Table 9 • Printer Parameters (Continued, page 3 of 22)

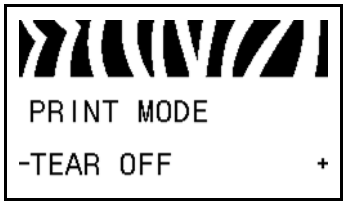
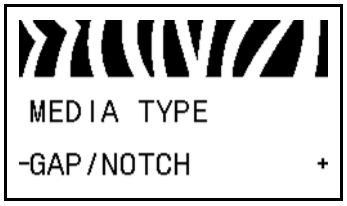
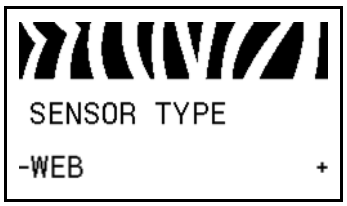
Language/Parameter	Action/Explanation
	**Select Print Mode** This parameter tells the printer how printed labels will be removed. Make sure that you select a print mode that is compatible with your printer and printer options. For information about how the print modes work with different printer options, see *Print Modes and Printer Options* on page 34. *Default Value (non-RFID printers):* TEAR-OFF *Selections (non-RFID printers):* TEAR-OFF, PEEL-OFF, CUTTER, DELAYED CUT, APPLICATOR, REWIND *Default Value (RFID printers):* RFID MODE *Selections (RFID printers):* TEAR-OFF, PEEL-OFF, CUTTER, DELAYED CUT, RFID MODE, REWIND **Note •** RFID MODE appears only on printers that have an RFID reader installed and the correct firmware loaded in the printer. The 110Xi4 and 170Xi4 are RFID-ready, but they do not come with an RFID reader installed. For more information about purchasing the RFID option for these printers, contact your authorized Zebra reseller. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Media Type** This parameter tells the printer the type of media that you are using (see *Types of Media* on page 29 for more information). Selecting continuous media requires that you include a label length instruction in your label format (^LLxxxx if you are using ZPL or ZPL II). When non-continuous media is selected, the printer feeds media to calculate label length (the distance between two recognized registration points of the inter-label gap, webbing, or alignment notch or hole). *Default Value:* NON-CONTINUOUS *Selections:* NON-CONTINUOUS, CONTINUOUS **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Sensor Type** This parameter tells the printer whether you are using media with a web (gap/space between labels, notch, or hole) to indicate the separations between labels or if you are using media with a black mark printed on the back. If your media does not have black marks for registration on the back, leave your printer at the default (WEB). *Default Value:* WEB *Selections:* WEB, MARK **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.

Table 9 • Printer Parameters (Continued, page 4 of 22)

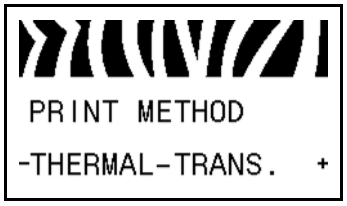
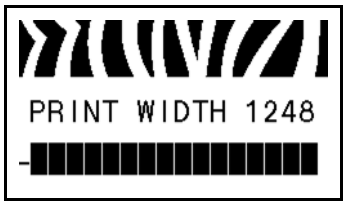
Language/Parameter	Action/Explanation
	**Select Print Method** The print method parameter tells the printer the method of printing that you want to use: direct thermal (no ribbon) or thermal transfer (using thermal transfer media and ribbon). *Default Value:* THERMAL TRANSFER *Selections:* THERMAL TRANSFER, DIRECT THERMAL **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Print Width** This parameter specifies the printable area across the width of the label. Table 10 shows the ranges and default values for print width, which are based on the printer model and the printhead resolution. **Table 10 • Print Width Ranges and Maximum Values** **Printhead Resolution** / **Printer**: **110Xi4** / **140Xi4, 170Xi4, 220Xi4** **200 dpi**: *Default Value:* 832; *Range:* 2 to 832 dots / *Default Value:* 1344; *Range:* 2 to 1344 dots **300 dpi**: *Default Value:* 1248; *Range:* 2 to 1248 dots / *Default Value:* 1984; *Range:* 2 to 1984 dots **600 dpi**: *Default Value:* 2496; *Range:* 2 to 2496 dots / N/A **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 printing off of the label and on the platen roller. This setting can affect the horizontal position of the label format if the image was inverted using the `^POI` ZPL II command. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to change the value shown.

Table 9 • Printer Parameters (Continued, page 5 of 22)

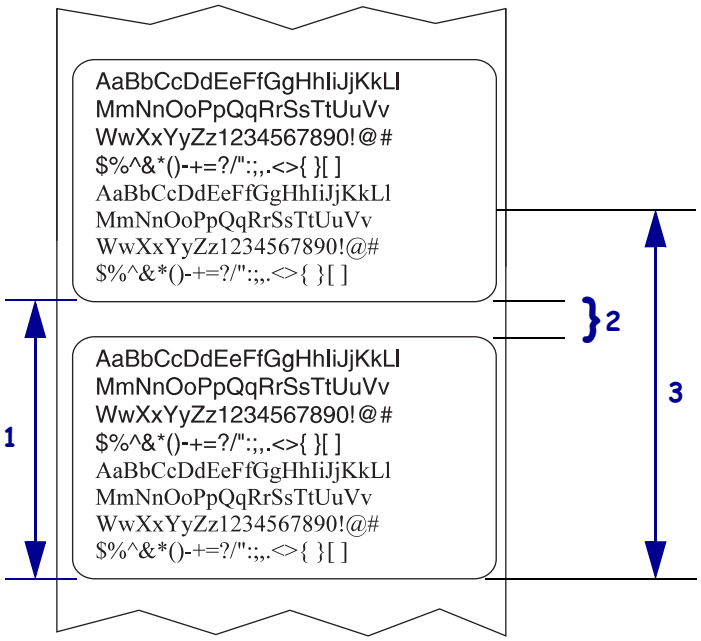
Language/Parameter	Action/Explanation
MAXIMUM LENGTH -39.0IN 988MM	**Set Maximum Label Length** This parameter is used during the media portion of the calibration process. Always set maximum label length to a value that is at least 1.0 in. (25.4 mm) greater than the actual label length (Figure 15). If the value is set to a smaller value than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate. For example, if the label length is 5.0 inches (126 mm) including the interlabel gap, set the parameter for 6.0 inches (152 mm). If the label length is 7.5 inches (190 mm), set the parameter for 9.0 inches (229 mm). **Figure 15 • Label Length**  1 — Label length (including interlabel gap) 2 — Interlabel gap 3 — Set maximum label length to approximately this value *Default Value:* 39.0 inches (988 mm) *Selections:* Values are adjustable in one-inch (25.4 mm) increments **To change the value shown:** 1. Press PLUS (+) or MINUS (-) to change the value shown.
SUPPLIES WARNING -DISABLED +	**Set Supplies Low Warning** When this feature is enabled, the printer provides a warning when the media or ribbon level is low. **Default:** DISABLED **Selections:** ENABLED, DISABLED

Table 9 • Printer Parameters (Continued, page 6 of 22)

Language/Parameter	Action/Explanation
	**Set Early Warning for Maintenance** When this feature is enabled, the printer provides warnings when the printhead needs to be cleaned. *Default Value:* MAINT. OFF *Selections:* MAINT. OFF, MAINTENANCE ON **To change the Early Warning settings:** 1. When the LCD displays **EARLY WARNING MAINTENANCE**, press PLUS (+) or MINUS (-) to toggle between **OFF** and **ON**. (If you are prompted for a password, enter your password using the instructions in *Change Password-Protected Parameters* on page 96.) 2. Exit Setup mode and save changes to enable additional parameters related to the early warning system. 3. Enter Setup mode again and go to the following parameters to enter the printhead cleaning interval and the printhead life.
	**Set Printhead Cleaning Interval for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. This value should correspond to the length of the media or ribbon roll that you are using. *Default Value:* 450 M/1476 FT *Selections:* 100 M/328 FT to 450 M/1476 FT in 50 M increments **To change the value shown:** 1. Press PLUS (+) or MINUS (-) to set the printhead cleaning interval to the desired number of inches of media or ribbon. When the printhead reaches the set length, **WARNING CLEAN PRINTHEAD** appears on the LCD. If the alert function is enabled, the printer generates an alert.
	**Reset Printhead Cleaning Counter for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. **To reset the printhead cleaning counter:** 1. Did you clean the printhead? • If you cleaned the printhead, press PLUS (+) to select **YES**. • If you did not clean the printhead, press MINUS (-) to select **NO**.

Table 9 • Printer Parameters (Continued, page 7 of 22)

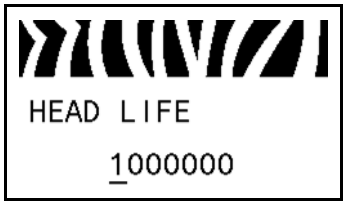
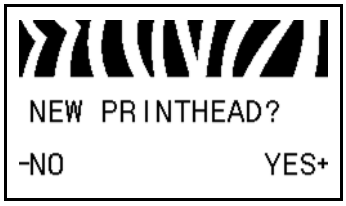
Language/Parameter	Action/Explanation
	**Set Printhead Life for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. Set this value to the number of inches of media that the printhead is expected to print. *Default Value:* 1,000,000 inches *Range:* 100 to 1,000,000 inches **To change the value shown:** 1. Press MINUS (-) to move the cursor. 2. Press PLUS (+) to increase the value of the digit. When the printhead reaches the set length, **WARNING REPLACE HEAD** appears on the LCD. If the alert function is enabled, the printer generates an alert.
	**Reset Printhead Life Counter for Early Warning** This parameter appears only when Early Warning for Maintenance is enabled. **To reset the printhead life counter:** 1. Did you replace the printhead? • If you replaced the printhead, press PLUS (+) to select **YES**. • If you did not replace the printhead, press MINUS (-) to select **NO**.
	**View Non-Resettable Counter** This parameter displays the total length of media that the printer has printed. You can use ZPL commands to change the unit of measure for this counter. For the commands, refer to the *ZPL Programming Guide*.
	**View User-Controlled Counter 1** This parameter displays the total length of media that the printer has printed since this parameter was last reset. You can use ZPL commands to change the unit of measure and reset this counter. For the commands, refer to the *ZPL Programming Guide*.
	**View User-Controlled Counter 2** This parameter displays the total length of media that the printer has printed since this parameter was last reset. You can use ZPL commands to change the unit of measure and reset this counter. For the commands, refer to the *ZPL Programming Guide*.

Table 9 • Printer Parameters (Continued, page 8 of 22)

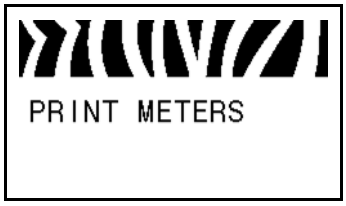
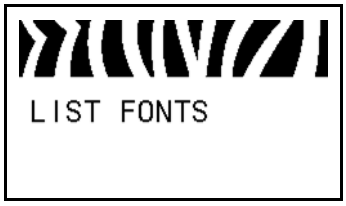
Language/Parameter	Action/Explanation
	**Print Counter Readings** Prints a label that lists the odometer readings for the following: • the non-resettable counter • the two user-controlled counters • the Early Warning for Maintenance counters, which indicate when the printhead was last cleaned and the printhead life If the Early Warning for Maintenance feature is disabled, the counters related to it do not print. **To print a list of the odometer readings:** **1.** Press PLUS (+) to print the odometer readings.
	**List Fonts** 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. **To print a list of the available fonts:** **1.** Press PLUS (+) to select **PRINT**.
	**List Bar Codes** This option prints a label that lists the available bar codes in the printer. Bar codes may be stored in RAM or Flash memory. **To print a list of the available bar codes:** **1.** Press PLUS (+) to select **PRINT**.
	**List Images** This option prints a label that lists the available images stored in the printer's RAM, Flash memory, or optional memory card. **To print a list of the available images:** **1.** Press PLUS (+) to select **PRINT**.
	**List Formats** This option prints a label that lists the available formats stored in the printer's RAM, Flash memory, or optional memory card. **To print a list of the available formats:** **1.** Press PLUS (+) to select **PRINT**.
	**List Setup** This option prints a configuration label (see Figure 12 on page 97), which lists the current printer configuration. **To print a configuration label:** **1.** Press PLUS (+) to select **PRINT**.

Table 9 • Printer Parameters (Continued, page 9 of 22)

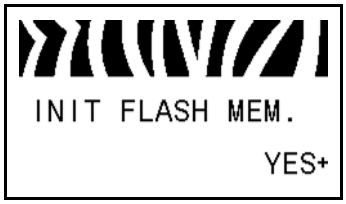
Language/Parameter	Action/Explanation
	**List Network Settings** This option prints a network configuration label (see Figure 13 on page 98), which lists the settings for any print server that is installed. **To print a network configuration label:** **1.** Press PLUS (+) to select **PRINT**.
	**List All** This option prints labels that list the available fonts, bar codes, images, formats, and the current printer and network configurations. **To print labels for all settings:** **1.** Press PLUS (+) to select **PRINT**.
	**Initialize Flash Memory** This option erases all previously stored information from Flash memory. **Caution** • This option completely erases the Flash memory. **To initialize Flash memory:** **1.** If prompted for a password, enter the printer password. For instructions, see *Change Password-Protected Parameters* on page 96. 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** • Depending on the amount of free FLASH memory, initialization may take up to 1 minute to complete.

Table 9 • Printer Parameters (Continued, page 10 of 22)

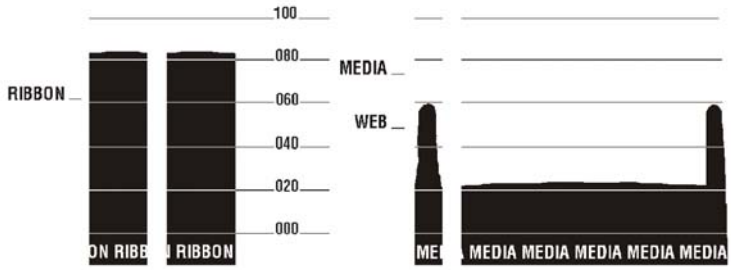
Language/Parameter	Action/Explanation
SENSOR PROFILE	**Print Sensor Profile** A sensor profile shows sensor settings compared to actual sensor readings. This label (which will extend across several actual labels or tags) can be used to troubleshoot printing problems. To interpret the results of the sensor profile, see *Sensor Profile* on page 160.  **To print a sensor profile:** **1.** Press PLUS (+) to start this standard calibration procedure and print a media sensor profile. **2.** If the sensitivity of the sensors must be adjusted, perform *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.

Table 9 • Printer Parameters (Continued, page 11 of 22)

Language/Parameter	Action/Explanation
	**Calibrate Media and Ribbon Sensor Sensitivity** Use this procedure to adjust sensitivity of media and ribbon sensors. **Important •** Follow this procedure exactly as presented. All of the steps must be performed even if only one of the sensors requires adjustment. You may press MINUS (-) at any step in this procedure to cancel the process. **To perform a media and ribbon sensor calibration:** **1.** Press PLUS (+) to start the calibration procedure. The LOAD BACKING prompt displays. **2.** Open the printhead. **3.** Remove approximately 8 in. (203 mm) of labels from the backing, and pull the media into the printer so that only the backing is between the media sensors. **4.** Leave the printhead open. **5.** Press PLUS (+) to continue. The REMOVE RIBBON prompt displays. **6.** Remove the ribbon (if used). **7.** Close the printhead. **8.** Press PLUS (+) to continue. The message CALIBRATING PLEASE WAIT displays. The printer adjusts the scale (gain) of the signals that it receives from the media and ribbon sensors based on the specific media and ribbon combination being used. On the sensor profile, this essentially corresponds to moving the peak of the graph up or down to optimize the readings for your application. When calibration is complete, RELOAD ALL displays. **9.** Open the printhead and pull the media forward until a label is positioned under the media sensor. **10.** Reload the ribbon (if used). **11.** Close the printhead. **12.** Press PLUS (+) to continue. The printer performs an auto-calibration. During this process, the printer checks the readings for the media and ribbon based on the new scale established, determines the label length, and determines the print mode. To see the new readings on the new scale, print a sensor profile.
	**Set Parallel Communications** Select the communications port that matches the one being used by the host computer. *Default Value:* BIDIRECTIONAL *Selections:* BIDIRECTIONAL, TWINAX/COAX, UNIDIRECTIONAL **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 9 • Printer Parameters (Continued, page 12 of 22)

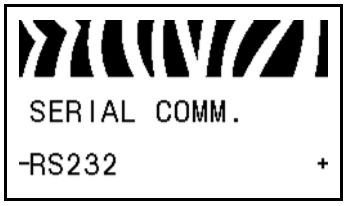
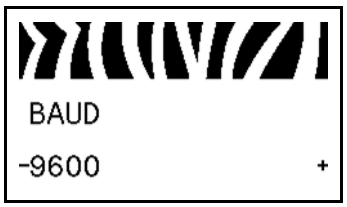
Language/Parameter	Action/Explanation
	**Set Serial Communications** Select the communications port that matches the one being used by the host computer. This setting applies only when the serial port is used. **Note** • Select RS232 if you are using an external adapter to enable RS422/485 operation. *Default Value:* RS232 *Selections:* RS232, RS422/485, RS485 MULTIDROP **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Baud** This setting applies only when the serial port is used. The baud setting of the printer must match the baud setting of the host computer for accurate communications to take place. Select the value that matches the one being used by the host computer. *Default Value:* 9600 *Selections:* 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200 **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Data Bits** This setting applies only when the serial port is used. The data bits of the printer must match the data bits of the host computer for accurate communications to take place. Set the data bits to match the setting being used by the host computer. *Default Value:* 8 BITS *Selections:* 7 BITS, 8 BITS **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Set Parity** This setting applies only when the serial port is used. The parity of the printer must match the parity of the host computer for accurate communications to take place. Select the parity that matches the one being used by the host computer. *Default Value:* NONE *Selections:* EVEN, ODD, NONE **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 9 • Printer Parameters (Continued, page 13 of 22)

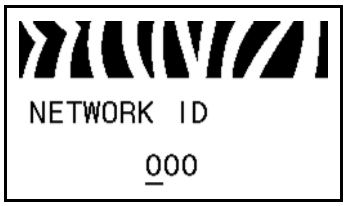
Language/Parameter	Action/Explanation
	**Set Host Handshake** This setting applies only when the serial port is used. The handshake protocol of the printer must match the handshake protocol of the host computer for communication to take place. Select the handshake protocol that matches the one being used by the host computer. *Default Value:* XON/XOFF *Selections:* XON/XOFF, DSR/DTR, RTS/CTS **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set 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. Further details on protocol can be found in the *ZPL Programming Guide*. *Default Value:* NONE *Selections:* 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. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set 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. *Default Value:* 000 *Range:* 000 to 999 **To change the value shown:** **1.** Press MINUS (-) to move to the next digit position. **2.** Press PLUS (+) to increase the value of the digit.
	**Set Communications Mode** The communication diagnostics mode is a troubleshooting tool for checking the interconnection between the printer and the host computer. For more information, see *Communications Diagnostics Test* on page 159. *Default Value:* NORMAL MODE *Selections:* NORMAL MODE, DIAGNOSTICS **To select communication diagnostics mode:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.

Table 9 • Printer Parameters (Continued, page 14 of 22)

Language/Parameter	Action/Explanation
	**Set Control Prefix Character** The printer looks for this two-digit hex character to indicate the start of a ZPL/ZPL II control instruction. **Note •** Do not use the same hex value for the control, format, and delimiter character. The printer must see different characters to work properly. *Default Value:* 7E ~ *Range:* 00 to FF **To change the value shown:** **1.** Press MINUS (-) to move to the next digit position. **2.** Press PLUS (+) to increase the value of the digit.
	**Set Format Prefix Character** The format 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. See the *ZPL Programming Guide* for more information. **Note •** Do not use the same hex value for the control, format, and delimiter character. The printer must see different characters to work properly. *Default Value:* 5E ^ *Range:* 00 to FF **To change the value shown:** **1.** Press MINUS (-) to move to the next digit position. **2.** Press PLUS (+) to increase the value of the digit.
	**Set Delimiter Character** The delimiter character is a two-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. See the *ZPL Programming Guide* for more information. **Note •** Do not use the same hex value for the control, format, and delimiter character. The printer must see different characters to work properly. *Default Value:* 2C , *Range:* 00 to FF **To change the value shown:** **1.** Press MINUS (-) to move to the next digit position. **2.** Press PLUS (+) to increase the value of the digit.

Table 9 • Printer Parameters (Continued, page 15 of 22)

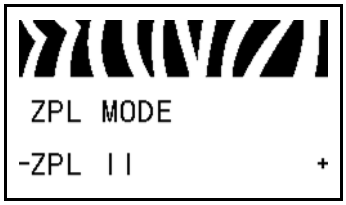
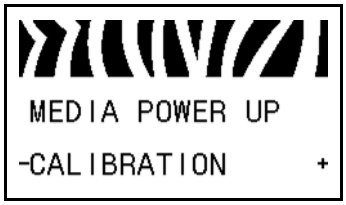
Language/Parameter	Action/Explanation
	**Select ZPL Mode** The printer remains in the selected mode until it is changed by this parameter or by using a ZPL/ZPL II command. The printer accepts label formats written in either ZPL or ZPL II, eliminating the need to rewrite any ZPL formats that already exist. See the *ZPL Programming Guide* for more information on the differences between ZPL and ZPL II. *Default Value:* ZPL II *Range:* ZPL II, ZPL **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Select Media Power-Up Option** This parameter sets the action of the media when you turn on the printer. *Default Value (non-RFID printers):* CALIBRATION *Default Value (RFID printers):* FEED *Selections:* CALIBRATION, LENGTH, SHORT CAL, NO MOTION, FEED • **Calibration** adjusts sensor levels and thresholds, determines length, and feeds the media to the next web. • **Short Cal** sets media and web thresholds without adjusting sensor gain, determines length, and feeds the media to the next web. • **Length** determines 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. • **Feed**—feeds the labels to the first registration point. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 9 • Printer Parameters (Continued, page 16 of 22)

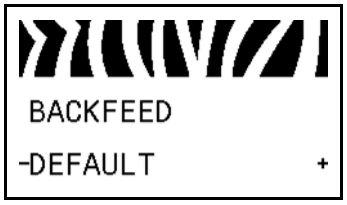
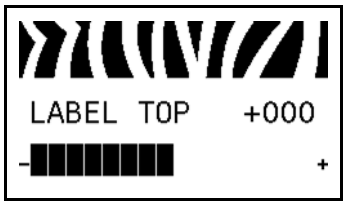
Language/Parameter	Action/Explanation
	**Select Head Close Option** This parameter sets the action of the media when you close the printhead. *Default Value (non-RFID printers):* CALIBRATION *Default Value (RFID printers):* FEED *Selections:* CALIBRATION, LENGTH, SHORT CAL, NO MOTION, FEED • **Calibration** adjusts sensor levels and thresholds, determines length, and feeds the media to the next web. • **Short Cal** sets media and web thresholds without adjusting sensor gain, determines length, and feeds the media to the next web. • **Length** determines 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. • **Feed**—feeds the labels to the first registration point. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Select 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 the *ZPL Programming Guide* for more information). *Default Value:* DEFAULT (90%) *Selections:* DEFAULT, AFTER, OFF, BEFORE, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80% **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Adjust 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). *Default Value:* +000 *Range:* -120 to +120 **To change the value shown:** **1.** Press PLUS (+) to increase the value. **2.** Press MINUS (-) to decrease the value.

Table 9 • Printer Parameters (Continued, page 17 of 22)

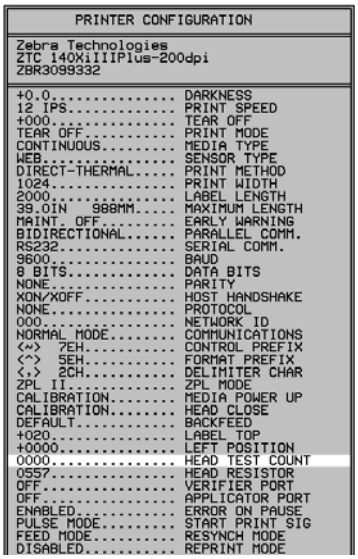
Language/Parameter	Action/Explanation
LEFT POSITION - +0000 +	**Adjust Left Position** This parameter adjusts the print position horizontally on the label. Positive numbers adjust printing to the left by the specified number of dots. Negative numbers shift printing to the right. *Default Value:* 0000 *Range:* –9999 to +9999 dots **To change the value shown:** 1. Press MINUS (-) to move the cursor. 2. Press PLUS (+) to change between +/- and to increase the value of the digit. For a negative value, enter the value before changing to the minus sign.
HEAD TEST COUNT 0000	**Set the Head Test Count** The printer periodically performs a test of the printhead functionality, called a printhead test or head test. This parameter establishes how many labels are printed between these internal tests. **Note •** On the 110Xi4, this parameter appears only if the Head Test Count option is installed. Check the printer configuration label for the option.  PRINTER CONFIGURATION Zebra Technologies ZTC 140XiIIIPlus-200dpi ZBR3099332 +0.0 ... DARKNESS 12 IPS ... PRINT SPEED +000 ... TEAR OFF TEAR OFF ... PRINT MODE CONTINUOUS ... MEDIA TYPE WEB ... SENSOR TYPE DIRECT-THERMAL ... PRINT METHOD 1024 ... PRINT WIDTH 2000 ... LABEL LENGTH 39.0IN 988MM ... MAXIMUM LENGTH MAINT. OFF ... EARLY WARNING BIDIRECTIONAL ... PARALLEL COMM. RS232 ... SERIAL COMM. 9600 ... BAUD 8 BITS ... DATA BITS NONE ... PARITY XON/XOFF ... HOST HANDSHAKE NONE ... PROTOCOL 000 ... NETWORK ID NORMAL MODE ... COMMUNICATIONS <~> 7EH ... CONTROL PREFIX <^> 5EH ... FORMAT PREFIX <,> 2CH ... DELIMITER CHAR ZPL II ... ZPL MODE CALIBRATION ... MEDIA POWER UP CALIBRATION ... HEAD CLOSE DEFAULT ... BACKFEED +020 ... LABEL TOP +0000 ... LEFT POSITION 0000 ... HEAD TEST COUNT 0557 ... HEAD RESISTOR OFF ... VERIFIER PORT OFF ... APPLICATOR PORT ENABLED ... ERROR ON PAUSE PULSE MODE ... START PRINT SIG FEED MODE ... RESYNCH MODE DISABLED ... REPRINT MODE **Default:** 0000 (disables the test) **Range:** 0000 to 9999 **To set the number of labels to print between head tests:** 1. Press MINUS (-) to move to the next digit position. 2. Press PLUS (+) to increase the value of the digit.

Table 9 • Printer Parameters (Continued, page 18 of 22)

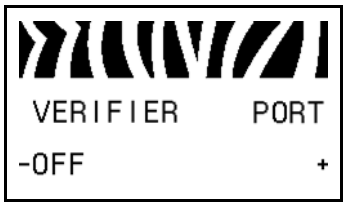
Language/Parameter	Action/Explanation
	**Set the Verifier Port** The auxiliary port is used to determine how the printer reacts to an online verifier. For more information on the operation of the optional verifier, refer to the documentation provided with that option. **Default:** OFF **Selections:** OFF, VER-RPRNT ERR, VER-THRUPUT • **OFF:** The verifier port is off. • **VER-RPRNT ERR:** Label reprinted if verifier detects an error. If a bar code is near the upper edge of the label, the label is fed out far enough to be verified and then backfed to allow the next label to be printed and verified. • **VER-THRUPUT:** Allows greatest throughput but may not indicate a verification error immediately upon detection. May print from one to three labels before an error is recognized and printing stops. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Applicator Port Mode** Determines the action of the applicator port. **Note •** Set this value as suggested by the applicator manufacturer. **Default:** OFF **Selections:** OFF, MODE 1, MODE 2, MODE 3, MODE 4 • **OFF:** The applicator port is off. • **MODE 1:** Asserts the ~END_PRINT signal low while the printer is moving the label forward. • **MODE 2:** Asserts the ~END_PRINT signal high while the printer is moving the label forward. • **MODE 3:** Asserts the ~END_PRINT signal low for 20 milliseconds when a label has been completed and positioned. Not asserted during continuous printing modes. • **MODE 4:** Asserts the ~END_PRINT signal high for 20 milliseconds when a label has been completed and positioned. Not asserted during continuous printing modes. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Table 9 • Printer Parameters (Continued, page 19 of 22)

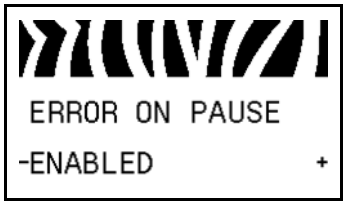
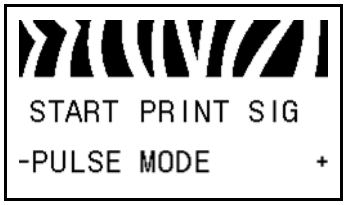
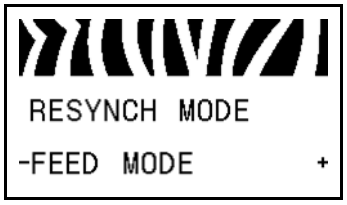
Language/Parameter	Action/Explanation
	**Set Applicator Error Signal When Printer Pauses** When this option is enabled and the printer is paused, the printer sets the applicator error state. **Default:** ENABLED **Selections:** ENABLED, DISABLED **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Select Start Print Signal** This parameter determines how the printer reacts to the Start Print Signal input on pin 3 of the applicator interface connector at the rear of the printer. **Caution •** Start Print Signal is set by the applicator manufacturer and should not be changed unless the factory defaults have been reloaded. Please make a note of it. While other choices are valid, the printer must be returned to its designated setting for it to work properly. **Default:** PULSE MODE **Selections:** PULSE MODE, LEVEL MODE • **PULSE MODE**—Labels print when the signal transitions from HIGH to LOW. • **LEVEL MODE**—Labels print as long as the signal is asserted LOW. **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
	**Select Resynch Mode** This parameter determines how the printer reacts if the label synchronization is lost and the label top is not where expected. **Default:** FEED MODE **Selections:** FEED MODE, ERROR MODE • **FEED MODE**—If the label top is not where expected, the printer feeds a blank label to find the label top position. • **ERROR MODE**—If the label top is not where expected, the printer stops, enters Pause mode, displays the message **Error Condition Feed Label**, flashes the ERROR light, and asserts the Service Required signal (pin 10 on the Applicator Interface Connector). To resynch the media to the top of the label in Error mode, press PAUSE to exit Pause mode. The ERROR light stops flashing, and the Service Required signal is deactivated. The action of the printer is determined by the **Head Close** configuration selection (see *Select Head Close Option* on page 114). **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.

Table 9 • Printer Parameters (Continued, page 20 of 22)

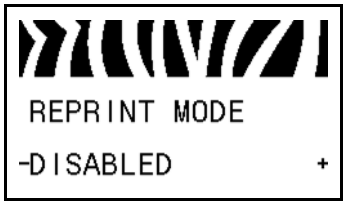
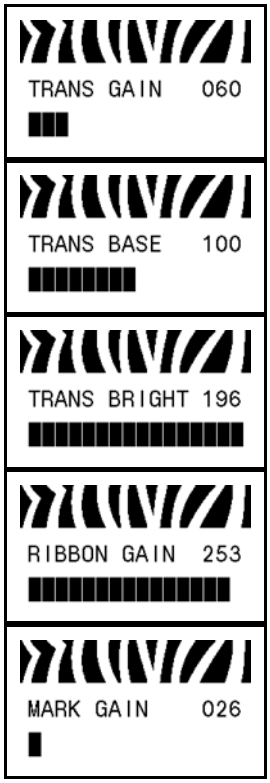
Language/Parameter	Action/Explanation
	**Set Reprint Mode** When reprint mode is enabled, you can reprint the last label printed either by issuing the ~PR ZPL command or by pressing MINUS (-) on the control panel. *Default Value:* DISABLED *Selections:* ENABLED, DISABLED **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to toggle between the options.
See next column	**View Sensor Settings** These parameters are automatically set during the calibration procedure and should be changed only by a qualified service technician. Refer to the *ZPL II Programming Guide* for information on these parameters. **To skip these parameters:** **1.** Press PLUS (+) to skip each of the following parameters:  

Table 9 • Printer Parameters (Continued, page 21 of 22)

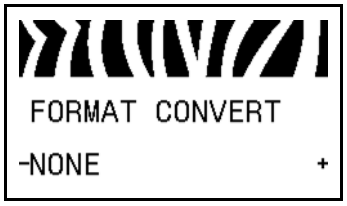
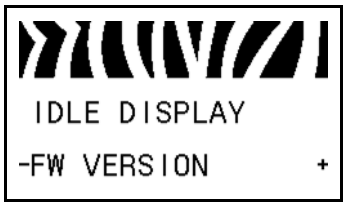
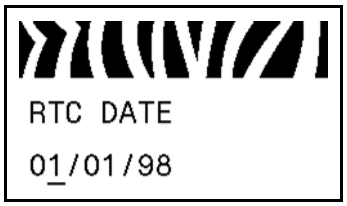
Language/Parameter	Action/Explanation
	**Select Format Convert** Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second, the dpi to which you would like to scale. *Default Value:* NONE *Selections:* NONE, 150 → 300, 150 → 600, 200 → 600, 300 → 600 **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Select Idle Display** This parameter selects the LCD options for the real-time clock. **Note •** If the default value is not selected, pressing PLUS (+) or MINUS (-) briefly displays the firmware version of the printer. *Default Value:* FIRMWARE (FW) VERSION *Selections:* MM/DD/YY (24HR), MM/DD/YY (12HR), DD/MM/YY (24HR), DD/MM/YY (12HR), FW VERSION **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.
	**Set Real-Time Clock (RTC) Date** This parameter allows you to set the date following the convention selected in **IDLE DISPLAY**. **To change the value shown:** **1.** Press MINUS (-) to move to the next digit position. **2.** Press PLUS (+) to change the value of the digit.
	**Set RTC Time** This parameter allows you to set the time following the convention selected in **IDLE DISPLAY**. **To change the value shown:** **1.** Press MINUS (-) to move to the next digit position. **2.** Press PLUS (+) to change the value of the digit.
	**Specify Password Level** This parameter allows you to select whether certain factory-selected menu items or all menu items are password protected. *Default Value:* SELECTED ITEMS *Selections:* SELECTED ITEMS, ALL ITEMS **1.** Press PLUS (+) or MINUS (-) to toggle between the options.

Table 9 • Printer Parameters (Continued, page 22 of 22)

Language/Parameter	Action/Explanation
	**Select the Display Language** This parameter changes the language displayed on the LCD. Each language selection is displayed in the language itself. *Default Value:* ENGLISH *Selections:* ENGLISH, SPANISH, FRENCH, GERMAN, ITALIAN, NORWEGIAN, PORTUGUESE, SWEDISH, DANISH, SPANISH 2, DUTCH, FINNISH, JAPANESE, KOREAN, SIMPLIFIED CHINESE, TRADITIONAL CHINESE, POLISH, RUSSIAN  **To change the value shown:** **1.** Press PLUS (+) or MINUS (-) to scroll through the options.

Additional Control Panel Parameters

Additional parameters appear in the following situations.

- When a Radio Frequency Identification (RFID) reader is installed. The 110Xi4 and 170Xi4 are RFID-ready, but they do not come with an RFID reader installed. For more information about purchasing the RFID option for these printers, contact your authorized Zebra reseller.
- When a wired print server is installed in the printer. For more information, refer to the *ZebraNet 10/100 Print Server User and Reference Guide*
- When a wireless print server is installed in the printer. Refer to the *ZebraNet Wireless User Guide*.

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

Notes •

5

Routine Maintenance

This section provides routine cleaning and maintenance procedures.

Contents

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 *Contacts* on page 11 for contact addresses and telephone numbers.

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 11. 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 11 • Recommended Printer Cleaning Schedule

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

* 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.

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.

Cleaning intervals are as follows, based on the printhead resolution:

For 203 and 300 dpi printers 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.

For 600 dpi printers Clean the printhead after each roll (500 feet or 150 m) of 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.

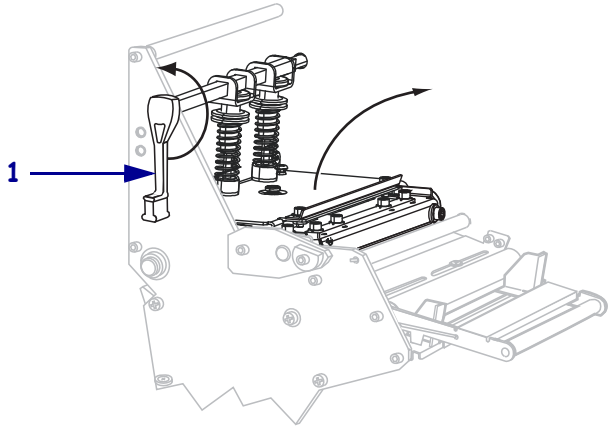
Caution • The printhead may be hot and can cause severe burns. Allow the printhead to cool.

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.

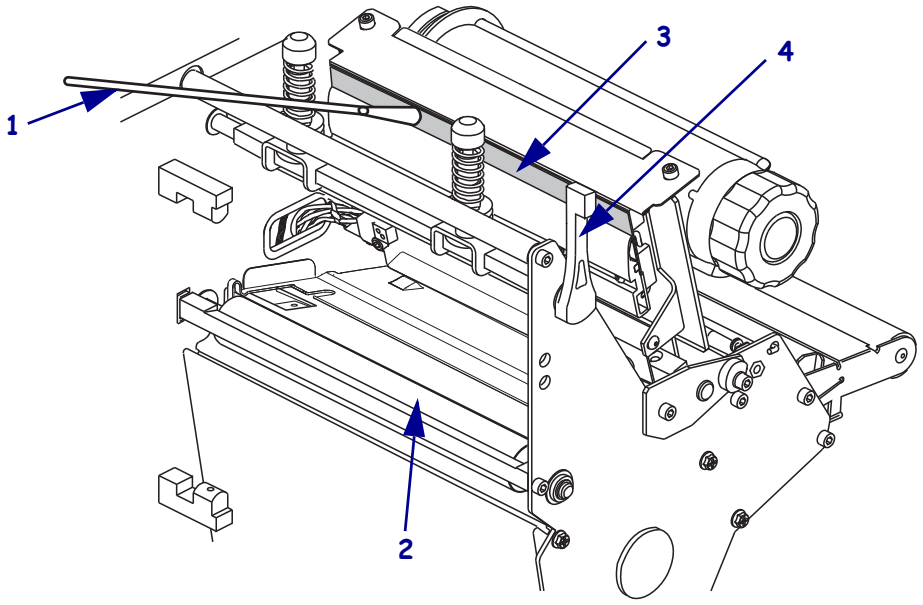
To clean the printhead and platen roller, complete these steps:

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



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.

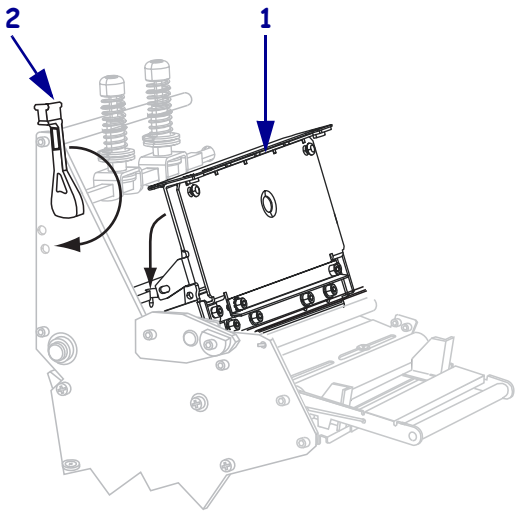


1	Swab
2	Platen roller
3	Printhead print elements
4	Printhead-open lever

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**) clockwise until it locks into place.



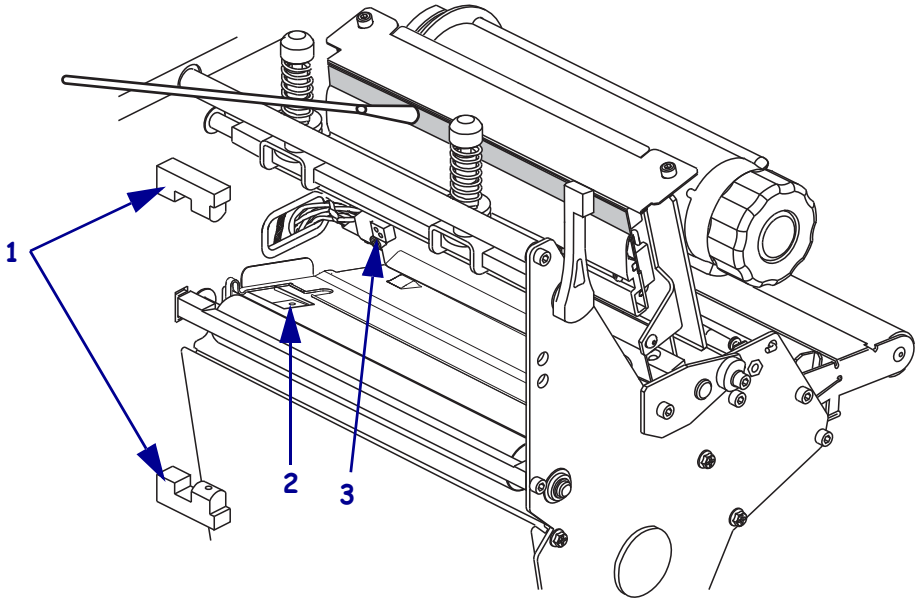
Clean the Sensors

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 16.

Figure 16 • Sensor Locations

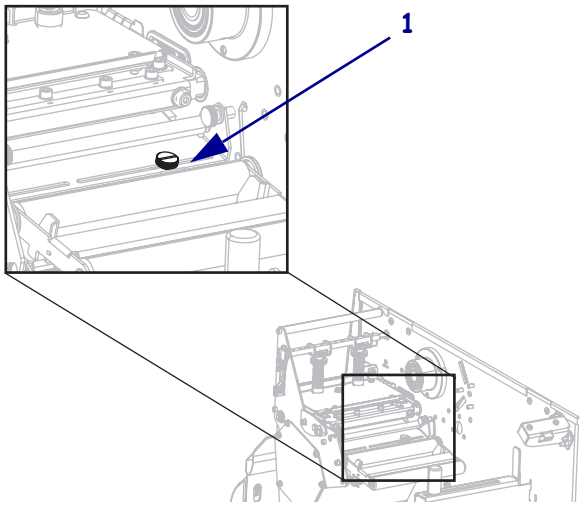


1	Label-available sensors
2	Black mark sensor
3	Ribbon sensor

Transmissive (Media) Sensor Locations

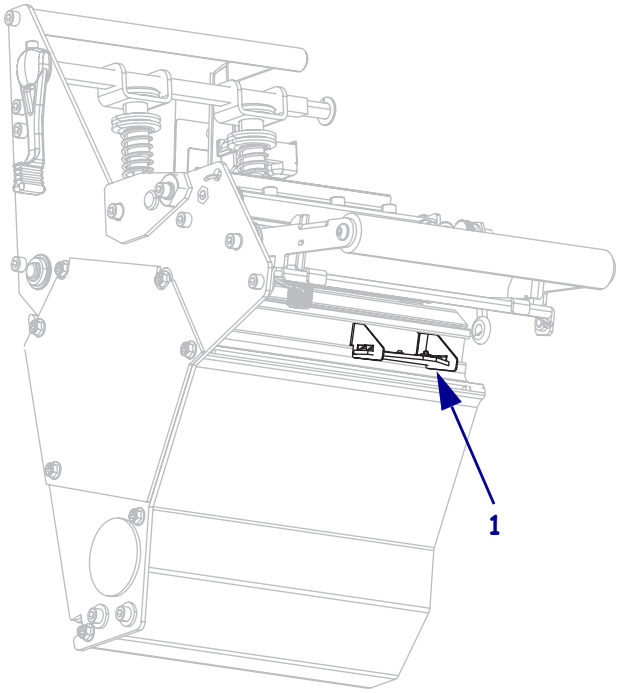
The locations of the upper and lower transmissive (media) sensors are shown in Figure 17 and Figure 18.

Figure 17 • Upper Media Sensor



1	Upper media sensor

Figure 18 • Lower Media Sensor

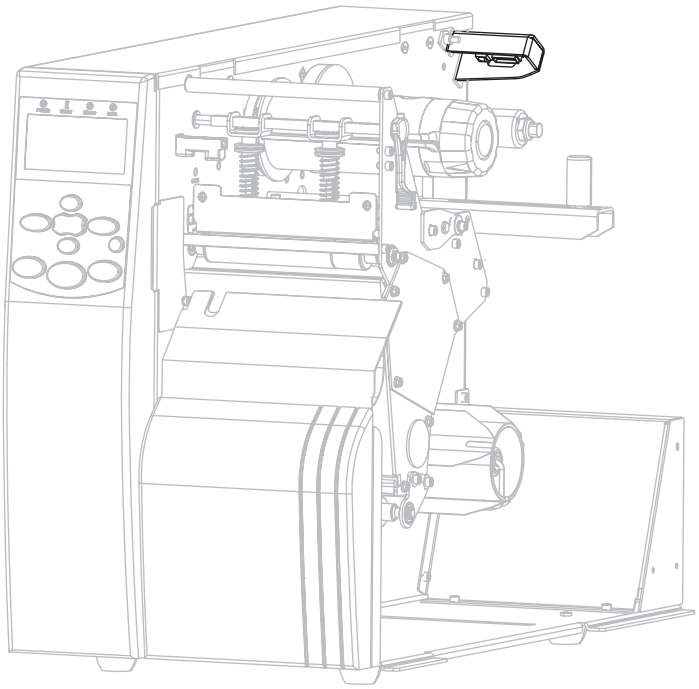


1	Lower media sensor

Media Out Sensor Location

The location of the media out sensor is shown in Figure 19.

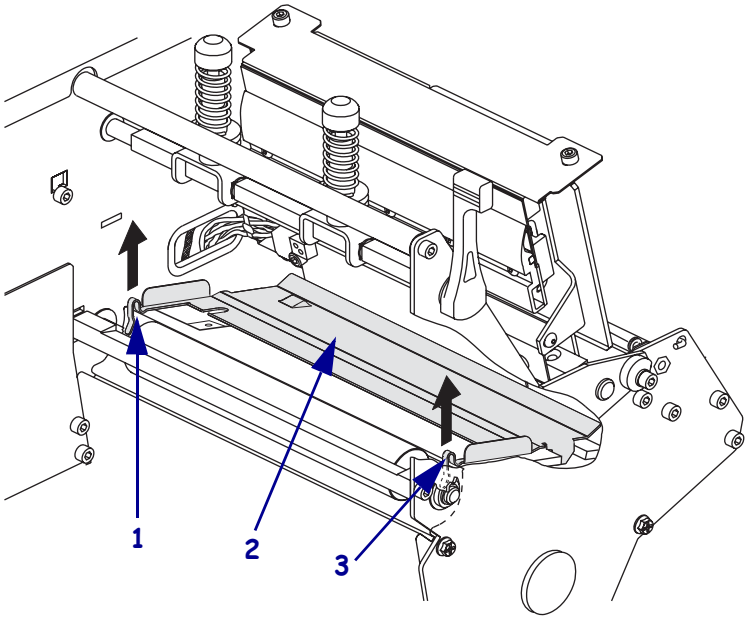
Figure 19 • Media Out Sensor



Clean the Snap Plate

Clean the snap plate when label adhesive or a label is stuck to the underside. Figure 20 shows the location of the snap plate.

Figure 20 • Snap Plate Location



1	Left loop
2	Snap plate
3	Right loop

To clean the snap plate, complete these steps:

1. See Figure 20. Insert a small-blade screwdriver or similar tool into the loop on the left side of the snap plate.
2. Gently lift the left side of the snap plate.
3. Insert a small-blade screwdriver or similar tool into the loop on the right side of the snap plate.
4. Gently lift the right side of the snap plate.
5. Remove the snap plate from the printer.
6. Clean the snap plate with cleaning solvent and a soft cloth.
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. Slide the snap plate toward you.
9. Press down on the loops to lock the snap plate into place.

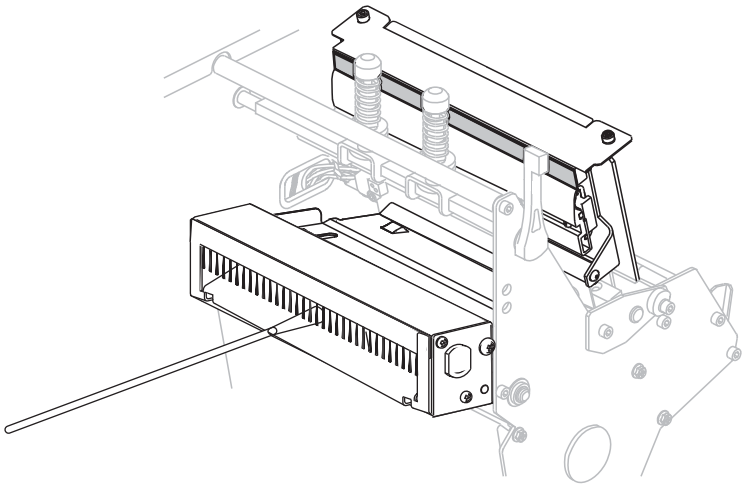
Clean the Cutter

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. Turn off (**O**) the printer.
2. Unplug the power cord.
3. Clean the stationary cutter blade with a swab and solvent.



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

Replace the Fuse

The instructions that follow are for the 140Xi4, 170Xi4, and 220Xi4 printers only. Fuses are not user-replaceable in the 110Xi4.

Caution • Turn the AC power switch off (**O**) and remove the power cord before performing this procedure.

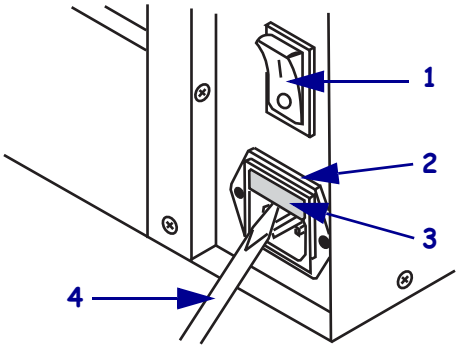
The printer uses a metric-style fuse (5 × 20 mm IEC) rated at F5A, 250 V. The AC power entry module comes with two approved fuses in the fuse holder: one is in-circuit, and the second is provided as a spare. The end caps of the fuse must bear the certification mark of a known international safety organization (see Figure 5 on page 28).

To replace a faulty fuse, complete these steps:

1. Use a small-blade screwdriver or similar tool to remove the fuse holder.

   The fuse holder is part of the AC power entry module at the rear of the printer (Figure 21).

Figure 21 • AC Power Entry Module

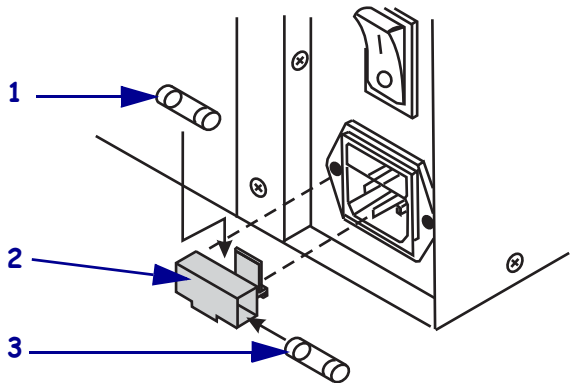


1	Power switch
2	Fuse holder
3	AC power entry module
4	Small-blade screwdriver

2. Remove the faulty fuse and install a new fuse in the in-circuit position (Figure 22).

Important • If you use the spare fuse, be sure to order a replacement fuse from an authorized Zebra distributor. The spare fuse should be the exact type and rating as the original in-circuit fuse.

Figure 22 • Fuse Locations



1	In-circuit fuse
2	Fuse holder
3	Spare fuse

3. Snap the fuse holder back into the AC power entry module.

4. Reconnect the power cord, and turn the printer on (**I**).

Note • If the printer does not power on, an internal component failure may have occurred, and the printer requires servicing by an authorized service technician.

Notes • _____

6 Troubleshooting

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

Contents

Troubleshooting Checklists

If an error condition exists with the printer, review this checklist:

- ❑ Is there an error message on the LCD? If yes, see *LCD Error Messages* on page 139.
- ❑ Are noncontinuous labels being treated as continuous labels? If yes, see *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
- ❑ Is the CHECK RIBBON light on when ribbon is loaded properly? If yes, see *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
- ❑ Are you experiencing problems with print quality? If yes, see *Print Quality Problems* on page 143.
- ❑ Are you experiencing communications problems? If yes, see *Communications Problems* on page 148.

If the labels are not printing or advancing correctly, review this checklist:

- ❑ Are you using the correct type of labels? Review the types of label in *Types of Media* on page 29.
- ❑ Are you using a label that is narrower than the maximum print width? See *Set Print Width* on page 102.
- ❑ Review the label- and ribbon-loading illustrations in *Print Modes and Printer Options* on page 34 and *Load Ribbon* on page 74.
- ❑ Does the printhead need to be adjusted? See *Adjust Printhead Pressure and Toggle Position* on page 88 for more information.
- ❑ Do the sensors need to be calibrated? See *Calibrate Media and Ribbon Sensor Sensitivity* on page 109 for more information.

If none of the above suggestions correct the problem, review this checklist:

- ❑ Perform one or more of the self-tests given in *Printer Diagnostics* on page 152. Use the results to help identify the problem.
- ❑ If you are still having problems, see *Contacts* on page 11 for customer support information.

LCD Error Messages

The LCD displays messages when there is an error. See Table 12 for LCD errors, the possible causes, and the recommended solutions.

Table 12 • LCD Error Messages

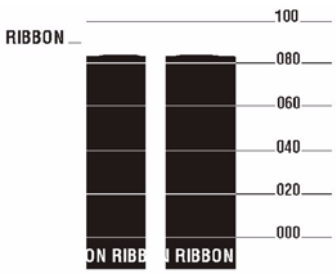
LCD Display/ Printer Condition	Possible Cause	Recommended Solution
ERROR CONDITION INVALID HEAD The ERROR light flashes.	The printhead was replaced with one that is not a genuine Zebra™ printhead.	Install a genuine Zebra™ printhead.
ERROR CONDITION RIBBON OUT The printer stops; the RIBBON light is on; the ERROR light flashes.	In thermal transfer mode, ribbon is not loaded or incorrectly loaded.	Load ribbon correctly.
	In thermal transfer mode, the ribbon sensor is not detecting ribbon that is loaded incorrectly.	**1.** Load ribbon correctly. See *Load Ribbon* on page 74. **2.** Calibrate the sensors. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
	In thermal transfer mode, media is blocking the ribbon sensor.	**1.** Load media correctly. See *Print Modes and Printer Options* on page 34. **2.** Calibrate the sensors. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
	In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.	**1.** Print a sensor profile. See *Print Sensor Profile* on page 108. The ribbon out threshold (marked by the word RIBBON) is likely too high, above the black area that indicates where the ribbon is detected.  **2.** Calibrate the sensors or load printer defaults. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 109 or *LOAD DEFAULTS* on page 95.

Table 12 • LCD Error Messages (Continued)

LCD Display/ Printer Condition	Possible Cause	Recommended Solution
WARNING RIBBON IN The RIBBON light is on; the ERROR light flashes.	Ribbon is loaded, but the printer is set for direct thermal mode.	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.
		If you are using thermal transfer media, which requires ribbon, set the printer for Thermal Transfer mode. See *Select Print Method* on page 102.
ERROR CONDITION PAPER OUT The printer stops; the MEDIA light is on; the ERROR light flashes.	The media is not loaded or is loaded incorrectly.	Load media correctly. See *Print Modes and Printer Options* on page 34.
	Misaligned media sensor.	Check position of the media sensor.
	The printer is set for noncontinuous media, but continuous media is loaded.	Install proper media type, or reset printer for current media type and perform calibration.
HEAD OPEN The printer stops; the ERROR light flashes.	The printhead is not fully closed.	Close printhead completely.
	The head open sensor is not working properly.	Call a service technician.
THERMISTOR FAULT The ERROR light flashes.	The printhead has a faulty thermistor.	Call a service technician.
WARNING HEAD COLD	 **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.	
THERMISTOR FAULT ERROR CONDITION HEAD ELEMENT BAD The printer stops; the ERROR light is on; the printer cycles through these three messages.	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.

Table 12 • LCD Error Messages (Continued)

LCD Display/ Printer Condition	Possible Cause	Recommended Solution
WARNING HEAD COLD The printer prints while the ERROR light flashes.	 **Caution •** An improperly connected printhead data or power cable can cause this error message. The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead temperature is approaching its lower operating limit.	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.
	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.
WARNING HEAD TOO HOT The printer stops; the ERROR light flashes.	 **Caution •** The printhead may be hot enough to cause severe burns. Allow the printhead to cool.	
	The printhead is over temperature.	Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature.

Table 12 • LCD Error Messages (Continued)

LCD Display/ Printer Condition	Possible Cause	Recommended Solution
DEFRAGMENTING The printer stops.	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.
ERROR CONDITION CUTTER JAM The printer stops; the ERROR light flashes.	 **Caution •** The cutter blade is sharp. Do not touch or rub the blade with your fingers.	
	The cutter blade is in the media path.	Turn off the printer power and unplug the printer. Inspect the cutter module for debris and clean as needed following the cleaning instructions in *Clean the Cutter* on page 133.
OUT OF MEMORY (function)	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 *Set Print Width* on page 102.
		Ensure that the device, such as FLASH memory or PCMCIA card, is installed and not write protected or full.
		Ensure that the data is not directed to a device that is not installed or is unavailable.
		Refer to the *Maintenance Manual* for more information about the specified function.

Print Quality Problems

Table 13 identifies problems with print quality, the possible causes, and the recommended solutions.

Table 13 • Print Quality Problems

Problem	Possible Cause	Recommended Solution
General print quality issues	The printer is set at the incorrect print speed.	For optimal print quality, set the print speed to the lowest possible setting for your application via control panel, the driver, or the software. See *Adjust Print Speed* on page 100. You may want to perform the *FEED Self Test* on page 155.
	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 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 via the control panel, the driver, or the software. See *Adjust Print Speed* on page 100. You may want to perform the *FEED Self Test* on page 155 to determine the ideal darkness setting.
	The printhead is dirty.	Clean the printhead. See *Clean the Printhead and Platen Roller* on page 126.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust Printhead Pressure and Toggle Position* on page 88.
	The printhead is improperly balanced.	Call a service technician.
Long tracks of missing print on several labels	Print element damaged.	Call a service technician.
	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in this table.

Table 13 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
Wrinkled ribbon	Ribbon was fed through the ribbon system incorrectly.	Load the ribbon correctly. See *Load Ribbon* on page 74.
	Incorrect burn temperature.	Set the darkness to the lowest possible setting for good print quality. See *Adjust Print Darkness* on page 99.
	Incorrect or uneven printhead pressure.	Set the printhead pressure to the minimum needed for good print quality. See *Adjust Printhead Pressure and Toggle Position* on page 88.
	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 strip plate needs adjusting.	Call a service technician.
	The printhead needs vertical adjustment.	Call a service technician.
	The printhead is improperly balanced.	Call a service technician.
	The printhead and platen roller need to be realigned.	Call a service technician.
Fine, angular gray lines on blank labels	Wrinkled ribbon.	See wrinkled ribbon causes and solutions in this table.
Printing too light or too dark over the entire label	The media is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.
	You are using an incorrect combination of media 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.
	You are using ribbon with direct thermal media.	Direct thermal media does not require ribbon. To check if you are using direct thermal media, perform the label scratch test in *When to Use Ribbon* on page 31.
	Incorrect or uneven printhead pressure.	Set the pressure to the minimum needed. See *Adjust Printhead Pressure and Toggle Position* on page 88.
Smudge marks on labels	The media or ribbon is not designed for high-speed operation.	Replace supplies with those recommended for high-speed operation.

Table 13 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
Misregistration/skips labels	The printer is not calibrated.	Recalibrate the printer.
	The media sensor is not positioned correctly.	Perform media sensor position adjustment.
	Improper label format.	Use correct label format.
Misregistration and misprint of one to three labels	The platen roller is dirty.	See *Clean the Printhead and Platen Roller* on page 126.
	The media sensor is not positioned correctly.	Place the media sensor in the proper position.
	Media does not meet specifications.	Use media that meets specifications.
Vertical drift in top-of-form position	The printer is out of calibration.	Recalibrate the printer.
	Vertical drift occurs during normal printer operation. **Note •** A vertical drift of ± 4 to 6 dot rows (approximately 0.5 mm) is within normal tolerances.	Calibrate the printer. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
	The platen roller is dirty.	Clean the platen roller. See *Clean the Printhead and Platen Roller* on page 126.
Vertical image or label drift	The printer is using non-continuous labels but is configured in continuous mode.	Configure the printer for non-continuous and run calibration routine, if necessary.
	The media sensor is positioned incorrectly.	Ensure that the media sensor is properly positioned to read a single/consistent interlabel gap.
	The media sensor is calibrated improperly.	See *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
	The platen roller is dirty.	Clean the platen roller. See *Clean the Printhead and Platen Roller* on page 126.
	Improper printhead pressure settings (toggles).	Adjust the printhead pressure to ensure proper functionality.
	Improperly loaded media.	Verify that the printer is loaded properly.
	Incompatible media.	Ensure that the interlabel gaps or notches are 2 to 4 mm and consistently placed. Media must not exceed minimum specifications for mode of operation.

Table 13 • Print Quality Problems (Continued)

Problem	Possible Cause	Recommended Solution
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 155. Adjust the darkness or print speed settings as necessary.
	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.

Calibration Problems

Table 14 identifies problems with calibration, the possible causes, and the recommended solutions.

Table 14 • Calibration Problems

Problem	Possible Cause	Recommended Solution
Loss of printing registration on labels. Excessive vertical drift in top-of-form registration.	The platen roller is dirty.	Clean the platen roller according to the instructions in *Clean the Printhead and Platen Roller* on page 126.
	Media guides are positioned improperly.	Ensure that the media guides are properly positioned.
	The media type is set incorrectly.	Set the printer for the correct media type (non-continuous or continuous). See *Set Media Type* on page 101.
Auto Calibrate failed.	Media or ribbon is loaded incorrectly.	Ensure that media and ribbon are loaded correctly.
	The sensors could not detect the media or ribbon.	Manually calibrate the printer. See *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
	The sensors are dirty or positioned improperly.	Ensure that the sensors are clean and properly positioned.

Communications Problems

Table 15 identifies problems with communications, the possible causes, and the recommended solutions.

Table 15 • Communications Problems

Problem	Possible Cause	Recommended Solution
A label format was sent to the printer but was not recognized. The DATA light does not flash.	The communication parameters are incorrect.	Check the printer driver or software communications settings (if applicable).
		If you are using serial communication, check the serial port setting in the control panel menu. See *Set Serial Communications* on page 110.
		If you are using serial communication, make sure that you are using a null modem cable or a null modem adapter.
		Using the control panel controls, check the protocol setting. It should be set to NONE. See *Set Protocol* on page 111.
		If a driver is used, check the driver communication settings for your connection.
A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.	The serial communication settings are incorrect.	Ensure that the flow control settings match.
		Check the communication cable length. See Table 3 on page 23 for requirements.
		Check the printer driver or software communications settings (if applicable).
A label format was sent to the printer but was not recognized. The DATA light flashes but no printing occurs.	The prefix and delimiter characters set in the printer do not match the ones in the label format.	Verify the prefix and delimiter characters. See *Set Format Prefix Character* on page 112 and *Set Delimiter Character* on page 112 for the requirements.
	Incorrect data is being sent to the printer.	Check the communication settings on the computer. Ensure that they match the printer settings.
		Ensure that ZPL II is being used.
		If the problem continues, check the ZPL II format for changes to ^CC, ^CT, and ^CD.

Ribbon Problems

Table 16 identifies problems that may occur with ribbon, the possible causes, and the recommended solutions.

Table 16 • Ribbon Problems

Problem	Possible Cause	Recommended Solution
Broken or melted ribbon	Darkness setting too high.	1. Reduce the darkness setting. 2. Clean the printhead thoroughly.
The printer does not detect when the ribbon runs out.	The printer was 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 Media and Ribbon Sensor Sensitivity* on page 109.
In thermal transfer mode, the printer did not detect the ribbon even though it is loaded correctly.		
The ribbon light is on even though ribbon is loaded correctly.	The printer was not calibrated for the label and ribbon being used.	Perform the calibration procedure in *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.

Miscellaneous Printer Problems

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

Table 17 • Miscellaneous Printer Problems

Problem	Possible Cause	Recommended Solution
The LCD displays a language that I cannot read	The language parameter was changed through the control panel or a firmware command.	**1.** Press SETUP/EXIT to enter configuration mode. **2.** Press MINUS (-). The printer displays the LANGUAGE parameter in the current language. Even if you cannot recognize the characters displayed, you can still scroll to another language. **3.** Press PLUS (+) or MINUS (-) to scroll through the choices until you find a language that you can read. **4.** Press SETUP/EXIT. The LCD displays SAVE CHANGES in the original language. **5.** Press NEXT/SAVE to exit configuration mode and save the changes (if the language does not change, you may need to scroll to a different save option by pressing PLUS (+) or MINUS (-) in the previous step). **6.** Repeat this process, if necessary, until you reach the desired language.
The LCD is missing characters or parts of characters	The LCD may need replacing.	Call a service technician.
Changes in parameter settings did not take effect	Parameters are set incorrectly.	**1.** Set parameters and save permanently. **2.** Turn the printer off (**O**) and then on (**I**).
	A firmware command turned off the ability to change the parameter.	Refer to the *Programming Guide* for the printer language being used, or call a service technician.
	A firmware command changed the parameter back to the previous setting.	Refer to the *Programming Guide* for the printer language being used, or call a service technician.
	If the problem continues, there may be a problem with the main logic board.	Call a service technician.

Table 17 • Miscellaneous Printer Problems (Continued)

Problem	Possible Cause	Recommended Solution
The printer fails to calibrate or detect the top of the label.	The printer was not calibrated for the label being used.	Perform the calibration procedure in *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
	The printer is configured for continuous media.	Set the media type to noncontinuous media. See *Set Media Type* on page 101.
	The driver or software configuration is not set correctly.	Driver or software settings produce commands that can overwrite the printer configuration. Check the driver or software media-related setting.
Non-continuous labels are being treated as continuous labels.	The printer was not calibrated for the media being used.	Perform the calibration procedure in *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.
	The printer is configured for continuous media.	Set the media type to noncontinuous media. See *Set Media Type* on page 101.
All lights are on, but nothing displays on the LCD, 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. The most commonly used are the Power-On and the CANCEL self tests.

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 using *Set Print Width* on page 102, 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**).
- If printer is in applicator mode and the liner is being taken up by the applicator, the operator must manually remove the labels as they become available.

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 POWER 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

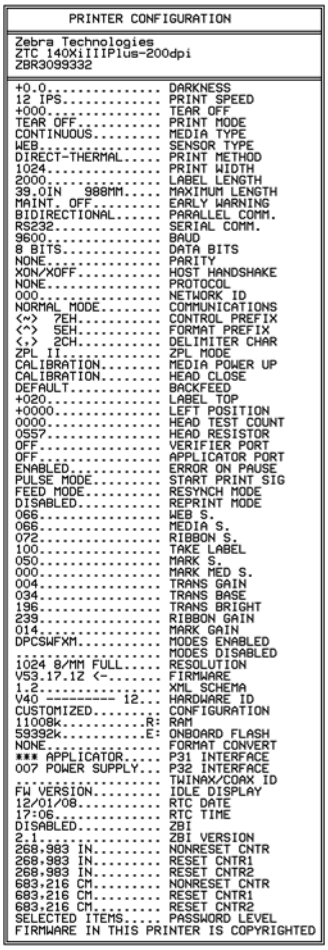
The CANCEL self test prints a configuration label (Figure 23).

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.

   A printer configuration label prints (Figure 23).

Figure 23 • Sample Configuration Label



```
PRINTER CONFIGURATION

Zebra Technologies
ZTC 140XiIIIPlus-200dpi
ZBR3099332

+0.0............... DARKNESS
12 IPS............. PRINT SPEED
+000............... TEAR OFF
TEAR OFF........... PRINT MODE
CONTINUOUS......... MEDIA TYPE
WEB................ SENSOR TYPE
DIRECT-THERMAL..... PRINT METHOD
1024............... PRINT WIDTH
2000............... LABEL LENGTH
39.0IN   988MM..... MAXIMUM LENGTH
MAINT. OFF......... EARLY WARNING
BIDIRECTIONAL...... PARALLEL COMM.
RS232.............. SERIAL COMM.
9600............... BAUD
8 BITS............. DATA BITS
NONE............... PARITY
XON/XOFF........... HOST HANDSHAKE
NONE............... PROTOCOL
000................ NETWORK ID
NORMAL MODE........ COMMUNICATIONS
<~>  7EH........... CONTROL PREFIX
<^>  5EH........... FORMAT PREFIX
<,>  2CH........... DELIMITER CHAR
ZPL II............. ZPL MODE
CALIBRATION........ MEDIA POWER UP
CALIBRATION........ HEAD CLOSE
DEFAULT............ BACKFEED
+020............... LABEL TOP
+0000.............. LEFT POSITION
0000............... HEAD TEST COUNT
0557............... HEAD RESISTOR
OFF................ VERIFIER PORT
OFF................ APPLICATOR PORT
ENABLED............ ERROR ON PAUSE
PULSE MODE......... START PRINT SIG
FEED MODE.......... RESYNCH MODE
DISABLED........... REPRINT MODE
066................ WEB S.
066................ MEDIA S.
072................ RIBBON S.
100................ TAKE LABEL
050................ MARK S.
000................ MARK MED S.
004................ TRANS GAIN
034................ TRANS BASE
196................ TRANS BRIGHT
239................ RIBBON GAIN
014................ MARK GAIN
DPCSWFXM........... MODES ENABLED
................... MODES DISABLED
1024 8/MM FULL..... RESOLUTION
V53.17.12 <-....... FIRMWARE
1.2-............... XML SCHEMA
V4Q ---------- 12... HARDWARE ID
CUSTOMIZED......... CONFIGURATION
11008k..........R: RAM
59392k..........E: ONBOARD FLASH
NONE............... FORMAT CONVERT
*** APPLICATOR..... P31 INTERFACE
007 POWER SUPPLY... P32 INTERFACE
................... TWINAX/COAX ID
FW VERSION......... IDLE DISPLAY
12/01/08........... RTC DATE
17:06.............. RTC TIME
DISABLED........... ZBI
2.1................ ZBI VERSION
268,983 IN......... NONRESET CNTR
268,983 IN......... RESET CNTR1
268,983 IN......... RESET CNTR2
683,216 CM........ NONRESET CNTR
683,216 CM........ RESET CNTR1
683,216 CM........ RESET CNTR2
SELECTED ITEMS..... PASSWORD LEVEL
FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

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 24 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 24 shows a sample of the labels.

Figure 24 • PAUSE Test Label

- 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.
- 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.

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).

Depending on the dot density of the printhead, seven labels are printed at each of the following speeds:

- 203 dpi printers: 2 ips, 6 ips, and 10 ips
- 300 dpi printers: 2 ips, 6 ips, 8 ips
- 600 dpi printers: 2 ips, 4 ips

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 25) at various speeds and at darkness settings higher and lower than the darkness value shown on the configuration label.

Figure 25 • FEED Test Label

4. See Figure 26 and Table 18. 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.

Figure 26 • Bar Code Darkness Comparison

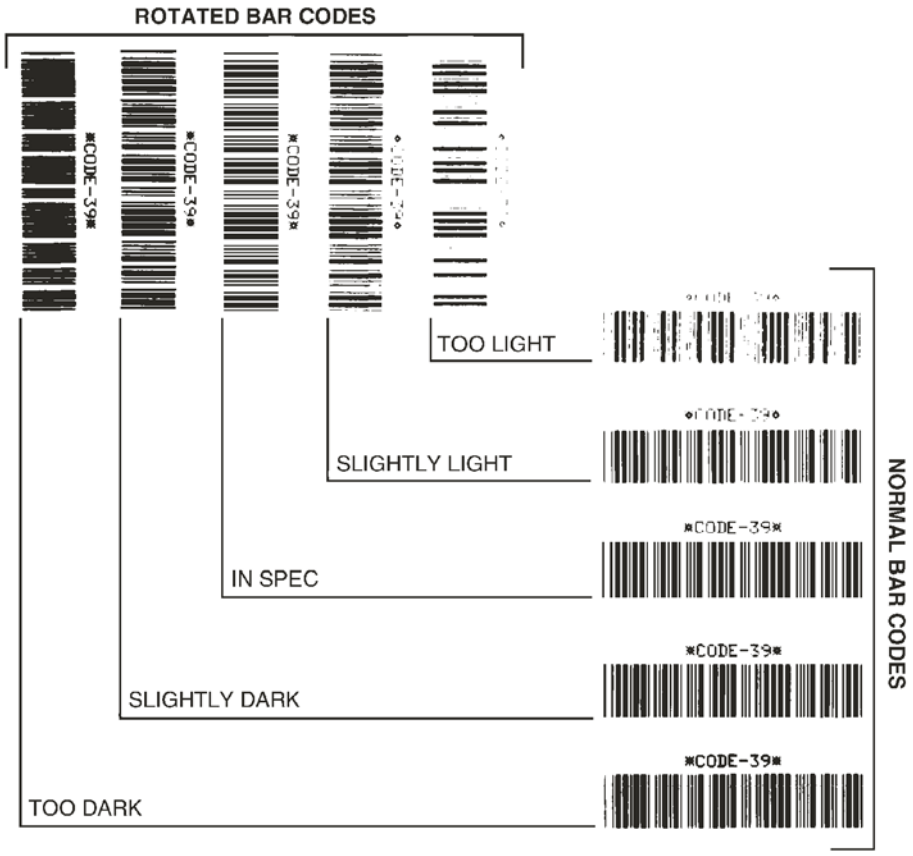


Table 18 • Judging Bar Code Quality

Print Quality	Description
Too dark	Labels that are too dark are fairly obvious. They may be readable but not “in-spec.” • The normal bar code bars increase in size. • The openings in small alphanumeric characters may fill in with ink. • Rotated bar code bars and spaces run together.
Slightly dark	Slightly dark labels are not as obvious. • The normal bar code will be “in-spec.” • Small character alpha numerics will be bold and could be slightly filled in. • The rotated bar code spaces are small when compared to the “in-spec” code, possibly making the code unreadable.
“In-spec”	The “in-spec” bar code can only be confirmed by a verifier, but it should exhibit some visible characteristics. • The normal bar code will have complete, even bars and clear, distinct spaces. • 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.” • In both normal and rotated styles, small alphanumeric characters look complete.
Slightly light	Slightly light labels are, in some cases, preferred to slightly dark ones for “in-spec” bar codes. • Both normal and rotated bar codes will be in spec, but small alphanumeric characters may not be complete.
Too light	Labels that are too light are obvious. • Both normal and rotated bar codes have incomplete bars and spaces. • Small alphanumeric characters are unreadable.

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. See *Adjust Print Darkness* on page 99.

8. If necessary, change the print speed to the same speed as on the best test label. See *Adjust Print Speed* on page 100.

FEED and 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 media calibration procedure must be performed.

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

1. Turn off (**O**) the printer.
2. Press and hold FEED and PAUSE while turning on (**I**) the printer.
3. Hold FEED and PAUSE until the first control panel light turns off.

   The printer configuration is temporarily reset to the factory default values. No labels print at the end of this test.

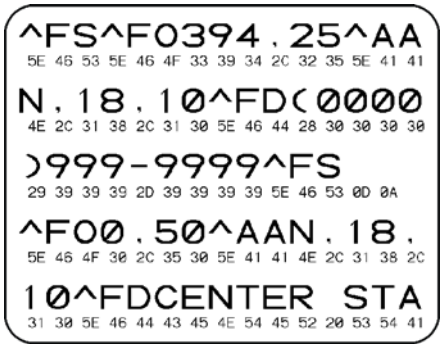
Communications Diagnostics Test

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 27 shows a typical test label from this test.

Note • The test label prints upside-down.

Figure 27 • Communications Diagnostics Test Label



To use communications diagnostics mode, complete these steps:

1. Set the print width equal to or less than the label width being used for the test. See *Set Print Width* on page 102 for more information.
2. Set the printer to **DIAGNOSTICS**. For instructions, see *Set Communications Mode* on page 111.

   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

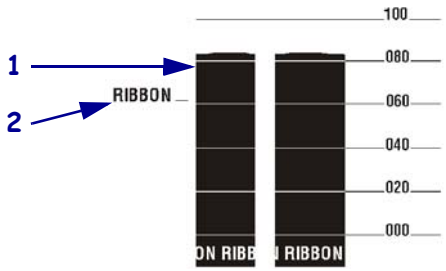
Use the sensor profile label to troubleshoot the following types of problems:

- If the media sensor experiences difficulty in determining gaps (web) between labels.
- If the media sensor incorrectly identifies preprinted areas on a label as gaps (web).

For instructions on printing a sensor profile, see *Print Sensor Profile* on page 108. If the sensitivity of the sensors must be adjusted, perform *Calibrate Media and Ribbon Sensor Sensitivity* on page 109.

Ribbon Sensor Profile (Figure 28) 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.

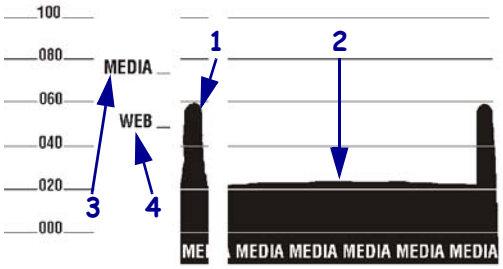
Figure 28 • Sensor Profile (Ribbon Section)



Media Sensor Profile (Figure 29) The media sensor readings are shown as bars and flat areas on the sensor profile. 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.

Figure 29 • Sensor Profile (Media Section)



7 Specifications

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

Contents

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
- DRAM 16 MB
- USB 2.0 Port
- Real-time Clock
- Advanced Counter

Print Modes

Five different print modes can be used, depending on the printer options purchased:

- **Tear-Off Mode:** Labels are produced in strips.
- **Peel-Off Mode:** Labels are dispensed and peeled from the backing as needed.
- **Cutter Mode:** Labels are printed and individually cut.
- **Applicator Mode:** The printer is part of a larger label application system.
- **Rewind Mode:** Labels are rewound internally.

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°)
- Slew command
- 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

Dimensions	110Xi4	140Xi4	170Xi4	220Xi4
Height	15.5 in (393.7 mm)	15.5 in. (393.7 mm)	15.5 in. (393.7 mm)	15.5 in (393.7 mm)
Width	10.37 in. (263.5 mm)	11.5 in. (283.2 mm)	13.15 in. (334.4 mm)	15.65 in. (397.5 mm)
Depth	19.5 in. (495.3 mm)	19.5 in. (495.3 mm)	19.5 in. (495.3 mm)	19.5 in. (495.3 mm)
Weight without options	51 lb. (25 kg)	55 lb. (25 kg)	67 lb. (30.5 kg)	72 lb. (32.7 kg)

Electrical Specifications

Power	110Xi4	140Xi4	170Xi4	220Xi4
General	90 to 265 VAC; 48 to 62 Hz	90 to 265 VAC; 48 to 62 Hz	90 to 265 VAC; 48 to 62 Hz	90 to 265 VAC; 48 to 62 Hz
Power consumption printing PAUSE test at slowest speed	180 W	180 W	220 W	269 W
Printer idle	20 W	20 W	20 W	20 W

Environmental Conditions for Operation and Storage

Environment	Mode	Temperature	Relative Humidity
Operation	Thermal Transfer	40° to 105°F (5° to 40° C)	20 to 85% non-condensing
	Direct Thermal	32° to 105°F (0° to 40° C)	
Storage	Thermal Transfer or Direct Thermal	–40° to 140°F (–40° to 60° C)	5 to 85% non-condensing

Print Specifications by Model

Refer to the key and the tables that follow for printer specifications.

Specifications Key

▞	Non-Continuous printing (gap, notch, or hole between labels).
■	Continuous printing (no gap, notch or hole).
◆	Ladder (rotated) orientation.
✧	Picket fence (nonrotated) orientation.

110Xi4

Print Specifications	110Xi4 200 dpi	110Xi4 300 dpi	110Xi4 600 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	600 dots/inch (24 dots/mm)
Dot size (width×length)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0033×0.0033 in. (0.084×0.084 mm)	0.0016×0.0016 in. (0.042×0.042 mm)
First dot location (measured from inside media edge)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.023 ± 0.035 in. (0.6 ± 0.9 mm)	0.023 ± 0.035 in. (0.6 ± 0.9 mm)
Maximum print width	4.09 in. (104 mm)	4.09 in. (104 mm)	4.09 in. (104 mm)
Selectable print speeds (inches per second)	2.4, 3 through 10	2.4, 3 through 8	1.5, 2 through 4
Maximum Print length	39 in. (991 mm)▞ 150 in. (3810 mm)■	39 in. (991 mm)▞ 100 in. (3810 mm)■	39 in. (991 mm)▞ 39 in. (991 mm)■
Bar code modulus (X) dimension	4.9 mil to 49 mil◆ 4.9 mil to 49 mil✧	3.9 mil to 39 mil◆ 3.33 mil to 33 mil✧	1.6 mil to 16 mil◆ 1.6 mil to 16 mil✧
Thin film printhead with Element Energy Equalizer (E^3)®	Yes	Yes	Yes

140Xi4, 170Xi4, and 220Xi4

Print Specifications	140Xi4	170Xi4 200 dpi	170Xi4 300 dpi	220Xi4 200 dpi	220Xi4 300 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)
Dot size (width×length)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0033×0.0033 in. (0.084×0.084 mm)	0.0049×0.0049 in. (0.125×0.125 mm)	0.0033×0.0033 in. (0.084×0.084 mm)
First dot location (measured from inside media edge)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)	0.10 ± 0.035 in. (2.5 ± 0.9 mm)
Maximum print width	5.04 in. (128 mm)	6.6 in. (168 mm)	6.6 in. (168 mm)	8.5 in. (216 mm)	8.5 in. (216 mm)
Selectable Print Speeds (inches per second)	2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	2.4, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	2.4, 3, 4, 5, 6, 7, 8	2.4, 3, 4, 5, 6, 7, 8, 9, 10	2.4, 3, 4, 5, 6
Maximum print length	39 in. (99 cm)▄■ 150 in. (381 cm)■	39 in. (99 cm)▄■ 100 in. (254 cm)■	39 in. (99 cm)▄■ 100 in. (254 cm)■	39 in. (99 cm)▄■ 150 in. (381 cm)■	39 in. (99 cm)▄■ 150 in. (381 cm)■
Bar code modulus (X) dimension	4.9 mil to 49 mil◆ 4.9 mil to 49 mil✧	3.9 mil to 39 mil◆ 3.33 mil to 33 mil✧	3.9 mil to 39 mil◆ 3.33 mil to 33 mil✧	4.9 mil to 49 mil◆ 4.9 mil to 49 mil✧	4.9 mil to 49 mil◆ 4.9 mil to 49 mil✧
Thin film printhead with Element Energy Equalizer (E3)	Yes	Yes	Yes	Yes	Yes

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.

110Xi4

Ribbon Specifications	110Xi4 200 dpi	110Xi4 300 dpi	110Xi4 600 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	600 dots/inch (24 dots/mm)
Ribbon width Minimum	0.79 in. (20 mm)	0.79 in. (20 mm)	0.79 in. (20 mm)
Ribbon width Maximum	4.33 in. (110 mm)	4.33 in. (110 mm)	4.33 in. (110 mm)
Standard length with 2:1 label to ribbon ratio	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)
Standard length with 3:1 label to ribbon ratio	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)
Ribbon core inside diameter	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
Maximum ribbon roll outside diameter	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)

140Xi4, 170Xi4, and 220Xi4

Ribbon Specifications	140Xi4	170Xi4 200 dpi	170Xi4 300 dpi	220Xi4 200 dpi	220Xi4 300 dpi
Printhead resolution	203 dots/inch (8 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)
Ribbon width Minimum	1.57 in. (40 mm)	2.0 in. (51 mm)	2.0 in. (51 mm)	4.25 in. (108 mm)	4.25 in. (108 mm)
Ribbon width Maximum	5.10 in. (130 mm)	6.7 in. (170 mm)	6.7 in. (170 mm)	8.60 in. (220 mm)	8.60 in. (220 mm)
Standard length with 2:1 label to ribbon ratio	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)	984 ft (300 m)
Standard length with 3:1 label to ribbon ratio	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)	1476 ft (450 m)
Ribbon core inside diameter	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)	1.0 in. (25.4 mm)
Maximum ribbon roll outside diameter	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)	3.2 in. (81.3 mm)

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.

110Xi4

Media Specifications		110Xi4 200 dpi	110Xi4 300 dpi	110Xi4 600 dpi
Minimum label length	Tear-Off	0.7 in. (18 mm)	0.7 in. (18 mm)	0.7 in. (18 mm)
	Peel-Off	0.5 in. (13 mm)	0.5 in. (13 mm)	0.5 in. (13 mm)
	Cutter	1.5 in. (38 mm)	1.5 in. (38 mm)	1.5 in. (38 mm)
	Rewind	0.25 in. (6 mm)	0.25 in. (6 mm)	0.25 in. (6 mm)
Total media width (label + backing, if any)	Minimum	0.79 in. (20 mm)	0.79 in. (20 mm)	0.79 in. (20 mm)
	Maximum	4.5 in. (114 mm)	4.5 in. (114 mm)	4.5 in. (114 mm)
Total thickness (includes backing, if any)		0.003 in. (0.076 mm)	0.003 in. (0.076 mm)	0.003 in. (0.076 mm)
		0.012 in. (0.305 mm)	0.012 in. (0.305 mm)	0.012 in. (0.305 mm)
Cutter maximum full-width media thickness		0.009 in. (0.23 mm)	0.009 in. (0.23 mm)	0.009 in. (0.23 mm)
Roll media core inside diameter		3 in. (76 mm)	3 in. (76 mm)	3 in. (76 mm)
Maximum roll diameter on 3 in. (76 mm) core		8.0 in. (203 mm)	8.0 in. (203 mm)	8.0 in. (203 mm)
Interlabel gap	Minimum	0.079 in. (2 mm)	0.079 in. (2 mm)	0.079 in. (2 mm)
	Preferred	0.118 in. (3 mm)	0.118 in. (3 mm)	0.118 in. (3 mm)
	Maximum	No more than the calibrated length of the label.	No more than the calibrated length of the label.	No more than the calibrated length of the label.
Maximum internal fanfold media pack size (label + backing): L × W×H		8.0×4.5×4.5 in. (203×114×114 mm)	8.0×4.5×4.5 in. (203×114×114 mm)	8.0×4.5×4.5 in. (203×114×114 mm)
Ticket/tag sensing notch: L × W		0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)
Ticket/tag sensing hole diameter		0.125 in. (3 mm)	0.125 in. (3 mm)	0.125 in. (3 mm)
Label registration tolerance (vertical)		± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)
Label registration tolerance (horizontal)		± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)	± 0.06 in. (± 1.5 mm)

110Xi4 Black Mark Sensing Only

Media Specifications		110Xi4 200 dpi	110Xi4 300 dpi	110Xi4 600 dpi
Mark length (measuring parallel to label/tag edge)	Minimum	0.12 in. (3 mm)	0.12 in. (3 mm)	0.12 in. (3 mm)
	Maximum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
Mark width (measuring to perpendicular label/tag edge)	Minimum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
	Maximum	Full media width	Full media width	Full media width
Mark location		within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge
Mark density in Optical Density Unit (ODU)		>1.0	>1.0	>1.0

140Xi4, 170Xi4, and 220Xi4 Printers

Media Specifications		140Xi4	170Xi4	220Xi4
Minimum label length	Tear-Off	0.7 in. (18 mm)	0.7 in. (18 mm)	0.7 in. (18 mm)
	Peel-Off	0.5 in. (13 mm)	0.5 in. (13 mm)	0.5 in. (13 mm)
	Cutter	1.5 in. (38 mm)	1.5 in. (38 mm)	1.5 in. (38 mm)
	Rewind	0.25 in. (6 mm)	0.25 in. (6 mm)	0.25 in. (6 mm)
Total media width (label + backing, if any)	Minimum	1.57 in. (40 mm)	2.00 in. (51 mm)	4.25 in. (108 mm)
	Maximum	5.51 in. (140 mm)	7.1 in. (180 mm)	8.80 in. (224 mm)
Total thickness (includes backing, if any)	Minimum	0.003 in. (0.076 mm)	0.003 in. (0.076 mm)	0.003 in. (0.076 mm)
	Maximum	0.012 in. (0.305 mm)	0.012 in. (0.305 mm)	0.012 in. (0.305 mm)
Cutter maximum full-width media thickness		0.009 in. (0.23 mm)	0.007 in. (0.18 mm)	0.005 in. (0.14 mm)
Roll media core inside diameter		3 in. (76 mm)	3 in. (76 mm)	3 in. (76 mm)
Maximum roll diameter on 3 in. (76 mm) core		8.0 in. (203 mm)	8.0 in. (203 mm)	8.0 in. (203 mm)
Interlabel gap	Minimum	0.079 in. (2 mm)	0.079 in. (2 mm)	0.079 in. (2 mm)
	Preferred	0.118 in. (3 mm)	0.118 in. (3 mm)	0.118 in. (3 mm)
	Maximum	No more than the calibrated length of the label.	No more than the calibrated length of the label.*	No more than the calibrated length of the label.
Maximum internal fanfold media pack size (label + backing): L×W×H		8.0×5.5×4.5 in. (203×140×114 mm)	8.0×7.1×4.5 in. (203×180×114 mm)	8.0×8.8×4.5 in. (203×224×114 mm)
Ticket/tag sensing notch: L×W		0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)	0.12×0.25 in. (3×6 mm)
Ticket/tag sensing hole diameter		0.125 in. (3 mm)	0.125 in. (3 mm)	0.125 in. (3 mm)
Effective leading edge registration accuracy (vertical)		± 0.070 in. (± 1.8 mm)	± 0.070 in. (± 1.8 mm)	± 0.060 in. (± 1.5 mm)
Effective leading edge registration accuracy (horizontal)		± 0.070 in. (± 1.8 mm)	± 0.070 in. (± 1.8 mm)	± 0.060 in. (± 1.5 mm)

140Xi4, 170Xi4, and 220Xi4 Black Mark Sensing Only

Media Specifications		140Xi4	170Xi4	220Xi4
Mark length (measuring parallel to label or tag edge)	Minimum	0.12 in. (3 mm)	0.12 in. (3 mm)	0.12 in. (3 mm)
	Maximum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
Mark width (measuring to perpendicular label or tag edge)	Minimum	0.43 in. (11 mm)	0.43 in. (11 mm)	0.43 in. (11 mm)
	Maximum	Full media width	Full media width	Full media width
Mark location		within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge	within 0.040 in. (1 mm) of the inside media edge
Mark density in Optical Density Unit (ODU)		>1.0	>1.0	>1.0

Notes •

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17. Injunctive Relief. You acknowledge that, in the event you breach any provision of this Agreement, Zebra will not have an adequate remedy in money or damages. Zebra shall therefore be entitled to obtain an injunction against such breach from any court of competent jurisdiction immediately upon request without posting bond. Zebra's right to obtain injunctive relief shall not limit its right to seek further remedies.

18. Entire Agreement. This Agreement constitutes the entire understanding and agreement of the parties and supersedes any and all prior or contemporaneous representations, understandings and agreements between the parties with respect to the subject matter of this Agreement. If any provision of this Agreement is held invalid, the remainder of this Agreement shall continue in full force and effect.

19. Assignment. You may not assign this Agreement or any of your rights or obligations hereunder (by operation of law or otherwise) without the prior written consent of Zebra. Zebra may assign this Agreement and its rights and obligations without your consent. Subject to the foregoing, this Agreement shall be binding upon and inure to the benefit of the parties to it and their respective legal representatives, successors and permitted assigns.

20. Modification. No modification of this Agreement shall be binding unless it is in writing and is signed by an authorized representative of the party against whom enforcement of the modification is sought.

21. Waiver. The failure by a party to exercise any right hereunder shall not operate as a waiver of such party's right to exercise such right or any other right in the future.

22. QUESTIONS. Should you have any questions, or if you desire to contact Zebra for any reason, please contact the Zebra subsidiary serving your country, or write:

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333 Corporate Woods Parkway
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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.

character set The set of all letters, numerals, punctuation marks, and other characters that can be expressed by a particular font or bar code.

character shaping Characters assume different glyphic forms depending on the context.They can be used with a script-based language.

check digit A character added to a bar code symbol that indicates to the scanner that it has read the symbol correctly.

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™.

inlay An RFID transponder.

integrated circuit (IC) chip The part of an RFID transponder that contains the RF circuit, coders, decoders, and memory.

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.

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.

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*.

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