless network. This setting, which cannot be modified from the control panel, gives the ESSID for the current wireless configuration.</td>
</tr>
<tr>
<td></td>
<td>Accepted values: 32-character alphanumeric string (default 125)</td>
</tr>
<tr>
<td></td>
<td>Related ZPL command(s): none</td>
</tr>
<tr>
<td></td>
<td>SGD command used: wlan.essid</td>
</tr>
<tr>
<td></td>
<td>Control panel menu item: ESSID on page 34</td>
</tr>
<tr>
<td></td>
<td>Printer web page: none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reset Network</th>
<th>This option resets the wired or wireless print server. You must reset the print server to allow any changes to the network settings to take effect.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accepted values: N/A</td>
</tr>
<tr>
<td></td>
<td>Related ZPL command(s): ~WR</td>
</tr>
<tr>
<td></td>
<td>SGD command used: device.reset</td>
</tr>
<tr>
<td></td>
<td>Control panel menu item: RESET NETWORK on page 35</td>
</tr>
<tr>
<td></td>
<td>Printer web page: Print Server Settings &gt; Factory Print Server Settings</td>
</tr>
</tbody>
</table>
## Language Settings

### Table 10 • Language Settings

| Language | If necessary, change the language that the printer displays. 
This change affects the words shown on the following:  
• status and error messages  
• the printer parameters  
• the printer configuration label, the network configuration label, and other labels that you can select to print through the user menus (This does not apply to Japanese, Korean, Simplified Chinese, or Traditional Chinese. Labels for those languages print in English.)  

**Note** • The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.  

| Accepted values: | ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, SPANISH 2, DUTCH, FINNISH, JAPANESE, KOREAN, SIMPLIFIED CHINESE, TRADITIONAL CHINESE, RUSSIAN, POLISH, CZECH, ROMANIAN  

| Related ZPL command(s): | ^KL  
| SGD command used: | none  
| Control panel menu item: | LANGUAGE on page 36  
| Printer web page: | View and Modify Printer Settings > General Setup > Language  

| Control Character | Set the Control Prefix Character Value  
The printer looks for this two-digit hex character to indicate the start of a ZPL/ZPL II control instruction.  
Set the control prefix character to match what is used in your label formats.  

| Accepted values: | 00 to FF  
| Related ZPL command(s): | ^CT or ~CT  
| SGD command used: | none  
| Control panel menu item: | CONTROL PREFIX on page 29  
| Printer web page: | View and Modify Printer Settings > ZPL Control  

## Table 10 • Language Settings (Continued)

<table>
<thead>
<tr>
<th>Command Character</th>
<th>Set the Format Command Prefix Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The format command prefix is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. The printer looks for this hex character to indicate the start of a ZPL/ZPL II format instruction.</strong> Set the format command prefix character to match what is used in your label formats. Important • You cannot use the same hex value for the format command prefix, control character, and delimiter characters. The printer must see different characters to work properly. If you are setting the value through the control panel, the printer will skip any value that is already in use.</td>
<td></td>
</tr>
<tr>
<td>Accepted values: 00 to FF</td>
<td></td>
</tr>
<tr>
<td>Related ZPL command(s): ^CC or ~CC</td>
<td></td>
</tr>
<tr>
<td>SGD command used: none</td>
<td></td>
</tr>
<tr>
<td>Control panel menu item: FORMAT PREFIX on page 29</td>
<td></td>
</tr>
<tr>
<td>Printer web page: View and Modify Printer Settings &gt; ZPL Control</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Delimiter Character</th>
<th>Set the Delimiter Character Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The delimiter character is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions.</strong> Set the delimiter character to match what is used in your label formats.</td>
<td></td>
</tr>
<tr>
<td>Accepted values: 00 to FF</td>
<td></td>
</tr>
<tr>
<td>Related ZPL command(s): ^CD or ~CD</td>
<td></td>
</tr>
<tr>
<td>SGD command used: none</td>
<td></td>
</tr>
<tr>
<td>Control panel menu item: DELIMITER CHAR on page 29</td>
<td></td>
</tr>
<tr>
<td>Printer web page: View and Modify Printer Settings &gt; ZPL Control</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZPL Mode</th>
<th>Set the ZPL Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Select the ZPL mode that matches what is used in your label formats.</strong> This printer accepts label formats written in either ZPL or ZPL II, eliminating the need to rewrite any ZPL formats that already exist. The printer remains in the selected mode until it is changed in one of the ways listed here.</td>
<td></td>
</tr>
<tr>
<td>Accepted values: • ZPL II • ZPL</td>
<td></td>
</tr>
<tr>
<td>Related ZPL command(s): ^SZ</td>
<td></td>
</tr>
<tr>
<td>SGD command used: none</td>
<td></td>
</tr>
<tr>
<td>Control panel menu item: ZPL MODE on page 29</td>
<td></td>
</tr>
<tr>
<td>Printer web page: View and Modify Printer Settings &gt; ZPL Control</td>
<td></td>
</tr>
</tbody>
</table>
## Sensor Settings

### Table 11 • Sensor Settings

<table>
<thead>
<tr>
<th>Sensor Type</th>
<th>Select the Media Sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select the media sensor that is appropriate for the media that you are using.</td>
</tr>
<tr>
<td></td>
<td><em>Accepted values:</em></td>
</tr>
<tr>
<td></td>
<td>• WEB</td>
</tr>
<tr>
<td></td>
<td>• MARK</td>
</tr>
<tr>
<td></td>
<td><em>Related ZPL command(s):</em></td>
</tr>
<tr>
<td></td>
<td>^JS</td>
</tr>
<tr>
<td></td>
<td><em>SGD command used:</em></td>
</tr>
<tr>
<td></td>
<td>none</td>
</tr>
<tr>
<td></td>
<td><em>Control panel menu item:</em></td>
</tr>
<tr>
<td></td>
<td>SENSOR TYPE on page 22</td>
</tr>
<tr>
<td></td>
<td><em>Printer web page:</em></td>
</tr>
<tr>
<td></td>
<td>View and Modify Printer Settings &gt; Media Setup</td>
</tr>
</tbody>
</table>
# Port Settings

## Table 12 • Port Settings

<table>
<thead>
<tr>
<th>Parallel Communications</th>
<th>Set Parallel Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select the communications port that matches the one being used by the host computer.</td>
</tr>
<tr>
<td></td>
<td><strong>Accepted values:</strong></td>
</tr>
<tr>
<td></td>
<td>• BIDIRECTIONAL</td>
</tr>
<tr>
<td></td>
<td>• UNIDIRECTIONAL</td>
</tr>
<tr>
<td></td>
<td><strong>Related ZPL command(s):</strong></td>
</tr>
<tr>
<td></td>
<td>none</td>
</tr>
<tr>
<td></td>
<td><strong>SGD command used:</strong></td>
</tr>
<tr>
<td></td>
<td>none</td>
</tr>
<tr>
<td></td>
<td><strong>Control panel menu item:</strong></td>
</tr>
<tr>
<td></td>
<td>PARRALEL COMM. on page 27</td>
</tr>
<tr>
<td></td>
<td><strong>Printer web page:</strong></td>
</tr>
<tr>
<td></td>
<td>View and Modify Printer Settings &gt; Serial Communications Setup</td>
</tr>
</tbody>
</table>

## Serial Communications

Set Serial Communications

Select the communications port that matches the one being used by the host computer.

- **Accepted values:**
  - RS232
  - RS422/485
  - RS485 MULTIDROP

**Note** • Select RS232 if you are using an external adapter to enable RS422/485 operation.

- **Related ZPL command(s):** none
- **SGD command used:** none
- **Control panel menu item:** SERIAL COMM. on page 27
- **Printer web page:** View and Modify Printer Settings > Serial Communications Setup > Serial Comm.
### Changing Printer Settings

#### Baud Rate

<table>
<thead>
<tr>
<th>Baud Rate</th>
<th>Set the Baud Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select the baud value that matches the one being used by the host computer.</td>
</tr>
</tbody>
</table>

- **Accepted values:**
  - 115200
  - 57600
  - 38400
  - 28800
  - 19200
  - 14400
  - 9600
  - 4800
  - 2400
  - 1200
  - 600
  - 300

*Related ZPL command(s):* `^SC`

*SGD command used:* `comm.baud`

*Control panel menu item:* **BAUD on page 27**

*Printer web page:* View and Modify Printer Settings > Serial Communications Setup > Baud

#### Data Bits

<table>
<thead>
<tr>
<th>Data Bits</th>
<th>Set the Data Bits Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select the data bits value that matches the one being used by the host computer.</td>
</tr>
</tbody>
</table>

- **Accepted values:**
  - 7
  - 8

*Related ZPL command(s):* `^SC`

*SGD command used:* `comm.data_bits`

*Control panel menu item:* **DATA BITS on page 27**

*Printer web page:* View and Modify Printer Settings > Serial Communications Setup > Data Bits

#### Parity

<table>
<thead>
<tr>
<th>Parity</th>
<th>Set the Parity Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select the parity value that matches the one being used by the host computer.</td>
</tr>
</tbody>
</table>

- **Accepted values:**
  - NONE
  - EVEN
  - ODD

*Related ZPL command(s):* `^SC`

*SGD command used:* `comm.parity`

*Control panel menu item:* **PARITY on page 28**

*Printer web page:* View and Modify Printer Settings > Serial Communications Setup > Parity
### Host Handshake

Set the Host Handshake Protocol Value  
Select the handshake protocol that matches the one being used by the host computer.

- **Accepted values:**  
  - XON/XOFF  
  - RTS/CTS  
  - DSR/DTR

- **Related ZPL command(s):** ^SC

- **SGD command used:** none

- **Control panel menu item:** HOST HANDSHAKE on page 28

- **Printer web page:** View and Modify Printer Settings > Serial Communications Setup > Host Handshake

### Protocol

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.

- **Accepted values:**  
  - NONE  
  - ZEBRA  
  - ACK_NAK

- **Note:** ZEBRA is the same as ACK_NAK, except that ZEBRA response messages are sequenced. If ZEBRA is selected, the printer must use DSR/DTR for host handshake protocol.

- **Related ZPL command(s):** ^SC

- **SGD command used:** none

- **Control panel menu item:** PROTOCOL on page 28

- **Printer web page:** View and Modify Printer Settings > Serial Communications Setup > Protocol

### Network ID

This parameter assigns a unique number to the printer when the printer is operating in an RS422/485 multi-drop network environment (an external RS422/485 adapter is required). This gives the host computer the means to address a specific printer. This does not affect TCP/IP or IPX networks. Set a unique network ID number for this printer.

- **Accepted values:** 000 to 999

- **Related ZPL command(s):** ^NI

- **SGD command used:** none

- **Control panel menu item:** NETWORK ID on page 28

- **Printer web page:** View and Modify Printer Settings > Serial Communications Setup > Network ID
Calibrate the Ribbon and Media Sensors Manually

Use the calibration procedure in this section when necessary to calibrate the printer based on the media and ribbon that you are currently using. Manual calibration is recommended whenever you are using pre-printed labels (or label backing) or if the printer will not correctly auto calibrate.

- For issues that may be resolved by sensor calibration, see Printing Issues on page 136.
- For a summary of the options for initiating calibration, see Media and Ribbon Sensor Calibration on page 94.

**Important** • Follow the calibration procedure exactly as presented. All of the steps must be performed even if only one of the sensors requires adjustment. You may press and hold CANCEL at any step in this procedure to cancel the process.

**To perform sensor calibration, complete these steps:**

1. With the printer in the Ready state, initiate media and ribbon calibration through the printer’s display:
   a. Navigate to the following parameter. See Control Panel Display on page 17 for information about using the control panel.

   ![Control Panel Display](image)

   MEDIA AND RIBBON CALIBRATE

   b. Press RIGHT SELECT to select START.

   The printer does the following:

   - The STATUS light and SUPPLIES light flash yellow once.
   - The PAUSE light blinks yellow.
   - The control panel displays:

   LOAD BACKING
2. Raise the media door.

3. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

   Rotate the printhead-open lever (1) to the open position.
Calibrate the Ribbon and Media Sensors Manually

4. What type of media are you using? For more information, see *Types of Media* on page 47.

<table>
<thead>
<tr>
<th>If you are using...</th>
<th>Then...</th>
</tr>
</thead>
</table>
| Media where labels are separated by gaps | a. Set the sensor type to WEB. (See *Sensor Type* on page 102.)  
b. Extend approximately 8in. (203 mm) of media out of the printer.  
c. Remove and discard the labels from this exposed media.  
d. Pull the backing into the printer. |
5. Press PLUS (+) to continue.
   The control panel displays:

   **REMOVE RIBBON**

6. Remove the ribbon (if used).

7. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.

<table>
<thead>
<tr>
<th>If you are using...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black mark media</td>
<td>a. Set the sensor type to MARK. (See <em>Sensor Type on page 102.</em>)</td>
</tr>
<tr>
<td></td>
<td>b. Position a black mark over the red light from the black mark media sensor.</td>
</tr>
<tr>
<td>Media where labels are separated by holes or notches</td>
<td>a. Remove the media from between the media sensors.</td>
</tr>
</tbody>
</table>
8. Press **PAUSE** to begin the media calibration process.

   The control panel displays:

   **CALIBRATING**
   **PLEASE WAIT**

   When the process is complete, the control panel displays:

   **RELOAD ALL**

9. Rotate the printhead-open lever (1) to the open position.

10. Reload the media and ribbon (if used). With preprinted or black mark media, make sure that an area without preprinting or without a black mark is over the media sensor.

11. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.
12. Close the media door.

13. Press PAUSE to enable printing.

The printer completes calibration and feeds labels until they come to rest in the appropriate spot for printing.
Remove Used Ribbon

Remove used ribbon from the ribbon take-up spindle each time you change the roll of ribbon.

To remove used ribbon, complete these steps:

1. Has the ribbon run out?

<table>
<thead>
<tr>
<th>If the ribbon...</th>
<th>Then</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ran out</td>
<td>Continue with the next step.</td>
</tr>
<tr>
<td>Did not run out</td>
<td>Cut or break the ribbon before the ribbon take-up spindle.</td>
</tr>
</tbody>
</table>

2. While holding the ribbon take-up spindle, turn the ribbon release knob clockwise until it stops.

The ribbon release bars pivot down, easing the spindle’s grip on the used ribbon.

3. Slide the used ribbon off of the ribbon take-up spindle and discard.
Remove Media or Liner from the Rewind Spindle

Rewind mode uses the rewind spindle to wind media, while Peel-Off mode uses the rewind spindle to wind used liner. Remove the media or the liner from the rewind spindle each time that you change media.

**Important** • It is **not** necessary to turn off the power to remove media or liner from the rewind spindle. If power is turned off, all label formats and images, as well as any temporarily saved parameter settings stored in the printer’s internal memory, are lost. When power is turned back on, these items must be reloaded.

To remove media or liner from the rewind spindle, complete these steps:

1. Has the media run out?

<table>
<thead>
<tr>
<th>If...</th>
<th>Then...</th>
</tr>
</thead>
</table>
| No    | a. Create slack in the media or liner by rotating the rewind spindle slightly clockwise.  
      | b. Cut or tear the media or liner at the rewind spindle. |
| Yes   | Continue with the next step. |
2. Pull out the spindle hook.

3. Slide the media or liner off of the rewind spindle.
Adjust Transmissive Media Sensors

The transmissive media sensor assembly consists of two parts: a light source and a light sensor. The lower media sensor is the light source, and the upper media sensor is the light sensor. The media passes between the two parts.

Adjust these sensors only when the printer cannot detect the top of the labels. In this situation, the control panel LCD displays **ERROR CONDITION PAPER OUT**, even though there are labels loaded in the printer. For non-continuous media with a notch or hole in the media, the sensor must be directly above the notch or hole.

Upper Media Sensor

The upper media sensor can be positioned along the inner portion of the media (the side closest to the back frame of the printer) or the outer portion of the media (the side farthest from the back frame of the printer). Moving the media sensor to the outer portion of the media should be performed only by a qualified service technician.

**To reposition the upper media sensor along the inside portion of the media, complete these steps:**

1. Remove the ribbon (if ribbon is used).

2. Locate the upper media sensor adjustment screw (1). The upper media sensor eye is directly below the adjustment screw head.
3. Using a thin, flat-blade screwdriver, loosen the upper media sensor adjustment screw.

4. Slide the upper media sensor along the slot to the desired position.
5. Tighten the adjustment screw to secure the upper media sensor in its new position.

6. Adjust the lower media sensor to match the new position of the upper media sensor. See *Lower Media Sensor* on page 118.
Lower Media Sensor

After you adjust the upper media sensor, adjust the lower media sensor to match its new position.

**To adjust the lower media sensor, complete these steps:**

1. Locate the lower media sensor assembly under the rear roller. The sensor is a spring clip holding a circuit board.

2. Slide the lower sensor until it is under the upper media sensor. Use the light that shines from the lower sensor to help align it with the upper sensor. Gently pull the wires as needed (wires should have a little slack).
Adjust Printhead Pressure and Toggle Position

Print quality depends on the labels and ribbon used as well as the toggle pressure and position. Make sure that your labels and ribbon are acceptable for your application. If they are, check the toggle position and then the printhead pressure.

Toggle Position Adjustment

You may need to adjust the toggles if printing is too light on one side or if thick labels are used. If the toggle pressure is too light or uneven, the labels and ribbon may slip.

To position the toggles, complete these steps:

1. Print some labels at 2 in. (51 mm) per second by running the PAUSE Self Test (see PAUSE Self Test on page 150).

2. While printing labels, use the control panel to lower the darkness setting until the labels are printing gray instead of black (see Print Darkness on page 83).

3. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

   Loosen the locking nut at the top of each toggle assembly.

4. Position the toggles approximately 1/4 of the way in from each edge of the media. (For extremely narrow media, position one toggle over the center of the labels, and decrease the pressure on the unused toggle.)
5. Tighten the locking nuts.

6. Print additional labels at 2 in. (51 mm) per second by again running the PAUSE Self Test. (Press and hold PAUSE while turning on (I) the printer.)

7. Do both sides of the label print at the same level of gray?

<table>
<thead>
<tr>
<th>If…</th>
<th>Then…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>The toggles are positioned correctly. Increase the darkness setting to the optimum level for the media being used.</td>
</tr>
</tbody>
</table>
| No   | a. Readjust the position of the toggle or toggles toward the side that printed lighter.  
b. Print additional labels at 2 in. (51 mm) per second by again running the PAUSE Self Test. (Press and hold PAUSE while turning on (I) the printer.)  
c. Repeat this step until both sides of the label print at the same level of gray.  
d. Increase the darkness setting to the optimum level for the media being used. |
Printhead Pressure Adjustment

If positioning the toggles properly does not solve a print quality problem, try adjusting the printhead pressure. Maximize printhead life by using the lowest pressure that produces the desired print quality.

Caution • Observe proper electrostatic safety precautions when handling any static-sensitive components such as circuit boards and printheads.

To adjust printhead pressure, complete these steps:

Before adjusting the printhead pressure, check that the toggles are positioned correctly. See Toggle Position Adjustment on page 119.

Printhead life and drive system life (belts and bearings) can be maximized by using the lowest pressure that produces the desired print quality without allowing the ribbon or media to slip. You may need to adjust the printhead pressure in the following instances:

• if there is noticeable bleed or swelling in the printed image (too much pressure)
• if there are voids (too little pressure)
• if the darkness setting (burn duration) is set properly, but printing is too light (too little pressure)
• if the ribbon slips (too little pressure)

Caution • Observe proper electrostatic safety precautions when handling any static-sensitive components such as circuit boards and printheads.

To adjust printhead pressure, complete these steps:

1. As needed throughout this procedure, refer to the PAUSE Self Test on page 150 to print test labels.

2. Refer to Print Darkness on page 83 to set the darkness value (burn duration) appropriately for your media and ribbon.

3. Loosen the locking nut on the toggle assemblies.
4. **Caution** • The printhead may be hot and could cause severe burns. Allow the printhead to cool.

Move the adjusting nut until the print quality is acceptable. Use the lowest pressure that provides the desired print quality.

- To increase printhead pressure, move the adjusting nut downward.
- To decrease printhead pressure, move the adjusting nut upward.

5. To lock the toggle pressure, tighten the locking nut against the adjusting nut.
Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Contents

Replacing Printer Components .......................................................... 124
Ordering Replacement Parts ............................................................. 124
Recycling Printer Components ......................................................... 124
Lubrication ....................................................................................... 124
Cleaning Schedule and Procedures ................................................... 125
Clean the Exterior ............................................................................ 125
Clean the Media Compartment ......................................................... 126
Clean the Printhead and Platen Roller .............................................. 126
Clean the Sensors .......................................................................... 128
Clean the Snap Plate ....................................................................... 130
Clean the Cutter ............................................................................. 134
Replacing Printer Components

Some printer components, such as the printhead and platen roller, may wear out over time and can be replaced easily. Regular cleaning may extend the life of some of these components. See Cleaning Schedule and Procedures on page 125 for the recommended cleaning intervals.

Ordering Replacement Parts

For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of genuine Zebra™ supplies as part of the total solution.

Contact your authorized Zebra reseller for part ordering information, or see http://www.zebra.com/support.

Recycling Printer Components

The majority of this printer’s components are recyclable. The printer’s main logic board includes a battery that you should dispose of properly.

Do not dispose of any printer components in unsorted municipal waste. Please dispose of the battery according to your local regulations, and recycle the other printer components according to your local standards. For more information, see http://www.zebra.com/environment.

Lubrication

Other than lubricating the cutter blade after approximately 60,000 cuts, no lubrication is needed for this printer.

Caution • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

Caution • Some commercially available lubricants will damage the finish and the mechanical parts if used inappropriately on this printer.
Cleaning Schedule and Procedures

Cleaning your printer regularly maintains print quality and may extend the life of the printer. The recommended cleaning schedule is shown in Table 13. See the following pages for specific procedures.

**Caution** • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

**Caution** • Use only the cleaning agents indicated. Zebra is not responsible for damage caused by any other fluids being used on this printer.

### Table 13 • Recommended Printer Cleaning Schedule

<table>
<thead>
<tr>
<th>Area</th>
<th>Method</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printhead</td>
<td>Solvent*</td>
<td>Perform these procedures at the following times:</td>
</tr>
<tr>
<td>Platen roller</td>
<td>Solvent*</td>
<td>• When <strong>CLEAN HEAD NOW</strong> appears.</td>
</tr>
<tr>
<td>Transmissive (media) sensor</td>
<td>Air blow†</td>
<td>• <strong>Direct Thermal Print Mode</strong>: After every roll of labels or 500 ft (150 m) of fanfold labels.</td>
</tr>
<tr>
<td>Black mark sensor</td>
<td>Air blow†</td>
<td>• <strong>Thermal Transfer Print Mode</strong>: After every roll (1500 ft or 450 m) of ribbon.</td>
</tr>
<tr>
<td>Media path</td>
<td>Solvent*</td>
<td>Every 6 months, or as needed</td>
</tr>
<tr>
<td>Ribbon sensor</td>
<td>Air blow</td>
<td></td>
</tr>
<tr>
<td>Label-available sensors</td>
<td>Air blow</td>
<td></td>
</tr>
<tr>
<td>Tear-off/peel-off bar</td>
<td>Solvent*</td>
<td>As needed</td>
</tr>
<tr>
<td>Snap plate</td>
<td>Solvent*</td>
<td></td>
</tr>
<tr>
<td>Cutter</td>
<td>Solvent*</td>
<td></td>
</tr>
</tbody>
</table>

* Zebra recommends using Preventive Maintenance Kit (part number 47362). In place of this kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%).

† If using canned air, it is recommended that you turn off the printer before cleaning.

### Clean the Exterior

Clean the outside surfaces of the printer with a lint-free cloth. Use a mild detergent solution or desktop cleaner sparingly, as needed.

**Caution** • Do not use harsh or abrasive cleaning agents or solvents.
Clean the Media Compartment

After every four rolls of media, inspect the media compartment. Use a soft bristle brush or a vacuum cleaner to remove any dirt and lint from the interior of the printer.

Clean the Printhead and Platen Roller

If print quality does not improve after you perform this procedure, clean the printhead with Save-a-Printhead cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller or distributor for more information.

Clean the printhead after every roll (1500 feet or 450 m) of thermal transfer ribbon or after every roll (500 feet or 150 m) of direct thermal labels or when CLEAN HEAD NOW appears on the LCD. Clean the printhead more often if you see inconsistent print quality, such as voids in the bar code or graphics.

---

Caution • The printhead may be hot and can cause severe burns. Allow the printhead to cool.

Caution • Before touching the printhead assembly, discharge any built-up static electricity by touching the metal printer frame or by using an anti-static wriststrap and mat.

Caution • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead. You are not required to turn off the printer power when working near an open printhead, but Zebra recommends it as a precaution. If you turn off the power, you will lose all temporary settings, such as label formats, and you must reload them before you resume printing.

To clean the printhead and platen roller, complete these steps:

1. Open the printhead assembly by rotating the printhead-open lever (1).
2. Remove the media and ribbon (if loaded).

3. Using the swab from the Preventive Maintenance Kit (part number 47362), wipe along the brown strip on the printhead assembly from end to end. In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.

4. While manually rotating the platen roller, clean it thoroughly with the swab. Allow the solvent to evaporate.

5. Reload the media and the ribbon (if required).

6. Push down the printhead assembly (1), and then rotate the printhead-open lever (2) until it locks into place.
Clean the Sensors

Brush or vacuum any accumulated paper lint and dust off the sensors. Clean the sensors according to the recommendations in Cleaning Schedule and Procedures on page 125.

Ribbon and Label-Available Sensor Locations

The ribbon sensor and optional label-available sensor are shown in Figure 9.

Figure 9 • Sensor Locations

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Label-available sensors</td>
</tr>
<tr>
<td>2</td>
<td>Black mark sensor</td>
</tr>
<tr>
<td>3</td>
<td>Ribbon sensor</td>
</tr>
</tbody>
</table>
Transmissive Media Sensor

The upper and lower transmissive media sensors are show in Figure 10 and Figure 11.

**Figure 10 • Upper Media Sensor**

1 Upper media sensor adjustment screw

**Figure 11 • Lower Media Sensor**
Clean the Snap Plate

Clean the snap plate when label adhesive or a label is stuck to the underside. Figure 12 shows the location of the snap plate.

![Snap Plate Location](image)

**Important** • Be careful not to bend or twist the metal snap plate as you remove it from or insert it into the printer.

**To clean the snap plate, complete these steps:**

1. **Caution** • Turn off (O) the printer and disconnect it from the power source before performing the following procedure.

   Turn off (O) the printer, and disconnect the AC power cord and all data cables.

2. **Caution** • While performing any tasks near an open printhead, remove all rings, watches, hanging necklaces, identification badges, or other metallic objects that could touch the printhead.

   Open the printhead and remove the media and ribbon (if used).
3. Insert a small-blade screwdriver or similar tool into the loop on the left side of the snap plate. Gently lift the left side of the snap plate slightly and, if necessary, support it with your left hand.

**Important** • Take care not to bend, twist, or otherwise deform the loops. If the snap plate is damaged in any way, you may need a new plate for proper ribbon sensing.

4. Insert the small-blade screwdriver or similar tool into the loop on the right side of the snap plate. Gently lift the right side of the snap plate.
5. Remove the snap plate from the printer.

6. Using the swab from the Preventive Maintenance Kit (part number 47362), clean the back of the snap plate. In place of the Preventive Maintenance Kit, you may use a clean swab or soft cloth dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.

7. To reinstall the snap plate, insert the two tabs on the bottom of the snap plate into the two slots of the media path.
8. Press down on the loops to lock the snap plate into place.

9. Reinstall the media and ribbon (if used).

10. Reconnect the data cables and AC power cord, and turn on (I) the printer.
Clean the Cutter

If the cutter is not cutting the labels cleanly or if it jams with labels, clean the cutter.

Caution • The cutter blade is sharp. Do not touch or rub the blade with your fingers.

To clean the cutter, complete these steps:

1. Caution • Turn off (O) the printer and disconnect it from the power source before performing the following procedure.

   Turn off (O) the printer, and disconnect the AC power cord and all data cables.

2. Using the swab from the Preventive Maintenance Kit (part number 47362), clean the stationary cutter blade. In place of the Preventive Maintenance Kit, you may use a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%). Allow the solvent to evaporate.

3. If cleaning does not remove label fragments and adhesive, contact an authorized service technician.

4. Reconnect the data cables and AC power cord, and turn on (I) the printer.
Troubleshooting

This section provides information about errors that you might need to troubleshoot. Assorted diagnostic tests are included.

Contents

Printing Issues ...................................................... 136
Error Messages .................................................... 139
Calibration Problems ............................................. 144
Communications Problems ..................................... 145
Ribbon Problems ................................................... 146
Miscellaneous Issues ............................................. 147
Printer Diagnostics ............................................... 148
  Power-On Self Test ............................................. 148
  CANCEL Self Test ............................................ 149
  PAUSE Self Test .............................................. 150
  FEED Self Test ............................................... 151
  FEED + PAUSE Self Test ..................................... 154
  Communication Diagnostics Test ......................... 155
  Sensor Profile ............................................... 156
# Printing Issues

Table 14 identifies possible issues with printing or print quality, the possible causes, and the recommended solutions.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General print quality issues</strong></td>
<td>The printer is set at an incorrect print speed.</td>
<td>For optimal print quality, set the print speed to the lowest possible setting for your application via control panel, the driver, or the software. You may want to perform the <em>FEED Self Test on page 151</em> to determine the optimal settings for your printer. See <em>Print Speed on page 83</em> for how to change the print speed.</td>
</tr>
</tbody>
</table>
| You are using an incorrect combination of labels and ribbon for your application. | 1. Switch to a different type of media or ribbon to try to find a compatible combination.  
2. If necessary, consult your authorized Zebra reseller or distributor for information and advice. |                                                                                      |
| The printer is set at an incorrect darkness level. | For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the *FEED Self Test on page 151* to determine the ideal darkness setting.  
See *Print Darkness on page 83* for how to change the darkness setting. |                                                                                      |
| The printhead is dirty. | Clean the printhead. See *Clean the Printhead and Platen Roller on page 126.* |                                                                                      |
| Incorrect or uneven printhead pressure. | 1. Position the printhead toggles correctly. See *Toggle Position Adjustment on page 119.*  
2. Set the printhead pressure to the minimum needed for good print quality. See *Printhead Pressure Adjustment on page 121.* |                                                                                      |
| **Loss of printing registration on labels.**  
Excessive vertical drift in top-of-form registration. | The platen roller, pinch roller, or peel roller is dirty. | Clean the printhead and rollers. See *Clean the Printhead and Platen Roller on page 126.* |
<p>| Media guides are positioned improperly. | Ensure that the media guides are properly positioned. See <em>Load the Ribbon on page 54.</em> |                                                                                      |
| The media type is set incorrectly. | Set the printer for the correct media type (gap/notch, continuous, or mark). See <em>Media Type on page 85.</em> |                                                                                      |
| The media is loaded incorrectly. | Load media correctly. See <em>Load the Ribbon on page 54.</em> |                                                                                      |</p>
<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long tracks of missing print on several labels</td>
<td>Print element damaged.</td>
<td>Call a service technician.</td>
</tr>
<tr>
<td></td>
<td>Wrinkled ribbon.</td>
<td>See wrinkled ribbon causes and solutions in <em>Ribbon Problems</em> on page 146.</td>
</tr>
<tr>
<td>Fine, angular gray lines on blank labels</td>
<td>Wrinkled ribbon.</td>
<td>See wrinkled ribbon causes and solutions in <em>Ribbon Problems</em> on page 146.</td>
</tr>
<tr>
<td>Printing too light or too dark over the entire label</td>
<td>The media or ribbon is not designed for high-speed operation.</td>
<td>Replace supplies with those recommended for high-speed operation.</td>
</tr>
<tr>
<td></td>
<td>You are using an incorrect combination of media and ribbon for your application.</td>
<td>1. Switch to a different type of media or ribbon to try to find a compatible combination. 2. If necessary, consult your authorized Zebra reseller or distributor for information and advice.</td>
</tr>
<tr>
<td></td>
<td>You are using ribbon with direct thermal media.</td>
<td>Direct thermal media does not require ribbon. To determine if you are using direct thermal media, perform the label scratch test in <em>When to Use Ribbon</em> on page 49.</td>
</tr>
<tr>
<td></td>
<td>Incorrect or uneven printhead pressure.</td>
<td>1. Position the printhead toggles correctly. See <em>Toggle Position Adjustment</em> on page 119. 2. Set the printhead pressure to the minimum needed for good print quality. See <em>Printhead Pressure Adjustment</em> on page 121.</td>
</tr>
<tr>
<td>Smudge marks on labels</td>
<td>The media or ribbon is not designed for high-speed operation.</td>
<td>Replace supplies with those recommended for high-speed operation.</td>
</tr>
<tr>
<td>Misregistration/skips labels</td>
<td>The printer is not calibrated.</td>
<td>Calibrate the printer. See <em>Calibrate the Ribbon and Media Sensors Manually</em> on page 106.</td>
</tr>
<tr>
<td></td>
<td>Improper label format.</td>
<td>Check your label format and correct it as necessary.</td>
</tr>
<tr>
<td>Misregistration and misprint of one to three labels</td>
<td>The platen roller, pinch roller, or peel roller is dirty.</td>
<td>Clean the printhead and rollers. See <em>Clean the Printhead and Platen Roller</em> on page 126.</td>
</tr>
<tr>
<td></td>
<td>Media does not meet specifications.</td>
<td>Use media that meets specifications. See <em>Media Specifications</em> on page 164.</td>
</tr>
<tr>
<td>Vertical drift in top-of-form position</td>
<td>The printer is out of calibration.</td>
<td>Calibrate the printer. See <em>Calibrate the Ribbon and Media Sensors Manually</em> on page 106.</td>
</tr>
<tr>
<td></td>
<td>The platen roller, pinch roller, or peel roller is dirty.</td>
<td>Clean the printhead and rollers. See <em>Clean the Printhead and Platen Roller</em> on page 126.</td>
</tr>
</tbody>
</table>
### Table 14 • Printing Issues (Continued)

<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vertical image or label drift</strong></td>
<td>The printer is using non-continuous labels but is configured in continuous mode.</td>
<td>Set the printer for the correct media type (gap/notch, continuous, or mark)—see Media Type on page 85 and calibrate the printer, if necessary (see Calibrate the Ribbon and Media Sensors Manually on page 106).</td>
</tr>
<tr>
<td></td>
<td>The media sensor is calibrated improperly.</td>
<td>Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106.</td>
</tr>
<tr>
<td></td>
<td>The platen roller, pinch roller, or peel roller is dirty.</td>
<td>Clean the printhead and rollers. See Clean the Printhead and Platen Roller on page 126.</td>
</tr>
</tbody>
</table>
|                              | Incorrect or uneven printhead pressure.                                          | 1. Position the printhead toggles correctly. See Toggle Position Adjustment on page 119.  
                                    |                                                                                       | 2. Set the printhead pressure to the minimum needed for good print quality. See Printhead Pressure Adjustment on page 121. |
|                              | The media or ribbon is loaded incorrectly.                                       | Ensure that the media and ribbon are loaded correctly. See Load the Ribbon on page 54. |
|                              | Incompatible media.                                                             | You must use media that meets the printer specifications. Ensure that the interlabel gaps or notches are 2 to 4 mm and consistently placed (see Media Specifications on page 164). |
| **The bar code printed on a label does not scan.** | The bar code is not within specifications because the print is too light or too dark. | Perform the FEED Self Test on page 151. Adjust the darkness or print speed settings as necessary. |
|                              | There is not enough blank space around the bar code.                            | Leave at least 1/8 in. (3.2 mm) between the bar code and other printed areas on the label and between the bar code and the edge of the label. |
| **Auto Calibrate failed.**   | The media or ribbon is loaded incorrectly.                                       | Ensure that the media and ribbon are loaded correctly. See Load the Ribbon on page 54. |
|                              | The sensors could not detect the media or ribbon.                               | Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106. |
|                              | The sensors are dirty or positioned improperly.                                 | Ensure that the sensors are clean and properly positioned. |
|                              | The media type is set incorrectly.                                              | Set the printer for the correct media type (gap/notch, continuous, or mark). See Media Type on page 85. |
### Error Messages

The control panel displays messages when there is an error. See Table 15 for LCD errors, the possible causes, and the recommended solutions.

<table>
<thead>
<tr>
<th>Display/Printer Condition</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Image] ERROR CONDITION INVALID HEAD</td>
<td>The printhead was replaced with one that is not a genuine Zebra™ printhead.</td>
<td>Install a genuine Zebra™ printhead.</td>
</tr>
<tr>
<td></td>
<td>The ERROR light flashes.</td>
<td></td>
</tr>
</tbody>
</table>
| [Image] WARNING CLEAN PRINthead | The Early Warning for Maintenance feature is enabled, and the printhead has reached the end of the specified interval for cleaning. See Early Warning for Maintenance on page 89 for more information. | 1. Clean the printhead.  
2. On the control panel, go to the HEAD CLEANED? menu item.  
3. Press PLUS to select YES to reset the Early Warning for Maintenance printhead cleaning counter. |
|                           | The printhead is not fully closed.                                             | Close printhead completely.                                                         |
| [Image] ERROR CONDITION HEAD OPEN | The printhead is not fully closed.                                             | Close printhead completely.                                                         |
|                           | The printhead is not fully closed.                                             | Close printhead completely.                                                         |
| [Image] ERROR CONDITION PAPER OUT | The printhead is not fully closed.                                             | Close printhead completely.                                                         |
|                           | The printhead is not fully closed.                                             | Close printhead completely.                                                         |
Table 15 • Error Messages (Continued)

<table>
<thead>
<tr>
<th>Display/Printer Condition</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>In thermal transfer mode, ribbon is not loaded or incorrectly loaded.</td>
<td>Load ribbon correctly. See Load the Ribbon on page 54.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>In thermal transfer mode, the ribbon sensor is not detecting ribbon.</td>
<td>1. Load ribbon correctly. See Load the Ribbon on page 54.</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td>In thermal transfer mode, media is blocking the ribbon sensor.</td>
<td>2. Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106.</td>
</tr>
<tr>
<td><img src="image4.png" alt="Image" /></td>
<td>In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.</td>
<td>1. Print a sensor profile. See Print a Sensor Profile on page 91. The ribbon out threshold (1) is likely too high, above the black area that indicates where the ribbon is detected (2).</td>
</tr>
<tr>
<td><img src="image5.png" alt="Image" /></td>
<td>If you are using direct thermal media, the printer is waiting for ribbon to be loaded because it is incorrectly set for Thermal Transfer mode.</td>
<td>Set the printer for Direct Thermal mode. See Print Method on page 85.</td>
</tr>
<tr>
<td><img src="image6.png" alt="Image" /></td>
<td>Ribbon is loaded, but the printer is set for direct thermal mode.</td>
<td>Ribbon is not required with direct thermal media. If you are using direct thermal media, remove the ribbon. This error message will not affect printing.</td>
</tr>
<tr>
<td><img src="image7.png" alt="Image" /></td>
<td>If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See Print Method on page 85.</td>
<td></td>
</tr>
</tbody>
</table>
Table 15 • Error Messages (Continued)

<table>
<thead>
<tr>
<th>Display/Printer Condition</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="THERMISTOR FAULT" /></td>
<td>The printhead has a faulty thermistor.</td>
<td>Call a service technician.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING HEAD COLD" /></td>
<td>The printhead temperature is approaching its lower operating limit.</td>
<td>Continue printing while the printhead reaches the correct operating temperature. If the error remains, the environment may be too cold for proper printing. Relocate the printer to a warmer area.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING HEAD TOO HOT" /></td>
<td>The printhead data cable is not properly connected.</td>
<td>Caution • Turn off (O) the printer before performing this procedure. Failure to do so can damage the printhead. 1. Turn off (O) the printer. 2. Disconnect and reconnect the data cable to the printhead. 3. Ensure that the cable connector is fully inserted into the printhead connector. 4. Turn on (I) the printer.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING HEAD TOO HOT" /></td>
<td>The printhead has a faulty thermistor.</td>
<td>Call a service technician.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING HEAD TOO HOT" /></td>
<td>The printhead is over temperature.</td>
<td>Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature.</td>
</tr>
</tbody>
</table>
The printer stops; the ERROR light is on; the printer cycles through these three messages.

Caution • An improperly connected printhead data or power cable can cause these error messages. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.

The printhead data cable is not properly connected.

Caution • Turn off (O) the printer before performing this procedure. Failure to do so can damage the printhead.
1. Turn off (O) the printer.
2. Disconnect and reconnect the data cable to the printhead.
3. Ensure that the cable connector is fully inserted into the printhead connector.
4. Turn on (I) the printer.

The printhead has a faulty thermistor.

Call a service technician.

The printer is defragmenting memory.

Caution • Do NOT turn off the printer power during defragmenting. Doing so can damage the printer.

Allow the printer to finish defragmenting. If you get this error message frequently, check your label formats. Formats that write to and erase memory frequently may cause the printer to defragment often. Using properly coded label formats usually minimizes the need for defragmenting. If this error message does not go away, contact Technical Support. The printer requires service.
There is not enough memory to perform the function specified on the second line of the error message.

Free up some of the printer’s memory by adjusting the label format or printer parameters. One way to free up memory is to adjust the print width to the actual width of the label instead of leaving the print width set to the default. See Print Width on page 85.

Ensure that the device, such as a FLASH memory card, is installed and not write protected or full.

Ensure that the data is not directed to a device that is not installed or is unavailable.

Call a service technician.

<table>
<thead>
<tr>
<th>Display/Printer Condition</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT OF MEMORY CREATING BITMAP</td>
<td>There is not enough memory to perform the function specified on the second line of the error message.</td>
<td>Free up some of the printer’s memory by adjusting the label format or printer parameters. One way to free up memory is to adjust the print width to the actual width of the label instead of leaving the print width set to the default. See Print Width on page 85.</td>
</tr>
<tr>
<td>OUT OF MEMORY BUILDING FORMAT</td>
<td></td>
<td>Ensure that the device, such as a FLASH memory card, is installed and not write protected or full.</td>
</tr>
<tr>
<td>OUT OF MEMORY STORING GRAPHIC</td>
<td></td>
<td>Ensure that the data is not directed to a device that is not installed or is unavailable.</td>
</tr>
<tr>
<td>OUT OF MEMORY STORING FORMAT</td>
<td></td>
<td>Call a service technician.</td>
</tr>
<tr>
<td>OUT OF MEMORY STORING BITMAP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUT OF MEMORY STORING FONT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Calibration Problems

Table 16 identifies problems with calibration, the possible causes, and the recommended solutions.

Table 16 • Calibration Problems

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.</td>
<td>The platen roller is dirty.</td>
<td>Clean the platen roller according to the instructions in Clean the Printhead and Platen Roller on page 126.</td>
</tr>
<tr>
<td></td>
<td>Media guides are positioned improperly.</td>
<td>Ensure that the media guides are properly positioned.</td>
</tr>
<tr>
<td></td>
<td>The media type is set incorrectly.</td>
<td>Set the printer for the correct media type (non-continuous or continuous) See Media Type on page 85.</td>
</tr>
<tr>
<td></td>
<td>The media is loaded incorrectly or the media sensor is positioned improperly.</td>
<td>Reload the media and ensure that the sensor in use is properly positioned. See Adjust Transmissive Media Sensors on page 115.</td>
</tr>
<tr>
<td>Auto Calibrate failed.</td>
<td>Media or ribbon is loaded incorrectly.</td>
<td>Ensure that media and ribbon are loaded correctly.</td>
</tr>
<tr>
<td></td>
<td>The sensors could not detect the media or ribbon.</td>
<td>Calibrate the printer. See Calibrate the Ribbon and Media Sensors Manually on page 106.</td>
</tr>
<tr>
<td></td>
<td>The sensors are dirty or positioned improperly.</td>
<td>Ensure that the sensors are clean and properly positioned.</td>
</tr>
<tr>
<td></td>
<td>The media type is set incorrectly.</td>
<td>Set the printer for the correct media type (non-continuous or continuous) See Media Type on page 85.</td>
</tr>
</tbody>
</table>
## Communications Problems

Table 17 identifies problems with communications, the possible causes, and the recommended solutions.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>A label format was sent to the printer but was not recognized. The DATA light does not flash.</td>
<td>The communication parameters are incorrect.</td>
<td>Check the printer driver or software communications settings (if applicable). If you are using serial communication, check the serial port settings. See Port Settings on page 103. If you are using serial communication, make sure that you are using a null modem cable or a null modem adapter. Check the printer’s handshake protocol setting. The setting used must match the one being used by the host computer. See Set the Host Handshake Protocol Value on page 105. If a driver is used, check the driver communication settings for your connection.</td>
</tr>
<tr>
<td>A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.</td>
<td>The serial communication settings are incorrect.</td>
<td>Ensure that the flow control settings match. Check the communication cable length. See Table 4 on page 41 for requirements. Check the printer driver or software communications settings (if applicable).</td>
</tr>
<tr>
<td>A label format was sent to the printer but was not recognized. The DATA light flashes but no printing occurs.</td>
<td>The prefix and delimiter characters set in the printer do not match the ones in the label format. Incorrect data is being sent to the printer.</td>
<td>Verify the prefix and delimiter characters. See Set the Control Prefix Character Value on page 100 and Set the Delimiter Character Value on page 101. Check the communication settings on the computer. Ensure that they match the printer settings. If the problem continues, check the label format.</td>
</tr>
</tbody>
</table>
## Troubleshooting

**Ribbon Problems**

Table 18 identifies problems that may occur with ribbon, the possible causes, and the recommended solutions.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
</table>
| Broken or melted ribbon                   | Darkness setting too high.                          | 1. Reduce the darkness setting. See *Print Darkness on page 83* for how to change the darkness setting.  
2. Clean the printhead thoroughly. See *Clean the Printhead and Platen Roller on page 126*. |
|                                           | The ribbon is coated on the wrong side and cannot be used in this printer. | Replace the ribbon with one coated on the correct side. For more information, see *Coated Side of Ribbon on page 49*. |
| Wrinkled ribbon                           | Ribbon was loaded incorrectly.                     | Load the ribbon correctly. See *Load the Ribbon on page 54*.                           |
|                                           | Incorrect burn temperature.                        | For optimal print quality, set the darkness to the lowest possible setting for your application. You may want to perform the *FEED Self Test on page 151* to determine the ideal darkness setting.  
See *Print Darkness on page 83* for how to change the darkness setting. |
|                                           | Incorrect or uneven printhead pressure.            | Set the printhead pressure to the minimum needed for good print quality. See *Printhead Pressure Adjustment on page 121*. |
|                                           | Media not feeding properly; “walking” from side to side. | Make sure that media is snug by adjusting the media guide, or call a service technician. |
|                                           | The printhead or platen roller may be installed incorrectly. | Call a service technician. |
| The printer does not detect when the ribbon runs out. | The printer may have been calibrated without ribbon. Later, ribbon was inserted without the user recalibrating the printer or loading printer defaults. | Calibrate the printer, this time using ribbon, or load printer defaults. See *Calibrate the Ribbon and Media Sensors Manually on page 106* or *Load Defaults on page 93*. |
| In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly. | The printer was not calibrated for the label and ribbon being used. | Calibrate the printer. See *Calibrate the Ribbon and Media Sensors Manually on page 106*. |

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*P1056468-002* 7/3/13
## Miscellaneous Issues

Table 19 identifies miscellaneous issues with the printer, the possible causes, and the recommended solutions.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Recommended Solution</th>
</tr>
</thead>
</table>
| The control panel display shows a language that I cannot read          | The language parameter was changed through the control panel or a firmware command. | 1. On the control panel display, press **SETUP**.  
2. Press the **LEFT ARROW** once to move to the LANGUAGE parameter.  
3. Use **PLUS (+)** or **MINUS (-)** to scroll through the language selections. The selections for this parameter are displayed in the actual languages to make it easier for you to find one that you are able to read.  
4. Select the language that you want to display. |
| The display is missing characters or parts of characters                | The display may need replacing.                                               | Call a service technician.                                                            |
| Changes in parameter settings did not take effect                      | Some parameters are set incorrectly.                                          | 1. Check the parameters and change or reset if necessary.  
2. Turn the printer off (O) and then on (I). |
| A firmware command (such as device.command_override) turned off the ability to change the parameter. | Refer to the Programming Guide for ZPL, ZBI, Set-Get-Do, Mirror, and WML or call a service technician. |
| A firmware command changed the parameter back to the previous setting. |                                                                                   | Call a service technician.                                                            |
| If the problem persists, there may be a problem with the main logic board. |                                                                                   | Call a service technician.                                                            |
| Non-continuous labels are being treated as continuous labels           | The printer was not calibrated for the media being used.                      | Calibrate the printer. See *Calibrate the Ribbon and Media Sensors Manually* on page 106. |
| The printer is configured for continuous media.                        | Set the printer for the correct media type (gap/notch, continuous, or mark). See *Media Type* on page 85. |
| All indicator lights are on, nothing is on the display (if the printer has a display), and the printer locks up. | Internal electronic or firmware failure.                                      | Call a service technician.                                                            |
| The printer locks up while running the Power-On Self Test.             | Main logic board failure.                                                      | Call a service technician.                                                            |
Printer Diagnostics

Self tests and other diagnostics provide specific information about the condition of the printer. The self tests produce sample printouts and provide specific information that helps determine the operating conditions for the printer.

**Important** • Use full-width media when performing self tests. If your media is not wide enough, the test labels may print on the platen roller. To prevent this from happening, check the print width, and ensure that the width is correct for the media that you are using.

Each self test is enabled by pressing a specific control panel key or combination of keys while turning on (I) the printer power. Keep the key(s) pressed until the first indicator light turns off. The selected self test automatically starts at the end of the Power-On Self Test.

**Note** •
- When performing these self tests, do not send data to the printer from the host.
- If your media is shorter than the label to be printed, the test label continues on the next label.
- When canceling a self test prior to its actual completion, always reset the printer by turning it off (O) and then on (I).

**Power-On Self Test**

A Power-On Self Test (POST) is performed each time the printer is turned on (I). During this test, the control panel lights (LEDs) turn on and off to ensure proper operation. At the end of this self test, only the STATUS LED remains lit. When the Power-On Self Test is complete, the media is advanced to the proper position.

To initiate the Power-On Self Test, complete these steps:

1. Turn on (I) the printer.

   The POWER LED illuminates. The other control panel LEDs and the LCD monitor the progress and indicate the results of the individual tests. All messages during the POST display in English; however, if the test fails, the resulting messages cycle through the international languages as well.
CANCEL Self Test

The CANCEL self test prints a printer configuration label and a network configuration label. For other ways to print these labels, see Print Information on page 91.

To perform the CANCEL Self Test, complete these steps:

1. Turn off (O) the printer.

2. Press and hold CANCEL while turning on (I) the printer. Hold CANCEL until the first control panel light turns off.

The printer prints a printer configuration label (Figure 13) and then a network configuration label (Figure 14).

---

Figure 13 • Sample Printer Configuration Label

---

Figure 14 • Sample Network Configuration Label

---
PAUSE Self Test

This self test can be used to provide the test labels required when making adjustments to the printer’s mechanical assemblies or to determine if any printhead elements are not working. Figure 15 shows a sample printout.

To perform a PAUSE self test, complete these steps:

1. Turn off (O) the printer.

2. Press and hold PAUSE while turning on (I) the printer. Hold PAUSE until the first control panel light turns off.
   - The initial self test prints 15 labels at the printer’s slowest speed, and then automatically pauses the printer. Each time PAUSE is pressed, an additional 15 labels print. Figure 15 shows a sample of the labels.

   Figure 15 • PAUSE Test Label

   ![PAUSE Test Label](image)

   - While the printer is paused, pressing CANCEL alters the self test. Each time PAUSE is pressed, 15 labels print at 6 in. (152 mm) per second.
   - While the printer is paused, pressing CANCEL again alters the self test a second time. Each time PAUSE is pressed, 50 labels print at the printer’s slowest speed
   - While the printer is paused, pressing CANCEL again alters the self test a third time. Each time PAUSE is pressed, 50 labels print at 6 in. (152 mm) per second.
   - While the printer is paused, pressing CANCEL again alters the self test a fourth time. Each time PAUSE is pressed, 15 labels print at the printer’s maximum speed.

3. To exit this self test at any time, press and hold CANCEL.
FEED Self Test

Different types of media may require different darkness settings. This section contains a simple but effective method for determining the ideal darkness for printing bar codes that are within specifications.

During the FEED self test, labels are printed at different darkness settings at two different print speeds. The relative darkness and the print speed are printed on each label. The bar codes on these labels may be ANSI-graded to check print quality.

During this test, one set of labels is printed at 2 ips, and another set is printed at 6 ips. The darkness value starts at three settings lower than the printer’s current darkness value (relative darkness of –3) and increase until the darkness is three settings higher than the current darkness value (relative darkness of +3).

To perform a FEED self test, complete these steps:

1. Print a configuration label to show the printer’s current settings.
2. Turn off (O) the printer.
3. Press and hold FEED while turning on (I) the printer. Hold FEED until the first control panel light turns off.
   The printer prints a series of labels (Figure 16) at various speeds and at darkness settings higher and lower than the darkness value shown on the configuration label.

4. See Figure 17 and Table 20. Inspect the test labels and determine which one has the best print quality for your application. If you have a bar code verifier, use it to measure bars/spaces and calculate the print contrast. If you do not have a bar code verifier, use your eyes or the system scanner to choose the optimal darkness setting based on the labels printed in this self test.
Table 20 • Judging Bar Code Quality

<table>
<thead>
<tr>
<th>Print Quality</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too dark</td>
<td>Labels that are too dark are fairly obvious. They may be readable but not “in-spec.”</td>
</tr>
<tr>
<td></td>
<td>• The normal bar code bars increase in size.</td>
</tr>
<tr>
<td></td>
<td>• The openings in small alphanumeric characters may fill in with ink.</td>
</tr>
<tr>
<td></td>
<td>• Rotated bar code bars and spaces run together.</td>
</tr>
<tr>
<td>Slightly dark</td>
<td>Slightly dark labels are not as obvious.</td>
</tr>
<tr>
<td></td>
<td>• The normal bar code will be “in-spec.”</td>
</tr>
<tr>
<td></td>
<td>• Small character alpha numerics will be bold and could be slightly filled in.</td>
</tr>
<tr>
<td></td>
<td>• The rotated bar code spaces are small when compared to the “in-spec” code, possibly making the code unreadable.</td>
</tr>
</tbody>
</table>
5. Note the relative darkness value and the print speed printed on the best test label.

6. Add or subtract the relative darkness value from the darkness value specified on the configuration label. The resulting numeric value is the best darkness value for that specific label/ribbon combination and print speed.

7. If necessary, change the darkness value to the darkness value on the best test label.

8. If necessary, change the print speed to the same speed as on the best test label.

---

Table 20 • Judging Bar Code Quality (Continued)

<table>
<thead>
<tr>
<th>Print Quality</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“In-spec”</strong></td>
<td>The “in-spec” bar code can only be confirmed by a verifier, but it should exhibit some visible characteristics.</td>
</tr>
<tr>
<td></td>
<td>• The normal bar code will have complete, even bars and clear, distinct spaces.</td>
</tr>
<tr>
<td></td>
<td>• The rotated bar code will have complete, even bars and clear, distinct spaces. Although it may not look as good as a slightly dark bar code, the bar code will be “in-spec.”</td>
</tr>
<tr>
<td></td>
<td>• In both normal and rotated styles, small alphanumeric characters look complete.</td>
</tr>
<tr>
<td><strong>Slightly light</strong></td>
<td>Slightly light labels are, in some cases, preferred to slightly dark ones for “in-spec” bar codes.</td>
</tr>
<tr>
<td></td>
<td>• Both normal and rotated bar codes will be in spec, but small alphanumeric characters may not be complete.</td>
</tr>
<tr>
<td><strong>Too light</strong></td>
<td>Labels that are too light are obvious.</td>
</tr>
<tr>
<td></td>
<td>• Both normal and rotated bar codes have incomplete bars and spaces.</td>
</tr>
<tr>
<td></td>
<td>• Small alphanumeric characters are unreadable.</td>
</tr>
</tbody>
</table>
FEED + PAUSE Self Test

Performing this self test temporarily resets the printer configuration to the factory default values. These values are active only until power is turned off unless you save them permanently in memory. If the factory default values are permanently saved, a sensor calibration procedure must be performed. (See Calibrate the Ribbon and Media Sensors Manually on page 106.)

To perform a FEED and PAUSE self test, complete these steps:

1. Turn off (O) the printer.
2. Press and hold FEED + PAUSE while turning on (I) the printer.
3. Hold FEED + PAUSE until the first control panel light turns off.
   The printer configuration is reset to the factory default values. No labels print at the end of this test.

CANCEL + PAUSE Self Test

Performing this self test temporarily resets the network configuration to the factory default values. These values are active only until power is turned off unless you save them permanently in memory.

To perform a CANCEL and PAUSE self test, complete these steps:

1. Turn off (O) the printer.
2. Press and hold CANCEL + PAUSE while turning on (I) the printer.
3. Hold CANCEL + PAUSE until the first control panel light turns off.
   The printer’s network configuration is reset to the factory default values. No labels print at the end of this test.
Communication Diagnostics Test

The communication diagnostics test is a troubleshooting tool for checking the interconnection between the printer and the host computer. When the printer is in diagnostics mode, it prints all data received from the host computer as straight ASCII characters with the hex values below the ASCII text. The printer prints all characters received, including control codes such as CR (carriage return). Figure 18 shows a typical test label from this test.

**Note** • The test label prints upside-down.

**Figure 18 • Communication Diagnostics Test Label**

To use communication diagnostics mode, complete these steps:

1. Set the print width equal to or less than the label width being used for the test. See *Print Width* on page 85 for more information.

2. Set the DIAGNOSTICS MODE option to ENABLED. For methods, see *Communication Diagnostics Mode* on page 94.

   The printer enters diagnostics mode and prints any data received from the host computer on a test label.

3. Check the test label for error codes. For any errors, check that your communication parameters are correct.

   Errors show on the test label as follows:
   - **FE** indicates a framing error.
   - **OE** indicates an overrun error.
   - **PE** indicates a parity error.
   - **NE** indicates noise.

4. Turn the printer off (O) and then back on (I) to exit this self test and return to normal operation.
Sensor Profile

Use the sensor profile image (which will extend across several actual labels or tags) to troubleshoot the following situations:

- The printer experiences difficulty in determining gaps (web) between labels.
- The printer incorrectly identifies preprinted areas on a label as gaps (web).
- The printer cannot detect ribbon.

With the printer in the Ready state, print a sensor profile in one of these ways:

| Using the buttons on the control panel | a. Turn off (O) the printer.  
b. Press and hold FEED + CANCEL while turning on (I) the printer.  
c. Hold FEED + CANCEL until the first control panel light turns off. |
| Using ZPL | a. Send the ~JG command to the printer. See the Zebra Programming Guide for more information about this command. |
| Using the control panel menu items | a. On the control panel display, navigate to the following item. See Control Panel Display on page 17 for information about using the control panel and accessing the menus.  
b. Press PLUS (+) to select PRINT. |

Compare your results to the examples shown in this section. If the sensitivity of the sensors must be adjusted, calibrate the printer (see Calibrate the Ribbon and Media Sensors Manually on page 106).

Ribbon Sensor Profile (Figure 19) The bars (1) on the sensor profile indicate the ribbon sensor readings. The ribbon sensor threshold setting is indicated by the word RIBBON (2). If the ribbon readings are below the threshold value, the printer does not acknowledge that ribbon is loaded.
Media Sensor Profile (Figure 20) The media sensor readings are shown as bars and flat areas on the sensor profile (Figure 20). The bars (1) indicate gaps between labels (the web), and the low areas (2) indicate where labels are located. If you compare the sensor profile printout to a blank length of your media, the bars should be the same distance apart as the gaps on the media. If the distances are not the same, the printer may be having difficulty determining where the gaps are located.

The media sensor threshold settings are shown by the words MEDIA (3) for the media threshold and WEB (4) for the web threshold. Use the numbers to the left of the sensor readings to compare the numeric readings to the sensor settings.
Notes •  

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This section provides the features of and specifications for this printer.

Contents

Features ......................................................... 160
  Standard Features ..................................... 160
  Optional Features .................................... 160
  Zebra Programming Language (ZPL) ................ 161
  Bar Codes .............................................. 161
General Specifications .................................. 162
  Physical Specifications ................................ 162
  Electrical Specifications ........................... 162
  Environmental Conditions for Operation and Storage 162
Print Specifications ......................................... 163
Media Specifications .................................... 164
Ribbon Specifications ................................... 165
Features

This section lists the standard and optional features for the printer.

Standard Features

Note • Printer specifications are subject to change without notice.

- Thermal transfer and direct thermal printing
- 16 MB SDRAM (12 MB user-available)
- ZebraNet 10/100 Print Server (internal)
- USB 2.0 Port
- RS-232 serial port
- Bidirectional parallel port
- 10/100 internal Ethernet
- Real-Time Clock
- Advanced Counter
- XML-enabled printing

Optional Features

- ZebraNet Wireless Print Server
- Full-width rotary knife cutter and catch tray
- Media rewind spindle
- Factory-installed 64 MB (61 MB user available) Flash memory option
- Additional fonts
Zebra Programming Language (ZPL)

ZPL II features include:

- Downloadable graphics, scalable and bitmap fonts, and label formats
- Object copying between memory areas
- (RAM, memory card, and internal Flash)
- Code page 850 character set
- Data compression
- Automatic virtual input buffer management
- Format inversion
- Mirror image printing
- Four-position field rotation (0°, 90°, 180°, 270°)
- Controlled via mainframe, mini-computer, PC, portable data terminal
- Programmable quantity with print, pause, and cut control
- Communicates in printable ASCII characters
- Error-checking protocol
- Status message to host upon request
- Serialized fields
- In-spec OCR-A and OCR-B
- UPC/EAN
- User-programmable password

Bar Codes

Types of bar codes include:

- Bar code ratios—2:1, 7:3, 5:2, 3:1
- Codabar (supports ratios of 2:1 up to 3:1)
- CODABLOCK
- Code 11
- Code 39 (supports ratios of 2:1 up to 3:1)
- Code 49 (two-dimensional bar code)
- Code 93
- Code 128 (with subsets A, B, and C and UCC case codes)
- Check digit calculation where applicable
- Data Matrix
- EAN-8, EAN-13, EAN extensions
- ISBT-128
- Industrial 2 of 5
- Interleaved 2 of 5 (supports ratios of 2:1 up to 3:1, Modulus 10 Check Digit)
- LOGMARS
- MaxiCode
- Micro PDF
- MSI
- PDF-417 (2-dimensional bar code)
- PLANET code
- Plessey
- POSTNET
- QR-Code
- RSS code
- Standard 2 of 5
- TLC 39
- UPC-A, UPC-E, UPC extensions
General Specifications

Physical Specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>15.5 in  (393.7 mm)</td>
</tr>
<tr>
<td>Width</td>
<td>10.31 in. (262 mm)</td>
</tr>
<tr>
<td>Depth</td>
<td>20.38 in. (517.5 mm)</td>
</tr>
<tr>
<td>Weight without options</td>
<td>50 lb. (22.7 kg)</td>
</tr>
</tbody>
</table>

Electrical Specifications

<table>
<thead>
<tr>
<th>Power</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>100 to 240 VAC; 47 to 63 Hz</td>
</tr>
<tr>
<td>Power consumption printing PAUSE test at slowest speed</td>
<td>121 W</td>
</tr>
<tr>
<td>Printer idle</td>
<td>20 W</td>
</tr>
</tbody>
</table>

Environmental Conditions for Operation and Storage

<table>
<thead>
<tr>
<th>Environment</th>
<th>Mode</th>
<th>Temperature</th>
<th>Relative Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>Thermal Transfer</td>
<td>40°F to 104°F (5°C to 40°C)</td>
<td>20 to 85% non-condensing</td>
</tr>
<tr>
<td></td>
<td>Direct Thermal</td>
<td>32°F to 104°F (0°C to 40°C)</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>Thermal Transfer or</td>
<td>–40°F to 140°F (–40°C to 60°C)</td>
<td>5 to 85% non-condensing</td>
</tr>
<tr>
<td></td>
<td>Direct Thermal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Print Specifications

Refer to the tables that follow for printer specifications.

<table>
<thead>
<tr>
<th>Print Specifications</th>
<th>203 dpi</th>
<th>300 dpi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printhead resolution</td>
<td>203 dots/inch (8 dots/mm)</td>
<td>300 dots/inch (12 dots/mm)</td>
</tr>
<tr>
<td>Dot size (width×length)</td>
<td>0.0049×0.0049 in. (0.125×0.125 mm)</td>
<td>0.0033×0.0039 in. (0.084×0.099 mm)</td>
</tr>
<tr>
<td>First dot location (measured from inside media edge)</td>
<td>0.10 ± 0.035 in. (2.5 ± 0.9 mm)</td>
<td>0.023 ± 0.035 in. (0.6 ± 0.9 mm)</td>
</tr>
<tr>
<td>Maximum print width</td>
<td>4.09 in. (104 mm)</td>
<td>4.09 in. (104 mm)</td>
</tr>
<tr>
<td>Maximum print length (non-continuous)</td>
<td>39 in. (991 mm)</td>
<td>39 in. (991 mm)</td>
</tr>
<tr>
<td>Maximum print length (continuous)</td>
<td>150 in. (3810 mm)</td>
<td>100 in. (3810 mm)</td>
</tr>
<tr>
<td>Selectable print speeds (inches per second)</td>
<td>2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12</td>
<td>2.4, 3, 4, 5, 6, 7, 8, 9</td>
</tr>
<tr>
<td>Bar code modulus (X) dimension:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ladder (rotated) orientation</td>
<td>4.9 mil to 49 mil</td>
<td>3.9 mil to 39 mil</td>
</tr>
<tr>
<td>Picket fence (nonrotated) orientation</td>
<td>4.9 mil to 49 mil</td>
<td>3.33 mil to 33 mil</td>
</tr>
<tr>
<td>Thin film printhead with Element Energy Equalizer (E³)®</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
**Media Specifications**

Use the correct size and type of labels for best performance. Refer to the tables that follow for specifications.

**Important** • Media registration and minimum label length are affected by label type and width, ribbon type, print speed, and printer mode of operation. Performance improves as these factors are optimized. Zebra recommends qualifying any application with thorough testing.

<table>
<thead>
<tr>
<th>Media Specifications</th>
<th>203 dpi</th>
<th>300 dpi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum label length</td>
<td>Tear-Off 0.7 in. (18 mm)</td>
<td>0.7 in. (18 mm)</td>
</tr>
<tr>
<td></td>
<td>Peel-Off 0.5 in. (13 mm)</td>
<td>0.5 in. (13 mm)</td>
</tr>
<tr>
<td></td>
<td>Cutter 1.5 in. (38 mm)</td>
<td>1.5 in. (38 mm)</td>
</tr>
<tr>
<td></td>
<td>Rewind 0.25 in. (6 mm)</td>
<td>0.25 in. (6 mm)</td>
</tr>
<tr>
<td>Total media width</td>
<td>Minimum 0.79 in. (20 mm)</td>
<td>0.79 in. (20 mm)</td>
</tr>
<tr>
<td>(label + backing, if any)</td>
<td>Maximum 4.5 in. (114 mm)</td>
<td>4.5 in. (114 mm)</td>
</tr>
<tr>
<td>Total thickness</td>
<td>Minimum 0.003 in. (0.076 mm)</td>
<td>0.003 in. (0.076 mm)</td>
</tr>
<tr>
<td>(includes backing, if any)</td>
<td>Maximum 0.012 in. (0.305 mm)</td>
<td>0.012 in. (0.305 mm)</td>
</tr>
<tr>
<td>Cutter maximum full-width media thickness</td>
<td>0.009 in. (0.23 mm)</td>
<td>0.009 in. (0.23 mm)</td>
</tr>
<tr>
<td>Roll media core inside diameter</td>
<td>3 in. (76 mm)</td>
<td>3 in. (76 mm)</td>
</tr>
<tr>
<td>Maximum roll diameter on 3 in. (76 mm) core</td>
<td>8.0 in. (203 mm)</td>
<td>8.0 in. (203 mm)</td>
</tr>
<tr>
<td>Interlabel gap</td>
<td>Minimum 0.079 in. (2 mm)</td>
<td>0.079 in. (2 mm)</td>
</tr>
<tr>
<td></td>
<td>Preferred 0.118 in. (3 mm)</td>
<td>0.118 in. (3 mm)</td>
</tr>
<tr>
<td></td>
<td>Maximum No more than the calibrated length of the label.</td>
<td>No more than the calibrated length of the label.</td>
</tr>
<tr>
<td>Maximum internal fanfold media pack size (label + backing): L × W×H</td>
<td>8.0×4.5×4.5 in. (203×114×114 mm)</td>
<td>8.0×4.5×4.5 in. (203×114×114 mm)</td>
</tr>
<tr>
<td>Ticket/tag sensing notch: L × W</td>
<td>0.12×0.25 in. (3×6 mm)</td>
<td>0.12×0.25 in. (3×6 mm)</td>
</tr>
<tr>
<td>Ticket/tag sensing hole diameter</td>
<td>0.125 in. (3 mm)</td>
<td>0.125 in. (3 mm)</td>
</tr>
<tr>
<td>Label registration tolerance (vertical)</td>
<td>± 0.06 in. (± 1.5 mm)</td>
<td>± 0.06 in. (± 1.5 mm)</td>
</tr>
<tr>
<td>Label registration tolerance (horizontal)</td>
<td>± 0.06 in. (± 1.5 mm)</td>
<td>± 0.06 in. (± 1.5 mm)</td>
</tr>
<tr>
<td>Maximum media density</td>
<td>0.5 ODU</td>
<td>0.5 ODU</td>
</tr>
</tbody>
</table>
Black Mark Sensing

<table>
<thead>
<tr>
<th>Media Specifications</th>
<th>203 dpi</th>
<th>300 dpi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark length (measuring parallel to label/tag edge)</td>
<td>Minimum</td>
<td>0.12 in. (3 mm)</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>0.43 in. (11 mm)</td>
</tr>
<tr>
<td>Mark width (measuring to perpendicular label/tag edge)</td>
<td>Minimum</td>
<td>0.43 in. (11 mm)</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>Full media width</td>
</tr>
<tr>
<td>Mark location</td>
<td>within 0.040 in. (1 mm) of the inside media edge</td>
<td>within 0.040 in. (1 mm) of the inside media edge</td>
</tr>
<tr>
<td>Mark density in Optical Density Unit (ODU)</td>
<td>&gt;1.0</td>
<td>&gt;1.0</td>
</tr>
</tbody>
</table>

Ribbon Specifications

Refer to the following tables for ribbon specifications.

**Note** • Consider the following when using ribbon:
- Match the ribbon to the label width and printhead width that you are using. The ribbon should be at least as wide as the labels to protect the printhead from excessive wear.
- Ribbon must be wound with the coated side out.

<table>
<thead>
<tr>
<th>Ribbon Specifications</th>
<th>203 dpi</th>
<th>300 dpi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printhead resolution</td>
<td>203 dots/inch (8 dots/mm)</td>
<td>300 dots/inch (12 dots/mm)</td>
</tr>
<tr>
<td>Ribbon width Minimum</td>
<td>0.79 in. (20 mm)</td>
<td>0.79 in. (20 mm)</td>
</tr>
<tr>
<td>Ribbon width Maximum</td>
<td>4.33 in. (110 mm)</td>
<td>4.33 in. (110 mm)</td>
</tr>
<tr>
<td>Maximum ribbon length</td>
<td>1476 ft (450 m)</td>
<td>1476 ft (450 m)</td>
</tr>
<tr>
<td>Ribbon core inside diameter</td>
<td>1.0 in. (25.4 mm)</td>
<td>1.0 in. (25.4 mm)</td>
</tr>
<tr>
<td>Maximum ribbon roll outside diameter</td>
<td>3.2 in. (81.3 mm)</td>
<td>3.2 in. (81.3 mm)</td>
</tr>
</tbody>
</table>
Glossary

alphanumeric  Indicating letters, numerals, and characters such as punctuation marks.

backfeed  When the printer pulls the media and ribbon (if used) backward into the printer so that the beginning of the label to be printed is properly positioned behind the printhead. Backfeed occurs when operating the printer in Tear-Off and Applicator modes.

bar code  A code by which alphanumeric characters can be represented by a series of adjacent stripes of different widths. Many different code schemes exist, such as the universal product code (UPC) or Code 39.

black mark  A registration mark found on the underside of the print media that acts as a start-of-label indication for the printer. (See non-continuous media.)

calibration (of a printer)  A process in which the printer determines some basic information needed to print accurately with a particular media and ribbon combination. To do this, the printer feeds some media and ribbon (if used) through the printer and senses whether to use the direct thermal or thermal transfer print method, and (if using non-continuous media) the length of individual labels or tags.

configuration  The printer configuration is a group of operating parameters specific to the printer application. Some parameters are user selectable, while others are dependent on the installed options and mode of operation. Parameters may be switch selectable, control panel programmable, or downloaded as ZPL II commands. A configuration label listing all the current printer parameters may be printed for reference.

continuous media  Label or tag-stock media that has no notch, gap, or web (media liner only) to separate the labels or tags. The media is one long piece of material.

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

diagnostics  Information about which printer functions are not working that is used for troubleshooting printer problems.
**die-cut media** A type of label stock that has individual labels stuck to a media liner. The labels may be either lined up against each other or separated by a small distance. Typically the material surrounding the labels has been removed. (See *non-continuous media*.)

**direct thermal** A printing method in which the printhead presses directly against the media. Heating the printhead elements causes a discoloration of the heat-sensitive coating on the media. By selectively heating the printhead elements as the media moves past, an image is printed onto the media. No ribbon is used with this printing method. Contrast this with *thermal transfer*.

**direct thermal media** Media that is coated with a substance that reacts to the application of direct heat from the printhead to produce an image.

**dynamic RAM** The memory devices used to store the label formats in electronic form while they are being printed. The amount of DRAM memory available in the printer determines the maximum size and number of label formats that can be printed. This is volatile memory that loses the stored information when power is turned off.

**fanfold media** Media that comes folded in a rectangular stack. Contrast this with *roll media*.

**firmware** This is the term used to specify the printer’s operating program. This program is downloaded to the printer from a host computer and stored in FLASH memory. Each time the printer power is turned on, this operating program starts. This program controls when to feed the media forward or backward and when to print a dot on the label stock.

**FLASH memory** FLASH memory is non-volatile and maintains the stored information intact when power is off. This memory area is used to store the printer’s operating program. In addition, this memory can be used to store optional printer fonts, graphic formats, and complete label formats.

**Font** A complete set of alphanumeric characters in one style of type. Examples include CG Times™, CG Triumvirate Bold Condensed™.

**ips (inches-per-second)** The speed at which the label or tag is printed. Zebra printers can print from 1 ips to 12 ips.

**label** An adhesive-backed piece of paper, plastic, or other material on which information is printed.

**label backing (liner)** The material on which labels are affixed during manufacture and which is discarded or recycled by the end-users.

**light emitting diode (LED)** Indicators of specific printer status conditions. Each LED is either off, on, or blinking depending on the feature being monitored.

**liquid crystal display (LCD)** The LCD is a back-lit display that provides the user with either operating status during normal operation or option menus when configuring the printer to a specific application.

**lock-up** This is the term generally used to describe a fault condition that, for no apparent reason, causes the printer to stop working. THIS COMMAND IS NOT FOUND IN ZPL GUIDE.
media  Material onto which data is printed by the printer. Types of media include: tag stock, die-cut labels, continuous labels (with and without media liner), non-continuous media, fanfold media, and roll media.

media sensor  This sensor is located behind the printhead to detect the presence of media and, for non-continuous media, the position of the web, hole, or notch used to indicate the start of each label.

media supply hanger  The stationary arm that supports the media roll.

non-continuous media  Media that contains an indication of where one label/printed format ends and the next one begins. Examples are die-cut labels, notched tag-stock, and stock with black mark registration marks.

non-volatile memory  Electronic memory that retains data even when the power to the printer is turned off.

notched media  A type of tag stock containing a cutout area that can be sensed as a start-of-label indicator by the printer. This is typically a heavier, cardboard-like material that is either cut or torn away from the next tag. (See non-continuous media.)

peel-off  A mode of operation in which the printer peels a printed label away from the backing and allows the user to remove it before another label is printed. Printing pauses until the label is removed.

print speed  The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of ips (inches per second).

printhead wear  The degradation of the surface of the printhead and/or the print elements over time. Heat and abrasion can cause printhead wear. Therefore, to maximize the life of the printhead, use the lowest print darkness setting (sometimes called burn temperature or head temperature) and the lowest printhead pressure necessary to produce good print quality. In the thermal transfer printing method, use ribbon that is as wide or wider than the media to protect the printhead from the rough media surface. THIS COMMAND IS NOT FOUND IN ZPL GUIDE.

registration  Alignment of printing with respect to the top (vertical) or sides (horizontal) of a label or tag.

ribbon  A band of material consisting of a base film coated with wax or resin “ink.” The inked side of the material is pressed by the printhead against the media. The ribbon transfers ink onto the media when heated by the small elements within the printhead. Zebra ribbons have a coating on the back that protects the printhead from wear.

ribbon wrinkle  A wrinkling of the ribbon caused by improper alignment or improper printhead pressure. This wrinkle can cause voids in the print and/or the used ribbon to rewind unevenly. This condition should be corrected by performing adjustment procedures.

roll media  Media that comes supplied rolled onto a core (usually cardboard). Contrast this with fanfold media.

supplies  A general term for media and ribbon.
**symbology** The term generally used when referring to a bar code.

**tag** A type of media having no adhesive backing but featuring a hole or notch by which the tag can be hung on something. Tags are usually made of cardboard or other durable material.

**tear-off** A mode of operation in which the user tears the label or tag stock away from the remaining media by hand.

**thermal transfer** A printing method in which the printhead presses an ink or resin coated ribbon against the media. Heating the printhead elements causes the ink or resin to transfer onto the media. By selectively heating the printhead elements as the media and ribbon move past, an image is printed onto the media. Contrast this with *direct thermal*.

**void** A space on which printing should have occurred, but did not due to an error condition such as wrinkled ribbon or faulty print elements. A void can cause a printed bar code symbol to be read incorrectly or not at all.
A
active print server
  how to interpret, 96
  user menu item, 33
adhesive test for ribbon coating, 50
adjustments
  label left position, 87
  label top position, 87
  lower media sensor, 118
  maximum label length, 86
  media sensors, 115
  print darkness, 83
  print width, 85
  printhead toggle pressure, 119
  tear-off position, 84

B
backfeed sequence
  how to change, 87
  user menu item, 30
backfeed speed
  selection, 89
backing removal, 113
bar codes
  bar code does not scan, 138
  bar codes label, 91
  darkness comparison during FEED self test, 151
  types of codes, 161
  user menu item, 25
battery disposal, 124
baud rate
  user menu item, 27
  ways to set, 104

bitmap scaling factor, 94
black mark media
  black mark specifications, 165
  described, 47
  selecting media type, 85
  setting media type through user menu, 22
  when to clean sensor, 125
broken ribbon, 146
buttons on control panel, 15

C
CALIBRATE button, 16
calibration
  Auto Calibrate failed, 138
  how to set as head-close action, 92
  how to set as power-up action, 92
  media/ribbon cal
    procedure, 106
    user menu item, 27
SHORT CAL
  how to set for head-close action, 92
  how to set for power-up action, 92
troubleshooting problems, 144
  ways to initiate, 94
Canadian DOC compliance, 4
CANCEL button
  CANCEL self test, 149
  location, 16
cleaning
cutter, 134
exterior of printer, 125
media compartment, 126
printhead and platen roller, 126
recommended schedule, 125
sensors, 128
snap plate, 130
command character
user menu item, 29
ways to set, 101
communication diagnostics mode
how to initiate, 94
user menu item, 28
communication interfaces, 40
communications diagnostics mode
overview, 155
communications problems, 145
configuration label
network
ways to print, 91
printer
ways to print, 91
printing using CANCEL self test, 149
conformity declaration, 3
connect printer to computer or network, 40
connect printer to power source, 43
continuous media
described, 48
selecting media type, 85
setting media type through user menu, 22
counter character
user menu item, 29
ways to set, 100
counter panel
button function, 15
display, 17
test messages, 139
keypad cover, 46
navigation, 17
counters
non-resettable
description, 90
user menu item, 24
print odometer readings, 90
how to print, 90
user menu item, 24
user-controlled
counter 1 menu item, 24
counter 2 menu item, 24
how to change, 90
cutter
cleaning, 134
when to clean, 125
Cutter mode
description and media path, 53
how to select, 84
select print mode through user menu, 21
D
darkness
how to make adjustments, 83
print quality too light or too dark, 137
user menu item, 21
data bits
user menu item, 27
ways to set, 104
data cables, 42
data source
connections, 40
site selection considerations, 39
date setting, 32
declaration of conformity, 3
default gateway
user menu item, 34
ways to view or set, 98
default password, 20
default reset, 93
defragmenting message, 142
delimiter character
user menu item, 29
ways to set, 101
diagnostic mode
how to initiate, 94
user menu item, 28
diagnostics, 148
Direct Thermal mode
how to specify, 85
media scratch test, 49
disable password protection, 20
display
location, 15
missing characters, 147
display language
how to change from unfamiliar language, 147
user menu item, 36
ways to change, 100
disposal of printer parts, 124
E
  early warning maintenance
    how to enable or disable, 89
    printhead life menu item, 23
    reset new printhead counter, 24
    reset printhead cleaning counter, 23
    set printhead cleaning interval, 23
    user menu item, 23
  media and ribbon
    how to enable or disable, 89
    user menu item, 23
  electrical specifications, 162
  environmental specifications, 162
  error messages, 139
  ESSID
    user menu item, 34
    ways to view, 99
  Ethernet
    characteristics of a wired connection, 41
    characteristics of wireless connection, 42
    exterior cleaning, 125
F
  factory defaults
    reload parameters, 19
    restore network settings, 19
  fanfold media
    described, 48
    loading, 61
  FCC compliance, 4
  features, 160
  feed a label
    how to set as head-close action, 92
    how to set as power-up action, 92
  FEED button
    FEED and PAUSE self test, 154
    FEED self test, 151
    location, 16
  flash memory initialization
    how to start, 91
    user menu item, 26
  fonts
    fonts label, 91
    user menu item, 25
  format convert
    how to use, 94
    user menu item, 31
  format prefix
    user menu item, 29
    ways to set format command prefix, 101
  formats
    formats label, 91
    user menu item, 25
G
  gap/notch
    illustrations, 47
    selecting media type, 85
    sensor selection through user menu, 22
    setting media type through user menu, 22
    ways to select media sensor type, 102
  gateway
    user menu item, 34
    ways to view or set, 98
H
  head test count
    how to enable or disable, 87
    user menu item, 30
  head-close action
    how to change, 92
    user menu item, 30
  host handshake
    user menu item, 28
    ways to set, 105
I
  idle display
    described, 17
    how to change what displays, 95
    user menu item, 32
  images
    images label, 91
    user menu item, 25
    images distorted on labels, 145
  indicator lights
    combined with error message on ZT230, 139
  initialize flash memory
    how to start, 91
    user menu item, 26
  initiate manual calibration, 94
  inspect for shipping damage, 38
  IP address
    user menu item, 33
    ways to view or set, 97
  IP protocol
    how to change, 97
    user menu item, 33
  IP protocol (IP resolution)
    how to change, 97
    user menu item, 33
L
label backing removal, 113
label left position
  how to adjust, 87
  user menu item, 30
label length
  how to adjust maximum value, 86
  user menu item, 22
label shift, 87
label specifications, 164
label top position
  how to adjust, 87
  user menu item, 30
label width, 85
label-available sensor
  location, 128
  when to clean, 125
labels did not print, 145
labels not printing, 145
language
  how to change from unfamiliar language, 147
  user menu item, 36
  ways to change display language, 100
last saved settings, 93
LCD error messages, 139
LENGTH
  how to set as head-close action, 92
  how to set as power-up action, 92
liability, 2
Liner Take-Up mode
  description and media path, 52
  select print mode through user menu, 21
list bar codes, 25
list fonts, 25
list formats, 25
list images, 25
list network, 26
list setup, 25
load defaults
  how to load printer or print server defaults, 93
  load factory defaults, 19
load IP settings from external device
  how to use, 96
  user menu item, 33
load network defaults, 93
location for printer, 39
lower media sensor adjustment, 118
lubrication, 124

M
MAC address
  user menu item, 34
  ways to view, 98
manual calibration
  media/ribbon cal user menu item, 27
  procedure, 106
  ways to initiate, 94
maximum label length
  how to change, 86
  user menu item, 22
media
  black mark, 47
  continuous roll media, 48
  fanfold, 48
  non-continuous roll media, 47
  perforated, 47
  specifications, 164
  tag stock, 47
  types of media, 47
  web, 47
media compartment cleaning, 126
media liner removal, 113
media path cleaning, 125
media power up
  how to change, 92
  user menu item, 29
  media scratch test, 49
media sensor
  adjustments, 115
  sensor type user menu item, 22
  ways to select, 102
media sensor calibration
  procedure, 106
  user menu item, 27
  ways to initiate, 94
media type
  how to select, 85
  user menu item, 22
melted ribbon, 146
misregistration of labels, 137
missing print on labels, 137

N
navigation, 17
network configuration label
  user menu item, 26
  ways to print, 91
network ID
  how to change, 105
  user menu item, 28
network settings
load defaults
    ways to initiate, 93
    when exiting Setup mode, 19
reset network
    user menu item, 35
    ways to reset, 99
NO MOTION
    how to set as head-close action, 92
    how to set as power-up action, 92
non-continuous media
    described, 47
    problem with labels, 147
    selecting media type, 85

O
odometers
    non-resettable counter
        description, 90
        user menu item, 24
print readings
    how to print, 90
        user menu item, 24
print user-controlled counters, 90
user-controlled counters
    counter 1 menu item, 24
    counter 2 menu item, 24
    how to change, 90
operating conditions, 39
optional features, 160
ordering replacement parts, 124

P
parallel communications
    user menu item, 27
    ways to set, 103
parallel port
    characteristics of parallel connection, 41
parity
    user menu item, 28
    ways to set, 104
password
    default, 20
    disable, 20
    select password protection level
        how to set, 95
        user menu item, 35
PAUSE button
    FEED and PAUSE self test, 154
        location, 16
    PAUSE self test, 150
Peel-Off mode
    description and media path, 52
    how to select, 84
    select print mode through user menu, 21
perforated media, 47
physical specifications, 162
platen roller
    cleaning, 126
    when to clean, 125
power
    connect to power source, 43
    power cord specifications, 44
    site selection, 39
Power-On Self Test (POST), 148
power-up action
    how to change, 92
        user menu item, 29
primary network
    how to select, 96
        user menu item, 32
print configuration label
    CANCEL self test, 149
print darkness setting, 83
print information
    how to print various printer information, 91
        LIST ALL user menu item, 26
print method
    how to specify, 85
        user menu item, 22
print mode
    how to select, 84
        user menu item, 21
print quality
    bar code does not scan, 138
    effect of printhead toggle pressure, 119
    running FEED self test, 151
    troubleshooting, 136
print server
  active print server
    how to interpret, 96
    user menu item, 33
characteristics of wired connection, 41
characteristics of wireless connection, 42
default gateway
  user menu item, 34
  ways to view or set, 98
ESSID
  user menu item, 34
  ways to view, 99
IP address
  user menu item, 33
  ways to view or set, 97
IP protocol
  how to change, 97
  user menu item, 33
MAC address
  user menu item, 34
  ways to view, 98
network configuration label
  sample label, 149
  ways to print, 91
primary network
  user menu item, 32
reset network settings
  user menu item, 35
  ways to reset, 99
subnet mask
  user menu item, 34
  ways to view or set, 98
print specifications, 163
print speed
  how to select, 83
  user menu item, 21
print width
  how to adjust, 85
  user menu item, 22
printer configuration label
  user menu item, 25
  ways to print, 91
printer diagnostics, 148
printer locks up, 147
printer settings
  darkness, 83
  date, 32
  label left position, 87
  label top position, 87
  maximum label length, 86
  media type, 85
  print method, 85
  print mode, 84
  print speed, 83
  print width, 85
  reprint mode, 88
  settings not taking effect, 147
  tear-off position, 84
  time, 32
printhead
  cleaning, 126
  cleaning interval
    how to specify, 89
    user menu item, 23
  life expectancy
    how to specify, 89
    user menu item, 23
  pressure adjustment, 119
  when to clean, 125
protocol
  how to change, 105
  user menu item, 28
R
Real-Time Clock (RTC)
  date, 95
  date setting on control panel, 32
  time, 95
  time setting on control panel, 32
recycling printer parts, 124
reflective sensor
  selecting through user menu, 22
  ways to select, 102
registration loss during printing, 136
registration problems, 144
relative humidity
  operating, 39
  storing the printer, 38
reload last saved settings, 93
remove media liner from rewind spindle, 113
replacement parts, 124
report shipping damage, 38
reprint mode
  how to set and use, 88
  user menu item, 31
reset network settings
   user menu item, 35
   ways to reset, 99
reset printer to default values, 93
restore
   factory default settings, 19
   network settings, 19
   printer or printer default values, 93
rewind spindle, 113
ribbon
   adhesive test, 50
   broken or melted ribbon, 146
   determining coated side, 49
   removal, 112
   ribbon not detected correctly, 146
   scratch test, 50
   setting print method to Thermal Transfer mode, 85
   specifications, 165
   when to use, 49
   wrinkled ribbon, 146
ribbon sensor
   cleaning, 128
   location, 128
   when to clean, 125
ribbon sensor calibration
   procedure, 106
   user menu item, 27
   ways to initiate, 94
roll media, 47
   loading, 61
routine maintenance, 123
run a ZBI program
   START PROGRAM user menu item, 32
   ways to run, 95

S
schedule for cleaning, 125
scratch test
   media type, 49
   ribbon coated side, 50
self tests, 148
   CANCEL, 149
   communications diagnostics, 155
   FEED, 151
   FEED and PAUSE, 154
   PAUSE, 150
   Power-On Self Test (POST), 148
sensor profile
   how to print, 91
   user menu item, 26
sensor type
   user menu item, 22
   ways to select, 102
sensors
   cleaning, 128
   interpreting sensor profile, 156
   label-available sensor location, 128
   lower media sensor adjustment, 118
   ribbon sensor location, 128
   transmissive (media) sensor adjustment, 115
serial communications
   user menu item, 27
   ways to set, 103
serial port
   characteristics of serial connection, 41
   setup, 37
   unpack the printer, 38
shipping
   report damage, 38
   reshipping the printer, 38
SHORT CAL
   how to set as power-up action, 92
   how to set for head-close action, 92
   initiating through control panel, 16
site selection for printer, 39
smudge marks on labels, 137
snap plate
   cleaning, 130
   when to clean, 125
spacing requirements, 39
specification
   print, 163
specifications
   electrical, 162
   environmental, 162
   physical, 162
   power cord, 44
   ribbon, 165
standard features, 160
storing the printer, 38
subnet mask
   user menu item, 34
   ways to view or set, 98
surface for printer, 39
T
tag stock, 47
Tear-Off mode
   description and media path, 51
   how to select, 84
   select print mode through user menu, 21
tear-off bar cleaning, 125
tear-off position
  how to adjust, 84
user menu item, 21
temperature
  operating, 39
  storing the printer, 38
Thermal Transfer mode
  how to specify, 85
  media scratch test, 49
time setting, 32
toggle pressure adjustment, 119
transmissive (media) sensor
  adjustment, 115
  when to clean, 125
transmissive sensor
  selecting through user menu, 22
  ways to select, 102
troubleshooting
  communications problems, 145
  diagnostic tests, 148
  error messages, 139
  print quality problems, 136
  ribbon problems, 146
types of media
  black mark media, 47
  continuous roll media, 48
  fanfold media, 48
  how to specify, 85
  non-continuous roll media, 47
  perforated media, 47
  setting on control panel, 22
  tag stock, 47
  web media, 47

U
  unpack the printer, 38
  USB port
    characteristics of USB connection, 41

V
  ventilation requirements, 39
  vertical drift in top-of-form position, 137

W
  web media
    described, 47
    wired print server
      characteristics, 41
    wireless print server
      characteristics, 42
  wrinkled ribbon causes, 146

Z
  Zebra Basic Interpreter (ZBI)
    run a ZBI program
      ways to run, 95
  START PROGRAM user menu item, 32
  Zebra Programming Language (ZPL)
    features, 161
  Zebra protocol, 105
  ZPL mode
    user menu item, 29
    ways to select, 101
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