Zebra® QLn320™
Mobile Printer

User Guide

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- Canadian STD RSS-210
- EN60950: 2006 Safety Standard
- C-Tick (Australia)
- FCC part 15 Class B
- EN55024:2003 European Immunity Standard
- NOM/ETL (Mexico)
- EN55022:2006 Class B European Electromagnetic Radiation Standard

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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 QLn320™ Printer

Thank you for choosing our Zebra® QLn320™ Mobile Printer. You will find this rugged printer will become a productive and efficient addition to your workplace thanks to its 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 QLn320 printer. The QLn320 printer uses 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 (available at www.zebra.com/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 at www.zebra.com and on the product CD.)

Unpacking and Inspection

Inspect the printer for possible shipping damage:
- 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.

QLn320 Technology

The QLn320 uses several technologies made popular in other Zebra Mobile Printer product lines.

Smart Battery

The QLn320 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 QLn320'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 QLn320 printer 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 Capacity Diminished-Consider Replacing" *
>/=550 but <600	REPLACE	"Warning-Battery is Past its Useful Life" **
>/=600	POOR	"Please Replace Battery Before Proceeding-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 QLn320 uses 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.

QLn320 Overview
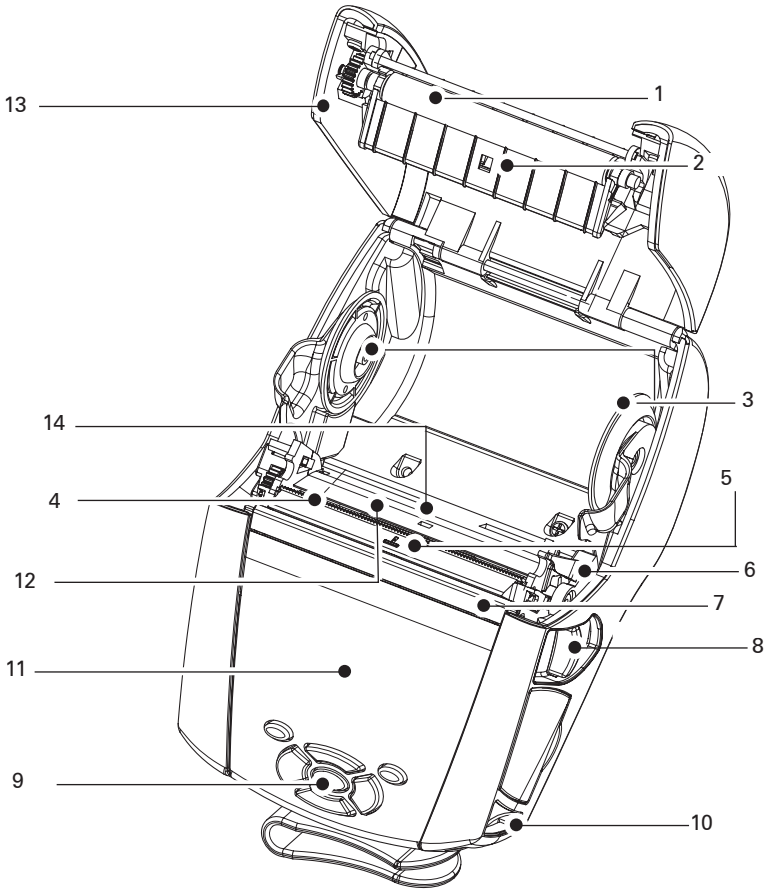
1. Platen Roller
2. Bar Sensor
3. Media Support Disks
4. Tear Bar
5. Label Presence Sensor
6. Peeler Lever
7. Peeler Bail
8. Latch Release Lever
9. Key Pad
10. Strap Post
11. Status Screen
12. Printhead
13. Media Cover
14. Gap Sensor
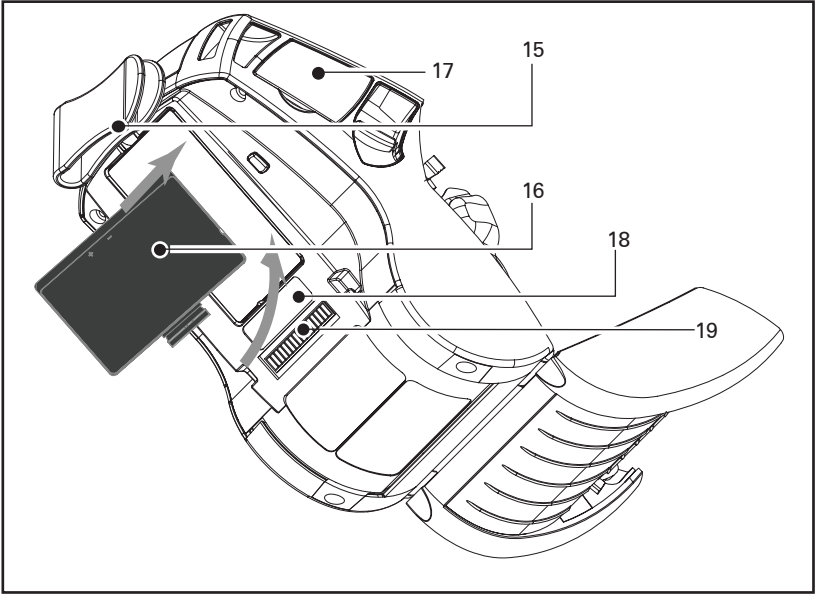
15. Belt Clip
16. Battery
17. USB/ RS-232 Comm Ports
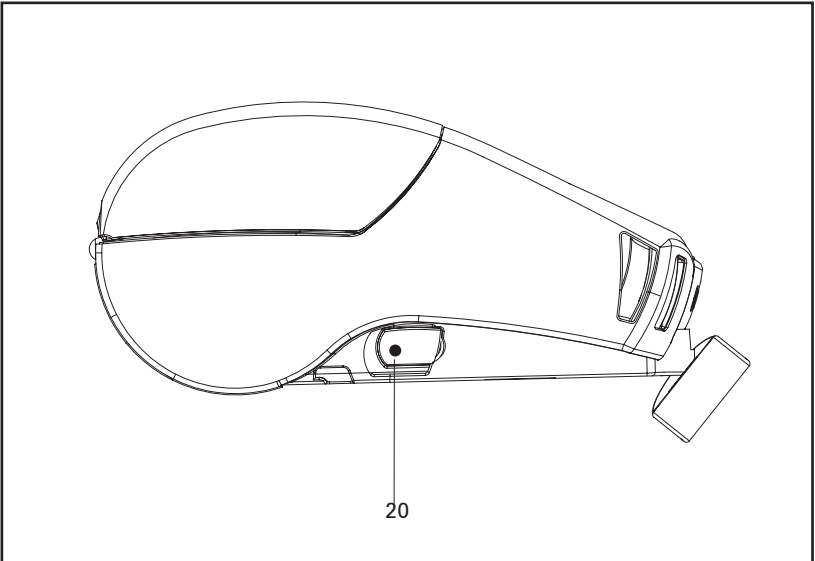18. MAC Address Label
19. Docking Contacts
20.. DC Input

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. Insert the battery into the printer as shown in Figure 2. (It is not possible to insert the pack in an incorrect orientation.)
3. 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 2: Installing the Battery

Battery

Belt Clip
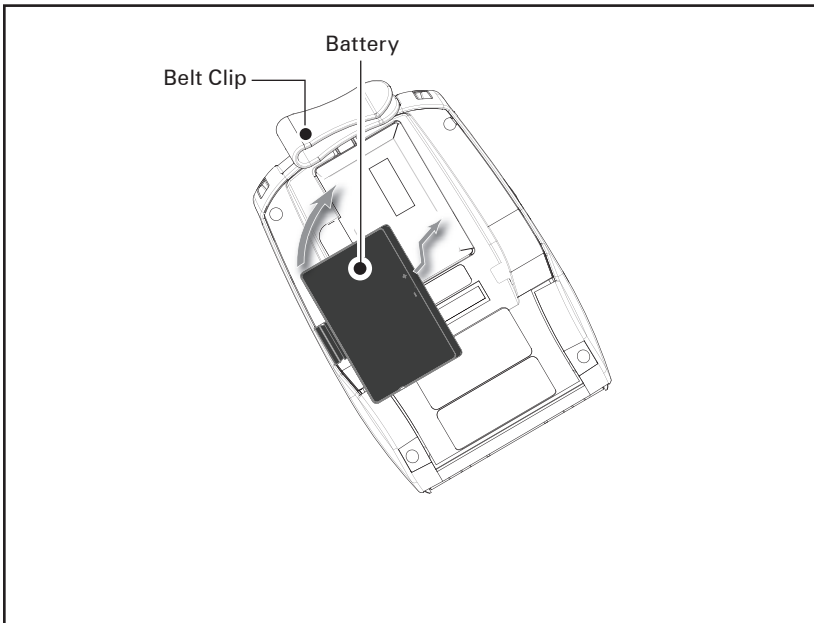
Smart Charger-2 (SC2) Single Battery Charger

The Smart Charger-2 (SC2) is a charging system for use with the 2-cell lithium-ion smart batteries used in the QLn320 printer. The goal of the SC2 is to fully charge a QLn320 battery in an average time of three (3) hours.

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
n/a	Off	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 3: Single Charger (SC2)

Smart Battery

Charge Status LED
Indicator
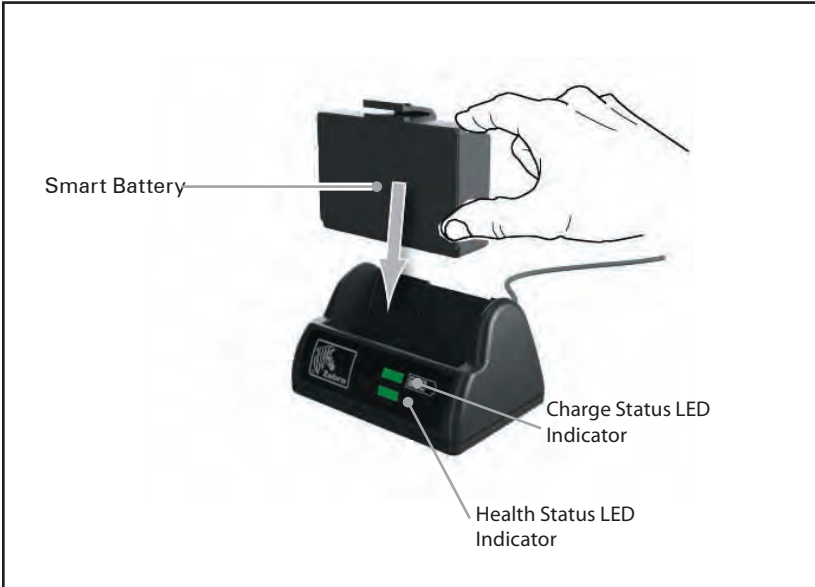
Health Status LED
Indicator

Figure 4: SC2 Dimensions

Dimension information to be provided.

Model UCLI72-4 Quad Charger

The UCLI72-4 Quad Charger is designed to charge up to four QLn320 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 5, 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 E.

Quad Charger Cycle Times :

Battery Status	QLn320
Battery 80% Charged	1.5 Hrs.
Battery Fully Charged	3 Hrs.

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.

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.

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.

❗ 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.

Figure 5: Quad Charger

1. Slide Battery Pack into Charger bay.

Power Supply

2. Rock Battery Pack into place.

Amber Indicator

Green Indicator

Charger Bay

Power Indicator
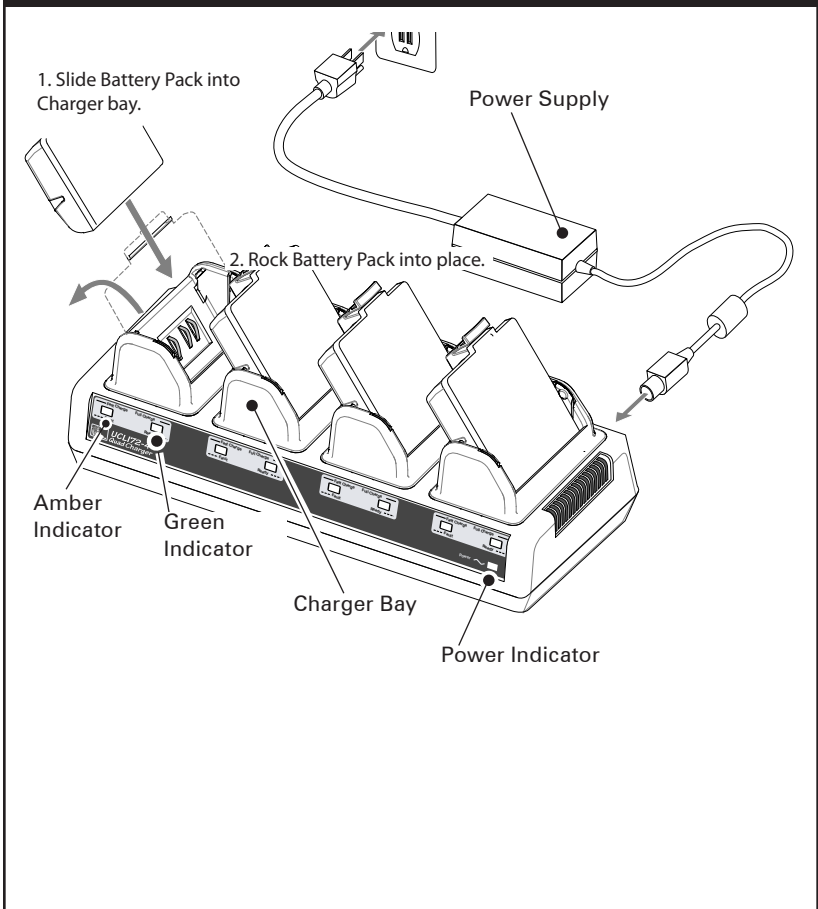
QLn-EC Ethernet Cradle

The Ethernet Cradle (EC) is an expansion base intended for use with the QLn320 printer, as well as the QLn220 printer. There is a four bay cradle (QLn-EC4) or a single bay option (QLn-EC) as shown on pages 19 and 20.

It provides charging power to the docked printer as well as providing a standard 10/100Mb/S Ethernet port for communication to the printer. The EC also supplies battery charging power to the docked printer and acts as a supplementary power source for a functioning QLn printer.

The EC features two green LED's to indicate the status of the cradle: Solid green to indicate when power ⏻ is provided to the input of the EC; 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.

> NOTE: Remove the "Docking Cradle Access" label on the bottom of the printer before docking the printer in the cradle.

LED Status	Indication
Solid Green	Power On
Blinking Green	Ethernet Activity

Docking Bay

Release Button

Ethernet Status
Indicator

Power Status Indicator
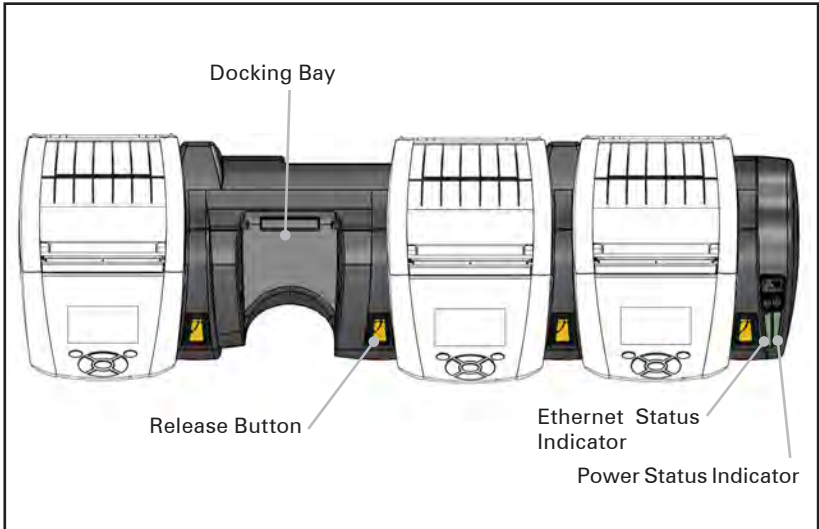
Figure 7: QLn-EC4 Dimensions

Dimension information to be provided.

Power Status
Indicator

Release Button
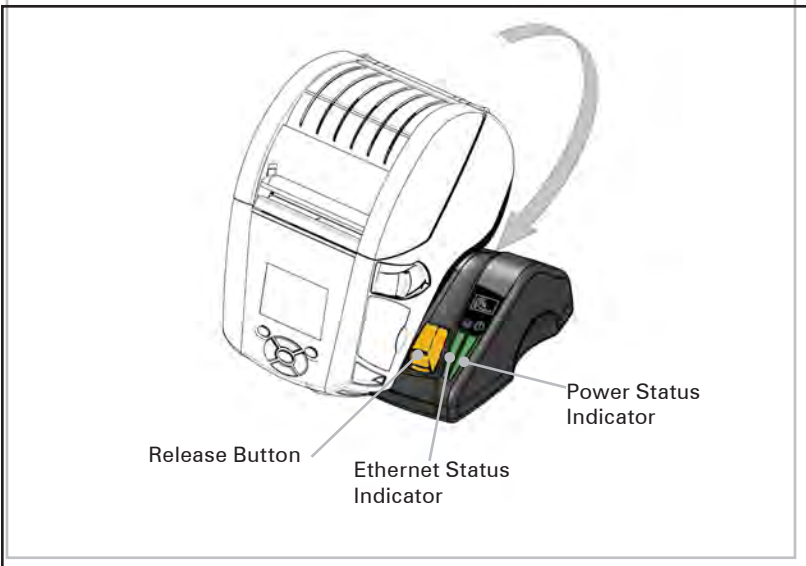
Ethernet Status
Indicator

Figure 9: QLn-EC Dimensions

Dimension information to be provided.

AC Power Adapter (included in kit p/n P1031365-024)

Figure 10: Charging the Battery Pack with the AC Power Adapter)

QIn320 AC Adapter

AC Power Cord (varies with location)
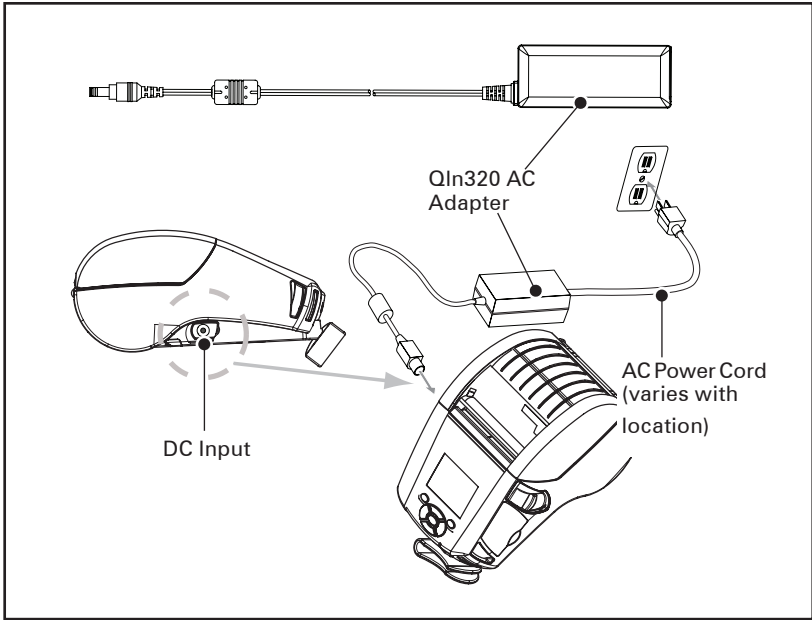
DC Input

- Open the protective cover on the QLn320 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 P1029871 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 protective shrink-wrap and labels from new battery packs 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 QLn320

You can operate QLn320 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 11 below. The Media Cover will open automatically as shown at "2" below, exposing the Media Compartment and the adjustable Media Supports.

Figure 11: Opening the QLn320

MediaCover

Media Compartment

Media Support (oppositesupport not visible)

2

1

Latch Release Lever
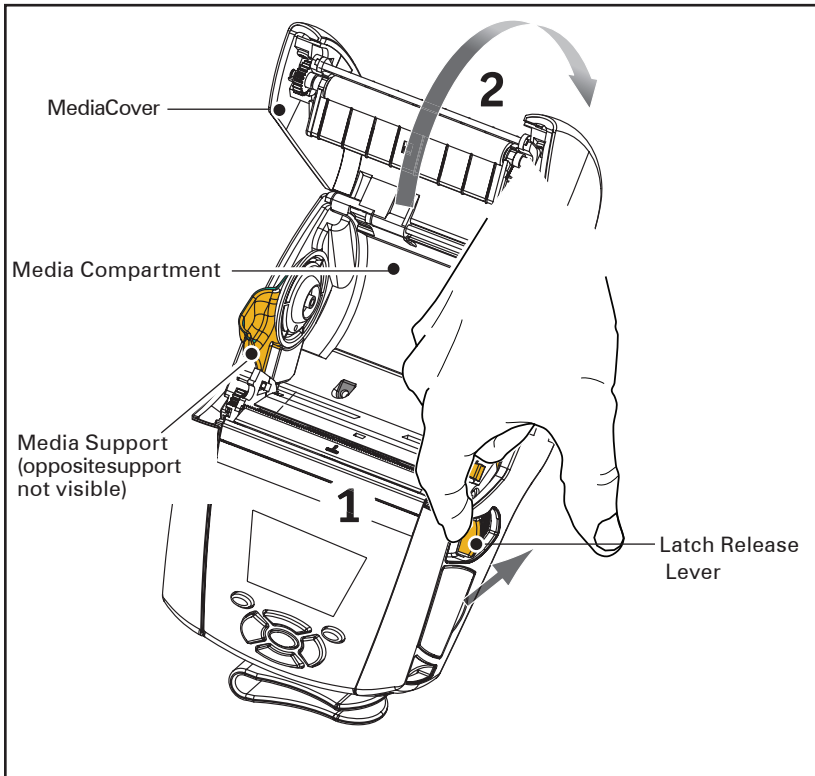
2. Load the media:

- Grasp the media supports where shown in Figure 12 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 12: Loading Media

Media Roll

Note direction media pulls off the roll.

3

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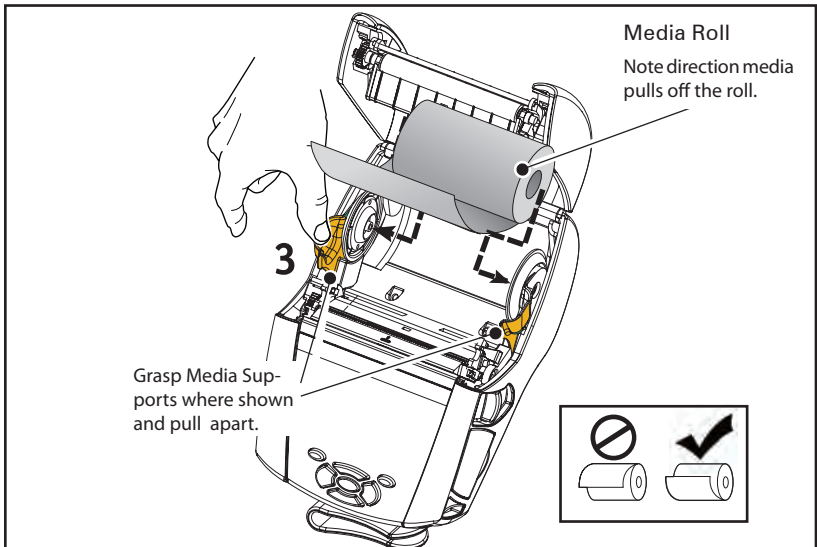
3. Close the Media Cover.

- 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.
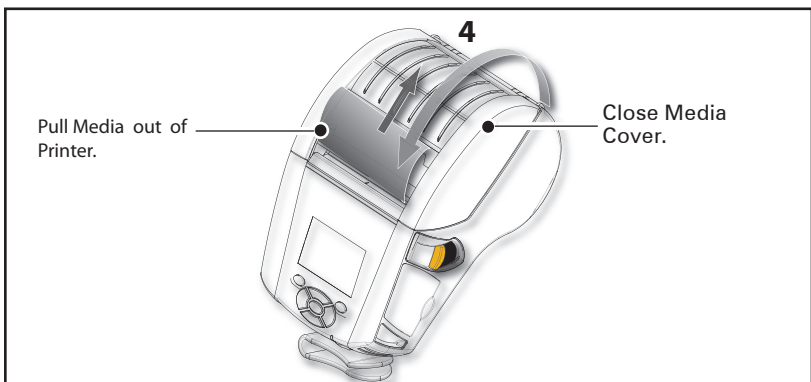
Loading Media in Peel-off Mode
- If you plan to use the printer in the peel-off mode, peel a few labels off of the media and load the media as previously described.
- Push the peeler lever forward to release the peeler bail into the "up" position as shown at "3" and "4" in Figure 13.
- Close the media cover to lock the peeler bail in place. The media will feed between the peeler bail and platen.

Figure 13: Activating Peeler Bar

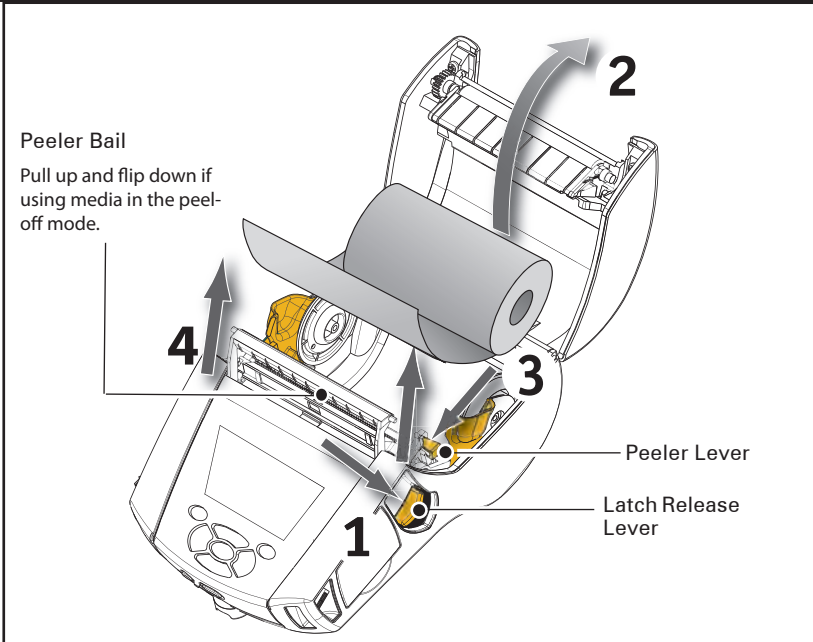Peeler Bail
Pull up and flip down if using media in the peel-off mode.

Peeler Lever

Latch Release 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.
- 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.

Operator Controls

The QLn320 printer comes equipped with a keypad control panel and LCD graphical user interface. The standard control panel is illustrated in Figure 14 and 15 on pages 26 and 27. The LCD interface allows easy display and selection of many printer functions as detailed on following pages.
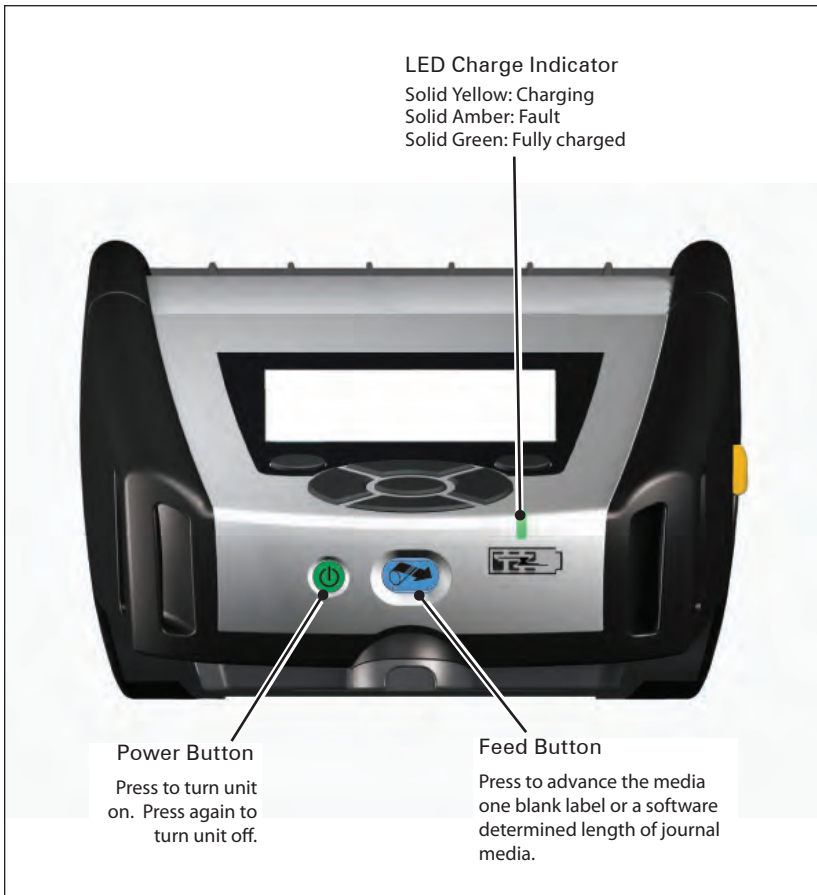
Standard Control Panel

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

- The Power Button turns the printer on and off.
- 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 solid Amber when there's a fault condition.
- 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.

LED Charge Indicator
Solid Yellow: Charging
Solid Amber: Fault
Solid Green: Fully charged

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
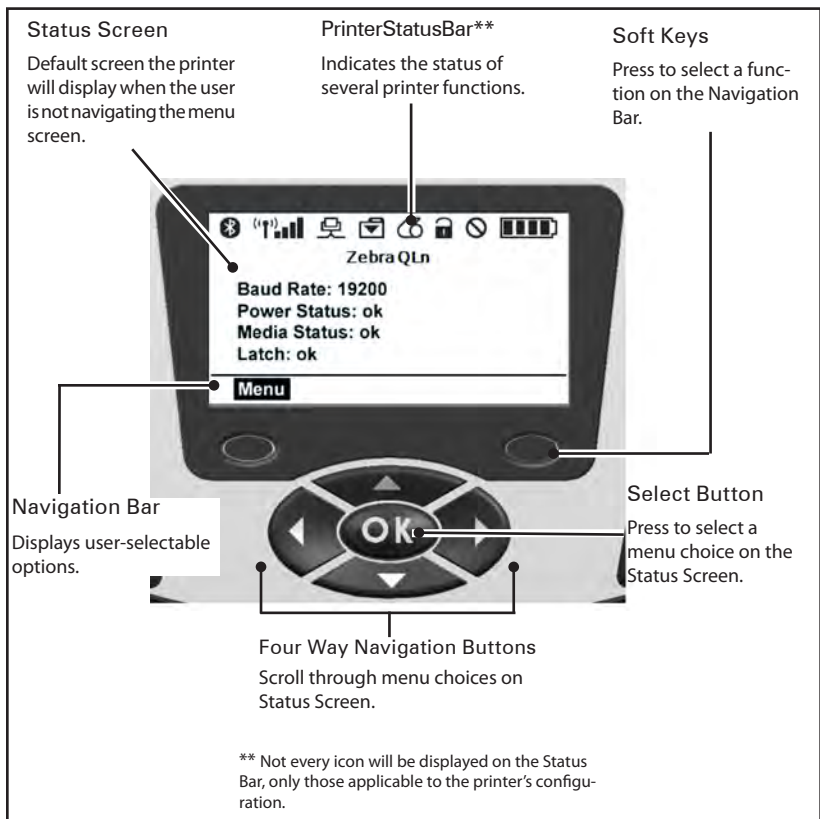determined length of journal
media.

LCD Control Panel

The 240x128 pixel LCD control panel allows the user to view the status of the QLn320 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 on the Status Screen shown below along with a Navigation Bar. The Status Screen is displayed before all other screens.

Figure 15: LCD Control Panel

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.

Zebra QLn

Baud Rate: 19200
Power Status: ok
Media Status: ok
Latch: ok

Menu

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.

Status Bar Icons

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 indicates WLAN is associated and authenticated. The icon and two parentheses will blink to show the printer is receiving printer data via WLAN. The four 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

The user can select options on the Main Menu screen by pressing the soft key located beneath the Menu option on the navigation bar (see Fig. 16). The Main Menu screen displays graphical options including Communication, Display, Media, Battery, and Help.

Figure 16: Main Menu Screen

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 QLn320 will also display various alerts, such as "Out of Media", "Clean Printhead", 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.