# Zebra® QLn™ Series Mobile Printers

## User Guide

ZEBRA
TECHNOLOGIES

# Table of Contents

# Proprietary Statements

This manual contains proprietary information of Zebra Technologies Corporation. It is intended solely for the information and use of parties operating and maintaining the equipment described herein. Such proprietary information may not be used, reproduced, or disclosed to any other parties for any other purpose without the expressed written permission of Zebra Technologies Corporation.

Product Improvements

Since continuous product improvement is a policy of Zebra Technologies Corporation, all specifications and signs are subject to change without notice.

Agency Approvals and Regulatory Information
- Design certified by TUV
- Canadian STD RSS-210
- EN60950: 2006 Safety Standard
- C-Tick (Australia)
- FCC part 15 Class B
- EN55024:2003 European Immunity Standard
- NOM (Mexico)
- EN55022:2006 Class B European Electromagnetic Radiation Standard

Liability Disclaimer

Inasmuch as every effort has been made to supply accurate information in this manual, Zebra Technologies Corporation is not liable for any erroneous information or omissions. Zebra Technologies Corporation reserves the right to correct any such errors and disclaims liability resulting therefrom.

No Liability for Consequential Damage

In no event shall Zebra Technologies Corporation or anyone else involved in the creation, production, or delivery of the accompanying product (including hardware and software) be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or the results of use of or inability to use such product, even if Zebra Technologies Corporation has been advised of the possibility of such damages. Because some states do not allow the exclusion of liability for consequential or incidental damages, the above limitation may not apply to you.

Copyrights

The copyrights in this manual and the label print engine described therein are owned by Zebra Technologies Corporation. Unauthorized reproduction of this manual or the software in the label print engine may result in imprisonment of up to one year and fines of up to $10,000 (17 U.S.C.506). Copyright violators may be subject to civil liability.

This product may contain ZPL®, ZPL II®, and ZebraLink™ programs; Element Energy Equalizer® Circuit; E3®; and AGFA fonts. Software © ZIH Corp. All rights reserved worldwide. ZebraLink and all product names and numbers are trademarks, and Zebra, the Zebra logo, ZPL, ZPL II, Element Energy Equalizer Circuit, and E3 Circuit are registered trademarks of ZIH Corp. All rights reserved worldwide.

Monotype®, Intellifont® and UFST® are trademarks of Monotype Imaging, Inc. registered in the United States Patent and Trademark Office and may be registered in certain jurisdictions.

Andy™ , CG Palacio™, CG Century Schoolbook™, CG Triumvirate™, CG Times™, Monotype Kai™, Monotype Mincho™ and Monotype Sung™ are trademarks of Monotype Imaging, Inc. and may be registered in some jurisdictions.

HY Gothic Hangul™ is a trademark of Hanyang Systems, Inc.

Angsana™ is a trademark of Unity Progress Company (UPC) Limited.

Andale®, Arial®, Book Antiqua®, Corsiva®, Gill Sans®, Sorts® and Times New Roman® are trademarks of The Monotype Corporation registered in the United States Patent and Trademark Office and may be registered in certain jurisdictions.

Century Gothic™, Bookman Old Style™ and Century Schoolbook™ are trademarks of The Monotype Corporation and may be registered in certain jurisdictions.

HGPGothicB is a trademark of the Ricoh company, Ltd. and may be registered in some jurisdictions.

Univers™ is a trademark of Heidelberger Druckmaschinen AG, which may be registered in certain jurisdictions, exclusively licensed through Linotype Library GmbH, a wholly owned

subsidiary of Heidelberger Druckmaschinen AG.

Futura® is a trademark of Bauer Types SA registered in the United States Patent and Trademark Office and may be registered in some jurisdictions.

TrueType® is a trademark of Apple® Computer, Inc. registered in the United States Patent and Trademark Office and may be registered in certain jurisdictions.

All other product names are the property of their respective owners.

"Made for iPod", "Made for iPhone", and "Made for iPad" mean that an electronic accessory has been designed to connect specifically to iPod, iPhone, or iPad, respectively, and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with iPod, iPhone, or iPad may affect wireless performance.

Bluetooth® is a registered trademark of the Bluetooth SIG.

# Document Conventions

The following conventions are used throughout this document to convey certain information:

Cautions, Important, and Note

**Caution •** Warns you of the potential for electrostatic discharge.

**Caution •** Warns you of a potential electric shock situation.

**Caution •** Warns you of a situation where excessive heat could cause a burn

**Caution •** Advises you that failure to take or avoid a specific action could result in physical harm to you.

**Caution •** Advises you that failure to take or avoid a specific action could result in physical harm to the hardware.

**Important •** Advises you of information that is essential to complete a task.

**Note •** Indicates neutral or positive information that emphasizes or supplements important points of the main text.

## Introduction to the QLn™ Series Printers

Thank you for choosing our Zebra® QLn™ Series Mobile Printers. You will find these rugged printers will become a productive and efficient addition to your workplace thanks to their innovative design. Zebra Technologies is the leader in industrial printers with world-class support for all of your bar code printers, software, and supplies.

This user's guide gives you the information you will need to operate the QLn420, QLn320 and QLn220 printers, including QLn Healthcare and Made for iPhone® (MFi) printers. MFi printers provide Apple co-processor (MFi) support which allows an Apple device such as an iPhone or iPad® to authenticate and connect over Bluetooth®.

Made for
 iPod  iPhone  iPad

These printers use CPCL and ZPL programming languages. To create and print labels using the CPCL and ZPL languages, refer to the Mobile Printing Systems CPCL Programming Manual and ZPL Programming Guide (See Appendix G for instructions on how to access manuals.)

QLn Series Software Utilities:
- • Zebra Net Bridge™ : printer configuration, fleet management
- • Zebra Setup Utility: single printer configuration, quick setup
- • Zebra Designer Pro: label design
- • Zebra Designer Drivers: Windows® driver
- • OPOS Driver: Windows driver
- • Multiplatform SDK

(These utilities can be found on the product CD that comes with the printer and at www.zebra.com . See Appendix G.)

## Unpacking and Inspection

- • Check all exterior surfaces for damage.
- • Open the media cover (refer to "Loading the Media" in the Getting Ready to Print section) and inspect the media compartment for damage.

In case shipping is required, save the carton and all packing material.

## Reporting Damage

If you discover shipping damage:
- • Immediately notify and file a damage report with the shipping company. Zebra Technologies Corporation is not responsible for any damage incurred during shipment of the printer and will not cover the repair of this damage under its warranty policy.
- • Keep the carton and all packing material for inspection.
- • Notify your authorized Zebra re-seller.

# QLn Series Technology

The QLn420, QLn320 and QLn220 use several technologies made popular in other Zebra Mobile Printer product lines, as well as newer technologies.

Smart Battery

The QLn Series battery pack is a high capacity, smart Lithium Ion battery that contains electronics which allow the printer to monitor its operating parameters. Among these are the number of charge cycles it has undergone and its date of manufacture. Using these parameters, the printer's software can monitor the battery's condition and alert the user when to recharge or remove the battery from service.

| Operating Temperature | Charging Temperature | Storage Temperature |
|---|---|---|
| -20$^0$C to +50$^0$C | 0$^0$C to +40$^0$C | -25$^0$C to +65$^0$C |

> **!** The QLn Series printers will only function properly with genuine Zebra smart battery packs.

The smart battery's health has three states: GOOD, REPLACE, and POOR. The battery health factor determines whether or not the printer can operate and what is communicated to the user via the display.

| # of Charge Cycles | Health | Power-up Message |
|---|---|---|
| <300 | GOOD | None |
| <550 but >300 | REPLACE | "Battery Diminished Consider Replacing" * |
| >550 but <600 | REPLACE | "Warning-Battery is Past its Useful Life" ** |
| >600 | POOR | "Replace Battery Shutting Down" *** |

* Warning accompanied by three beeps in rapid succession.

** Warning accompanied by a series of three double beeps in rapid succession.

*** Warning will flash on and off and be accompanied by beeping at a rate of once per second. After 30 seconds the printer will shut down.

## Printing Technology

The QLn Series printers use the Direct Thermal method to print human readible text, graphics and barcodes. It incorporates a sophisticated print engine for optimal printing under all operational conditions.

## Direct Thermal

Direct thermal printing uses heat to cause a chemical reaction on specially treated media.  This reaction creates a dark mark wherever a heated element on the printhead comes in contact with the media.  Since the printing elements are arranged very densely at 203 d.p.i. (dots per inch) horizontal and 200 d.p.i. vertical, highly legible characters and graphic elements may be created a row at a time as the media is advanced past the printhead.  This technology has the advantage of simplicity, as there is no requirement for consumable supplies such as ink or toner.  However, since the media is sensitive to heat, it will gradually loose legibility over long periods of time, especially if exposed to environments with relatively high temperatures.

## QR Code

The QR barcode includes human readable text (URL) which links the user to printer information and short videos on topics such as buying supplies, features overview, loading media, printing a configuration report, cleaning instructions, and accessory information.

## Made for iPhone (MFi)

QLn printers support communication with Apple devices running iOS 5 or later over a standalone Bluetooth 3.0 radio and the BT3.0 radio included with the 802.11n (dual) radio. Only printers with the "M" in the ninth digit spot of the part number support this feature, i.e. QNx-xxxxxMxx-xx.

## Near Field Communication (NFC)

A passive NFC tag with the Bluetooth printer address will provide instant access to printer-specific information via an NFC-enabled smartphone.

# QLn Series Overview

1. Platen Roller
2. Bar Sensor
3. Media Support Disks
4. Tear Bar
5. Label Presence Sensor
6. Peeler Lever
7. Peeler Bail
8. Latch Release Lever
9. Key Pad
10. Strap Post
11. Status Screen
12. Printhead
13. Media Cover
14. Gap Sensor

15. Belt Clip
16. Battery
17. USB/ RS-232 Comm Ports
18. MAC Address Label
19. Docking Contacts
20. DC Input

> **Note:** Scanning the QR code with a smartphone will provide printer-specific information at www.zebra.com/qln320-info.
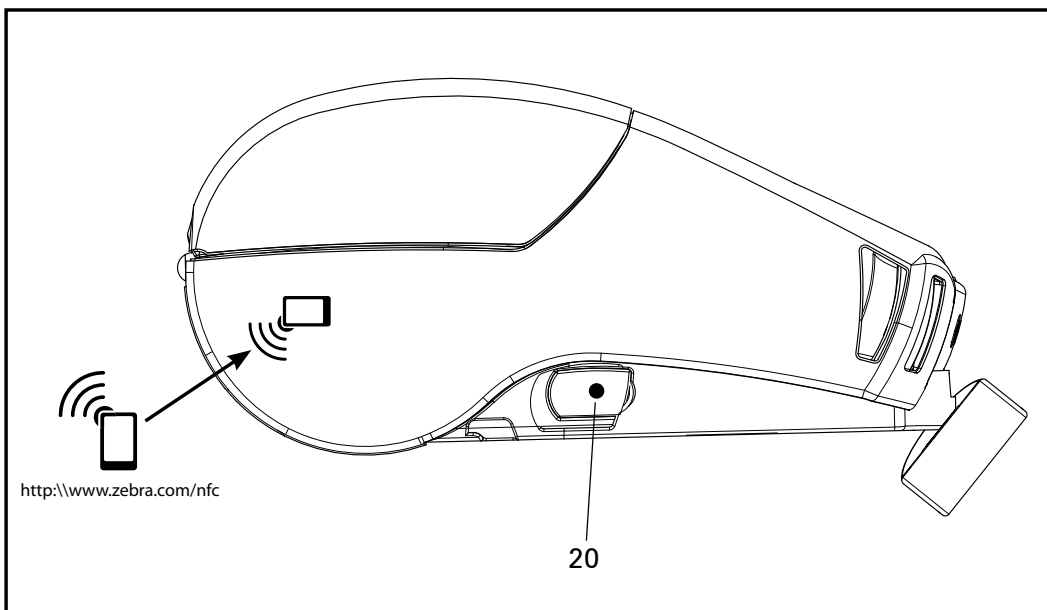
> **Note:** Tapping the Zebra Print Touch™ icon with a Near Field Communication (NFC) enabled smartphone will provide instant access to printer-specific information. For more information about NFC and Zebra products, go to http://www.zebra.com/nfc. Bluetooth pairing applications via NFC is also possible. Please see Zebra Multi-platform SDK for more information.
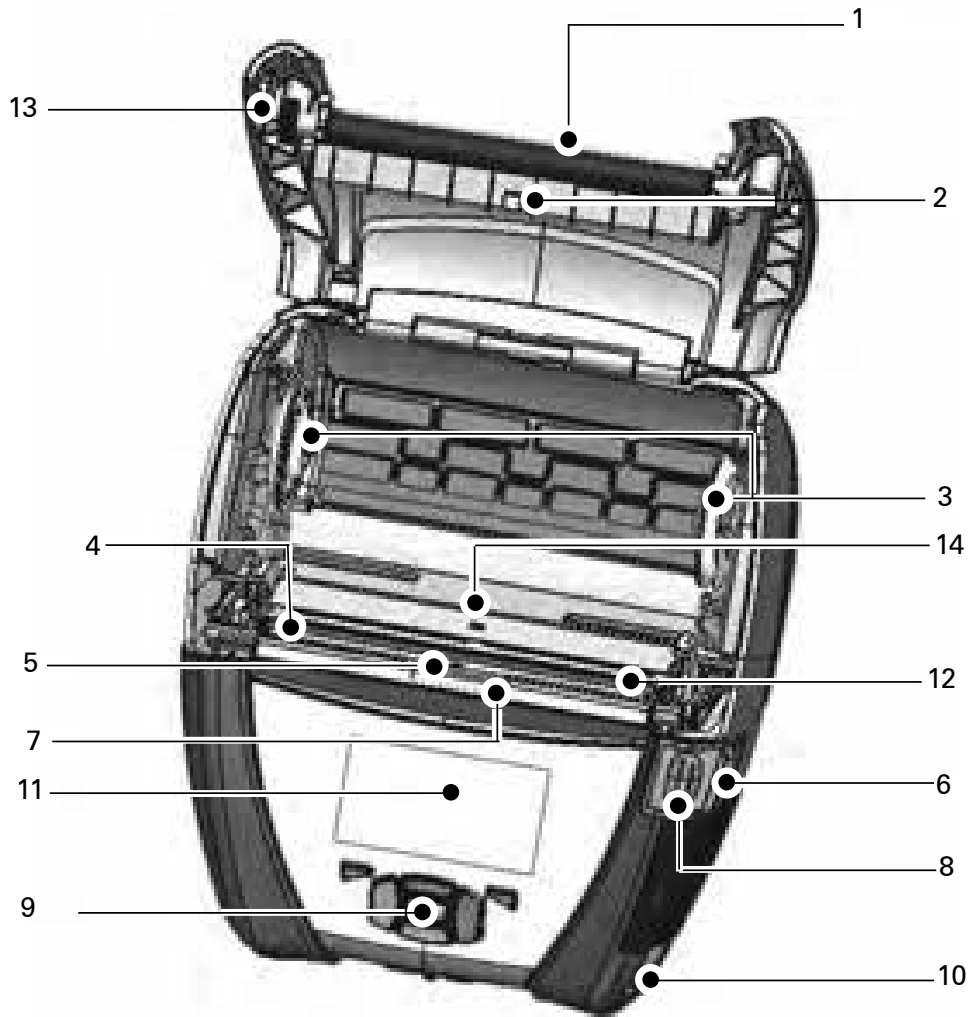
| | | | |
|---|---|---|---|
| 1 | Platen Roller | 15. | Belt Clip |
| 2. | Bar Sensor | 16. | Battery |
| 3. | Media Support Disks | 17. | DC Input |
| 4. | Tear Bar | 18. | MAC Address Label |
| 5. | Label Presence Sensor | 19. | Docking Contacts |
| 6. | Peeler Lever | 20. | USB/ RS-232 Comm Ports |
| 7. | Peeler Bail | | |
| 8. | Latch Release Lever | | |
| 9. | Key Pad | | |
| 10. | Strap Post | | |
| 11. | Status Screen | | |
| 12. | Printhead | | |
| 13. | Media Cover | | |
| 14. | Gap Sensor | | |

www.zebra.com/qln420-info

15

16

17

18

19
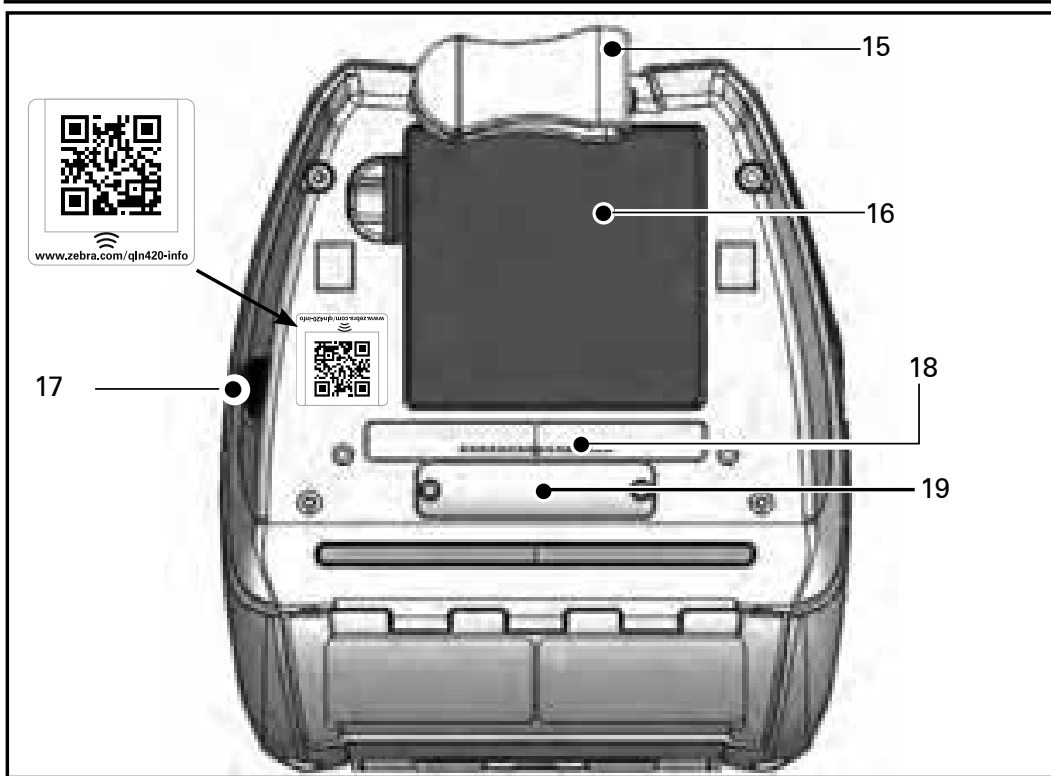
Note: Scanning the QR code with a smartphone will provide printer-specific information at www.zebra.com/qln420-info.



20
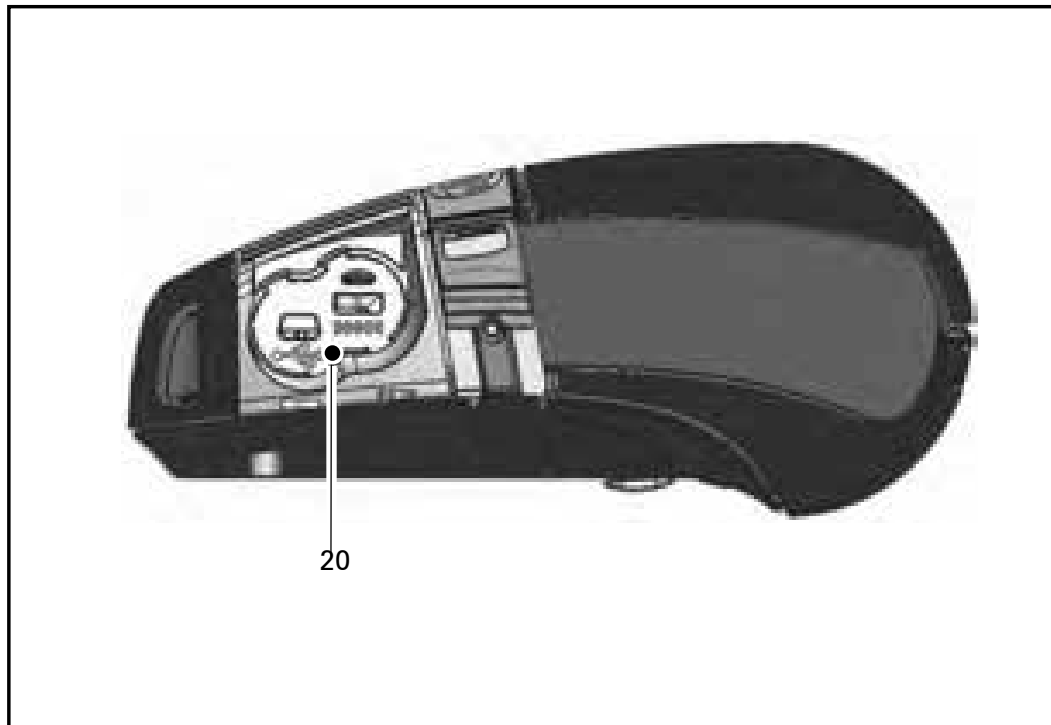
# Getting Ready to Print

## Battery

### Installing the Battery

> ⚠ **Important •** Batteries are shipped partially charged. Remove protective shrink-wrap and labels from new battery packs prior to use.

1. Locate the battery compartment on the bottom of the printer.

2. Swivel the belt clip (if present) to access battery compartment.

3. Insert the battery into the printer as shown in Figure 3. (It is not possible to insert the pack in an incorrect orientation.)

4. Rock the battery into the compartment as shown until it locks in place.

When the battery is first installed, the control panel indicators may briefly turn on and then go off which indicates the battery is not fully charged (see "Charging the Battery" below and "Operator Controls").

You must charge the batteries fully before using them for the first time. To ensure maximum battery capacity, new batteries should go through two or three complete charge/discharge cycles when first put into service.

**Figure 3: Installing the Battery (QLn220 Shown)**



Battery

Belt Clip
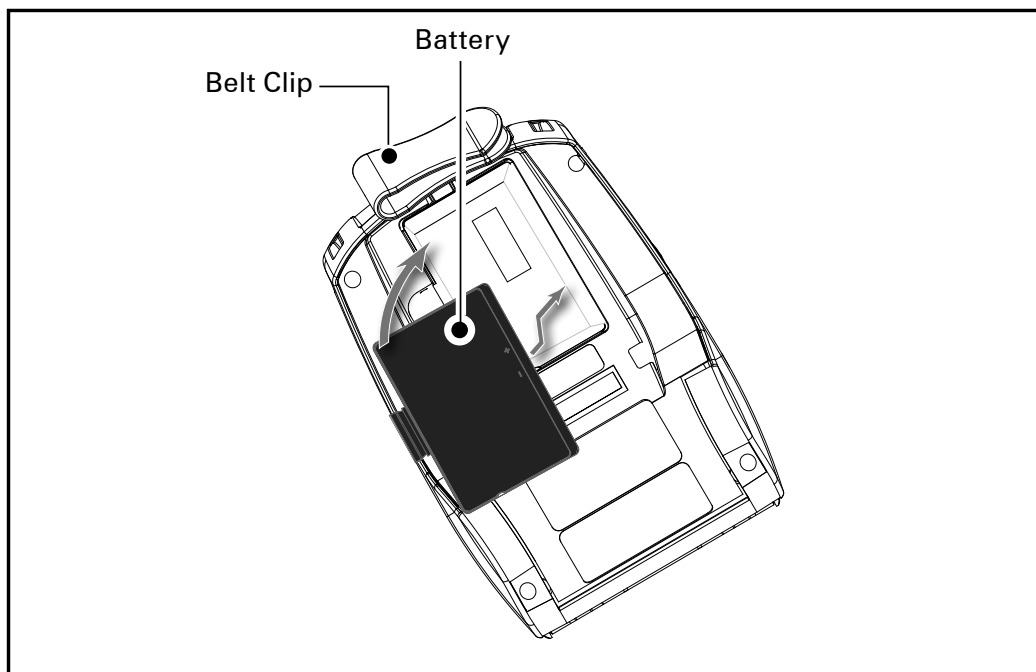
## Battery Safety

⚠ **Caution •** Avoid accidental short circuiting of any battery. Allowing battery terminals to contact conductive material will create a short circuit which could cause burns and other injuries or could start a fire.

❗ **Important •** Always refer to the Important Safety Information data sheet shipped with each printer and the Technical Bulletin shipped with each battery pack.  These documents detail procedures to ensure maximum reliability and safety while using this printer.

❗ **Important •** Always dispose of used batteries properly.  Refer to Appendix E for more battery recycling information.

⚠ **Caution •** Use of any charger not approved specifically by Zebra for use with its batteries could cause damage to the battery pack or the printer and will void the warranty.

⚠ **Caution •** Do not incinerate, disassemble, short circuit, or expose to temperatures higher than 60°C (140°F).

## Charger Safety

⚡ Do not place any charger in  locations where liquids or metallic objects may be dropped into the charging bays.

The Smart Charger-2 (SC2) is a charging system for use with the 2-cell and 4-cell lithium-ion smart batteries used in the QLn Series printers.

Charging Status Indicators

The SC2 uses a LED indicator to indicate the charge state in either Green, Yellow, or Amber as detailed below.

| DC Power Input | Indicator | Battery Status |
|----------------|-----------|----------------|
| Present | Green | Battery not present |
| Present | Green | Fully charged |
| Present | Yellow | Charging |
| Present | Amber | Fault |
| Present | Off | Present and Battery Health = POOR |

There will also be a battery charging graphic to indicate that this LED is the charging status indicator  .

Battery Health Indicator

The SC2 features a tri-color (Yellow/Green/Amber) LED to indicate the health of the battery pack. An evaluation of the battery health begins upon insertion of the battery in the charger and results in the appropriate LED being illuminated as shown below. The LED will remain illuminated as long as input power is applied.

| Battery | Indicator | Health Status |
|---------|-----------|---------------|
| None or non-smart | Off | |
| Smart battery present | Green | GOOD |
| Smart battery present | Yellow | CAPACITY DIMINISHED |
| Smart battery present | Flashing yellow | PAST USEFUL LIFE |
| Smart battery present | Amber | UNUSABLE-REPLACE (discard per Instructions in Appendix E |

**Figure 4: Smart Charger-2 (SC2)**



Smart Battery

Charge Status LED Indicator

Health Status LED Indicator

**Figure 5: SC2 Dimensions**

| Height | Width | Length |
|---|---|---|
| 65,1 mm (2.56 in.) | 101,5 mm (4 in.) | 120,9 mm (4.75 in.) |

## Model UCLI72-4 Quad Charger (All QLn Series Printers)

The UCLI72-4 Quad Charger is designed to charge up to four QLn battery packs simultaneously.  Batteries must be removed from the printer to be charged in the Quad Charger.

1. Ensure that the charger has been installed properly per the Quad Charger instruction manual.  Ensure that the power indicator on the front panel is on.

2. Remove any protective shrink-wrap and labels from all battery packs prior to use. Plug a battery pack into any one of the four charging bays as shown in Figure 6, noting the orientation of the battery pack. Slide the battery pack into the charging bay until it stops and then rock the battery pack back until it snaps into place. The amber indicator directly under the battery being charged will turn on if the battery is properly inserted.

The indicators under the battery will allow you to monitor the charging process per the table below:

| Amber | Green | Battery Status |
|---|---|---|
| On | Off | Charging |
| On | Flashing | 80% charged (O.K. to use) |
| Off | On | Completely Charged |
| Flashing | Off | Fault |

> **!** Important • A fault condition is caused by a problem with the battery. The charger may indicate a fault because the battery is too hot or cold to charge reliably. Try to charge the battery again when it returns to the room's ambient temperature.  If the amber indicator starts flashing on the second attempt, the battery should be discarded. Always dispose of batteries in a proper manner as described in Appendix F.

Quad Charger Cycle Times :

| Battery Status | QLn220/320 | QLn420 |
|---|---|---|
| Battery 80% Charged | 1.5 Hrs. | 3 Hrs 40 min.. |
| Battery Fully Charged | 3 Hrs. | 4 Hrs. 50 min. |

Note • These times are for completely discharged batteries.

Battery packs which are only partially discharged will take less time to reach their charged state.  Batteries which have reached 80% of their charge capacity may be used, however, it is recommended that you allow the batteries to reach a full charge to maintain maximum battery life.

Note • The UCLI72-4 Quad Charger has a safety feature which stops charging a battery after six hours regardless of its charge state.  If not fully charged, it might be indicative of a battery that needs to be replaced.

Important • Use care when installing the UCLI72-4  Quad Charger so that you do not block the ventilating slots on the top and bottom covers. Ensure that the charger is plugged into a power source which will not accidently be turned off if you will be charging batteries overnight.

1. Slide Battery Pack into Charger bay.

Power Supply

2. Rock Battery Pack into place.

Amber Indicator

Green Indicator

Charger Bay

Power Indicator
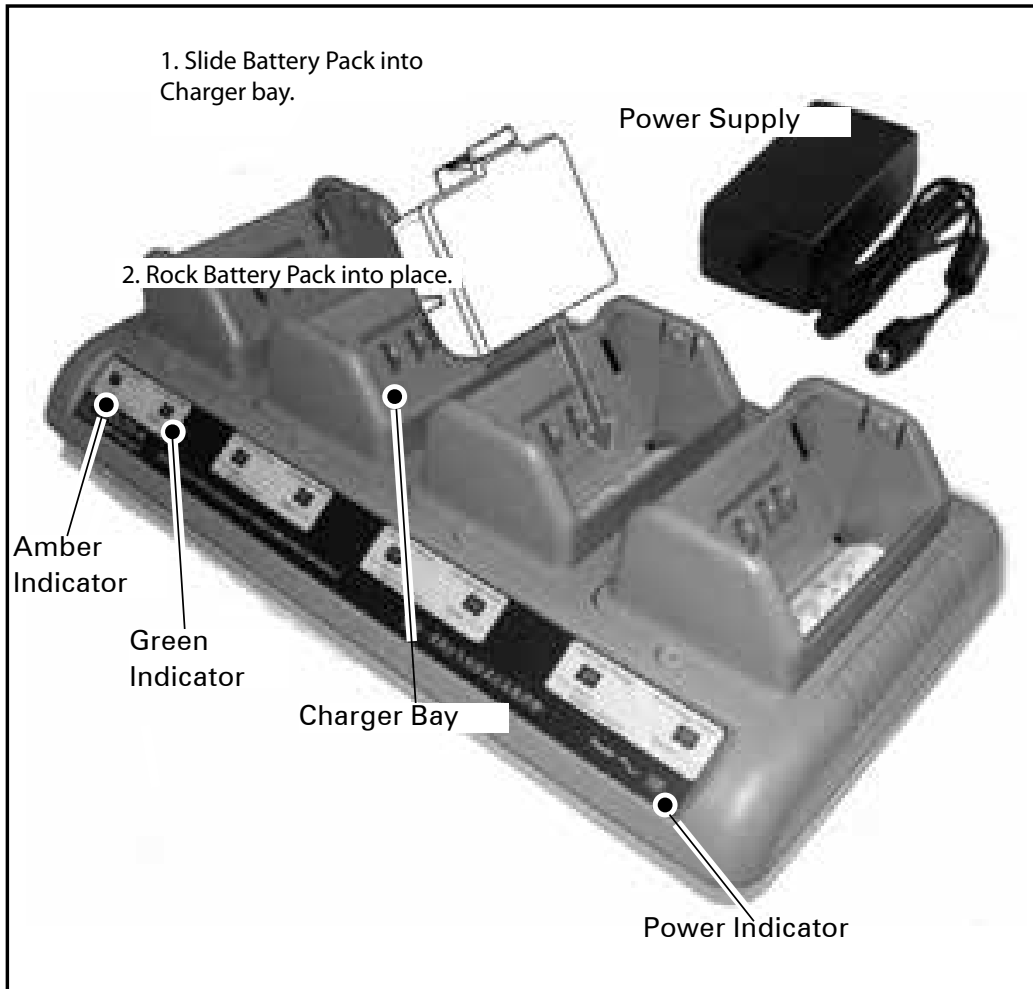
## Ethernet and Charging Cradles

The cradle is an expansion base intended for use with the QLn Series printers. There is a four bay cradle (QLn-EC4) or a single bay option (QLn-EC) for use with the QLn220 and 320, as shown on pages 23 and 24. There is also a single bay Ethernet and charging option for the QLn420 (QLn420-EC) as shown on page 24.

The QLn-EC/EC4 cradles provide charging power to the docked printer as well as providing a standard 10/100Mb/S Ethernet port for communication to the printer. The QLn420-EC also provides charging power to the docked printer, as well as a standard 10/100Mb/T Ethernet port for communication to the printer. All cradles also supply battery charging power to the docked printer and acts as a supplementary power source for a functioning QLn printer.

All QLn Ethernet cradles feature two LED's to indicate the status of the cradle: Solid green to indicate when power is provided to the input of the cradle; and blinking green to indicate Ethernet activity.

The cradle allows the user to dock the printer easily and remove it with the push of a button. The printer shall remain operable while docked, i.e. display is viewable, charge LED status is viewable, and printer controls and data entry are available. The printer will still print while docked and the user shall be able to replace the media as well.

| LED Status | Indication |
|---|---|
| Solid Green | Power On |
| Blinking Green | Ethernet Activity |

**Note •** Remove the "Docking Cradle Access" label on the bottom of the QLn320 or 220 printers before docking the printer in the cradle.

DOCKING CRADLE ACCESS

**Note •** Clean the docking contacts with a Zebra cleaning pen to remove any residue left behind by the label.

The QLn420 does not use the above label over the docking contacts, but instead includes a plastic docking contacts cover secured by two screws. Remove the screws to remove the docking contacts cover from the printer and expose the docking contacts (as shown below).

Docking Contacts

Docking Contacts Cover

Docking Bay

Ethernet Status Indicator

Release Button

Power Status Indicator
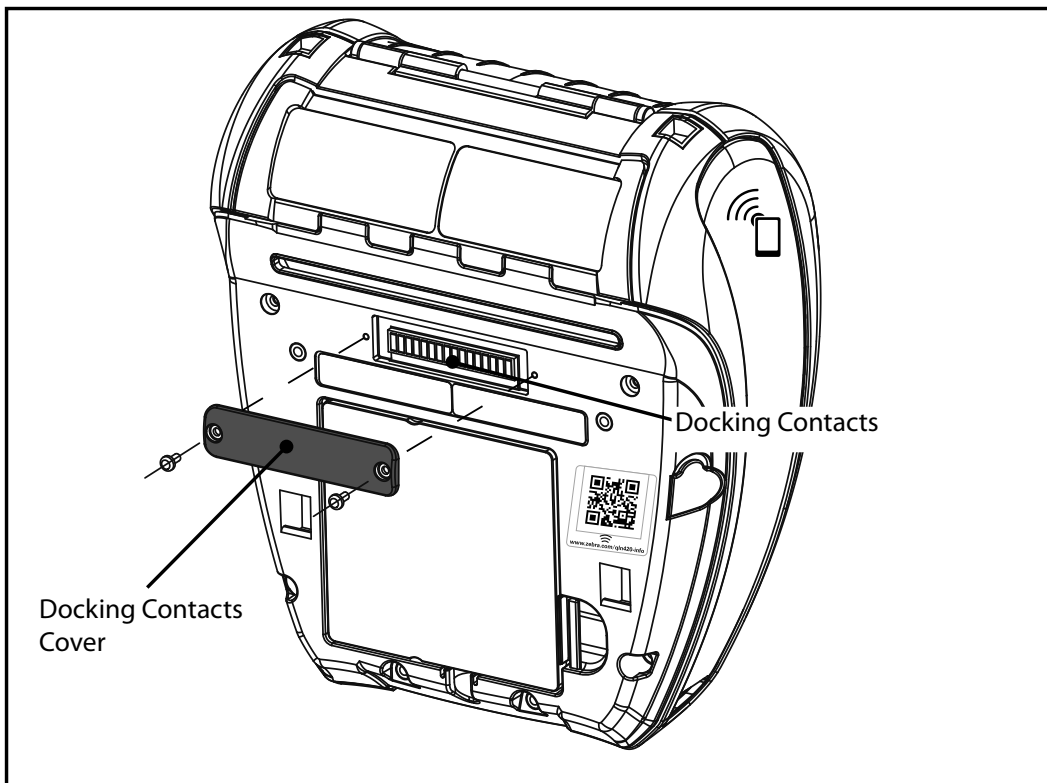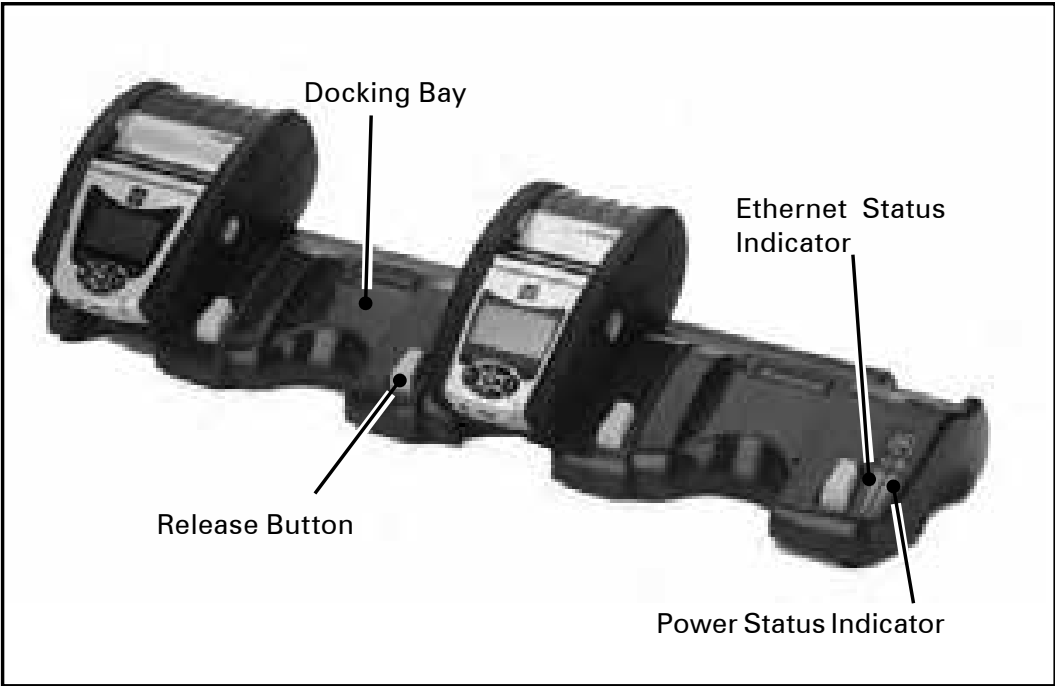
Figure 8: QLn-EC4 Dimensions

| Height | Width | Length |
|---|---|---|
| 66,7 mm (2.62 in.) | 579,9 mm (22.83 in.) | 150,57 mm (5.93 in.) |

Note • The QLn220 and 320 extended battery capacity battery is not compatible with the QLn-EC and EC4 Ethernet cradles.

Ethernet Status Indicator

Power Status Indicator

Release Button

Figure 10: QLn Series Ethernet Cradle Dimensions

| Cradle | Height | Width | Length |
|--------|--------|-------|--------|
| QLn-EC | 66,7 mm (2.62 in.) | 171,28 mm (6.74 in.) | 150,57 mm (5.93 in.) |
| QLn420-EC | 66,2 mm (2.60 in.) | 137,7 mm (5.42 in.) | 219,6 mm (8.64 in.) |

Figure 11: Ethernet Cradle (QLn420)



Release Button

AC Adapter

Ethernet Status Indicator

Power Status Indicator
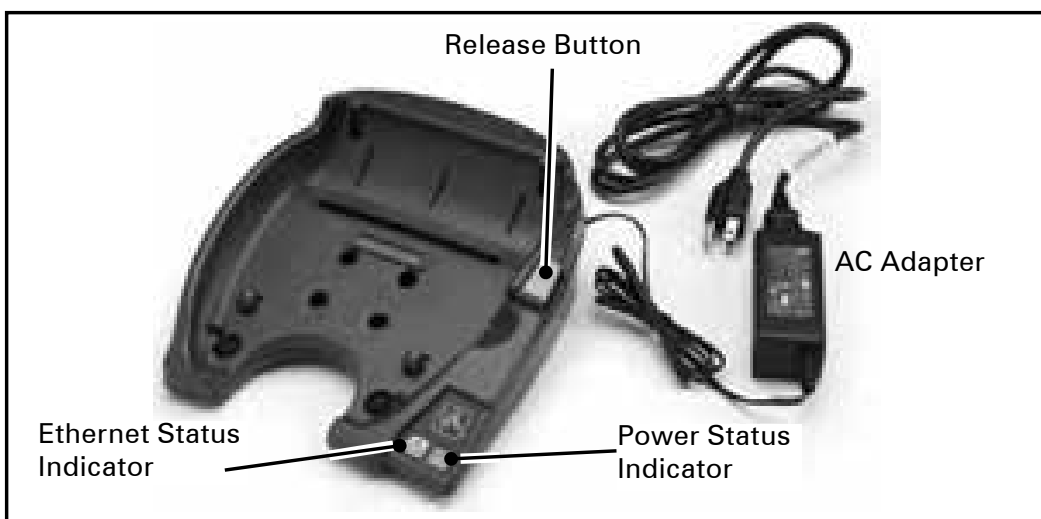
## Printer Operation with Cradle

- All QLn Series printers will charge when placed in their supported cradles.
- Only QLn Series printers that have the Ethernet option installed will connect to an Ethernet network. Check the PCC code on the back of the printer (see Appendix D for location). Codes of the form QNx-xxxxx0xx-xx do not support Ethernet, and codes of the form QNx-xxxxxExx-xx or QNx-xxxxxMxx-xx do support Ethernet (where "x" means don't care). You can also check the "Communications" sub-menu on the LCD (see Main Menu Screen on page 38). After selecting this sub-menu, any communication options not installed will be so indicated.
- When power is applied to the cradle and the printer is docked, the printer charge LED indicates the charge status of the printer (see Figure 18).
- Docking the printer in the cradle will automatically turn the printer on to ensure it is available to be managed remotely.
- When the printer detects input power from the cradle, and the presence of a live Ethernet link, it will automatically reboot and connect to the Ethernet network.
- For printers with an 802.11 radio, this interface will be turned off when the Ethernet link is active. It will turn back on if the Ethernet link is no longer active.
- For printers with a Bluetooth radio, this interface will remain active while the printer is in the cradle.
- The serial and USB ports will remain active while the printer is in the cradle.
- The DC input barrel jack connector (see Figure 12) cannot be used while the printer is in the cradle. The DC barrel jack should be plugged directly into the cradle insted.

NOTE: The printer provides over voltage protection such that  no damage occurs when voltages from 0-36V are applied at the DC Power jack. Upon application of voltage greater than 36V, the DC line fuse will permanently open to reduce fire hazard. The battery is only charged when 12VDC is applied using the Zebra AC adapter.

AC Power Adapter (included in kit p/n P1031365-024 for all QLn Series
Printers)

Figure 12: Charging the Battery Pack with the AC Power Adapter



QIn Series
AC Adapter

AC Power Cord
(varies with
geographic
location)
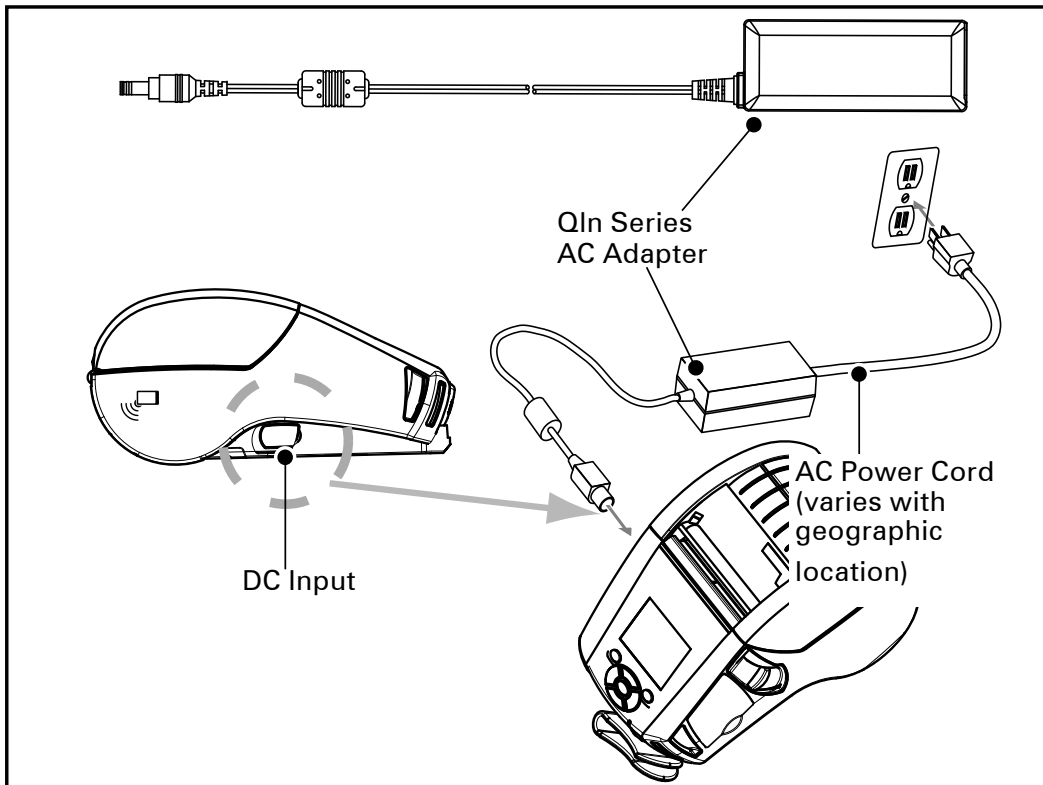
DC Input

- Open the protective cover on the QLn Series printer to expose the DC input charger jack.
- Connect the appropriate AC power cord for your location to the adapter and then plug the power cord into an AC receptacle.
- Plug the barrel plug  from the AC adapter into the charger jack on the printer.
- The printer will power up and begin charging. The printer can be left on or turned off at this point. Charging will continue in either state.

Batteries are shipped uncharged. Remove battery packs from the packaging and allow them to charge completely prior to initial use.

While it's possible to charge the battery when using the printer, charge times will increase under this condition.

## Loading the Media in the QLn Series Printers

You can operate QLn Series printers in one of two different modes: Tear-Off or Peel-Off. Tear-Off mode allows you to tear off each label (or a strip of labels) after it is printed. In Peel-Off mode, the backing material is peeled away from the label as it is printed. After you remove this label, the next one is printed.

1. Open the printer.
- Press down on the latch release lever on the side of the printer as shown at "1" in Figure 13 below.  The Media Cover will open automatically as shown at "2" below, exposing the Media Compartment and the adjustable Media Supports.

**Figure 13: Opening the QLn Series Printer**



MediaCover

Media Compartment

Media Support (oppositesupport not visible)

**2**

**1**

Latch Release Lever
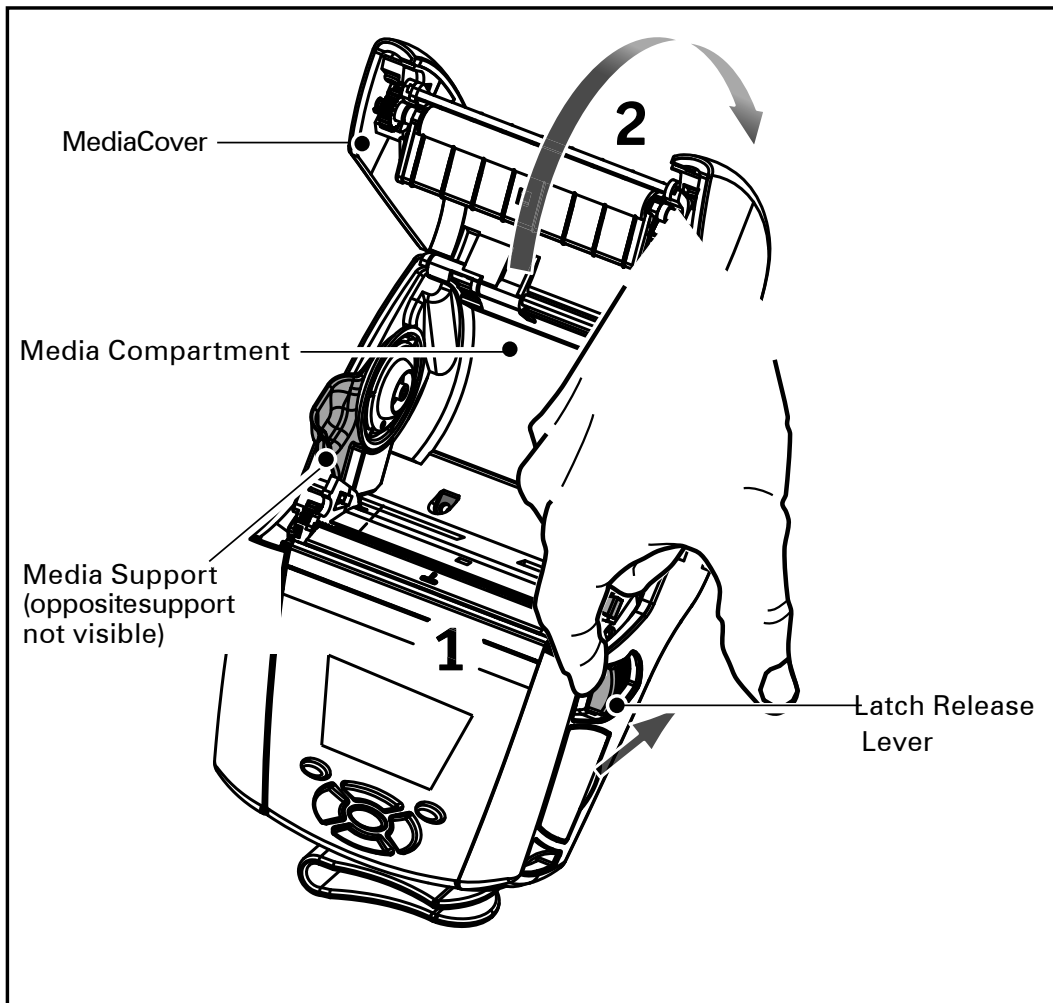
## 2. Load the media:

- Grasp the media supports where shown in Figure 14 and pull them apart. Insert the roll of media between them, and let the media supports close. Ensure that the media pulls off the core in the direction shown below. The supports will adjust themselves to the width of the media, and the media should be able to spin freely on the supports.

**Figure 14: Loading Media**



Media Roll
Note direction media pulls off the roll.

3

Grasp Media Supports where shown and pull apart.
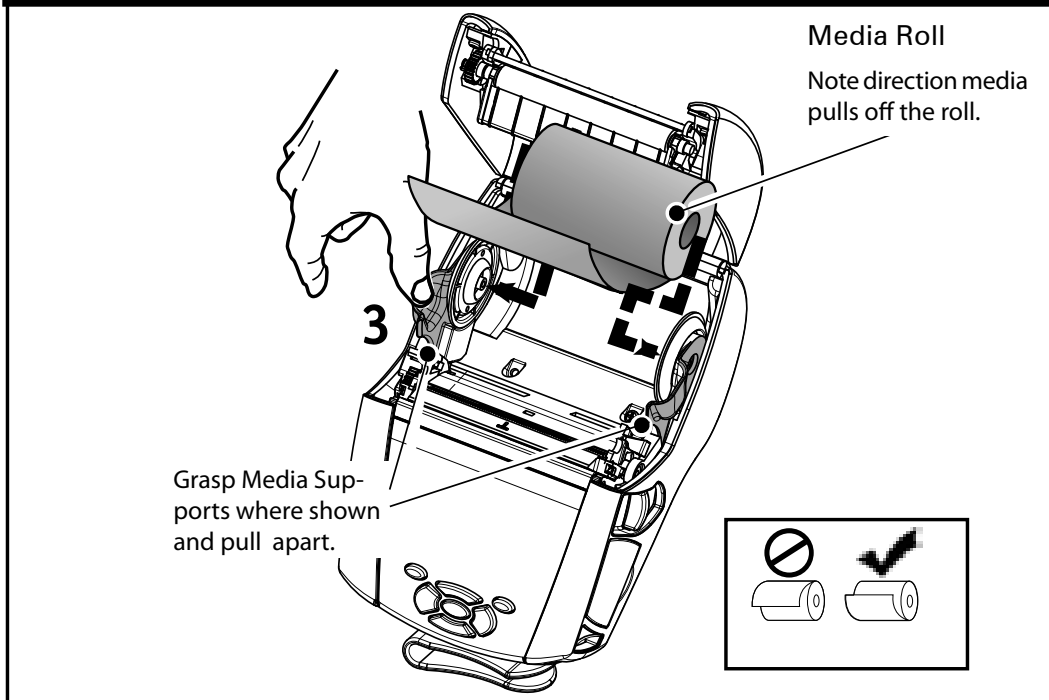
## 3. Close the Media Cover.

- If you plan to use the printer in the tear-off mode, close the media cover as shown below.



4

Pull Media out of Printer.

Close Media Cover.
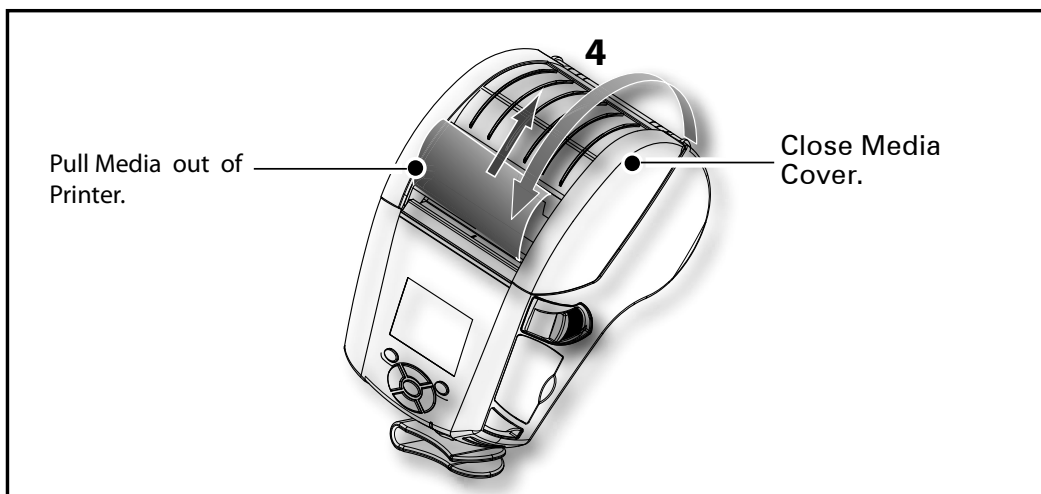
Loading Media in Peel-off Mode (QLn320 & QLn220)

- If you plan to use the printer in the peel-off mode, peel a few labels off of the media and load the media as previously described.
- Push the peeler lever forward to release the peeler bail into the "up" position as shown at "3" and "4" in Figure 15.
- Close the media cover to lock the peeler bail in place. The media will feed between the peeler bail and platen.

**Figure 15: Activating Peeler Bar (QLn320 Shown)**

Peeler Bail

Pull up and flip down if using media in the peel-off mode.

**2**

**4**

**3**

Peeler Lever

Latch Release Lever

**1**

- Turn on the printer or press the Feed button on the front of the printer if the printer is already on.
  The printer will advance the media to the next label, if printing labels.  If you are printing on journal media, the printer will advance a short strip of media.

To disengage the peeler bail, first open the media cover as previously described. The peeler bail will automatically return to the Up position.

Press straight down on the peeler bail to lock it in place in its original home position.

## Loading Media in Peel-off Mode (QLn420)

- If you plan to use the printer in the peel-off mode, peel a few labels off of the media and load the media as previously described.
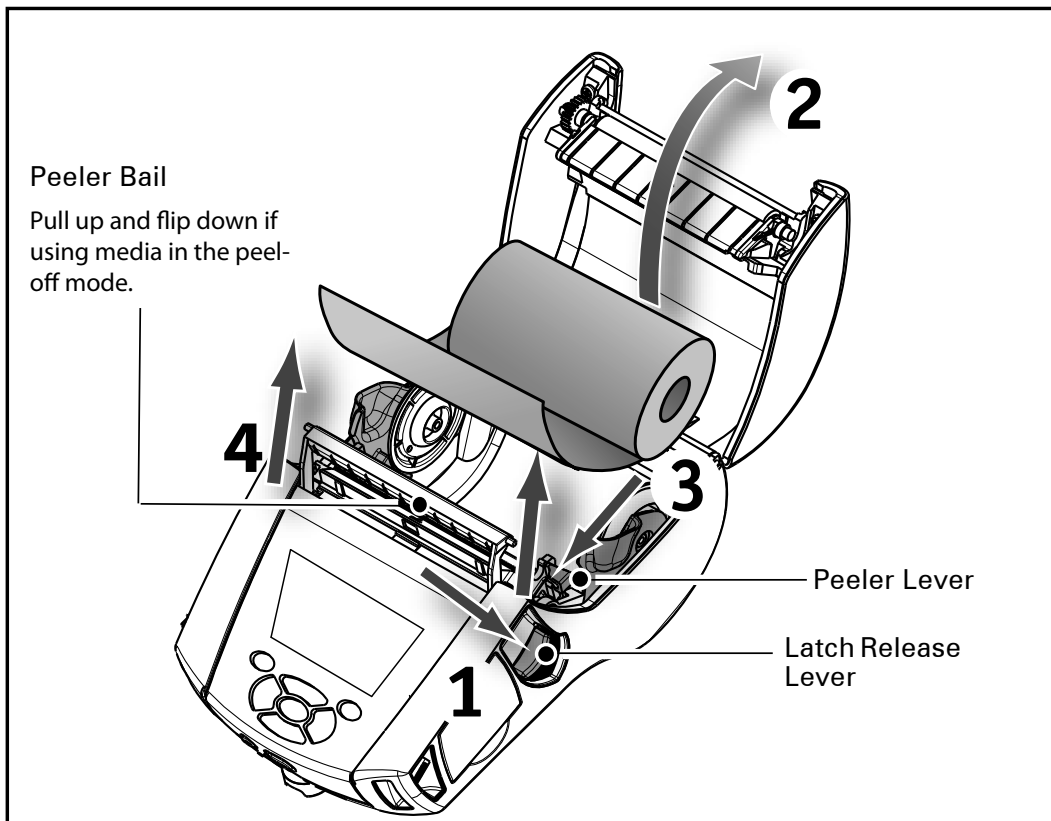- Close the media cover.
- Lift up on the peeler lever located on the side of the printer below the media cover button.
- Lock the peeler lever in the "up" position to fully engage the peeler bail.

**Figure 16: Activating Peeler Bar (QLn420 Shown)**

Media Cover Button

Peeler Bail

Peeler Release

Peeler Lever

- Turn on the printer or press the Feed button on the front of the printer if the printer is already on. The printer will advance the media to the next label, if printing labels. If you are printing on journal media, the printer will advance a short strip of media.

Note: Peeler will not work with most synthetic label stock since that media is softer and tends to adhere to its liner. However, the QLn420 printer is fully capable of printing on synthetic labels.

- To disengage the peeler bail, press the peeler release while pressing straight down on the peeler lever. This will disengage the peeler bail and return it to its original home position.

Note: Before disengaging peeler, be sure there are no peeled labels present on peeler bail. This could cause a label jam if you were to disengage with peeled label present

## QLn Healthcare Printers

Zebra QLn Healthcare 2" and 3" printers are designed to meet the specific and unique needs of the healthcare environment. The healthcare application is based on the QLn220 and QLn320 printers primarily for barcode label printing, but also retaining the QLn's ability to print receipts.

The QLn220 and 320 Healthcare printers also offer a few key enhancements to these existing printers:
- Provide printers with distinctive gray and white healthcare colors (see Page 32) and performance plastics that can also be disinfected with the most common cleaners used in hospitals.
- Leverage the technology advancements made on the QLn platform, i.e. new User Interface, NFC, QR code.
- Add the MFi chip to the QLn main logic board to support Bluetooth connectivity between the printer and an iOS device as Apple devices are expected to grow in popularity in this segment.

Made for
iPod  iPhone  iPad

Since the QLn220 and 320 Healthcare are based on the QLn220 and 320 platform, they are designed to be direct thermal printers which support variable print widths. They will provide a print experience compatible to the QLn220 and 320, specifically in the following areas:

- They will support the same barcodes, barcode quality, and visual print quality.
- They will offer equal wireless performance in terms of range, reliability, and speed.
- They will be compatible with all QLn220 and 320 accessories (see Page 80).

Due to the nature of the healthcare environment, QLn Healthcare printers feature more rugged plastics designed and tested to withstand constant cleaning with all major hospital cleaners for the life of the printer.

> Note • Refer to the Guide to Disinfecting and Cleaning QLn Healthcare Printers (P1066640-001) for detailed cleaning instructions.

> Note • Refer to the QLn Healthcare Printers Quick Start Guide (P1067208-001) for more detailed information on these printers.

## Operator Controls

The QLn Series printers come equipped with a keypad control panel and LCD graphical user interface. The standard control panel is illustrated in Figure 18, 18a, and 19. The LCD interface allows easy display and selection of many printer functions as detailed on following pages.

### Standard Control Panel

The standard control panel has multiple control buttons and two multipurpose indicators.

- The Power Button turns the printer on and off.

---

Note • When turning on the QLn420 printer, press and hold the Power Button between 1.5 and 2.5 seconds. When the LCD illuminates, relase the Power Button. To turn off the printer, press and hold the Power Button until the printer shuts down.

---

- The Media Feed Button advances a length of media which is determined by the type of media being used.  Label media will be advanced to the next gap or bar sense marker.  Journal (plain) media will be advanced by a length determined by the printer's software.
- The LED Charge Indicator shows solid Yellow when charging, solid Green when fully charged, and is turned off when there's a fault condition and the printer is plugged in.
- Four Way Navigation Buttons allow the user to scroll between functions on the LCD user space. (The Navigation Buttons do not apply to the Status Bar and Navigation Bar.)
- Enter Button allows the user to select the desired function highlighted on the LCD interface and is indicated by the word "OK".
- Two software defined function keys allow the user to select a function listed on the navigation bar.

**Figure 18: Standard Control Panel (QLn320 & QLn220)**

LED Charge Indicator

Solid Yellow: Charging
Solid Green: Fully charged
Off: No DC Power Applied
Off: With DC Power Applied: Charge Fault

Feed Button

Press to advance the media one blank label or a software determined length of journal media.

Power Button

Press to turn unit on. Press again to turn unit off.

**Figure 18a: Standard Control Panel (QLn420)**

LED Charge Indicator

Solid Yellow: Charging
Solid Green: Fully charged
Off: No DC Power Applied
Off: With DC Power Applied: Charge Fault

Power Button

Press to turn unit on. Press again to turn unit off.

Feed Button

Press to advance the media one blank label or a software determined length of journal media.
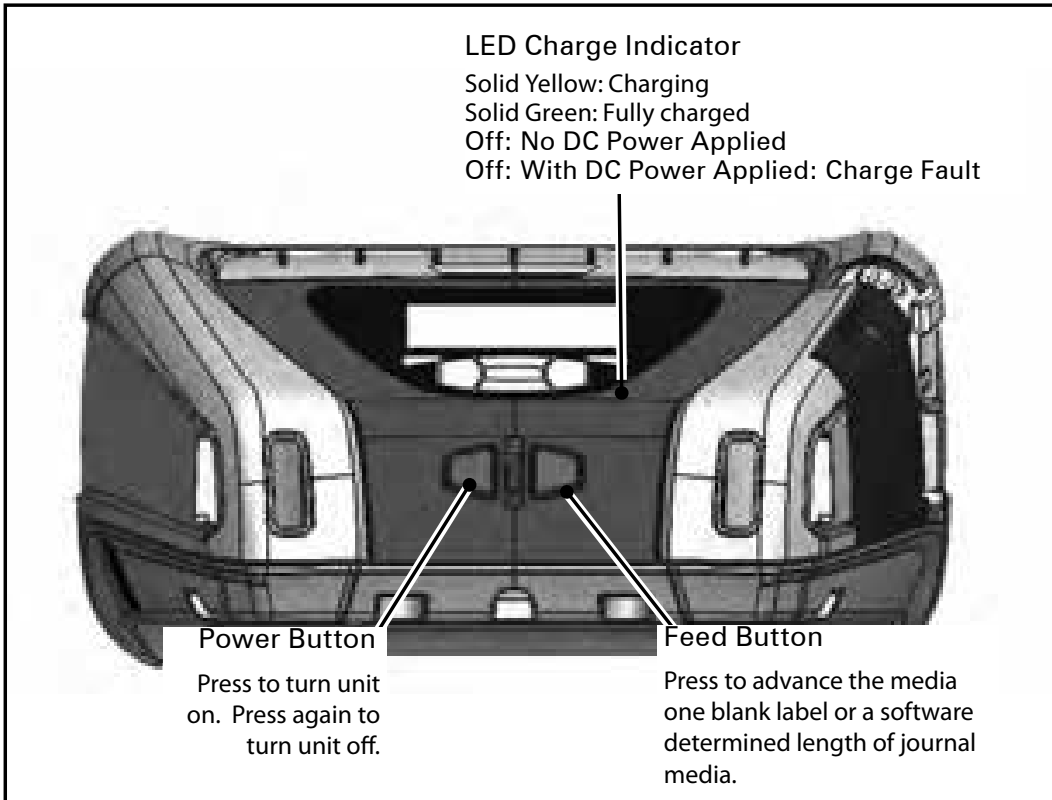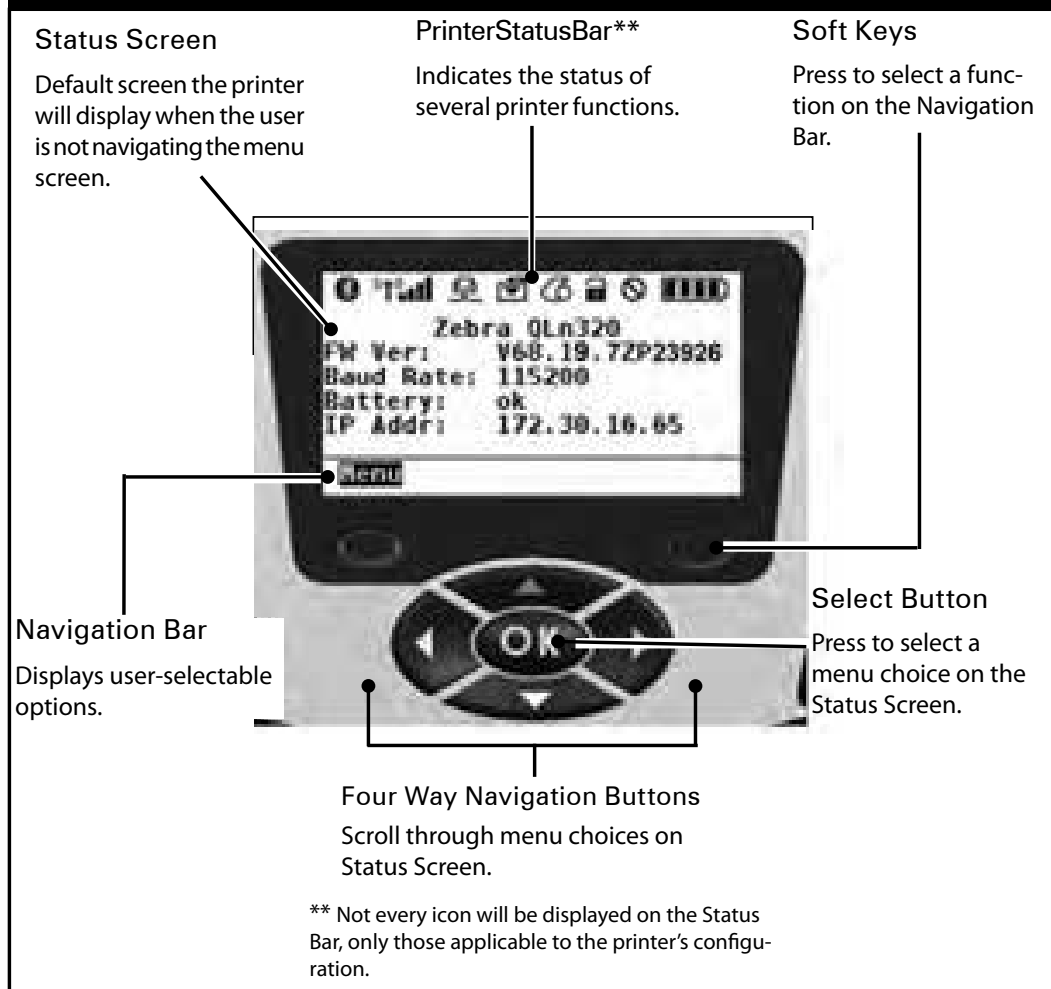
## LCD Control Panel

The 240x128 pixel LCD control panel allows the user to view the status of the QLn Series printer and have access to various printer alerts and messages. It also has multi-directional keys which allow navigation and selection of menu options affecting printer functions. These keys allow scrolling through the various options and settings. The "OK" button allows selection of the option or function displayed on the screen.

The top of the screen has a row of status icons, or a Status Bar, which indicate the state of various printer functions. The Status Bar is located above the Status Screen  shown below along with a Navigation Bar. The Status Screen is the default display and is shown at power up. When navigating the menus, the printer will automatically return to this screen when the user is done navigating after an appropriate delay.

**Figure 19: LCD Control Panel (QLn320 and 220)**

**Status Screen**

Default screen the printer will display when the user is not navigating the menu screen.

**PrinterStatusBar\*\***

Indicates the status of several printer functions.

**Soft Keys**

Press to select a function on the Navigation Bar.

**Navigation Bar**

Displays user-selectable options.

**Select Button**

Press to select a menu choice on the Status Screen.

**Four Way Navigation Buttons**

Scroll through menu choices on Status Screen.

\*\* Not every icon will be displayed on the Status Bar, only those applicable to the printer's configuration.

Indicates Bluetooth® connection status. The icon will blink to show that the printer is receiving label data via Bluetooth, and is solid when link is established. This icon appears only on printers with the Bluetooth wireless option installed.

Indicates that the printer is connected to a radio network via 802.11 protocols. The antenna icon will blink with no parentheses when looking for an access point. One set of solid parentheses with blinking antenna indicates WLAN is associated and attempting authentication. Two sets of solid parentheses and solid antenna indicate the printer is successfully connected to the WLAN. The icon and two parentheses will blink to show the printer is receiving printer data via WLAN. The four (4) bars indicate the strength of the WLAN connection to the access point. These icons appear only with the 802.11 radio installed.

The Ethernet icon will blink when the printer is receiving label data via the Ethernet connection. It will not be displayed on the status bar when the Ethernet is inactive. This icon appears only when the Ethernet option is installed and the printer is docked in Ethernet cradle.

The Data icon indicates data being sent to the printer, i.e. the icon will blink when there is a label data transmission via the serial or USB ports.

The Media Out icon will blink when there is no media in the printer and will not blink when there is media in the printer.

The Head Latch icon indicates if the media cover is closed or not properly latched. It will appear unlocked and blinking if open and will not appear if the cover is closed.

⊘ The Error icon will be displayed and blink if an error condition exists. The icon will not be displayed if no printer error exists. Since there are separate icons for Media Out and Head Latch Open, these two alerts do not apply to the Error icon.

▮▮▮▮ The Battery Charge Level icon indicates the reported state of charge from the battery pack. In a non-charging state, four (4) bars indicates the battery level is greater than 80%. Three (3) bars indicates if the battery level is less than or equal to 80% but greater than 60%. Two (2) bars indicates if the level is less than or equal to 60% but greater than 40%. One (1) bar indicates if the battery level is less than or equal to 40% but greater than 20%. And zero (0) bars indicates if the level is less than or equal to 20%.

While the battery is charging, a lightning bolt will appear in the battery icon ▮⚡▮ to indicate that charging is taking place.

When the battery is charging and fully charged, four bars will be displayed. When the battery is charging and the level is greater than 80%, the battery icon will alternate between four bars and three bars. When the battery is charging and the level is less than or equal to 80% but greater than 60%, the icon will alternate between three bars and two bars. When the battery is charging and the level is less than or equal to 60% but greater than 40%, the icon will alternate between two bars and one bar. When the battery is charging and the level is less than or equal to 40% the icon will alternate between one bar and zero bars.

## Main Menu Screen (QLn320 and QLn220)

The user can select options on the Main Menu screen by pressing the soft key located beneath the Menu option on the navigation bar. The Main Menu screen displays graphical options including Communication, Display, Media, Settings, Battery, and Help.

> **Note •** The QLn Healthcare printers feature a different menu system. See page 40 for details.

**Figure 20: Main Menu Screen QLn320 and QLn220**



Info (Help) Icon

The user can scroll between icons using the four-way arrow buttons. When an icon is highlighted, its text description will be displayed in the middle of the navigation bar, and can be selected by pressing the "OK" button. This will take the user to the screen with status information specific to that option. The Info (or Help) menu provides useful information on a variety of topics. Please explore this menu to become more familiar with your printer and how it operates.

The QLn Series printers will also display various alerts, such as "Media Out", "Media Cover Open", or "Battery Low". The user can respond to questions by pressing one of the soft keys to indicate that an action has been taken to address the alert in question. Once the condition causing the alert has been addressed (i.e. loading media), the alert message will be cleared.  (See Appendix H for a complete list of alerts for the QLn Series printers.)

SoftKeys

Programmable LCD Settings

   In addition to the status icons, the LCD control panel can dis-
play other printer settings and functions as text.  Applications
can be written to allow the user to view and /or modify these
settings using the scroll and select keys on the display. The
menu that comes with the printer provides access to the most
commonly used parameters. Refer to the Programming Guide
(p/n P1012728-008) for a complete list of the parameters, and
for details on how to change the front panel display at
 www.zebra.com/manuals).


   The LCD backlighting option allows viewing of the screen
in a dark environment, or provides better contrast in a very
bright environment. The QLn320 and QLn220 can be pro-
grammed to enter a low power mode (Backlight Off) during
periods of front panel inactivity. While in low power mode, the
screen is populated with menus and status icons, data which
may or may not be readable depending on ambient light con-
ditions. The QLn Series printers provide a configurable time
delay from the time the backlight is turned on to when it turns
off. The time range for this delay is 5 to 1200 seconds with
a default time of 10 seconds. The backlight can be activat-
ed within one second after any of the cursor, select, or soft
keys is pressed. (The feed button does not activate the back-
light.) The status bar icons, the user space content, and the
navigation bar will remain on the screen with the backlight
off. Extensive use of the display backlight will decrease the
time the printer can run between charges. Refer to the section
"Extending Battery Life" for more information.

QLn Series User Guide

## Home Menu Screen (QLn420 and QLn Healthcare Printers)

The QLn420 and QLn Healthcare printers share the same control panel. The printer's control panel includes a display where the user can view the printer's status or change its operating parameters. After the printer completes the power-up sequence, it moves to the Idle Display screen (Figure 21). This screen includes the printer's current status, information such as firmware version and IP address, and a Home menu shortcut.

The Home Menu for the printer uses a different set of icons than the standard QLn320 and QLn220, uses larger fonts for enhanced readability, and also provides support for multiple languages. The Home Menu screen displays graphical parameter options including Settings, Tools, Network, Battery, Language, Sensors, Ports, and Bluetooth (as shown in Figure 22). These options allow the user to view the printer's status or change its operating parameters.



Figure 21: Idle Display Screen (QLn420 and QLn Healthcare)
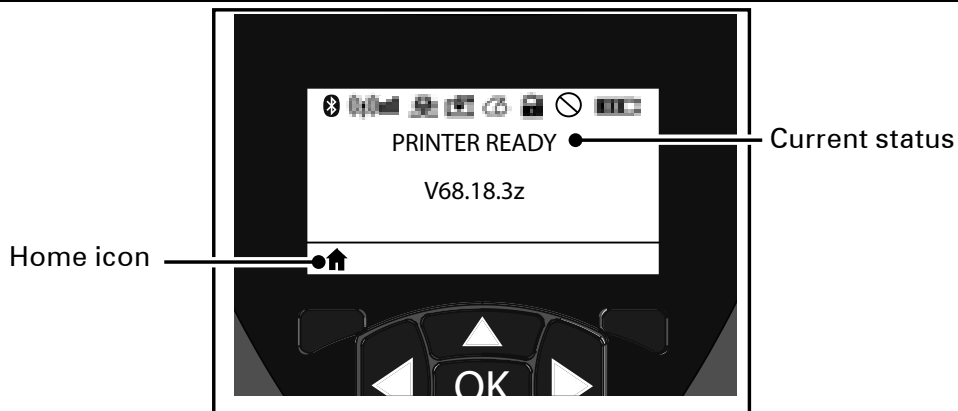
The printer's operating parameters are sorted into eight (8) user menus, which you can access through the printer's Home menu (Figure 22). Click on the Home icon located on the Idle Display screen to proceed to the Home Menu.

The user can scroll between icons using the four-way arrow buttons. When an icon is highlighted, its text description will be displayed in the middle of the navigation bar, and can be selected by pressing the "OK" button. This will take the user to the screen with status information specific to that option.

Figure 22: Home Menu Screen QLn420 and QLn Healthcare

| Icon | Parameter |
|------|-----------|
|  | See Settings menu in Appendix D |
|  | See Tools menu in Appendix D |
|  | See Network menu in Appendix D |
|  | See Battery menu in Appendix D |
|  | See Language menu in Appendix D |
|  | See Sensors menu in Appendix D |
|  | See Ports menu in Appendix D |
|  | See Bluetooth menu in Appendix D |

Whereas the QLn320 and 220 printers have multiple line items per screen, the QLn420 and QLn Healthcare printers display one setting per screen using larger fonts (as shown below). In order to navigate to the next setting, click on the right arrow  button. Click on the soft key below the Home icon to return to the Home Menu screen to choose a different parameter.

Figure 23: Print Settings Example
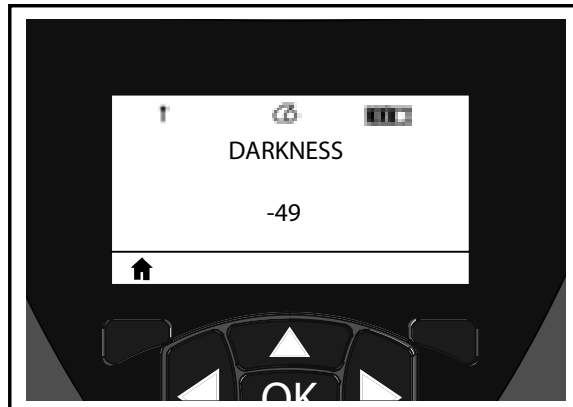


Some parameter settings have a scroll option to view multiple setting choices. This option is identifiable by the presence of up and down arrows located on either side of the display (Figure 24). For example, the Tools parameter has a Help option for many printer functions such as media, battery icon, error icon, latch icon, media icon, receive data icon, ethernet icon, signal icon, WLAN icon, Bluetooth icon, power LED, printhead, and battery.

Press the up and down arrows on the keypad to scroll through a setting's various options. Press the left and right arrows to scroll to the next setting.

**Figure 24: Scroll Option (Help Settings)**
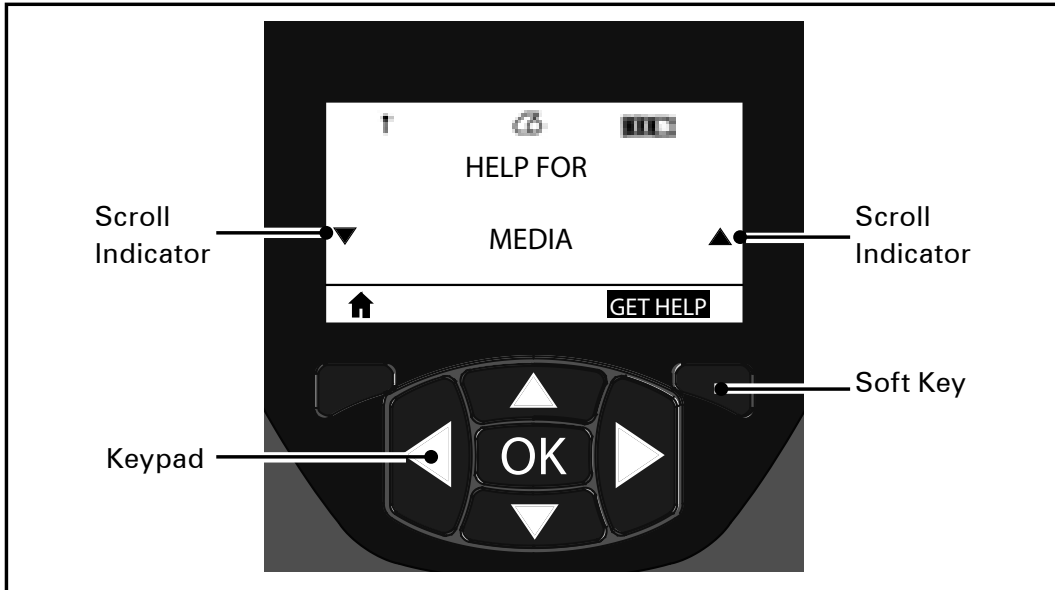


Press the soft key beneath the "GET HELP" command on the display in this example to receive basic help information for loading media in the printer (Figure 25).

**Figure 25: Scroll Details (Help For Media)**



Press the soft key beneath "BACK" to return to the previous screen.

## Verify the Printer Is Working

Before you connect the printer to your computer or portable data terminal, make sure that the printer is in proper working order. You can do this by printing a configuration label using the "two key" method. If you can't get this label to print, refer to "Troubleshooting".

Printing a Configuration Label

1. Turn the printer off. Load the media compartment with journal media (media with no black bars printed on the back)
2. Press and hold the Feed Button.
3. Press and release the Power button and keep the Feed button pressed. When printing starts, release the Feed button.

The unit will print a line of interlocking "x" characters to ensure all elements of the print head are working, print out the version of software loaded in the printer and then print the report. Note that the report can also be printed from the Info (Help) menu on the LCD.

The report indicates model, serial number, baud rate, and more detailed information on the printer's configuration and parameter settings. (See the Troubleshooting Section for sample printouts and a further discussion on how to use the configuration label as a diagnostic tool.)

## Connecting the Printer

The printer must establish communications with a host terminal which sends the data to be printed. Communications occur in four basic ways:

- QLn Series printers can communicate by cable via either RS-232C or USB 2.0 protocols. USB drivers are included in the Zebra Designer Driver which can be downloaded from www.zebra.com/drivers.
- By means of a wireless LAN (Local Area Network) per 802.11 specifications. (Optional)
- By means of the Ethernet when docked on the Ethernet cradle. (Optional)
- By means of a Bluetooth short range radio frequency link. (Optional)
    - WinMobile®, Blackberry®, and Android® devices use standard Bluetooth protocol.
    - QLn Series printers are compatible with iOS devices, therefore printing via Bluetooth to an Apple® device is possible.

## Cable Communication

⚠ Caution • The printer should be turned off before connecting or disconnecting a communications cable.

The QLn Series printers can communicate by cable; the specific cable supplied with your printer will vary with the host terminal and your model printer.

### RS-232C Communications

The 14-pin serial connector on your communications cable plugs into the serial communications port on the side of the printer.  QLn Series printers also have a USB port.

### USB Communications

The small 5-pin connector on the USB cable plugs into the printer.  The connectors are keyed to assure correct alignment; do not try to force the cable if it does not plug in.

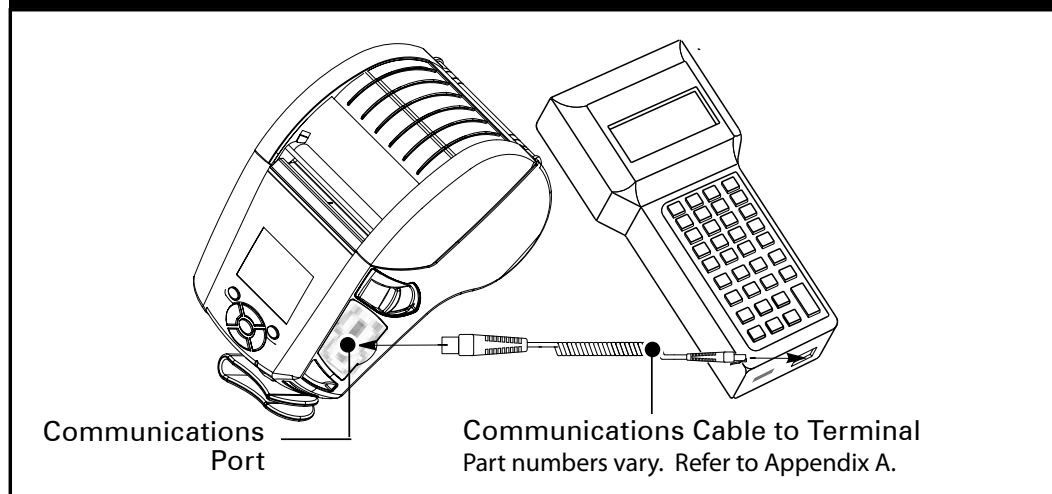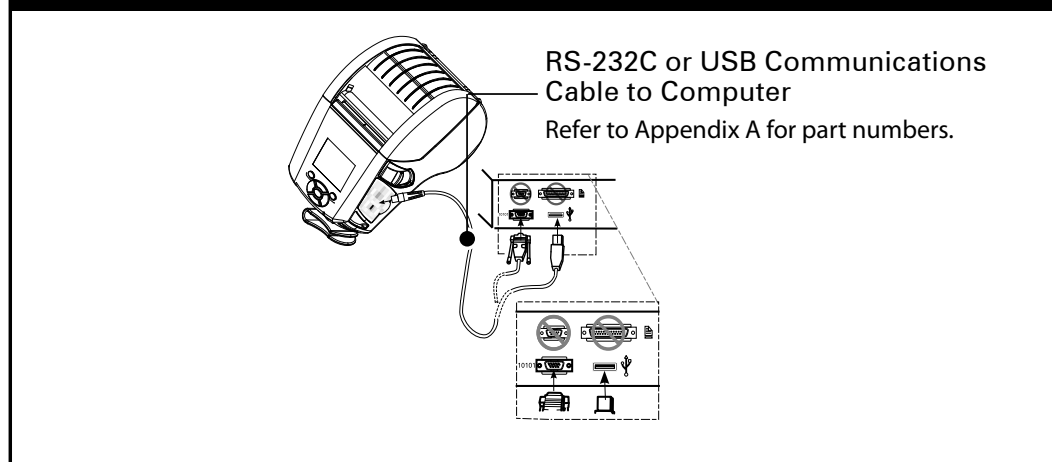Figure 26: Cable Communications (QLn320 Shown)

Communications Port

Communications Cable to Terminal
Part numbers vary.  Refer to Appendix A.

Figure 27: Communications with a P.C.

RS-232C or USB Communications Cable to Computer

Refer to Appendix A for part numbers.

The other end of the cable must be plugged into the host terminal as shown in Figure 26, or to a serial or USB port on a computer (Figure 27). The QLn Series is configured with the USB Open HCI interface driver allowing it to communicate with Windows® based devices.

USB drivers are included in the Zebra Designer Driver which can be downloaded from the Zebra Website. Other terminals or communications devices may require the installation of special drivers to use the USB connection. Consult the factory for further details.

Providing Strain Relief for Communications Cable

If you are connecting either a USB or RS-232 communications cable to the printer permanently, access the communications port on the side of the printer next to the latch release lever. Plug the connector into the appropriate port and align the plastic locking cap with the cut outs shown below. Rotate the locking cap clockwise to lock the cable in place. (Turn counterclockwise to unlock the cable.) Once locked in place, this provides strain relief for the cable and will prevent the cable from disconnecting from the printer.

Note • Only one cable can be present in the USB/RS-232 communications port at a time for strain relief purposes.
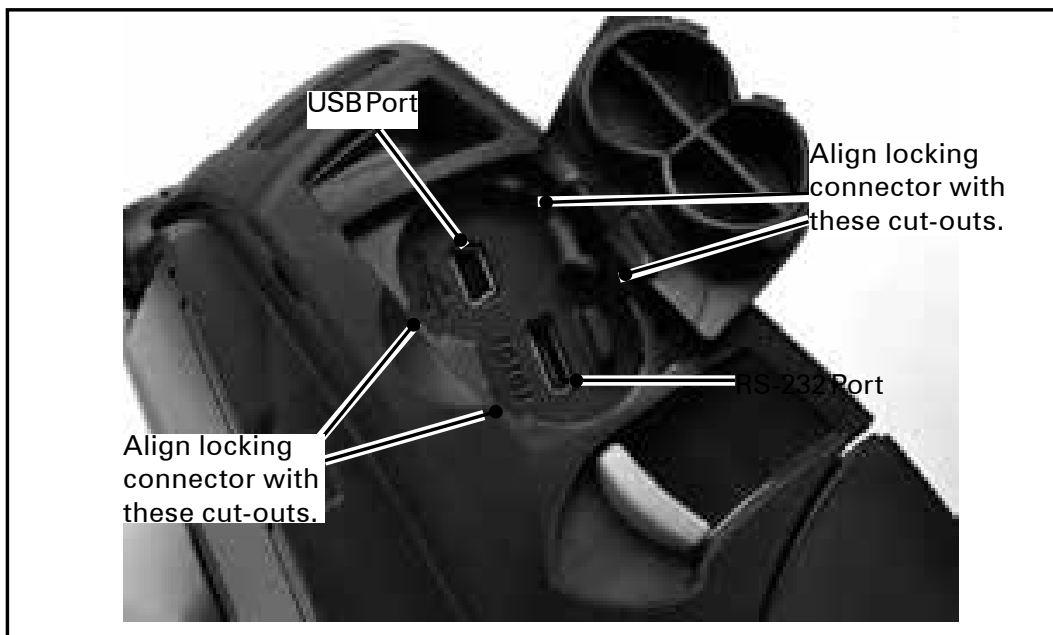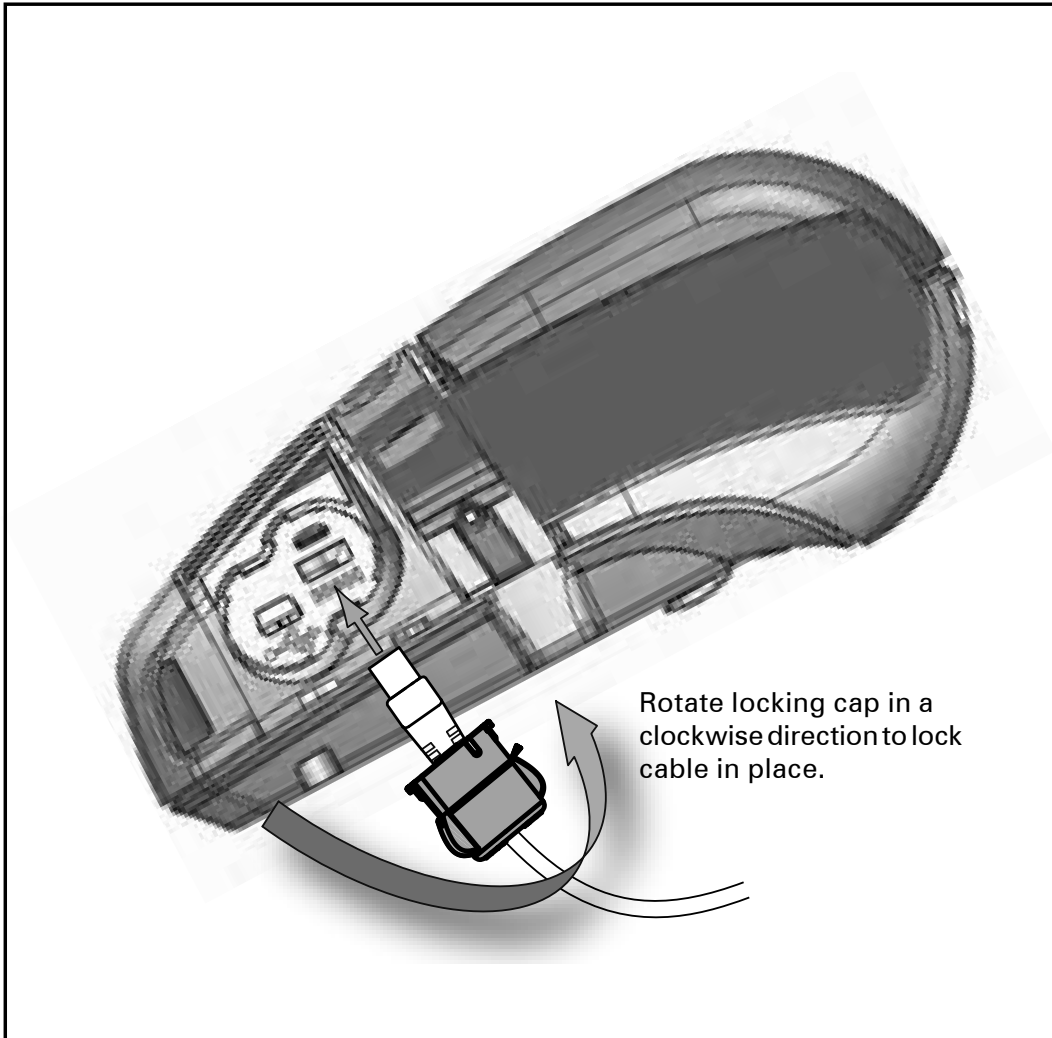
Figure 28: Communications Port (QLn420 Shown)

Rotate locking cap in a clockwise direction to lock cable in place.

## Wireless Communications with Bluetooth

Bluetooth is a worldwide standard for the exchange of data between two devices via radio frequencies. This form of point-to-point communication does not require access points or other infrastructure. Bluetooth radios are relatively low powered to help prevent interference with other devices running at similar radio frequencies. This limits the range of a Bluetooth device to about 10 meters (32 feet). Both the printer and the device it communicates with must follow the Bluetooth standard. Other than conditions specified elsewhere in this manual, only one of the radio options can be installed in the printer at one time and the antenna used for these transmitters must not be co-located or must not operate in conjunction with any other antenna.

## Bluetooth Networking Overview

Each Bluetooth enabled QLn Series printer is identified by a unique Bluetooth Device Address (BDADDR). This address resembles a MAC address whereby the first three bytes are vendor, and the last three bytes are device (e.g. 00:22:58:3C:B8:CB). In order to exchange data, two Bluetooth enabled devices must establish a connection.

Bluetooth software is always running in the background, ready to respond to connection requests. One device (known as the master or the client) must request/initiate a connection with another. The second device (the slave or the server) then accepts or rejects the connection. A Bluetooth enabled QLn Series printer will normally act as a slave creating a miniature network with the terminal sometimes referred to as a "piconet".

Discovery identifies Bluetooth devices that are available for pairing whereby the master device broadcasts a discovery request and devices respond. If a device is not discoverable, the master cannot pair unless in knows the BDADDR or has previously paired with the device.

Bluetooth 2.1 or higher uses Security Level 4 Secure Simple Pairing (SSP), a mandatory security architecture that features four (4) association models: Numeric Comparison (user must

enter passkey on one side), Just Works (no user confirma-
tion), and Out of Band (pairing info transmitted OOB, e.g. via
Near Field Communication).

## Figure 30: Bluetooth Security Modes

| Security Mode 1 | Security Mode 2 | Security Mode 3 |
|---|---|---|
| If a BT >/= 2.1 device is pairing with a BT </= 2.0 device, it falls back to BT 2.0 compatibility mode and behaves the same as BT 2.0. If both devices are BT >/= 2.1, Secure Simple Pairing must be used according to the BT spec. | If a BT >/= 2.1 device is pairing with a BT </= 2.0 device, it falls back to BT 2.0 compatibility mode and behaves the same as BT 2.0. If both devices are BT >/= 2.1, Secure Simple Pairing must be used according to the BT spec. | If a BT >/= 2.1 device is pairing with a BT </= 2.0 device, it falls back to BT 2.0 compatibility mode and behaves the same as BT 2.0. If both devices are BT >/= 2.1, Secure Simple Pairing must be used according to the BT spec. |

### Security Mode 4: Simple Secure Pairing

| Numeric Comparison: | Passkey Entry: | Just Works: | Out of Band (OOB): |
|---|---|---|---|
| designed for situation where both devices are capable of displaying a six-digit number and allowing user to enter "yes" or "no" response. During pairing, user enters "yes" if number displayed on both devices matches to complete pairing. Differs from the use of PINs in legacy (BT<=2.0) pairing because the number displayed for comparison is not used for subsequent link key generation, so even if it is viewed or captured by an attacker, it could not be used to determine the resulting link or encryption key. | designed for situation where one device has input capability but no display (e.g. keyboard), while other device has a display. The device with a display shows a six-digit number, then the user enters this key on the device with input. As with numeric comparison, the six-digit number is not used in link key generation. | designed for situation where one (or both) of the pairing devices has neither a display nor keyboard for entering digits (e.g. Bluetooth headset). It performs authentication step 1 in the same manner as as numeric comparison, but the user cannot verify that both values match, so MITM (man-in-the-middle) protection is not provided. This is the only model in SSP that does not provide authenticated link keys. | designed for devices that support a wireless technology other than Bluetooth (e.g. NFC) for the purposes of device discovery and cryptographic value exchange. In the case of NFC, the OOB model allows devices to pair securely by simply tapping one device against the other, followed by the user accepting the pairing via a single button push. Security against eavesdropping and MITM attacks is dependant on the OOB technology. |

Each mode, except for Just Works, has Man-In-The-Middle
(MITM) protection, meaning no third device can view the data
being passed between the two devices involved. The SSP
mode is usually negotiated automatically based on the capa-
bilities of both the master and slave. Lower security modes
can be disabled via the `bluetooth.minimum_securi-
ty_mode` SGD. The `bluetooth.minimum_security_
mode` SGD sets the lowest security level at which the printer
will establish a Bluetooth connection. The printer will always
connect at a higher security level if requested by the master
device. To  change the security mode and security settings in
the ZQ510 printer, use Zebra Setup Utilities.

| | BT Version of Master Device (>2.1) |
|---|---|
| `bluetooth.minimum_security_mode = 1` | Secure Simple Pairing<br>Just Works/Numeric Comparison |
| `bluetooth.minimum_security_mode = 2` | Secure Simple Pairing<br>Just Works/Numeric Comparison |
| `bluetooth.minimum_security_mode = 3` | Secure Simple Pairing<br>Numeric Comparison |
| `bluetooth.minimum_security_mode = 4` | Secure Simple Pairing<br>Numeric Comparison |
| `bluetooth.bluetooth_PIN` | Not Used |

Figure 31: Bluetooth Minimum Security Mode Behavior

The QLn Series printers also feature bonding for Bluetooth. The printer caches pairing info so devices stay paired through power cycles and disconnects. This eliminates the need to re-pair on every connection establishment. The `bluetooth.bonding` SGD is on by default.

In addition, the QLn Series supports Near Field Communication (NFC) technology. Using the "Print Touch" feature located on the side of the printer, end-users can automatically connect via Bluetooth from a handheld device that supports NFC technology. The NFC tag has the printer's BDADDR encoded in a URL on the tag. Simply touching the NFC handheld device to the "Print Touch" icon on the printer will connect and pair the handheld device to the printer.

Near Field Communication (NFC)

Bluetooth and Wi-Fi seem similar to Near Field Communication (NFC) on the surface. All three allow wireless communication and data exchange between digital devices like smartphones. Yet near field communication utilizes electromagnetic radio fields while technologies such as Bluetooth and Wi-Fi focus on radio transmissions instead.

NFC is an offshoot of radio-frequency identification (RFID), with the exception that NFC is designed for use by devices within close proximity to each other, i.e. a smartphone and a QLn Series printer. Three forms of NFC technology exist: Type A, Type B, and FeliCa. All are similar but communicate in slightly different ways. FeliCa is commonly found in Japan.

Devices using NFC may be active or passive. A passive device, such as a QLn Series printer with an NFC tag, contains information that other devices can read but does not read any information itself. An active device, such as a smartphone, can read the information on the printer's NFC tag, but the tag itself does nothing except transmit the info to authorized devices.

Active devices can read information and send it. An active NFC device, like a smartphone, would not only be able to collect information from NFC tags, but it would also be able to exchange information with other compatible phones or devices. An active device could even alter the information on the NFC tag if authorized to make such changes.

To ensure security, NFC often establishes a secure channel and uses encryption when sending sensitive information.

http://www.zebra.com/nfc

Note • Tapping the Zebra Print Touch™ icon ▯ with a Near Field Communication (NFC) enabled smartphone will provide instant access to printer-specific information. For more information about NFC and Zebra products, go to http://www.zebra.com/nfc. Bluetooth pairing applications via NFC is also possible. Please see Zebra Multi-platform SDK for more information.

## WLAN Overview

QLn Series printers can be equipped with a radio using the industry standard 802.11 protocols. They will have the FCC ID number on the serial number label on the back of the unit.

- QLn Series Wireless Network Printers with the Zebra 802.11 WLAN radio module can be identified by the text "Wireless Network Printer" on the serial number label on the back of the printer.

- These printers allow communication as a node within a wireless local area network (WLAN). Methods of establishing communications to the printer will vary with each application.

General information on establishing WLAN communications can be found in the "CPCL  Programming Manual" which is available on-line. More information and LAN configuration utilities are included in  Zebra's Net Bridge™ program (version 2.8 and later). Zebra Setup Utilities (ZSU) can also be used to configure WLAN communications settings. Both Net Bridge and ZSU may be downloaded from the Zebra Web site.

## Setting Up the Software

QLn Series printers use Zebra's CPCL and ZPL Programming languages which were designed for mobile printing applications. CPCL and ZPL are fully described in the "CPCL Programming Manual" and the "ZPL Programming Guide" available on-line at www.zebra.com/manuals.

You can also use Designer Pro, Zebra's Windows® based label creation program which uses a graphical interface to create and edit labels in either language.

Refer to Appendix F for tips on downloading the Designer Pro application from Zebra's Web site.

# Using the Accessories

Swivel Belt Clip

Most QLn Series printers have a plastic swivel belt clip installed as a standard feature. (It should be noted that QLn220 & 320 printers with extended capacity battery do not come equipped with a belt clip.) To use: hook the clip over your belt, and ensure that the clip is securely attached to the belt. The belt clip will pivot to allow you to move freely while wearing the printer. The QLn420 also provides a more rigid metal belt clip as an option.

In order to install or remove the plastic Belt Clip you will need to remove the battery pack.

**Figure 33: Using the Belt Clip (QLn420 Shown)**



Clip printer to belt

Belt

Plastic Belt Clip

Printer can pivot freely



Metal Belt Clip
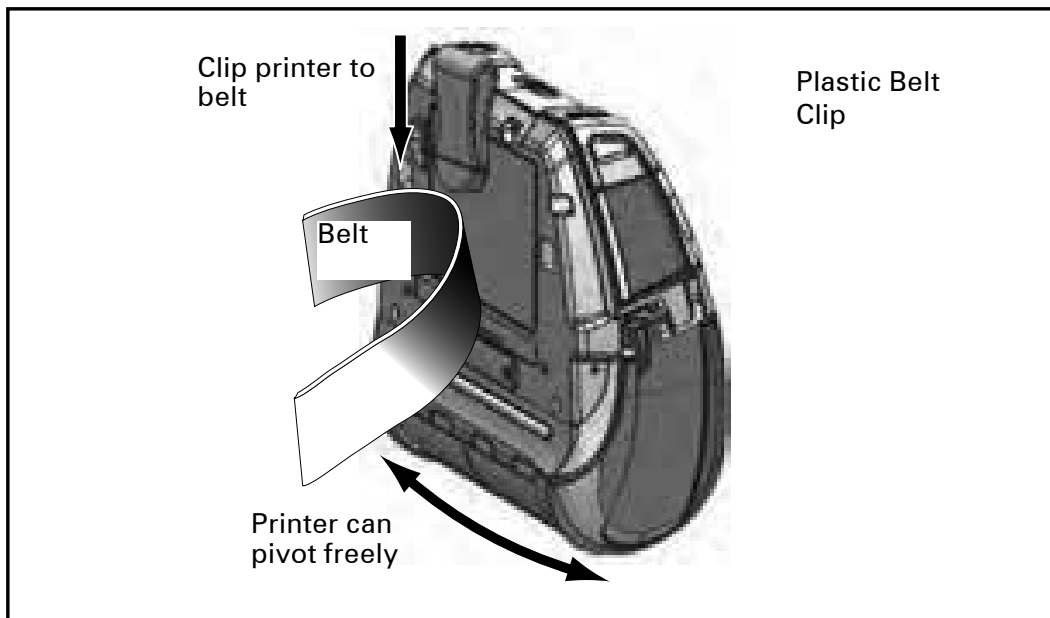
## Soft Case

QLn Series printers have soft case options that also allow you to carry the printer from your belt. The QLn420 soft case can be ordered through accessory kit number P1050667-017, the QLn320 is P1031365-029, and the QLn220 accessory kit is P1031365-044.
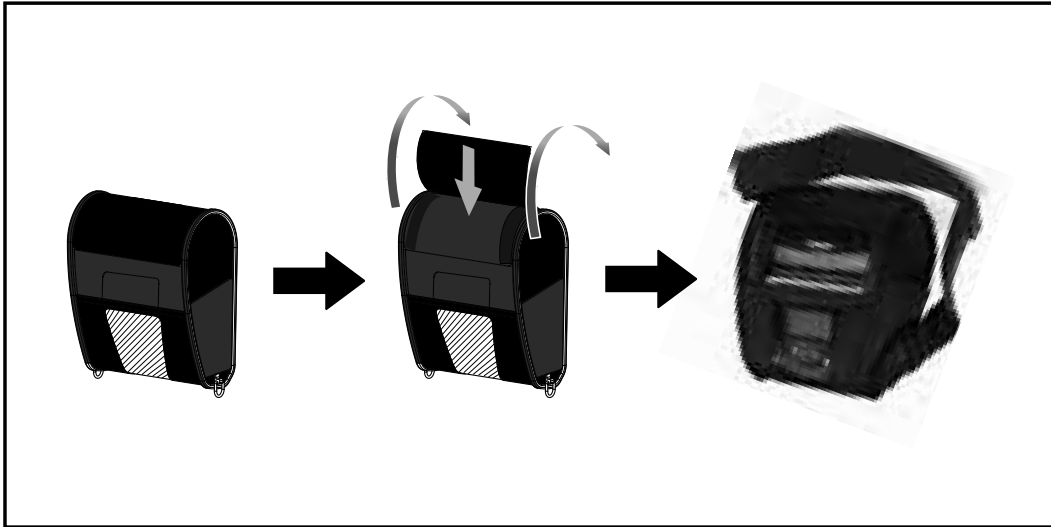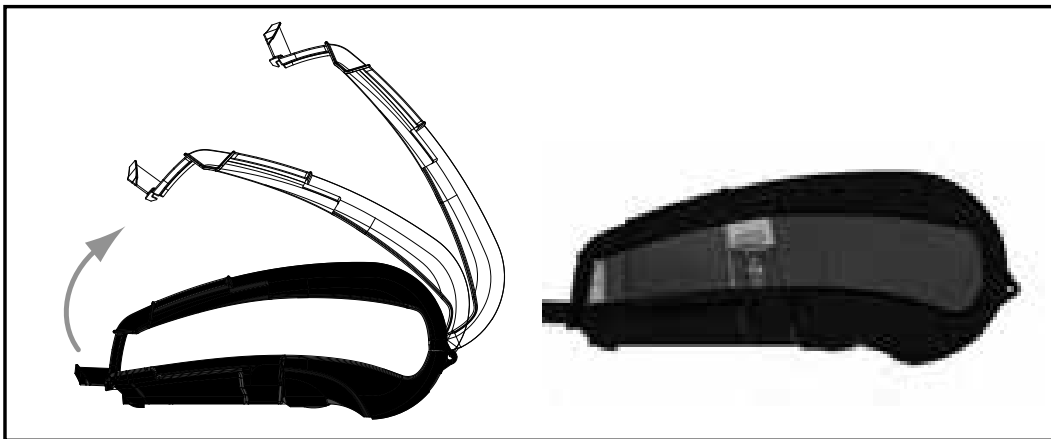


Figure 34: Using the Soft Case (QLn420 Shown)



Figure 35: Using the QLn420 Hard Case

## Hard Case

The QLn420 printer has a two piece hard case option that also allows you to carry the printer from your belt, while also providing increased protection for the printer. It pivots via a hinge located on the back and snaps into place in front as shown above. The metal belt clip is mounted to the hard case and printer with two screws.  If no belt clip is used, two shorter screws are used to hold the printer to the hard case.

## Adjustable Shoulder Strap

Refer to Figure 36 if your printer is equipped with the shoulder strap option (p/n P1031365-026). Insert each end of the shoulder strap into the cut-outs in each top corner of the printer and secure the looped end over the button on the end of the strap to fasten.

Hold the buckle and pull the strap as shown below until you achieve the desired length.

**Figure 36: Using the Optional Shoulder Strap(QLn220 Healthcare Shown)**



Insert loop into cut-outs on printer.

Button to secure strap to printer.
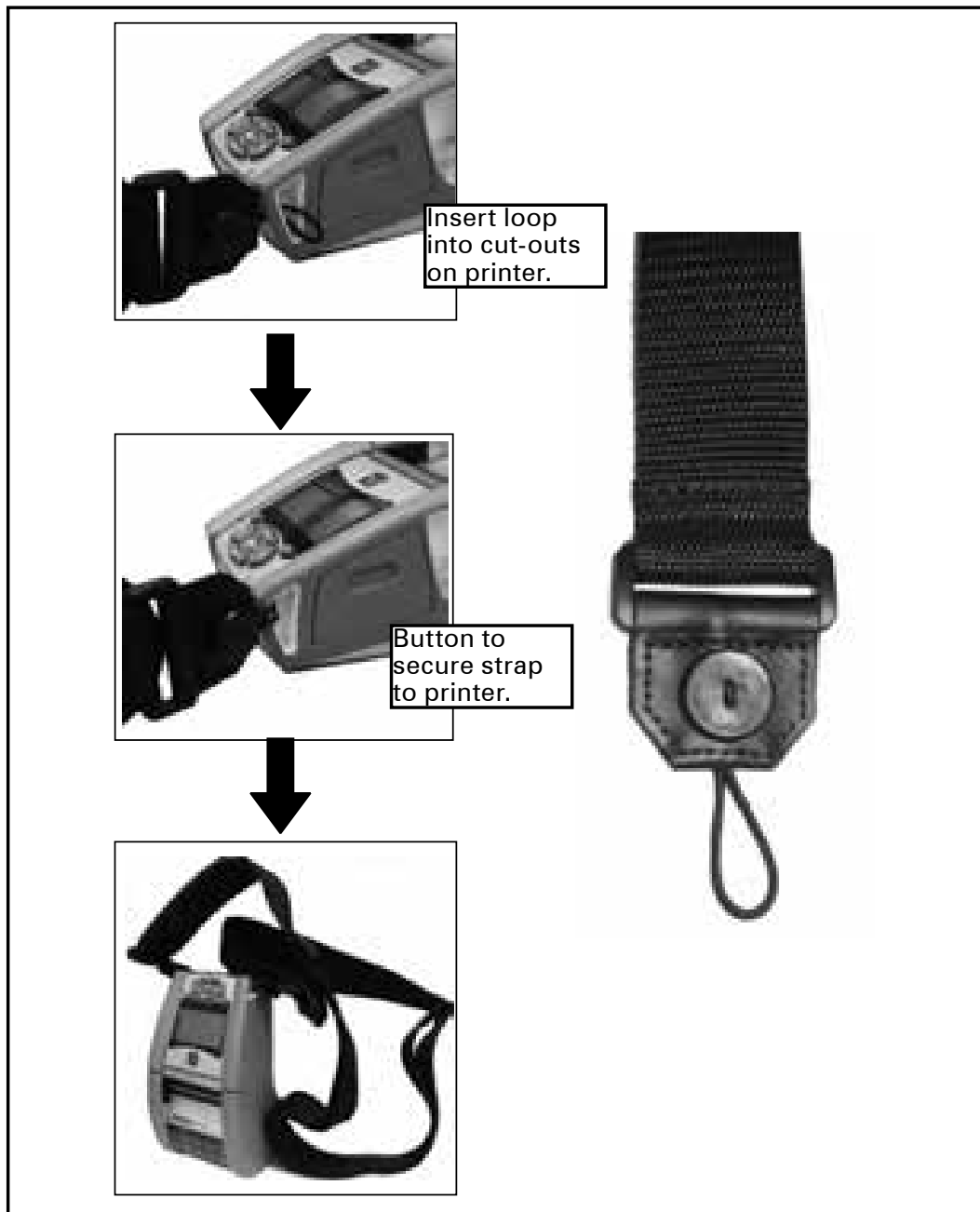
Hand Strap

The QLn Series hand strap accessory (p/n P1031365-027) attaches to the printer's cut-outs as does the shoulder strap to provide the user with a convenient and secure method of carrying the printer. To attach the hand strap to the printer:

- Insert the end of the strap through the cut out on the front of the printer as shown below.
- Loop the end of the strap back around the cut out and secure it over the button.
- Repeat this process for the opposite end of the strap.

Figure 37: Detachable Hand Strap (QLn420 Shown)
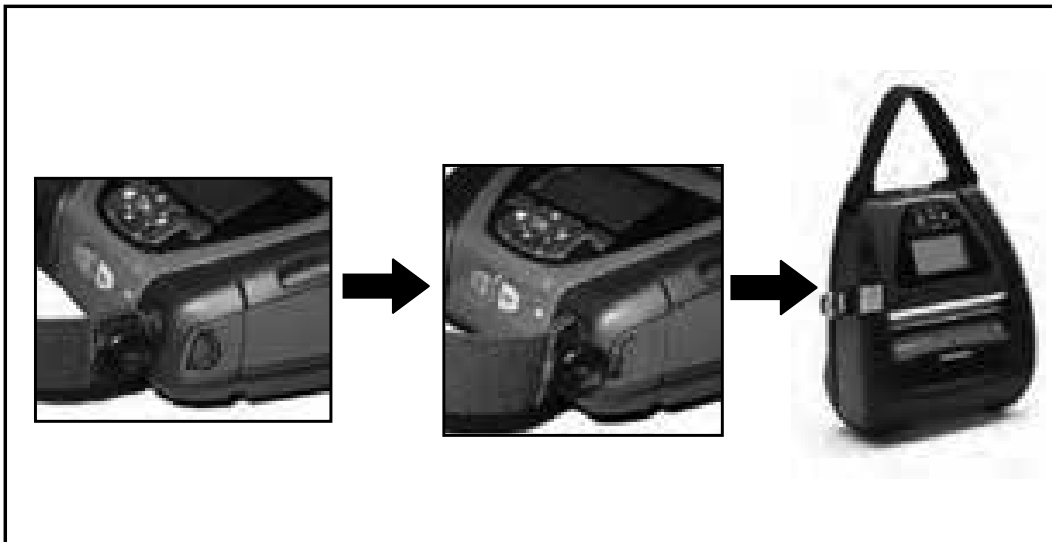


The QLn Series printers also feature two mounting holes on the base of the printer to accommodate future mounting options. Refer to RAM Mount Installation Procedure (p/n AA17518-003) on zebra.com.

# Preventive Maintenance

## Extending Battery Life

- Never expose the battery to direct sunlight or temperatures over 104° F (40° C).
- Always use a Zebra charger designed specifically for Lithium-Ion batteries. Use of any other kind of charger may damage the battery.
- Use the correct media for your printing requirements. An authorized Zebra re-seller can help you determine the optimum media for your application.
- If you print the same text or graphic on every label, consider using a pre-printed label.
- Choose the correct print darkness, and print speed for your media.
- Use software handshaking (XON/XOFF) whenever possible.
- Remove the battery if the printer won't be used for a day or more and you're not performing a maintenance charge.
- Consider purchasing an extra battery.
- Remember that any rechargeable battery will lose its ability to maintain a charge over time.  It can only be recharged a finite number of times before it must be replaced. Always dispose of batteries properly. Refer to Appendix E for more information on battery disposal.

## General Cleaning Instructions

⚠ Caution • Avoid possible personal injury or damage to the printer: never insert any pointed or sharp objects into the printer.
Always turn the printer off before performing any cleaning procedures.
Use care when working near the tear bar.  The edges are very sharp.

⚠ Caution • The printhead can be very hot after prolonged printing. Allow it to cool off before attempting any cleaning procedures.

❗ Only use a Zebra cleaning pen or a cotton swab saturated with alcohol for cleaning the printhead.

⚠ Caution • Use only cleaning agents specified in the following tables. Zebra Technologies Corporation will not be responsible for damage caused by any other cleaning materials used on this printer.

## QLn Series Cleaning

| Area | Method | Interval |
| --- | --- | --- |
| Printhead (Figure 38) | Use a Zebra cleaning pen or 70% Isopropyl alcohol on a cotton swab to clean the print elements from end to end (the print elements are located in the thin gray line on the printhead). | After every five rolls of media (or more often, if needed). When using Linerless type media, cleaning is required after every roll of media. |
| Platen Roller (Figure 38) | Rotate the platen roller and clean it thoroughly with the cleaning pen or 70% Isopropyl alcohol and a cotton swab. | After every five rolls of media (or more often if needed). |
| Platen Roller (Figure 39) | Units with linerless platens: Rotate platen & clean bearing points only. Avoid use of alcohol on the surface of linerless platens | After every roll of media. |
| Interior (Figure 39) | Units with linerless platens: Clean inside surfaces of edge guides & media rollers with the cleaning pen or 70% Isopropyl alcohol on a cotton swab. | After every roll of media. |
| Interior (Figure 38) | Brush/air blow. Ensure the Bar Sensor, Gap Sensor and Label Present Sensor windows are free of dust. | As needed |
| Peel bar (Figure 38) Tear bar (Figure 38) | Clean thoroughly with a cleaning pen or 70% Isopropyl alcohol and a cotton swab. | |
| Exterior | Water-dampened cloth or 70% Isopropyl alcohol wipe. | |

> **[!] Important •** The above cleaning procedures are not for QLn Healthcare printers. Refer to the Guide to Disinfecting and Cleaning QLn Healthcare Printers (P1066640-001) for detailed cleaning instructions.

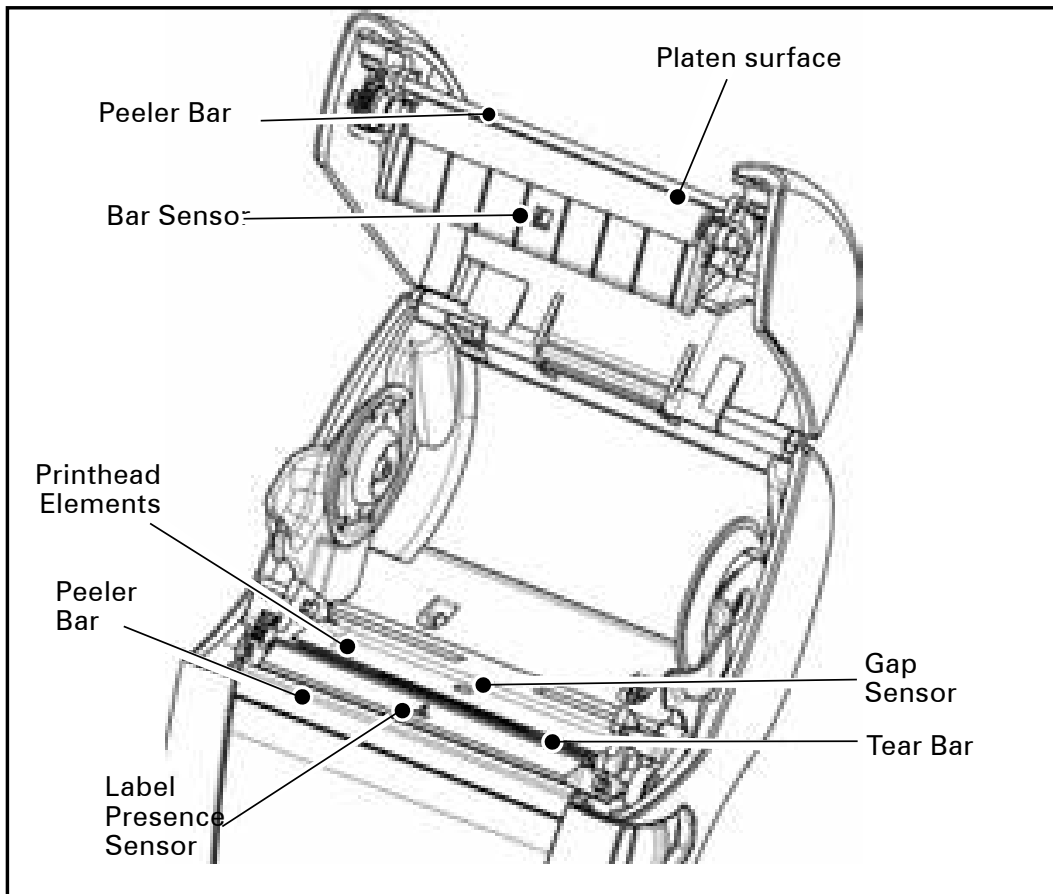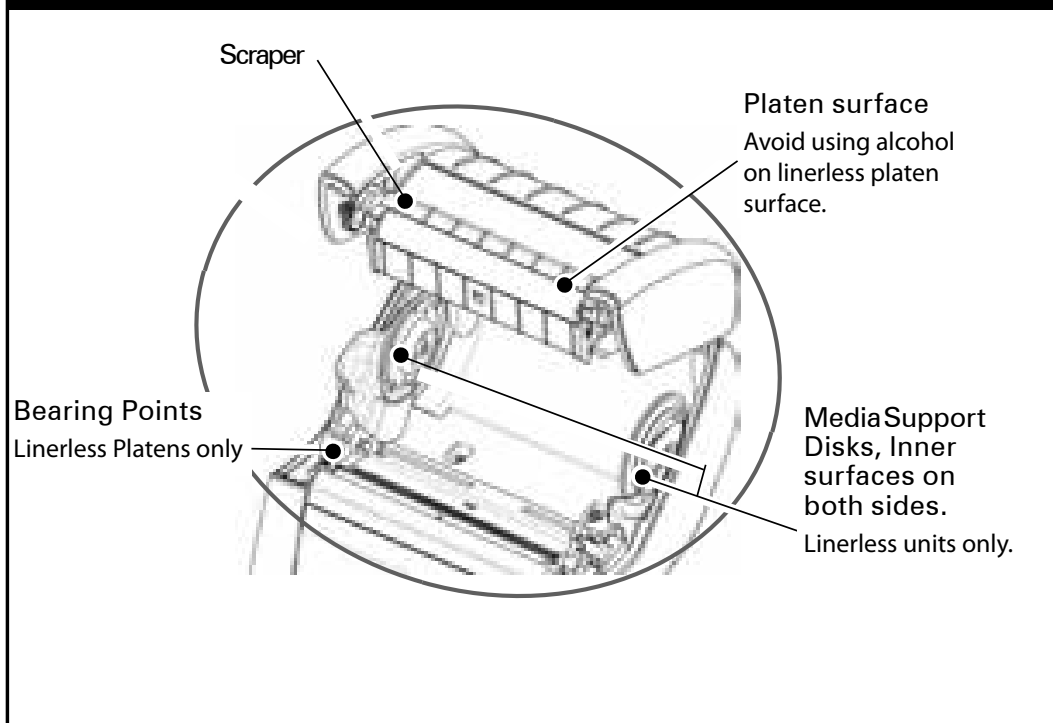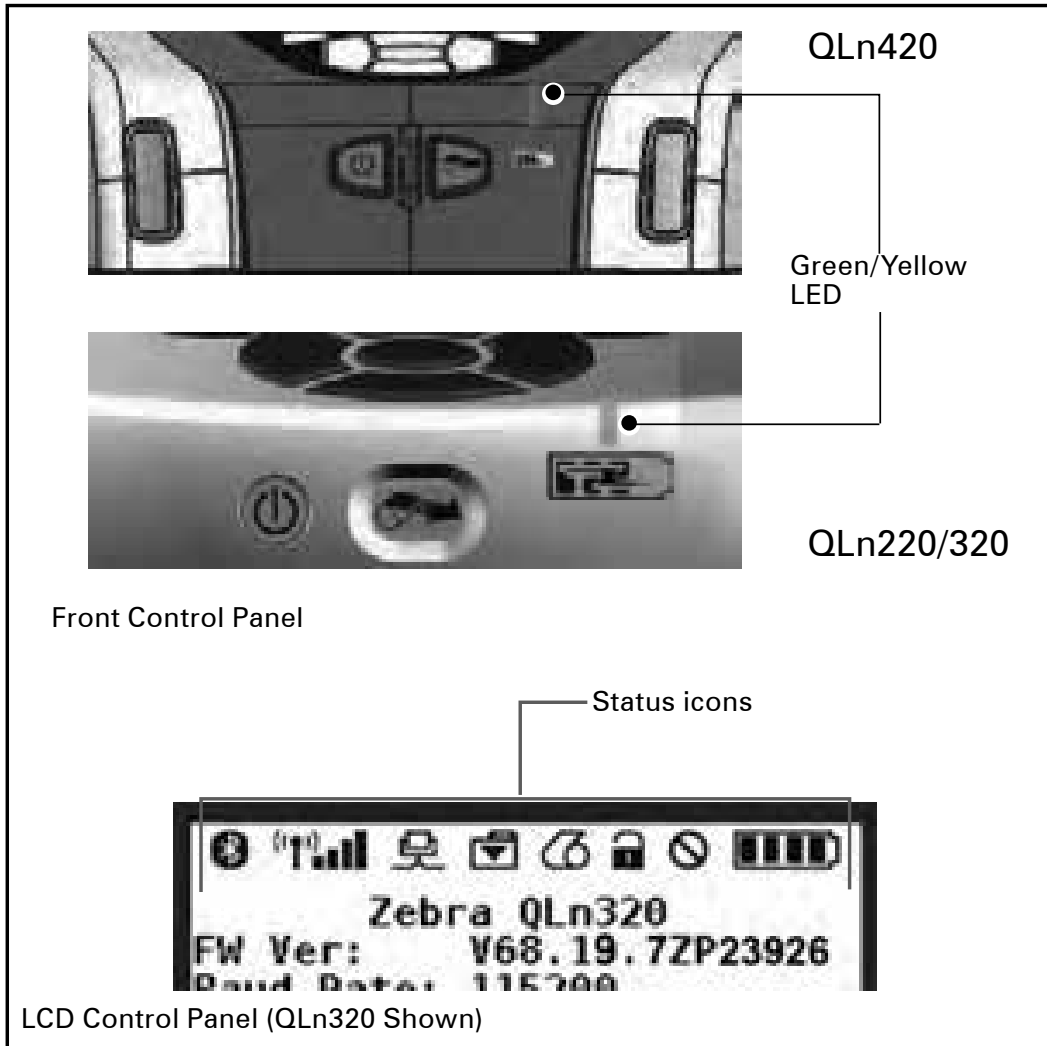**Figure 38: Cleaning the QLn Series Printers (QLn320 Shown)**

Platen surface

Peeler Bar

Bar Sensor

Printhead
Elements

Peeler
Bar

Gap
Sensor

Tear Bar

Label
Presence
Sensor

**Figure 39: Cleaning the Linerless QLn Series Printers**

Scraper

Platen surface
Avoid using alcohol
on linerless platen
surface.

Bearing Points
Linerless Platens only

Media Support
Disks, Inner
surfaces on
both sides.
Linerless units only.

# Troubleshooting

QLn420

Green/Yellow LED

QLn220/320

Front Control Panel

Status icons

Zebra QLn320
FW Ver:    V68.19.7ZP23926

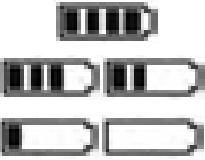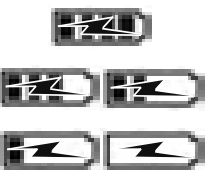LCD Control Panel (QLn320 Shown)

## Front Control Panel

If the printer is not functioning properly, refer to the chart below to find the state of the LED charge indicator on the Front Control Panel. Then refer to the Troubleshooting topic referenced in the chart to resolve the problem. Please note that the charge LED is only on when DC power is applied to the printer. If no DC power is applied the LED is off, which does not apply to the table below.
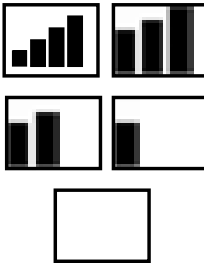
| Green | Yellow | Indication | Ref. to Topic |
|-------|--------|------------|---------------|
| Solid | Off | Fully charged | n/a |
| Off | Solid | Charging | n/a |
| Off | Off | Fault | 1 |

## LCD Control Panel Indicators

  The top of the display shows several icons which indicate the status of various printer functions. Check the indicator status, then refer to the Troubleshooting topic referenced in the chart to resolve the problem.

| Icon | Status | Indication |
|---|---|---|
| | On | Bluetooth Link established |
| | Not Present | Bluetooth Link inactive |
| | Blinking | Connecting or Transmitting Labels |
| | Antenna Blinking | Looking for AP |
| | Antenna Blinking/1 Parenthesis Solid | WLAN Associated & Attempting Authentication |
| | Antenna and 2 Parentheses Solid | WLAN Associated and Authenticated |
| | Antenna and 2 Parentheses Blinking | Receiving Data |
| | Not Present | No Radio Present |
| | 4 Bars | >80% Charged |
| | 3 Bars | 60%-80% Charged |
| | 2 Bars | 40%-60% Charged |
| | 1 Bar | 20%-40% Charged |
| | 0 Bars | Low Battery |
| | 4 Blinking w/ Lightning Bolt | Charging >80% Capacity |
| | 3 Blinking w/ Lightning Bolt | Charging 60-80% Capacity |
| | 2 Blinking w/ Lightning Bolt | Charging 40-60% Capacity |
| | 1 Blinking w/ Lightning Bolt | Charging 20-40% Capacity |
| | 0 Bars w/ Lightning Bolt | Charging <20% Capacity |
| | Blinking | Media cover open |

continued

| | | | |
|---|---|---|---|
| | Blinking | Receiving data |
| | Solid | Ethernet Connected |
| | Not Present | No Ethernet Connection |
| | Blinking | Data processing in progress |
| | Steady | No data being processed |
| | Blinking | Out of Media |
| | Steady | Media present |
| | Blinking | Error exists (excluding Media Out and Head Latch Open) |
| | Not Present | No error exists |
| | 4 Bars | 802.11 signal strength > 75% |
| | 3 Bars | 802.11 signal strength </= 75% |
| | 2 Bars | 802.11 signal strength </= 50% but >25% |
| | 1 Bar | 802.11 signal strength </= 25% |
| | 0 Bars | No Signal Strength |

## Troubleshooting Topics

### 1. No power

- Check that battery is installed properly.
- Recharge or replace battery as necessary.

> **!** Always dispose of batteries properly.  Refer to Appendix F for more information on proper battery disposal.

### 2. Media does not feed:

- Be sure media cover is closed and latched.
- Check spindle holding media for any binding.
- Ensure most recently printed label is removed (only in peel mode).
- Also ensure label sensor is not blocked.

### 3. Poor or faded print:

- Clean print head.
- Check quality of media.

### 4. Partial or missing print:

- Check media alignment

- Clean print head.
- Ensure printhead is properly closed and latched.

5. Garbled print:

- Check baud rate.

6. No print:

- Check baud rate.
- Replace battery.
- Check cable to terminal.
- Establish RF Link (Wireless units only) and/or restore LAN associativity (Printers with WLAN radios only).
- Invalid label format or command structure. Place printer in Communications Diagnostic (Hex Dump) Mode to diagnose problem.

7. Reduced battery charge life

- If battery is older than 1 year old, short charge life may be due to normal aging.
- Check battery health.
- Replace battery.

8. ▦ flashing:

- Flashing indicator is normal while data is being received.

9. ⬭ or ▣ flashing:

- Check that media is loaded and that the media cover is closed and securely latched.

10. Skips labels:

- Check media for top of form sense mark or label gap.
- Check that the maximum print field has not been exceeded on label.
- Ensure bar or gap sensor is not blocked or malfunctioning

11. Communication error:

- Check baud rate.
- Replace cable to terminal.

12. Label jam:

- Open head release latch and media cover.
- Remove and reinstall media.

13. Blank LCD screen

- Make sure printer is turned on.
- No application loaded or application corrupted: reload program.

## Troubleshooting Tests

### Printing a Configuration Label

To print out a listing of the printer's current configuration follow these steps:

1. Turn the printer off.  Load the media compartment with journal media (media with no black bars printed on the back).
2. Press and hold the Feed Button.
3. Press and release the Power button and keep the Feed button pressed.  When printing starts, release the Feed button.

> **Note •** The configuration report can also be printed from the Info (Help) menu on the LCD.

Refer to Figures 41, 41a, and 41b for sample configuration printouts.

### Communications Diagnostics

If there is a problem transferring data between the computer and the printer, try putting the printer in the Communications Diagnostics Mode (also referred to as the "DUMP" mode). The printer will print the ASCII characters and their text representation (or the period '.', if not a printable character) for any data received from the host computer.

To enter Communications Diagnostics Mode:

1. Print a configuration label as described above.
2. At the end of the diagnostics report, the printer will print: "Press FEED key to enter DUMP mode".
3. Press the FEED key. The printer will print: "Entering DUMP mode".

> **Note •** If the FEED key is not pressed within 3 seconds, the printer will print "DUMP mode not entered" and will resume normal operation.

4. At this point, the printer is in DUMP mode and will print the ASCII hex codes of any data sent to it, and their text representation (or "." if not a printable character). Additionally, a file with a ".dmp" extension containing the

ASCII information will be created and stored in the printer's memory. It can be viewed, "cloned" or deleted using the Net Bridge application. (Refer the Net Bridge documentation for more information.)

To terminate the Communications Diagnostics Mode and return the printer to normal operations:

1. Turn the printer OFF.
2. Wait 5 seconds.
3. Turn the printer ON.

Contacting Technical Support

If the printer fails to print the configuration label, or you encounter problems not covered in the Troubleshooting Guide, contact Zebra Technical Support.  Technical Support addresses and phone numbers for your area can be found in Appendix D of this manual.  You will need to supply the following information:

- Model number and type (e.g. QLn320)
- Unit serial number (Found on the large label on the back of the printer, also found in the configuration label printout.
- Product Configuration Code (PCC) (15 digit number found on the label on the back of the unit)

**Figure 41: QLn Series Configuration Label Example (QLn320 Shown)**



Identifies Printer as a QLn320 series

Unit Serial Number

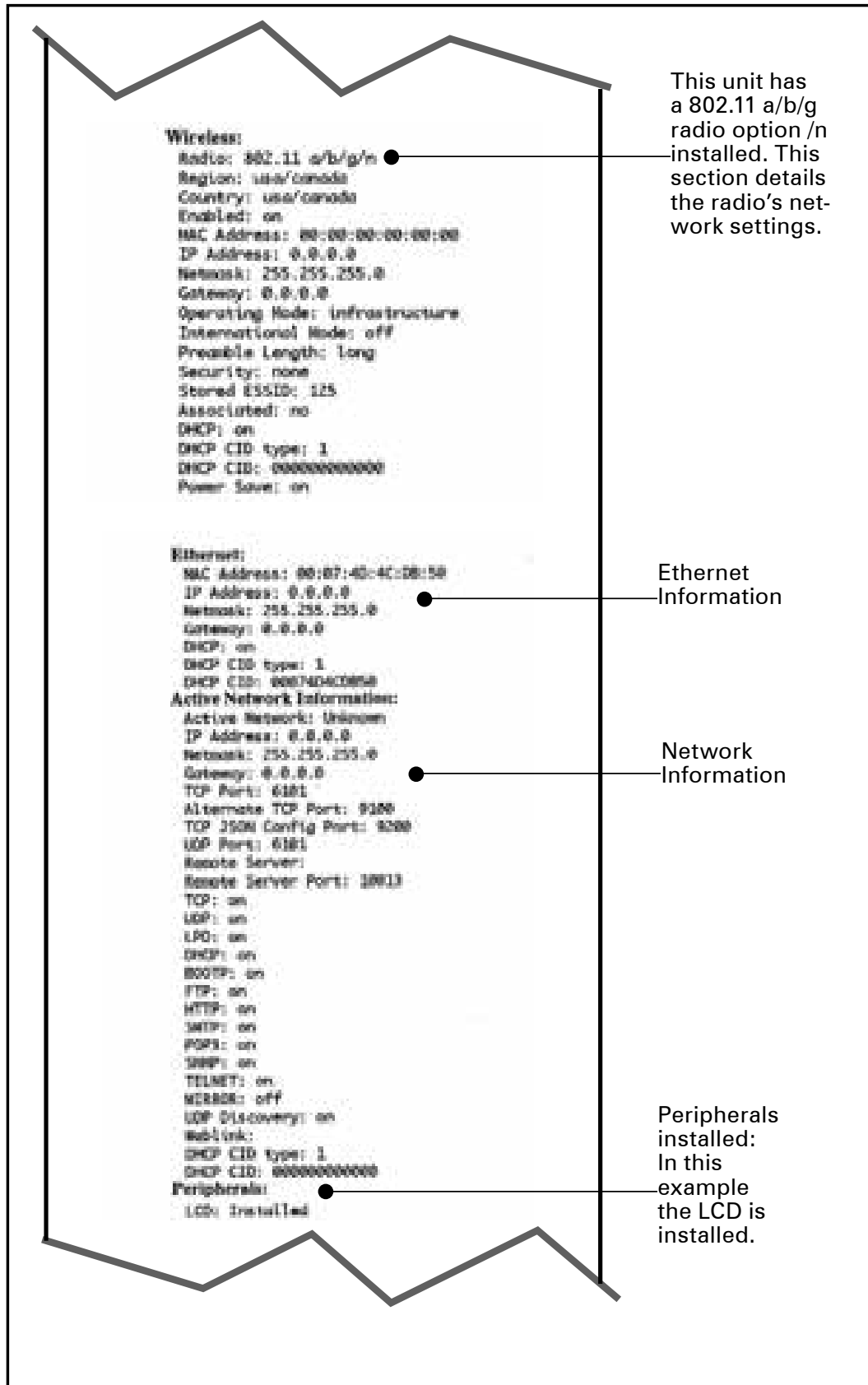MFi Supported

![Zebra note icon] Note • Wireless configuration settings may not print correctly when using the Power and Feed key method of printing as the radio takes time to initialize before these settings are valid. To get the correct setting, turn the printer on, wait 60 seconds, and then print the report from the Info (Help) menu.

```
Wireless:
  Radio: 802.11 a/b/g/n
  Region: usa/canada
  Country: usa/canada
  Enabled: on
  MAC Address: 00:00:00:00:00:00
  IP Address: 0.0.0.0
  Netmask: 255.255.255.0
  Gateway: 0.0.0.0
  Operating Mode: infrastructure
  International Mode: off
  Preamble Length: long
  Security: none
  Stored ESSID: 125
  Associated: no
  DHCP: on
  DHCP CID type: 1
  DHCP CID: 0000000000000
  Power Save: on


Ethernet:
  MAC Address: 00:07:4D:4C:DB:50
  IP Address: 0.0.0.0
  Netmask: 255.255.255.0
  Gateway: 0.0.0.0
  DHCP: on
  DHCP CID type: 1
  DHCP CID: 00074D4C0000
Active Network Information:
  Active Network: Unknown
  IP Address: 0.0.0.0
  Netmask: 255.255.255.0
  Gateway: 0.0.0.0
  TCP Port: 6101
  Alternate TCP Port: 9100
  TCP JSON Config Port: 9200
  UDP Port: 6101
  Remote Server:
  Remote Server Port: 10013
  TCP: on
  UDP: on
  LPD: on
  DHCP: on
  BOOTP: on
  FTP: on
  HTTP: on
  SMTP: on
  POP3: on
  SNMP: on
  TELNET: on
  MIRROR: off
  UDP Discovery: on
  Weblink:
  DHCP CID type: 1
  DHCP CID: 00000000000
Peripherals:
  LCD: Installed
```

This unit has a 802.11 a/b/g radio option /n installed. This section details the radio's network settings.

Ethernet Information

Network Information

Peripherals installed: In this example the LCD is installed.

Power Management:
  In-activity Timeout:1200 Secs
  Low-battery Timeout:60 Secs
  Remote(BTK) pwr-off:Enabled
  Voltage          :7.44
  Low-batt Warning  :176
  Low-bat Shut-down:166
  Power On Cycles  :58
  Battery Health    :good
  Battery Cycle Count:0
Memory:
  Flash :67108864 Bytes      ●————— Flash and RAM Memory Installed
  RAM   :8388608 Bytes
Label:
  Width :576 dots, 72 mm
  Height:65535 dots, 8191 mm   ●————— Maximum Label Size
Sensors: (Adj)
  Frez[DAC:218,Thr:60,Cur:223]
    Label Removed

  Media [166 (624 dots)]
  Gap [DAC:255,Thr:58,Cur:80]
  Bar [DAC:200,Thr:70,Cur:0]
  Temperature :27C (108)
  Voltage      :7.9V (200)
Resident Fonts:                ●————— Resident Human Readable fonts installed.

  Font      Sizes  Chars
  ————      ————   ————
   0        0- 6   20-FF
   1        0      20-80
   2        0- 1   20-58
   4        0- 7   20-FF
   5        0- 3   20-FF
   6        0      20-44
   7        0- 1   20-FF   ●

File Directory:
  File           Size
  ——————————     ————————
  E:TTN0004, TTF   160566   ●————— Files Loaded in Printer Memory (will include Pre-scaled or Scalable Fonts).
  66959392 Bytes Free
Command Language:
  CDL Key '1'[71]
  ZPL Configuration Information:

  Rewind..........Print Mode
  Mark............Media Type
  50.0..............Darkness
  400..........Tear Off Adjust
  2030..........Label Length
  48mm............Print Width
  7Eh..........Control Prefix
  5Eh..........Format Prefix
  2Ch..............Delimiter
  00............Top Position
  No Motion....Media Power Up
  Feed......Media Head Closed
  00.............Left Margin
  384...........Dots per row
  End ZPL Configuration

  End of report.

  Press FEED key to
  enter DUMP mode.

  Dump mode not entered.

# Specifications

Note • Printer specifications are subject to change without notice.

## Printing Specifications

| Parameter | QLn320 | QLn220 | QLn420 |
|---|---|---|---|
| Print Width | Up to 2.91 in. (74 mm) | Up to 1.89 in. (48 mm) | Up to 4.1 in. (104 mm) |
| Print Speed | 4 in./second (101,6 mm/second) without peeler | Same | Same |
| | 2 in./second (50,8 mm/second) with peeler | Same | Same |
| Printhead Burn Line to Tear Edge Distance | 0.20 in. (5,08 mm) | 0.17 in. (4,31 mm) | 0.16 in. (4,06 mm) |
| Print Head Life (as per Mfg. spec) | 2 million inches of paper fed | Same | Same |
| Print Density | 203 dots/in. | Same | Same |

## Memory and Communications Specifications for QLn Series

| | |
|---|---|
| Flash Memory | 256 MB Flash [1] |
| RAM Memory | 128 MB RAM [1] |
| Standard Communications | RS-232 serial port (14 Pin serial connector) Configurable Baud rate (from 9600 to 115.2 Kbps), parity and data bits. Software (X-ON/X-OFF) or hardware (DTR/STR) communication handshake protocols. |
| | USB 2.0 Full Speed Interface (12 Mbps) |
| Optional Wireless Communications | Bluetooth v2.1 compatible 2.4 GHz SRRF link |
| | Optional wireless LAN capabilities comply with 802.11a/b/g/n protocols |
| | QLn420: BT 3.0 and 802.11a/b/g/n |
| Real Time Clock (RTC) | Time and date under application control. Refer to CPCL and ZPL Programming Manuals, available at www.zebra.com/manuals for RTC commands. |
| Ethernet | 10 or 100 mps Ethernet auto detect when docked in cradle. |

1. Memory configuration on your printer may be ascertained by printing a configuration label as detailed on pages 66.

## Label Specifications

| Parameter | QLn320 | QLn220 | QLn420 |
|---|---|---|---|
| Media Width | 1.0 in. to 3.125 in. (25,4 to 79,4 mm) | .63 in to 2.18 in. (16 mm to 55,37 mm) | 2.0 in to 4.4 in. (50,8 mm to 111,76 mm) |
| Max/Min Label Length | 0.5 in. minimum to 32 in. maximum | Same | Same |
| Black Bar Sensor to Printhead Burn Line Distance. | 0.625 in. (15,87 mm) +/- 0.025 in. (+/-0.635 mm) | 0.53 in. (13,46 mm) | 0.625 in. (15,87 mm) +/-0.025 in. (+/-0.635 mm) |
| Label Thickness | 0.0023 in to 0.0065 in (0,058 mm to 0,165 mm) | 0.0023 in. to 0.0055 in. (0,058mm to 0,140 mm) | 0.0024 in. to 0.0075 in. (0,061 mm to 0,190 mm) |
| Max Tag Thickness | 0.0055 in. (0,152 mm) maximum | Same as QLn320 | 0.0075 in. (0,190 mm) max |
| Max. Label Roll dia. | 2.6 in. (66,8 mm) O.D. | 2.2 in. max (55,8 nn) O.D. | 2.6 in, (66,8 mm) O.D. |
| Label Inner Core** | 0.75 in. (19 mm) or 1.38 in (35,05 mm) minimum dia. for linered | Same | Same |
| | 1.38 in. (35,05 mm) minimum dia. for linerless media | Same | Same |
| Black Mark Location | The reflective media black marks should be centered on the media roll. | Same | Same |
| Black Mark Dimensions | Minimum mark width: 0.5 in. (12,7 mm) perpendicular to inside edge of media, centered within the width of the roll. Mark length: 0.12 in. to 0.43 in. (3-11 mm) parallel to inside edge of media | Same | Same |

Use Zebra brand direct thermal media that is outside wound. Media may be reflective (black mark) sensing, or transmissive (gap) sensing, die-cut, continuous, or linerless.

For die-cut labels, use only full auto dies.

** QLn Series printers support coreless media which is 0.75 in. (19 mm) in inner diameter.

# CPCL Font and Bar Code Specifications and Commands

| | |
|---|---|
| Standard Fonts | 25 bit-mapped fonts; 1 scalable font (CG Trimvirate Bold Condensed*) *Contains UFST from Agfa Monotype Corporation Downloadable optional bit-mapped & scalable fonts via Net Bridge software. |
| Available Optional Fonts | Optional International character sets: Chinese 16 x 16 (trad), 16 x 16 (simplified),24 x 24 (simplified); Japanese 16 x 16, 24 x 24 |
| Linear Bar Codes Available | **Barcode (CPCL Command)** |
| | Aztec (AZTEC) |
| | Codabar (CODABAR, CODABAR 16) |
| | UCC/EAN 128 (UCCEAN128) |
| | Code 39 (39, 39C, F39, F39C) |
| | Code 93 (93) |
| | Code 128 (128) |
| | EAN 8, 13, 2 and 5 digit extensions (EAN8, EAN82, EAN85, EAN13, EAN132, and EAN135) |
| | EAN-8 Composite (EAN8) |
| | EAN-13 Composite (EAN13) |
| | Plessey (PLESSEY) |
| | Interleaved 2 of 5 (I2OF5) |
| | MSI (MSI, MSI10, MSI1110) |
| | FIM/POSTNET (FIM) |
| | TLC39 (TLC39) |
| | UCC Composite A/B/C (128(Auto)) |
| | UPCA, 2 and 5 digit extensions (UPCA2 and UPCA5) |
| | UPCA Composite (UPCA) |
| | UPCE, 2 and 5 digit extensions (UPCE2 and UPCE5) |
| | UPCE Composite (UPCE) |
| 2-D Bar Codes Available | MaxiCode (MAXICODE) |
| | PDF 417 (PDF-417) |
| | Datamatrix (using ZPL emulation) (DATAMATRIX) |
| | QR Code (QR) |
| | RSS:    RSS-14 (RSS-Subtype 1) |
| | RSS:    RSS-14 Truncated (RSS-Subtype 2) |
| | RSS:    RSS-14 Stacked (RSS-Subtype 3) |
| | RSS:    RSS-14 Stacked Omnidirectional (RSS-Subtype 4) |
| | RSS:    RSS Limited (RSS-Subtype 5) |
| | RSS:    RSS Expanded (RSS-Subtype 6) |
| Rotation Angles | 0°, 90°, 180°, and 270° |

# ZPL Font and Bar Code Specifications and Commands

| | |
|---|---|
| Standard Fonts | 15 bit-mapped fonts; 1 scalable font (CG Trimvirate Bold Condensed*)<br>Downloadable optional bit-mapped & scalable fonts via Net Bridge software. |
| Available Optional Fonts | Zebra offers font kits covering multiple languages including Simplified and Traditional Chinese,  Japanese, Korean, Hebrew/Arabic, and others. |
| | **Barcode (ZPL Command)** |
| | Aztec (^B0) |
| | Codabar (^BK) |
| | Codablock (^BB) |
| | Code 11 (^B1) |
| | Code 39 (^B3) |
| | Code 49 (B4) |
| | Code 93 (^BA) |
| | Code 128 (^BC) |
| | DataMatrix (^BX) |
| | EAN-8 (^B8) |
| | EAN-13 (^BE) |
| | GS1 DataBar Omnidirectional (^BR) |
| | Industrial 2 of 5 (^BI) |
| Linear Bar Codes Available | Interleaved 2 of 5 (^B2) |
| 2-D Bar Codes Available | ISBT-128 (^BC) |
| | LOGMARS (^BL) |
| | Micro-PDF417 (^BF) |
| | MSI (^BM) |
| | PDF-417 (^B7) |
| | Planet Code (^B5) |
| | Plessey (^BP) |
| | Postnet (^BZ) |
| | Standard 2 of 5 (^BJ) |
| | TLC39 (^BT) |
| | UPC/EAN extensions (^BS) |
| | UPC-A (^BU) |
| | UPC-E (^B9) |
| | Maxi Code (^BD) |
| | QR Code (^BQ) |
| Rotation Angles | 0°, 90°, 180°, and 270° |

*Contains UFST from Agfa Monotype Corporation

## Communications Ports
### RS-232C

| Pin# | Signal Name | Type | Description |
|------|-------------|------|-------------|
| 1 | CTS | input | Clear To Send from host |
| 2 | TXD | output | Transmit Data |
| 3 | RXD | input | Receive Data |
| 4 | DSR | input | Data Set Ready: low to high transition turns printer on, high to low transition turns printer off (if enabled) |
| 5 | GND | | Ground |
| 6 | DTR | output | Data Terminal Ready: set high when printer is on. Switched 5V (300mA max) |
| 7 | N/A | | Do Not Use |
| 8 | RTS | output | Request To Send set high when printer is ready to accept a command or data |
| 9 | N/A | | Do Not Use |
| 10 | N/A | | Do Not Use |
| 11 | N/A | | Do Not Use |
| 12 | N/A | | Do Not Use |
| 13 | N/A | | Do Not Use |
| 14 | N/A | | Do Not Use |
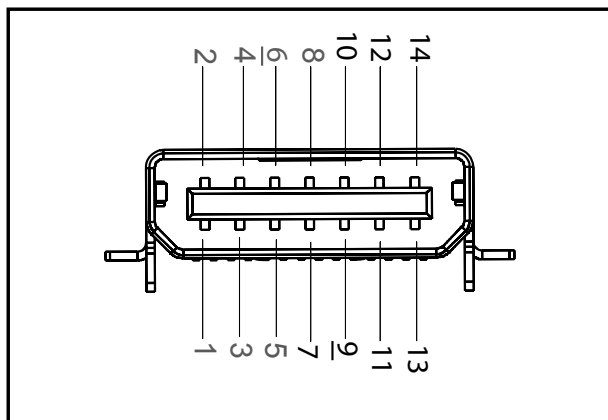


Figure 42: RS-232C Communications Port

USB

| Pin # | Signal Name | Type | Description |
|-------|-------------|------|-------------|
| 1 | VBUS | - | USB Bus Power |
| 2 | USB - | bi-directional | I/O signals |
| 3 | USB + | bi-directional | I/O signals |
| 4 | USB_ID | - | Identifies A/B connector |
| 5 | Return | | Ground |
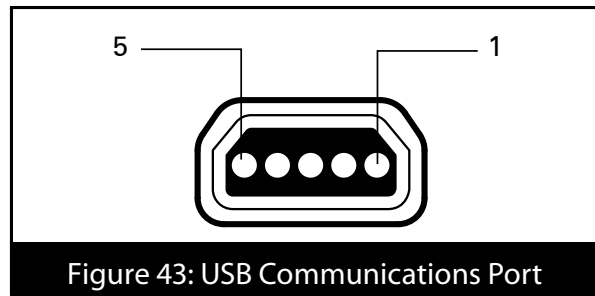


Figure 43: USB Communications Port

## Physical, Environmental and Electrical Specifications

| Parameter | QLn420 | QLn320 | QLn220 |
|-----------|--------|--------|--------|
| Weight w/ battery,excluding media & wireless options. | 2.20 lbs. (0,99 kg) | 1.60 lbs. (0,75 kg.) | 1.35 lbs. (0,61 kg.) |
| Temperature | Operating: -4° to 122° F (-20° to 50° C) Storage: -13° to 149° F (-25° to 65° C) Charging: 32° to 104° F (0° to 40° C) | Same | Same |
| Relative Humidity | Operating: 10% to 90% (non-condensing) | Operating: 10% to 80% (non-condensing) | Operating: 10% to 90% (non-condensing) |
| | Storage: 10% to 90% (non-condensing | Same | Same |
| Battery | Lithium-Ion, 7.4 VDC (nominal); 2.45 AHr min. | Same | Same |
| Intrusion Protection (IP) Rating | IP43 (without optional environmental case) IP54 (with case) | IP43 (without optional environmental case) IP54 (with case) | TBD (without optional environmental case) IP54 (with case) |
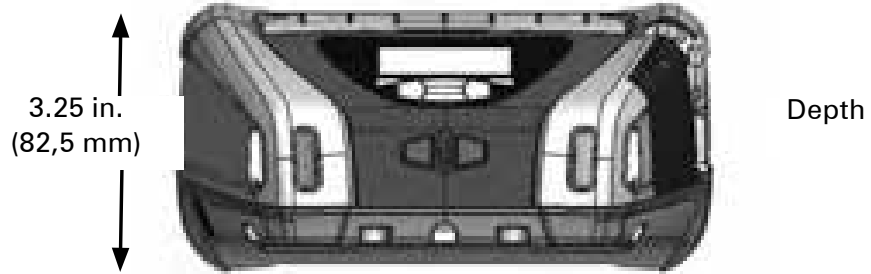
3.25 in.
(82,5 mm)

Depth

7.35 in.
(186,7 mm)

6.5 in.
(165,1 mm)

Width

Height

3.15 in.
(76,9mm)

Depth

6.85 in.
(173,7 mm)

4.65 in.
(117,9 mm)

Width

Height

2.85 in.
(72,4 mm)

Depth

6.73 in.
(170,9 mm)

3.5 in.
(91,4 mm)

Width

Height

## QLn Series Accessories

| Description |
| --- |
| Adjustable shoulder strap: Kit p/n P1031365-026 |
| Hand Strap: Kit p/n P1031365-027 |
| Protective soft case: Kit p/n P1050667-017 (QLn420); P1031365-029 (QLn320); P1031365-044 (QLn220) includes shoulder strap |
| Extra battery packs: Kit p/n P1031365-025 (QLn220/320); P1050667-016 (QLn420); P1051378-002 (QLn Healthcare); P1031365-101 (QLn Extended Battery) |
| Ethernet Cradle AC Adapter: p/n P1031365-033 (QLn220/320); P1050667-018 (QLn420); (US line cord, see Sales for others) |
| Ethernet Cradle: p/n P1050667-029 (QLn420); P1031365-038 (QLn220/320) |
| Quad Ethernet Cradle: P1031365-045 (US line cord, see Sales for others); for use with QLn220/320 only |
| Vehicle Cradle: P1050667-026 (QLn420 w/ adapter and cord); P1050667-030 (w/out adapter and cord) |
| SC2 Smart Single Battery Charger: P1031365-063 (US line cord, see Sales for others) |
| Li-Ion DC/DC 15 - 60 VDC Adapter (for use with forklifts); AK18913-003 (QLn420) |
| AC Power Adapter: p/n P1031365-024 ; (US line cord, see Sales for others) |
| Model UCLI72-4 Quad Battery Charger (100-240 VAC input): p/n AC18177-5 (US line cord, see Sales for others) |
| Protective hard case for QLn420: P1050667-034 |
| Metal Belt Clip (QLn420): P1050667-031 |
| Plastic Belt Clip (QLn Healthcare): P1024458-002 |

Refer to Appendix A for information on Data I/O Cables.

For more accessory kit details and order numbers, contact the factory or your authorized Zebra re-seller.

# Appendix A

## Interface Cables

## RS232 Cables

Part Number P1031365-053; DB-9 to 14-Pin Serial
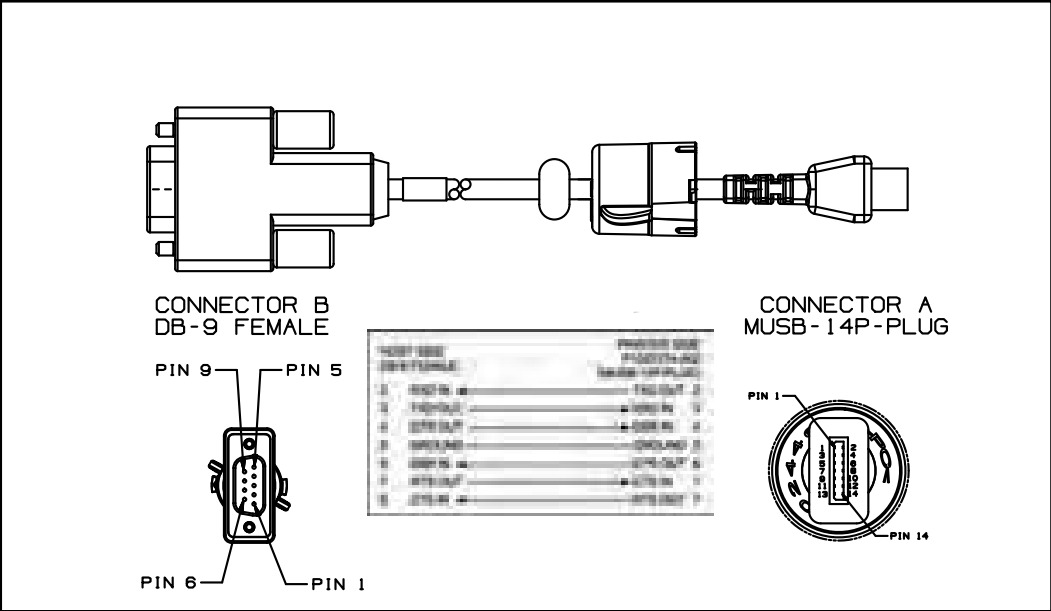


Part Number P1031365-052; 8-Pin DIN to 14-Pin Serial Cable (QL Adapter Cable)
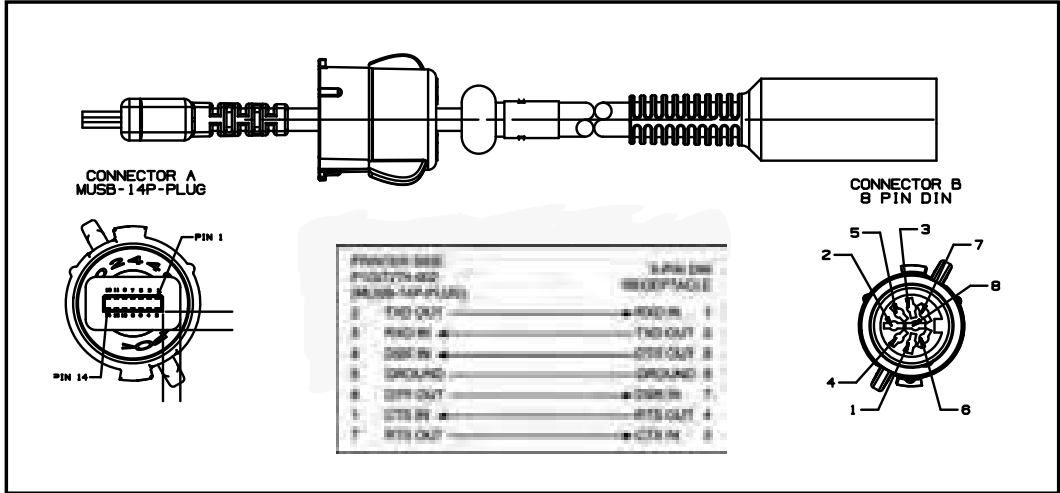
# USB Cable

Part Number AT17010-1; USB A to USB Mini B Cable
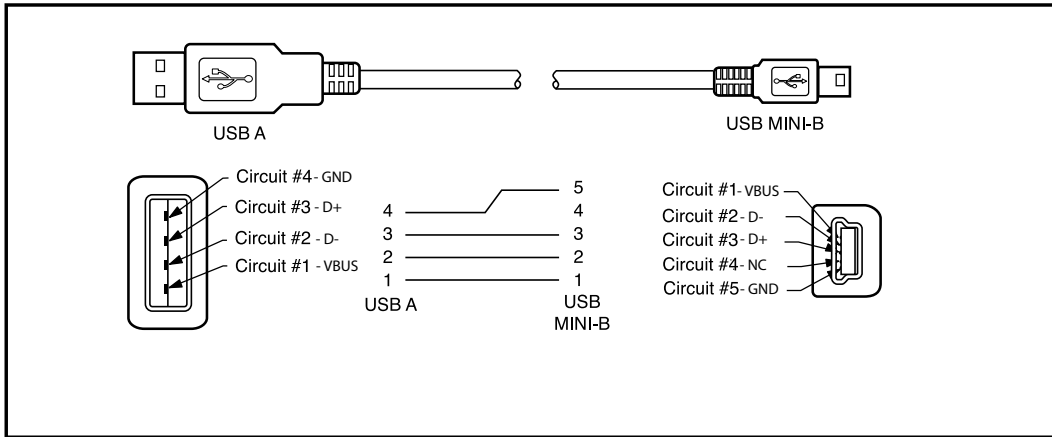


Part Number P1031365-055; 4 Position USB Mini to 4-Pin USB (w/ Strain Relief)
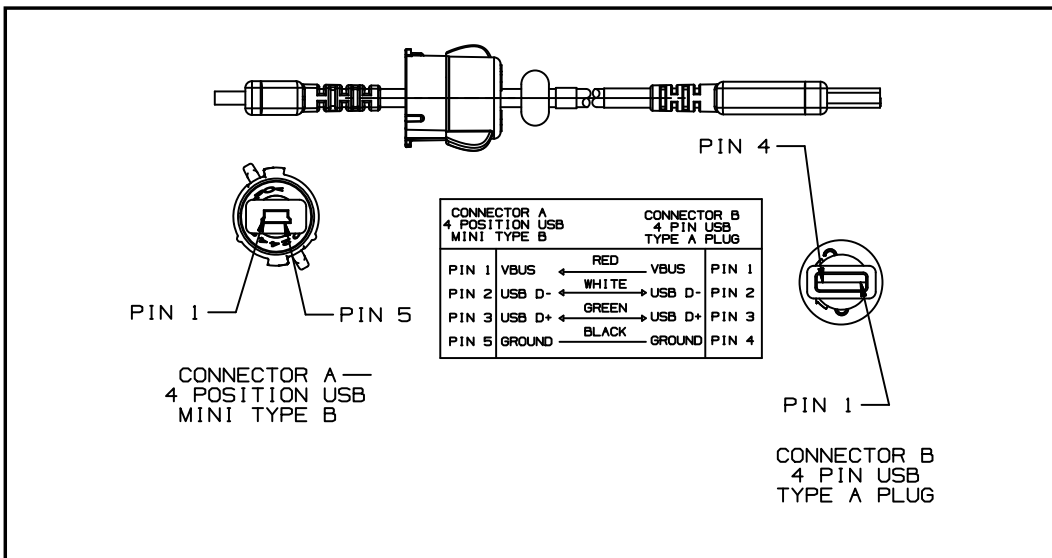


## More Interface Cables

Contact the Factory or your Zebra Sales Representative for more information on interface cables to most major manufacturer's data terminals.

You may also vist the Zebra Web site at:
www.zebra.com/accessories for a listing of interface cables for all  series of Zebra mobile printers

# Appendix B

Media Supplies

To insure maximum printer life and consistent print quality and performance for your individual application, it is recommended that only media produced by Zebra be used. Advantages include:
- Consistent quality and reliability of media products.
- Large range of stocked and standard formats.
- In-house custom format design service.
- Large production capacity which services the needs of many large and small media consumers including major retail chains world wide.
- Media products that meet or exceed industry standards.

For more information go the Zebra website (www.zebra.com) and select the Products tab, or refer to the CD included with the printer.

# Appendix C

Maintenance Supplies

In addition to using quality media provided by Zebra, it is recommended that the printer be cleaned as prescribed in the maintenance section.  The following item is available for this purpose:
- Cleaning Pen (12 pack): p/n 105950-035

# Appendix D

## SETTINGS Menu

DARKNESS

-49

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

PRINT SPEED

4.0

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

MEDIA TYPE

MARK

Select the type of media that you are using.

TEAR OFF

0

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

PRINT WIDTH

576

Specify the width of the labels being used. The default value is the maximum width for the printer based on the printhead's DPI value.

PRINT MODE

REWIND

🏠

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

---

LABEL TOP

0

🏠

---

LEFT POSITION

0

🏠

If necessary, shift the print position horizontally on the label. Positive numbers move the left edge of the image toward the center of the label by the number of dots selected, while negative numbers move the left edge of the image toward the left edge of the label.

---

REPRINT MODE

OFF

🏠

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

---

LABEL LENGTH MAX

39

🏠

Set the maximum label length to a value that is at least 1.0 in. (25,4 mm) greater than the actual label length plus the inter-label gap. If yu set the value to one that is smaller than the label length, the printer assumes that continuous media is loaded, and the printer cannot calibrate.

---

LANGUAGE

▼        ENGLISH        ▲

🏠

If necessary, change the language that the printer displays.

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

## ⛏ TOOLS Menu

---

```
HELP FOR

▼      MEDIA      ▲

🏠              GET HELP
```

Use scrolling feature to select from a variety of help topics including how to load media, location and removal of battery, and cleaning the printhead. There are also explanations of various icons including battery, error, latch, media, RCV data, Ethernet, signal, WLAN, and Bluetooth.

---

```
PRINT INFORMATION

▼      SETTINGS      ▲

🏠                 PRINT
```

Prints a printer configuration label, sensor profile, barcode information, font information, images, formats, two-key report, and network settings.

---

```
LCD CONTRAST

▼          10          ▲

🏠
```

Changes the contrast on the printer's display (i.e. the higher the number, the darker the contrast).

---

```
LCD BACKLIGHT

▼          ON          ▲

🏠
```

Allows the user to turn the LCD backlight on or off.

---

```
BACKLIGHT TIMEOUT

          10

🏠
```

Sets the duration of the LCD backlight in seconds.

---

IDLE DISPLAY

FW VERSION

🏠

Select the information shown on the printer's display when the printer is idle.

POWER UP ACTION

NO MOTION

🏠

Set the action for the printer to take during the power-up sequence, i.e. no motion, calibrate, etc.

HEAD CLOSE ACTION

FEED

🏠

Set the action for the printer to take when you close the printhead, i.e. feed, calibrate, etc.

LABEL LENGTH CAL

🏠

DIAGNOSTIC MODE

▼      ENABLED      ▲

🏠

Use this diagnostic tool to cause the printer to output the hexadecimal values for all data received by the printer.

ZBI ENABLED?

▼      NO      ▲

🏠

This menu item indicates if the Zebra Basic Interpreter (ZBI 2.0™.) option is enabled on your printer.

# **Appendix D** (continued)

## NETWORK Menu

ACTIVE PRINT SERVER

NONE

Informs the user of the presence of an active server. Only one print server can be installed at a time, therefore the print server installed is the active print server.

WLAN STATUS

NOT ASSOCIATED

Informs the user if WLAN is associated or not associated.

WLAN IP ADDRESS

0.0.0.0

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

WLAN SUBNET MASK

255.255.255.0

View, and if necessary, change the WLAN subnet mask.

WLAN GATEWAY

0.0.0.0

View, and if necessary, change the default WLAN gateway.

WLAN IP PROTOCOL

ALL

This parameter tells if the user or the server selects the WLAN IP address.

---

WLAN MAC ADDRESS

00:19:70:7A:20:44

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

---

ESSID

DSF802LESS54

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

---

AP MAC ADDRESS

00:05:9A:3C:78:00

View the AP MAC address associated with the printer.

---

CHANNEL

View the network channel.

SIGNAL

0

.View, and if necessary, change the printer's network signal.

WIRED IP ADDRESS

0.0.0.0

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

WIRED SUBNET MASK

255.255.255.0

View, and if necessary, change the printer's wired subnet mask.

WIRED GATEWAY

0.0.0.0

View, and if necessary, change the wired gateway setting.

WIRED IP PROTOCOL

ALL

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

WIRED MAC ADDRESS

00:07:4D:3F:D3:B2

🏠

.View, and if necessary, change the printer's network signal.

IP PORT

6101

🏠

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

IP ALT PORT

9100

🏠

View, and if necessary, change the printer's wired subnet mask.

# Appendix D (continued)

 BATTERY Menu

BATTERY ELIMINATOR

INSTALLED

Indicates if a battery eliminator has been installed.

HEALTH

GOOD

Indicates the current health of the battery, i.e. Good, Past Useful Life, etc.

CYCLE COUNT

3

View the current cycle count of the battery.

FIRST USED

7-12-2012

View the date on which the battery was first used in the printer.

SERIAL NUMBER

1509

View the serial number of the battery pack.

```
          TIMEOUT

         0 SECONDS


  🏠
```

View, and if necessary, change the battery timeout.

```
          VOLTAGE

            8.39


  🏠
```

View the current voltage level of the battery pack.

```
          WARNING

          6.87 (176)


  🏠
```

.

```
        DTR CONTROL

            OFF


  🏠
```

# Appendix D (continued)

## LANGUAGES Menu

LANGUAGE

▼        ENGLISH        ▲

🏠

If necessary, change the language that the printer displays.

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

COMMAND LANGUAGE

▼     HYBRID_XML_ZPL     ▲

🏠

ZPL OVERRIDE

DISABLED

🏠

Enable this menu item to allow certain ZPL commands to override the printer's current settings.

COMMAND CHAR

^ (5E)

🏠

Set the format command character to match what is used in your label formats.

CONTROL CHAR

~ (7E)

🏠

Set the control prefix character to match what is used in your label formats.

DELIMETER CHAR

,  (2E)

Set the delimiter character to match what is used in your label formats.

ZPL MODE

ZPL II

Select the mode that matches what is used in your label formats.

VIRTUAL DEVICE

▼          NONE          ▲

# Appendix D (continued)

## SENSORS Menu

---

MEDIA STATUS

▼                OK                ▲

🏠

.Informs the user of the presence or absence of media in the printer.

---

LABEL LENGTH CAL

🏠

---

TAKE LABEL

▼                0                ▲

🏠

Important: This value is set during sensor calibration. Do not change this setting unless you are told to do so by Zebra Technical Support or by an authorized service technician.

## PORTS Menu

```
      BAUD RATE

       19200

🏠
```

Select the baud value that matches the one being used by the host computer.

```
      DATA BITS

        8

🏠
```

Select the data bits value that matches the one being used by the host computer.

```
       PARITY

        NONE

🏠
```

Select the parity value that matches the one being used by the host computer.

```
      STOP BITS

        1

🏠
```

Select the stop bits value that matches the one being used by the host computer.

```
   HOST HANDSHAKE

       RTS/CTS

🏠
```

Select the handshake protocol that matches the one being used by the host computer.

HALT ON ERROR

▼ YES ▲

🏠

Select YES or NO to halt printing upon the occurrence of an error.

### BLUETOOTH Menu

| BLUETOOTH ADDRESS |
| --- |
| NO BLUETOOTH RADIO |
| 🏠 |

View the Bluetooth address for the presence of a BT radio.

| MODE |
| --- |
| SLAVE |
| 🏠 |

View the mode of the BT radio.

| DISCOVERY |
| --- |
| ON |
| 🏠 |

View the discovery status, i.e. ON or OFF.

| CONNECTED |
| --- |
| NO |
| 🏠 |

View the connection status of the BT radio, i.e. YES or NO.

BT SPEC VERSION

NO RADIO

🏠

View the Bluetooth spec version.

MIN SECURITY MODE

1

🏠

View, and change if necessary, the minimum security mode of the BT radio.

MFI CAPABILITY

PRESENT

🏠

Informs the user of the presence or availability of Made for iPhone (MFi) capability.

# Appendix E

Product Support

   When calling with a specific problem regarding your printer, please have the following information on hand:
   • Model number/type (e.g. QLn320)
   • Unit serial number (refer to figure on opposite page)
   • Product Configuration Code (PCC) (refer to figure on following page))

In the  Americas contact

| Regional Headquarters | Technical Support | Customer Service Dept. |
|---|---|---|
| Zebra Technologies Corporation<br>475 Half Day Road, Suite 500<br>Lincolnshire, Illinois 60069 U.S.A<br>T: +1 847 634 6700<br>Toll-free +1 866 230 9494<br>F: +1 847 913 8766 | T: +1 877 275 9327<br>F: +1 847 913 2578<br>Hardware:<br>ts1@zebra.com<br>Software:<br>ts3@zebra.com | For printers, parts, media, and ribbon, please call your distributor, or contact us.<br>T: +1 877 275 9327<br>E: clientcare@zebra.com |

In Europe, Africa, the Middle East, and India contact

| Regional Headquarters | Technical Support | Internal Sales Dept. |
|---|---|---|
| Zebra Technologies Europe Limited<br>Dukes Meadow<br>Millboard Road<br>Bourne End<br>Buckinghamshire SL8 5XF, UK<br>T: +44 (0)1628 556000<br>F: +44 (0)1628 556001 | T: +44 (0) 1628 556039<br>F: +44 (0) 1628 556003<br>E: Tseurope@zebra.com | For printers, parts, media, and ribbon, please call your distributor, or contact us.<br>T: +44 (0) 1628 556032<br>F: +44 (0) 1628 556001<br>E: cseurope@zebra.com |

In the Asia Pacific region contact

| Regional Headquarters | Technical Support | Customer Service |
|---|---|---|
| Zebra Technologies Asia Pacific Pte. Ltd.<br>120 Robinson Road<br>#06-01 Parakou Building<br>Singapore 068913<br>T: +65 6858 0722<br>F: +65 6885 0838 | T: +65 6858 0722<br>F: +65 6885 0838<br>E: (China)<br>tschina@zebra.com<br>All other areas:<br>tsasiapacific@zebra.com | For printers, parts, media, and ribbon, please call your distributor, or contact us.<br>T: +65 6858 0722<br>F: +65 6885 0836<br>E: (China) order-csr@zebra.com<br>All other areas:<br>csasiapacific@zebra.com |

# Appendix E (continued)

Serial Number Barcode

PCC Barcode

QLɴ320
(Bᴏᴛᴛᴏᴍ Vɪᴇᴡ)



QLɴ420
(Bᴏᴛᴛᴏᴍ Vɪᴇᴡ)
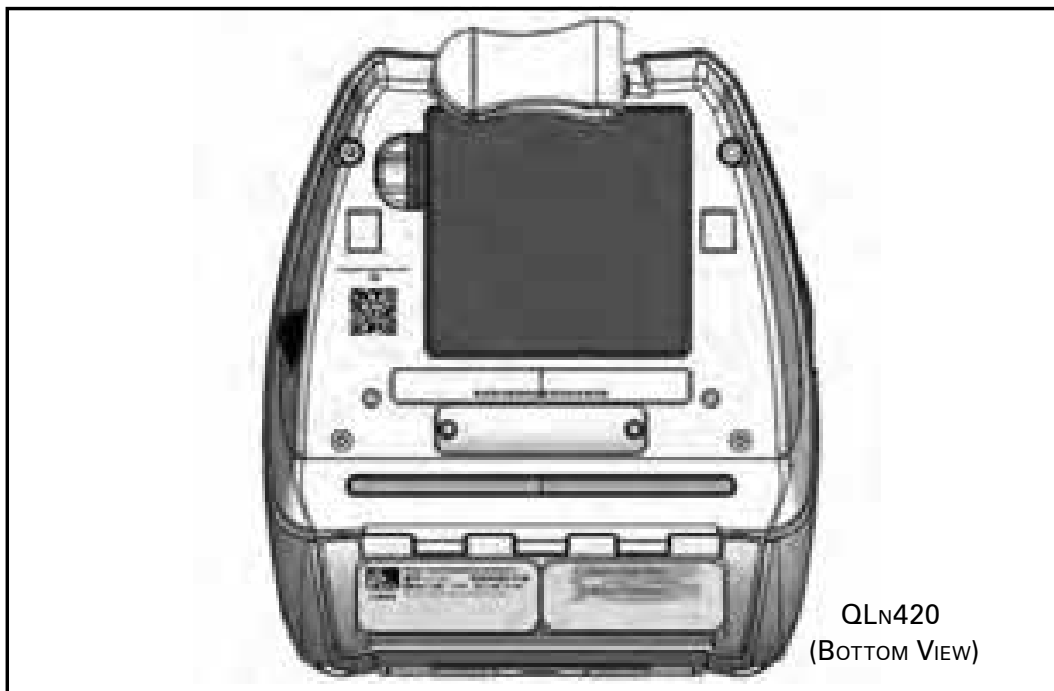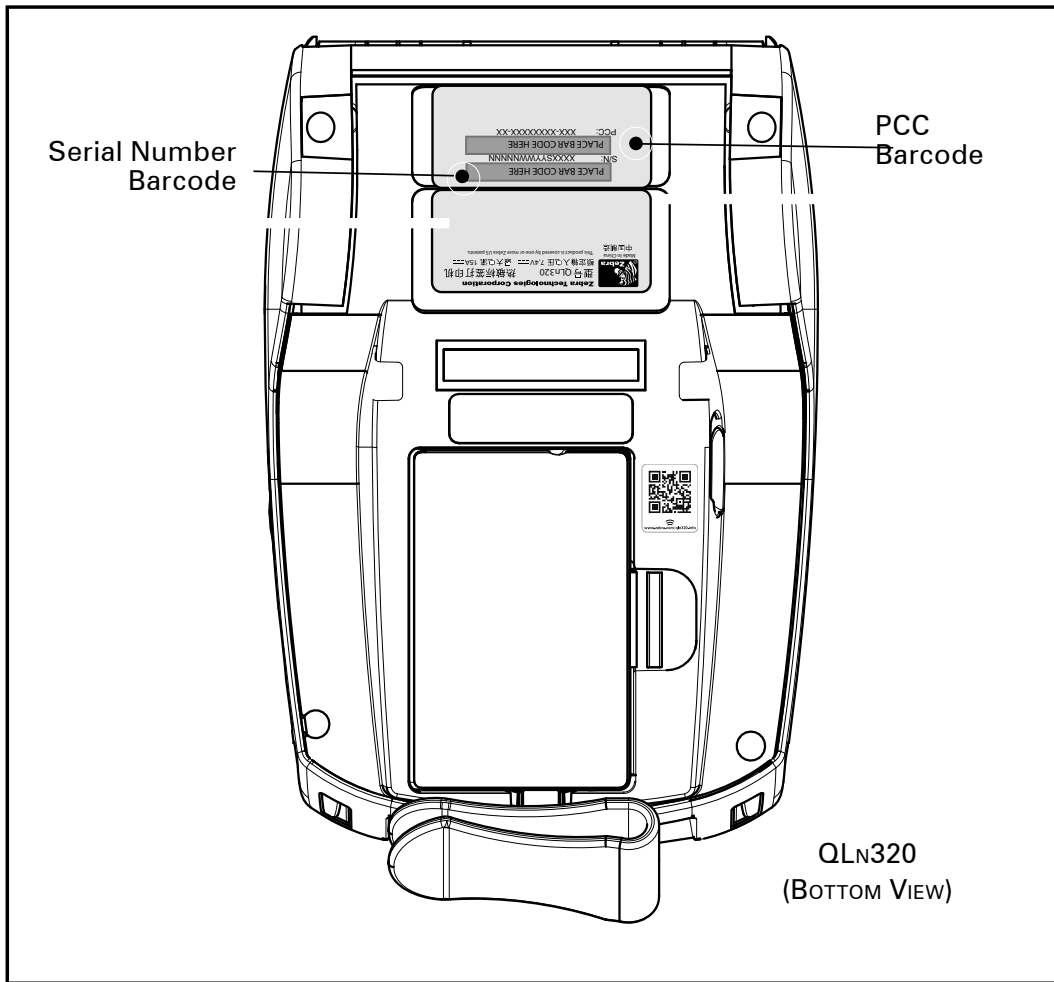
# Appendix F

Battery Disposal

The EPA certified RBRC® Battery Recycling Seal on the Lithium-Ion (Li-Ion) battery supplied with your printer indicates Zebra Technologies Corporation is voluntarily participating in an in-dustry program to collect and recycle these batteries at the end of their useful life, when taken out of service in the United States or Canada. The RBRC program provides a convenient alternative to placing used Li-Ion batteries into the trash or the municipal waste stream, which may be illegal in your area.

> ⚠ **Important •** When the battery is depleted,  insulate the terminals with tape before disposal

Please call 1-800-8-BATTERY for information on Li-Ion bat-tery recycling and disposal bans/restrictions in your area. Zebra Technologies Corporation's involvement in this program is part of our commitment to preserving our environment and conserving our natural resources.

Outside North America, please follow local battery recycling guidelines.

Product Disposal
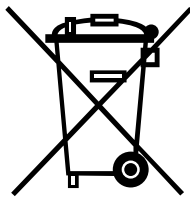
The majority of this printer's components are recyclable.

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 ac-cording to your local standards.

For more information, please see our web site at: http://www.zebra.com/environment

# Appendix G

## Using zebra.com

The following examples use the search functions on Zebra's Web site for finding specific documents .

Example1: Find the QLn Series User Guide.
Go to http://www.zebra.com/us/en/support-downloads.html
Select the appropriate printer in the Printer Support dropdown menu.



Click on the Manuals tab and select the desired language from the dropdown menu.



At the resulting screen, select "QLn User Guide (en)" or Download to view.

Example 2: Find the ZebraNet Bridge Enterprise download page:
Go to http://www.zebra.com/us/en/products-services/software.html and click on Manage under Software in the Products and Services section. Or click on Manage Software where shown.
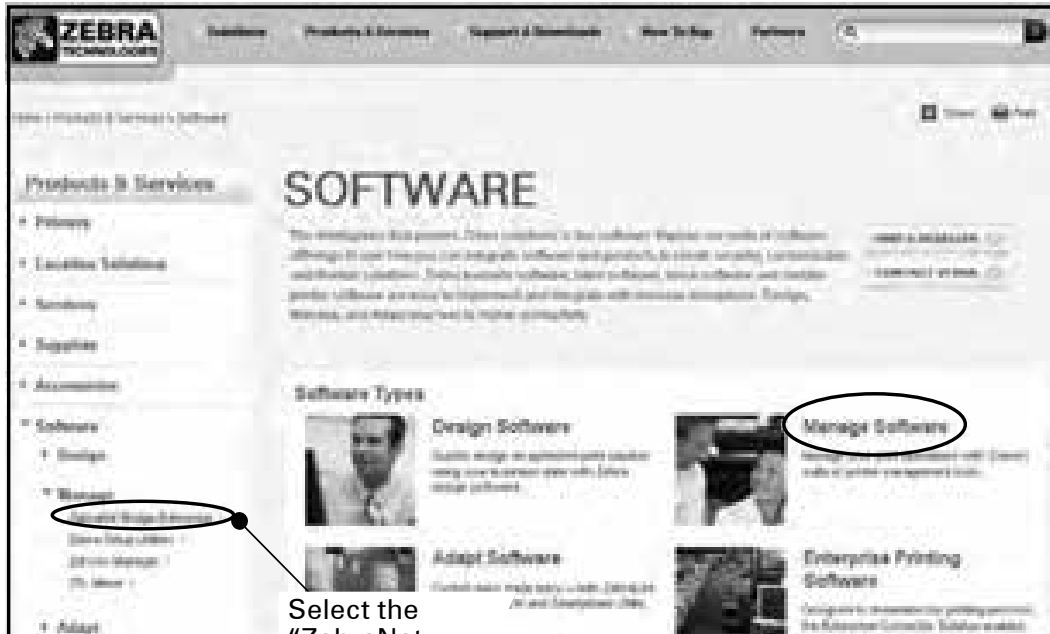


Select the "ZebraNet Bridge Enterprise

Click on "Download" in the Downloads tab where shown to access the latest software.
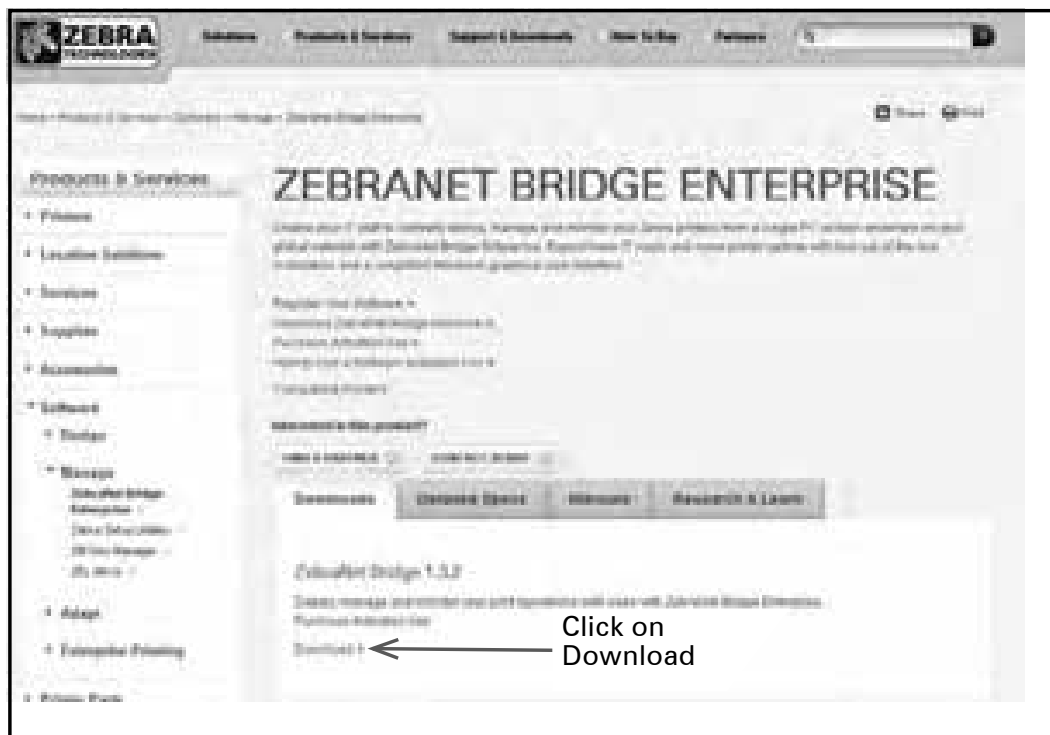


Click on Download

# Appendix H

## Alert Messages

The following alert messages will be displayed to inform the user of various fault conditions that may occur with the QLn Series printer.

| Line One (Status) | Line Two (Action) | Notes |
|---|---|---|
| MEDIA OUT | LOAD MEDIA | |
| MEDIA COVER OPEN | CLOSE MEDIA COVER | |
| MAINTENANCE NEEDED | CLEAN PRINTHEAD | |
| HEAD MAINTEN. NEEDED | PRINTING HALTED | |
| PAPER JAM | REMOVE MEDIA | |
| PRINTHEAD OVERTEMP | PRINTING HALTED | |
| BATTERY DIMINISHED | CONSIDER REPLACING | |
| WARNING - BATTERY | IS PAST USEFUL LIFE | |
| REPLACE BATTERY | SHUTTING DOWN | |
| BATTERY FAILED | REPLACE BATTERY | |
| BATTERY LOW | CHARGE BATTERY | |
| CHARGING TEMP FAULT | MUST BE 0-40°C | Battery Over Temp |
| CHARGING TEMP FAULT | MUST BE 0-40°C | Battery Under Temp |
| CHARGING FAULT | REPLACE BATTERY | |
| DOWNLOADING | FIRMWARE | |
| DOWNLOAD FAILED | PLEASE REBOOT | |
| FIRMWARE | WRITING TO FLASH | |
| LOOKING FOR UPDATES | PLEASE WAIT. . . | When searching for updates |
| RETRIEVING FIRMWARE | DO NOT POWER OFF! | When retrieving an application |
| RETRIEVING NEW FILES | PLEASE WAIT. . . | When downloading files |
| SENDING FEEDBACK | PLEASE WAIT. . . | When sending feedback |
| MIRRORING COMMANDS | N/A | |
| MIRROR PROCESSING | FINISHED | |
| LOSS OF SIGNAL | MOVE IN RANGE OF AP | For 802.11 models only |
| SIGNAL RESTORED | N/A | For 802.11 models only |

**Note •** Highlighted rows indicate Mirror Alert Messages. The mirror function is only available on units with either an 802.11 radio, Ethernet, or both.

## Alert Messages cont.

| Line One (Status) | Line Two (Action) | Notes |
|---|---|---|
| WIRELESS ERROR | INVALID CHANNEL | |
| WIRELESS ERROR | INVALID SECURITY | |
| PRINTER PAUSED | N/A | |
| ALL JOBS CLEARED | N/A | |
| ONE JOB CLEARED | N/A | |
| OUT OF MEMORY | STORING GRAPHIC | |
| OUT OF MEMORY | STORING FONT | |
| OUT OF MEMORY | STORING FORMAT | |
| OUT OF MEMORY | STORING BITMAP | |
| | | |
| | | |

QLn Series User Guide

# Index

QLn Series User Guide

# Patent Numbers

This product and/or its use may be covered by one or more of the following US patents and corresponding international patents worldwide

| | | | | |
|---|---|---|---|---|
| D275,286 | 5,113,445 | 5,399,846 | 5,726,630 | 6,261,009 |
| D347,021 | 5,140,144 | 5,408,081 | 5,768,991 | 6,261,013 |
| D389,178 | 5,132,709 | 5,410,139 | 5,790,162 | 6,267,521 |
| D430,199 | 5,142,550 | 5,410,140 | 5,791,796 | 6,270,072 B1 |
| D433,702 | 5,149,950 | 5,412,198 | 5,806,993 | 6,285,845 B1 |
| D549,768 | 5,157,687 | 5,415,482 | 5,813,343 | 6,292,595 |
| 3,964,673 | 5,168,148 | 5,418,812 | 5,816,718 | 6,296,032 |
| 4,019,676 | 5,168,149 | 5,420,411 | 5,820,279 | 6,364,550 |
| 4,044,946 | 5,180,904 | 5,436,440 | 5,848,848 | 6,379,058 B1 |
| 4,360,798 | 5,229,591 | 5,444,231 | 5,860,753 | 6,409,401 B1 |
| 4,369,361 | 5,230,088 | 5,449,891 | 5,872,585 | 6,411,397 B1 |
| 4,387,297 | 5,235,167 | 5,449,893 | 5,874,980 | 6,428,227 B2 |
| 4,460,120 | 5,243,655 | 5,468,949 | 5,909,233 | 6,480,143 |
| 4,496,831 | 5,247,162 | 5,479,000 | 5,976,720 | 6,530,705 |
| 4,593,186 | 5,250,791 | 5,479,002 | 5,978,004 | 6,540,122 |
| 4,607,156 | 5,250,792 | 5,479,441 | 5,995,128 | 6,540,142 |
| 4,673,805 | 5,262,627 | 5,486,057 | 5,997,193 | 6,607,316 |
| 4,736,095 | 5,267,800 | 5,503,483 | 6,004,053 | 6,609,844 |
| 4,758,717 | 5,280,163 | 5,504,322 | 6,010,257 | 6,655,593 |
| 4,816,660 | 5,280,164 | 5.519,381 | 6,020,906 | 6,784,787 |
| 4,845,350 | 5,280,498 | 5,528,621 | 6,034,708 | 6,874,958 |
| 4,896,026 | 5,304,786 | 5,532,469 | 6,036,383 | 6,899,477 |
| 4,897,532 | 5,304,788 | 5,543,610 | 6,057,870 | 6,908,034 |
| 4,923,281 | 5,321,246 | 5,545,889 | 6,068,415 | 7,126,716 |
| 4,933,538 | 5,335,170 | 5,552,592 | 6,068,415 | 7,137,000 |
| 4,992,717 | 5,364,133 | 5,570,123 | 6,095,704 | 7,172,122 |
| 5,015,833 | 5,367,151 | 5,578,810 | 6,109,801 | 7,190,270 |
| 5,017,765 | 5,372,439 | 5,589,680 | 6,123,471 | |
| 5,021,641 | 5,373,148 | 5,612,531 | 6,147,767 | |
| 5,029,183 | 5,378,882 | 5,642,666 | 6,151,037 | |
| 5,047,617 | 5,396,053 | 5,657,066 | 6,201,255 B1 | |
| 5,103,461 | 5,396,055 | 5,680,459 | 6,231,253 B1 | |

**Zebra Technologies Corporation**
475 Half Day Road, Suite 500
Lincolnshire, IL 60069
Phone: +1 847.634.6700
Toll Free: +1 800.423.0442
Fax: +1 847.913.8766