Thermal Printer User's Manual

TR 220

User's Manual No. 980402-001 Rev.A

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TRADEMARKS

TR 220 Thermal Printer

CE

European Council Directive		Compliance to Standards	
89/336/EEC	EMC Directive	EN55022-B, 1998	RF Emissions control
92/31/EE	EMC Directive	EN55024, 1998	Immunity to Electromagnetic Disturbances
73/23/EEC	CB Schema	EN60950 IEC950	Product Safety

FCC - Declaration Of Conformity:

FC

Model: TR 220 conforms to the following specification:

FCC Part 15, Subpart B, Section 15.107(a) and Section 15.109(a) Class B digital device

Supplemental Information:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following Two Conditions: (1) This device may not cause harmful interference , and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Notice:

This device complies with Industry Canada ICS-003 class B requirements.

Cet equipement est conforme a l'ICS-003 classe B de la norm Industrielle Canadian

Contents

General Cautions and Warnings

This page describes general safety and maintenance warnings and cautions for the printer and are referenced throughout the manual.

Warning - Static Discharge

The discharge of electrostatic energy that accumulates on the surface of the human body or other surfaces can damage or destroy the print head or electronic components used in this device. DO NOT TOUCH the print head or the electronic components under the print head assembly.

Media Warning

Always use high quality approved labels and tags. If adhesive backed labels are used that DO NOT lay flat on the backing liner, the exposed edges may stick to inside the printer, causing the label to peel off from the liner and jam the printer.

Media Reload Hint

If you should run out of labels while printing, DO NOT turn the terminal power OFF or remove the printer's battery while reloading or data loss may occur. The printer will automatically resume printing when a new label is loaded.

Battery Handling and Usage Warnings

Misusing the battery may cause the battery to get hot, explode, or ignite and cause serious injury. Be sure to follow the safety rules listed below:

Do not place the battery in fire or heat the battery.

Do not disassemble or modify the battery. The battery contains safety and protection devices which, if damaged, may cause the battery to generate heat, explode or ignite.

Do not connect the positive terminal and the negative terminal of the battery to each other with any metal object (such as wire).

Do not solder directly onto the battery.

Do not pierce the battery with nails, strike the battery with a hammer, step on the battery, or otherwise subject it to strong impacts or shocks.

Do not expose the battery to water or salt water, or allow the battery to get wet.

Do not place the battery on or near fires, stoves, or other high-temperature locations. Do not place the battery in direct sunshine, or use or store the battery inside cars in hot weather. Doing so may cause the battery to generate heat, explode, or ignite. Using the battery in this manner may also result in a loss of performance and a shortened life expectancy.

When the battery is worn out, insulate the terminals with adhesive tape or similar materials before disposal.

Immediately discontinue use of the battery if, while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, changes color, changes shape, or appears abnormal in any other way.

In the event that the battery leaks and the fluid gets into one's eye, do not rub the eye. Rinse well with water and immediately seek medical care. If left untreated the battery fluid could cause damage to the eye.

1
Operation

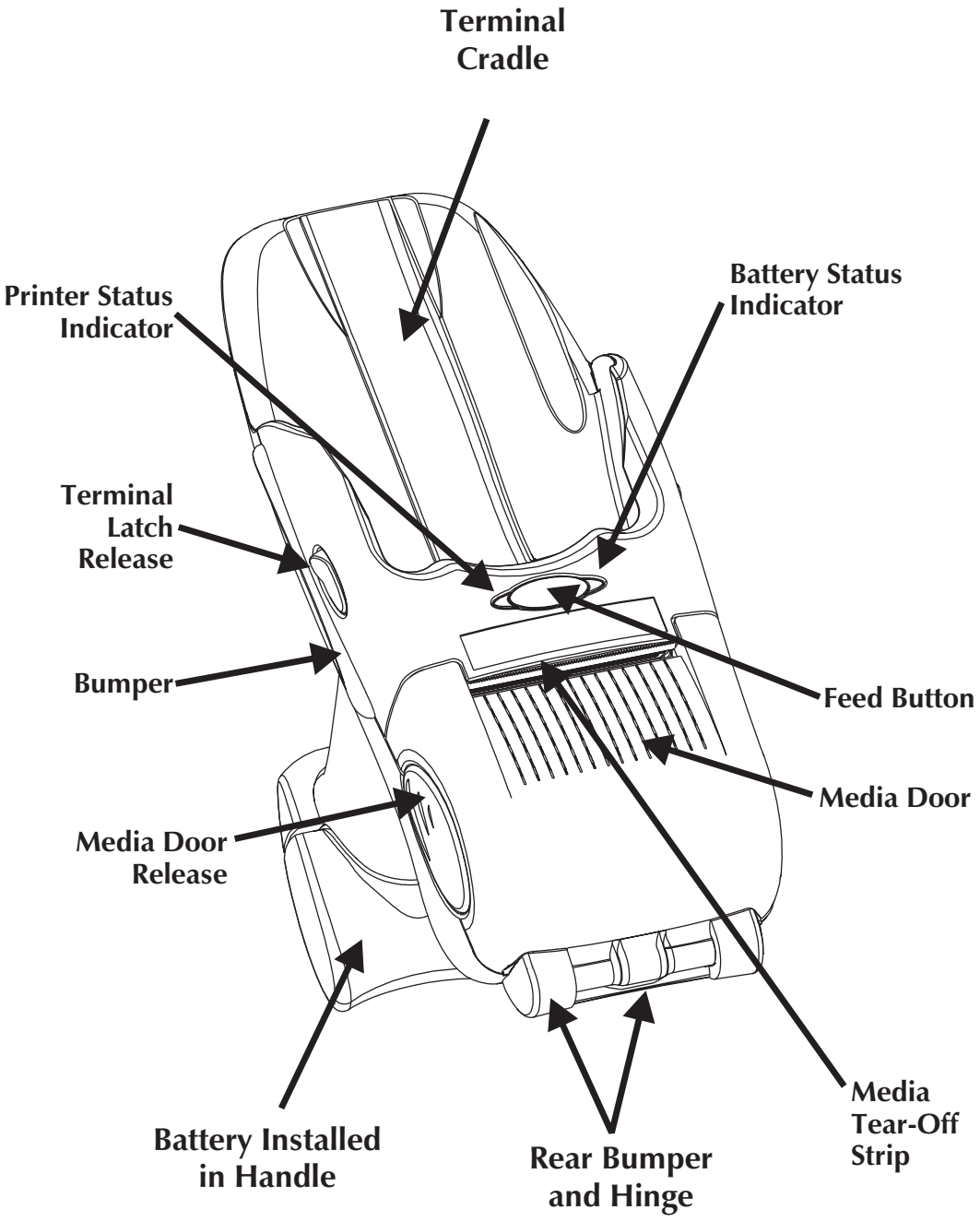
The Zebra TR 220 is a 2-inch wide direct thermal mobile printer that is designed to mate with a variety of Symbol® Portable Data Terminals, including Symbol models SPT 1700, SPT 1800, PDT 2700 and PDT 2800. The printer's rugged design features include a tough polycarbonate plastic body and shock absorbing rubber bumpers to permit the unit to withstand a 3-foot drop.

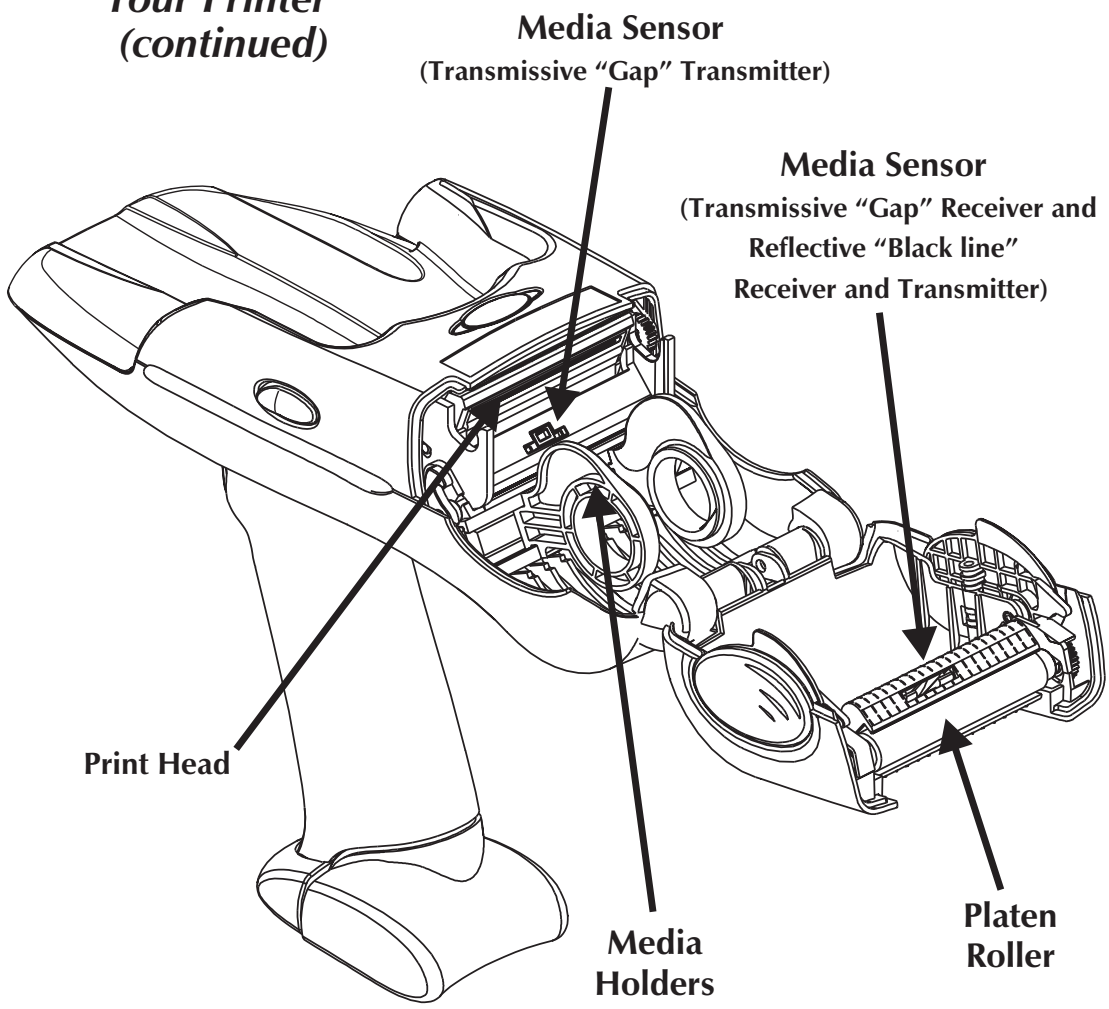
The TR 220 direct thermal printer can address printing requirements for labels, receipts, and tags. The printer accepts a maximum media width of 2.25 inches and prints in an industry standard 203 dpi (dots per inch) print resolution. Media sensing capability includes gap, black mark and notch.

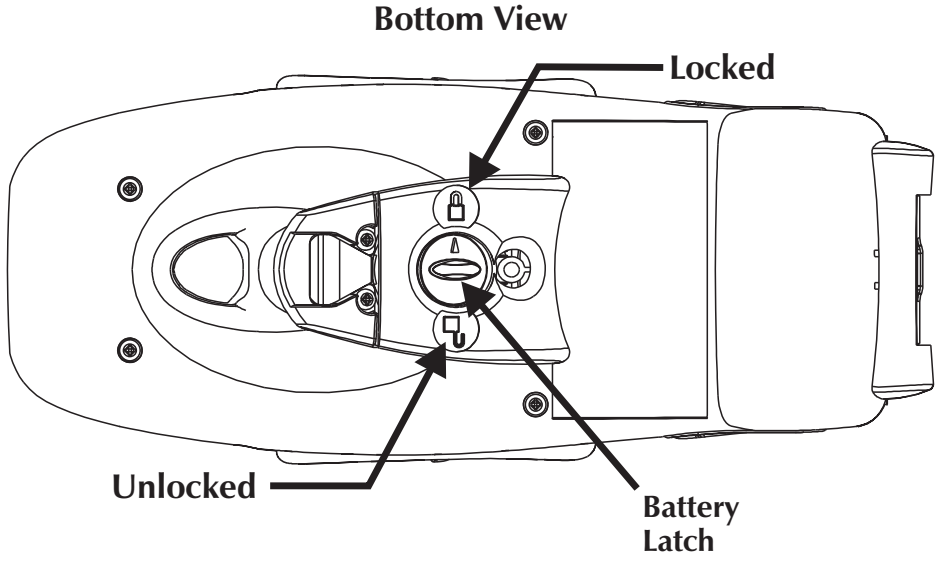
The printer has a light lithium ion battery that allows printing of 2500 inches at 25% black coverage of media on a single charge.

The printer utilizes the Zebra EPL2 programming language to communicate and process labels and forms.

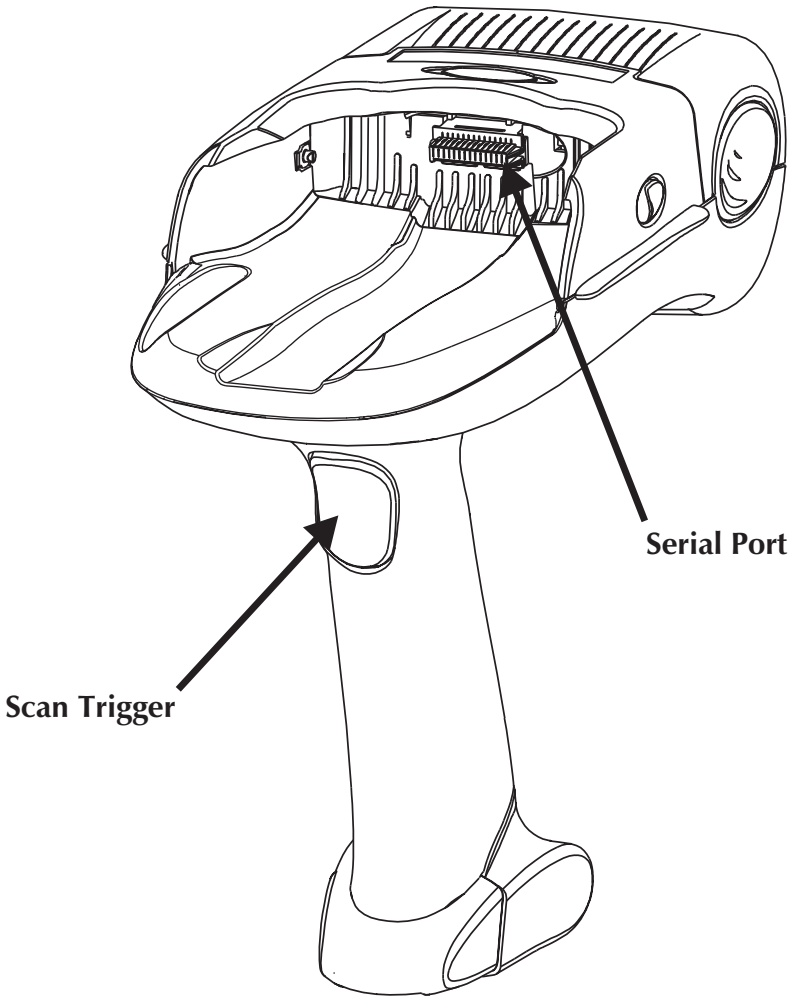
Getting to Know Your Printer



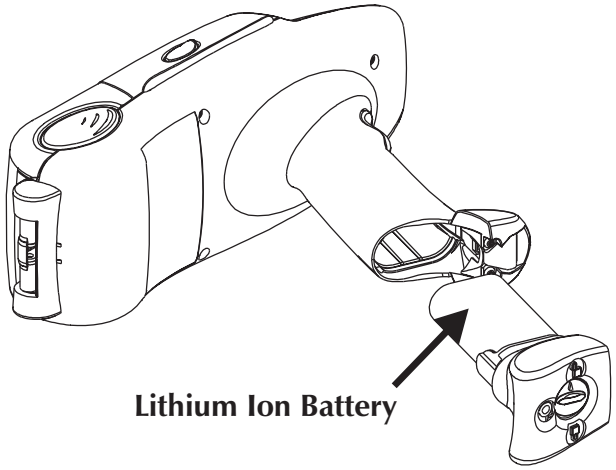

Media Sensor
(Transmissive "Gap" Transmitter)
Media Sensor
(Transmissive "Gap" Receiver and Reflective "Black line" Receiver and Transmitter)
Print Head
Media Holders
Platen Roller


Bottom View
Locked
Unlocked
Battery Latch

Getting to Know Your Printer (continued)



Bottom View



Getting Started

Before you can use the TR 220 printer, do the following:

- Charge and Install the Battery
- Load the Printer with Media
- Initialize the Media
- Mate the Printer and Terminal

Charge the Battery

Before the printer can be used the first time, the lithium-ion battery must be charged and installed into the printer.

The printer's battery can be charged using the Universal Battery Charger (UBC) which is an optional printer accessory, see page 23.

For instructions on using the UBC to charge your battery, see the Quick Reference Guide which comes with the UBC. Follow these same procedures to recharge the battery when the printer's battery level is low.

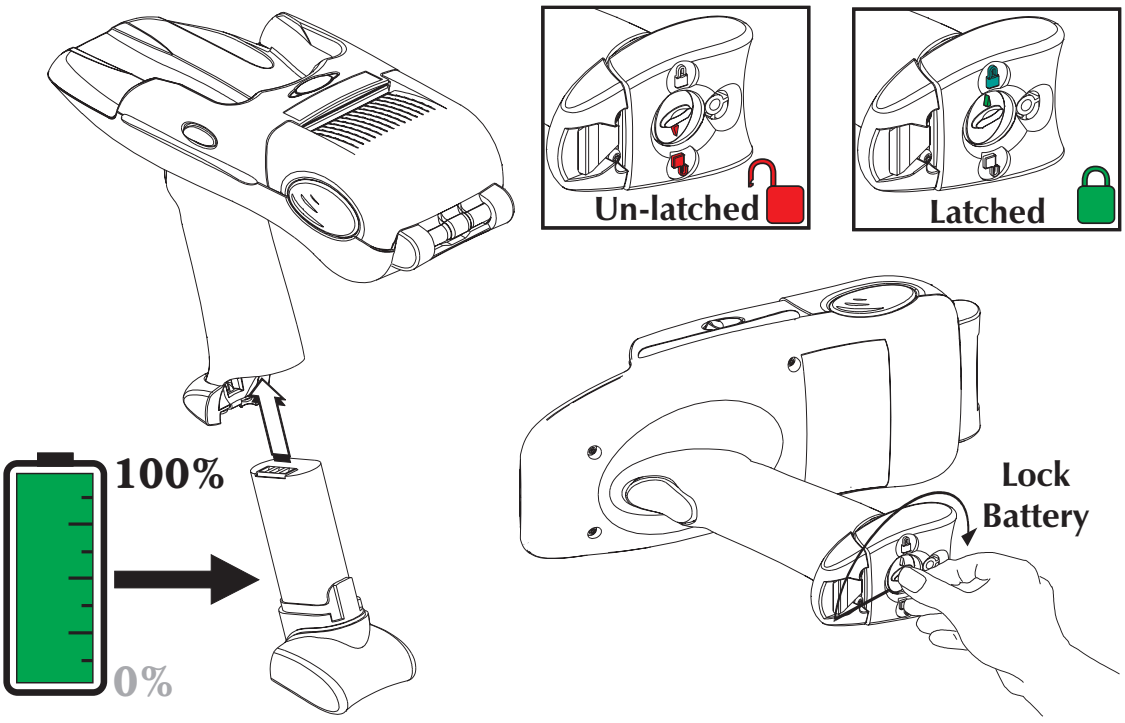
The printer's battery (Reorder number p/n 105312-001) must be exclusively used as the power source for the TR 220 printer and should not be used for any other purpose.

Installing the Battery

To install the battery in the TR 220 printer:

Step 1 Remove the fully charged battery from the charger. Leave the battery latch in the unlocked position to install into the printer.

Do not force the battery. The battery and printer are uniquely shaped (keyed) to avoid inserting the battery incorrectly or mixing batteries with similar products.



Step 2 Slide the battery into the empty printer handle.

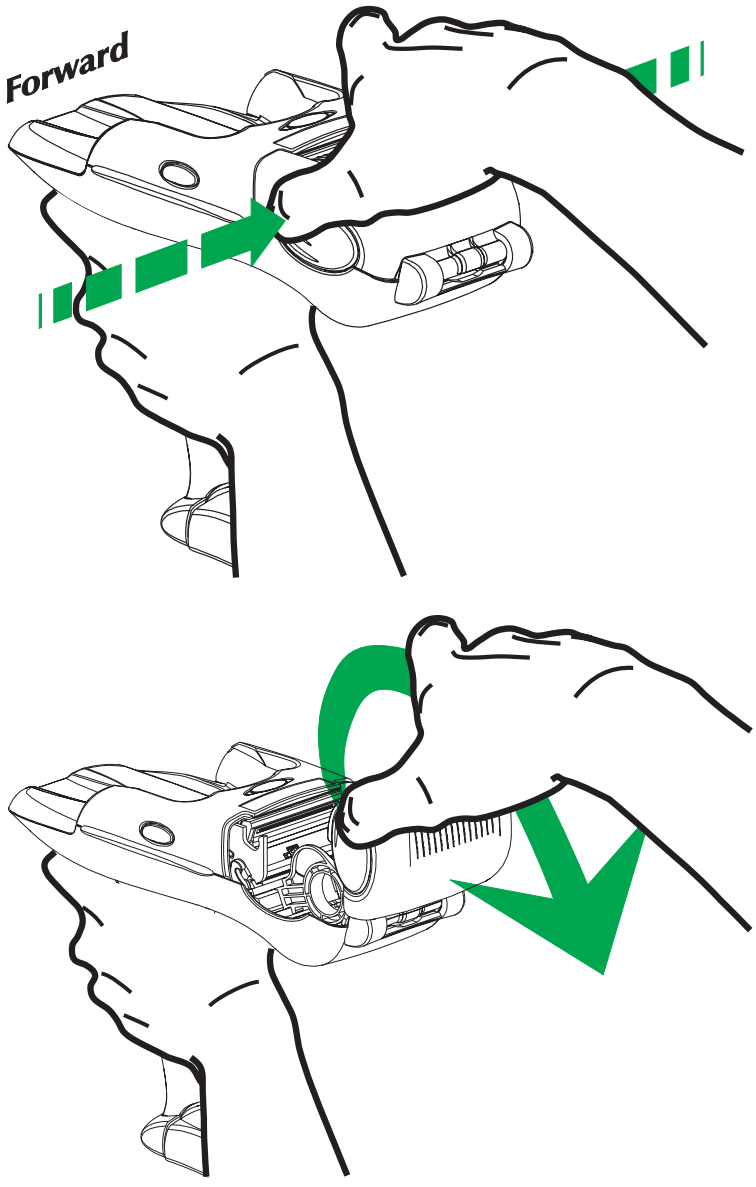
Step 3 Rotate the battery latch while holding the battery in the printer's handle to secure the battery. The point the arrow on the latch's locking knob to the closed lock symbol.

Loading Media

To load media into the printer:

Step 1 To open the media door, simultaneously press the front (forward) portion of the media door release buttons, located on the right and left sides.

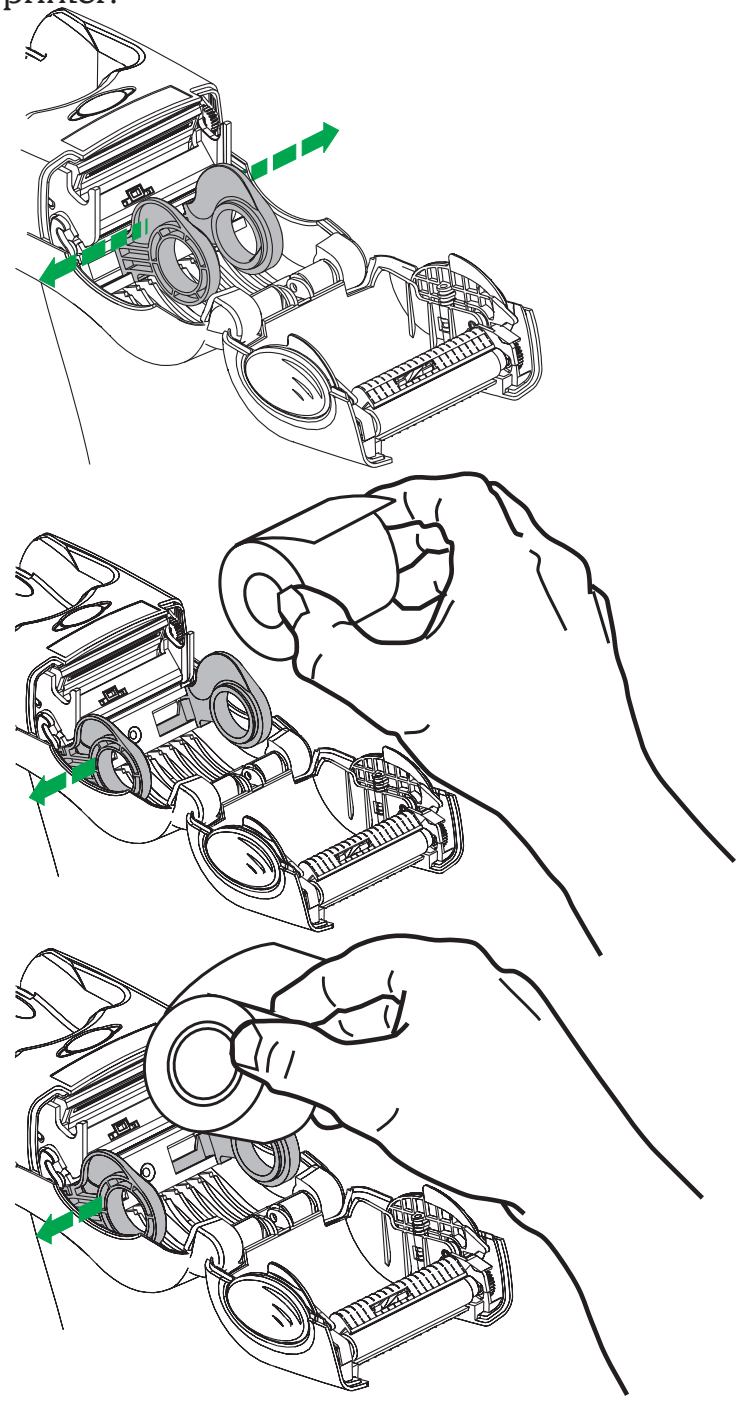
Lift the door open.



Loading Media
Step 3

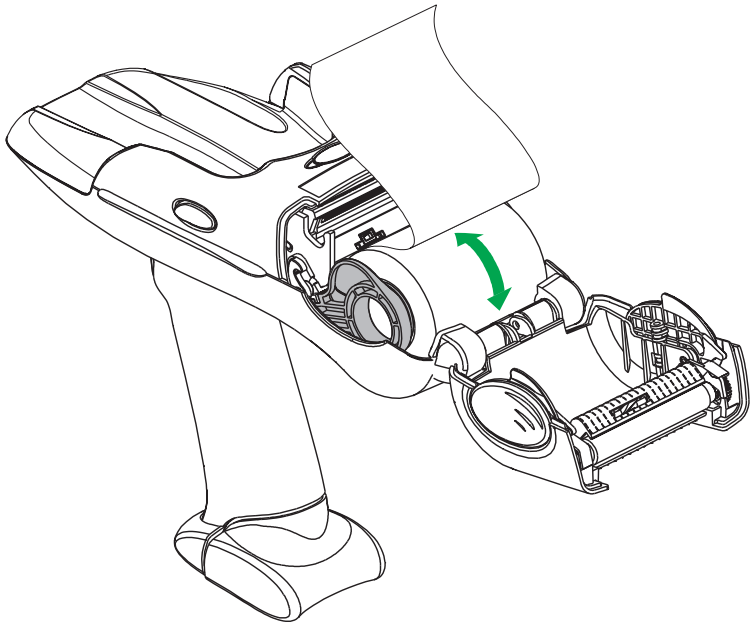
Open the media guides. Insert the media roll. The media roll holders are linked. Both sides open when one side is pushed open.

Place the media to unwind in the clockwise direction when viewed from the left side of the printer.



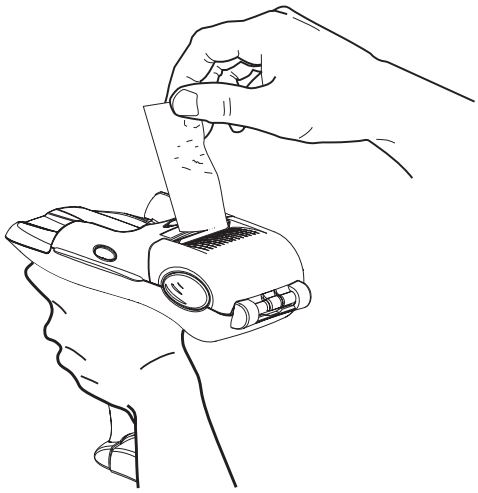
Loading Media
Step 4

Center the roll between the holders and release the roll holders. Gently wiggle and pull on the roll to guarantee the roll has seated and is centered on the roll holders. The roll should not bind and be able to rotate freely.



Step 5

Close and lock the cover. Tear off the excess media.



Remove the first few inches of media to eliminate contamination that collects from handling, storage and adhesive. Contaminates can transfer from the media to the print head, reducing print head life or performance.

AutoSense: Media Sensing without the Terminal

Prior to printing, the media sensing levels and the label's length and gap distances between labels must be set to print properly. The user initiates the TR 220's AutoSense feature to set and store these parameters in the printer.

Use the following procedure to run the printer's AutoSense routine.

Step 1 Remove the terminal from the printer.

Step 2 Load media into the printer.

Step 3 Press and hold the Scan Trigger.

Step 4 Press and hold the Feed Button down for 2 seconds and release. The Printer Status Indicator should begin blinking green.

Step 5 The indicator will stop blinking and then go solid green. When the media begins to feed (advance), release the Scan Trigger.

Step 6 The printer will advance 3-4 labels (or approximately 12 inches) while performing the adjustment. When the adjustment is complete, a status summary label will be printed and the printer will be placed in Diagnostic Dump mode.

Step 7 Press the Feed Button once to exit "Dump Mode".

The printer will remain on for 5 minutes in Stand-by Mode and then automatically turn off if there is no printer activity.

See "AutoSense: Media Sensing with the Terminal Installed" on page 12 to detect and configure the printer for new media while using the terminal and printer.

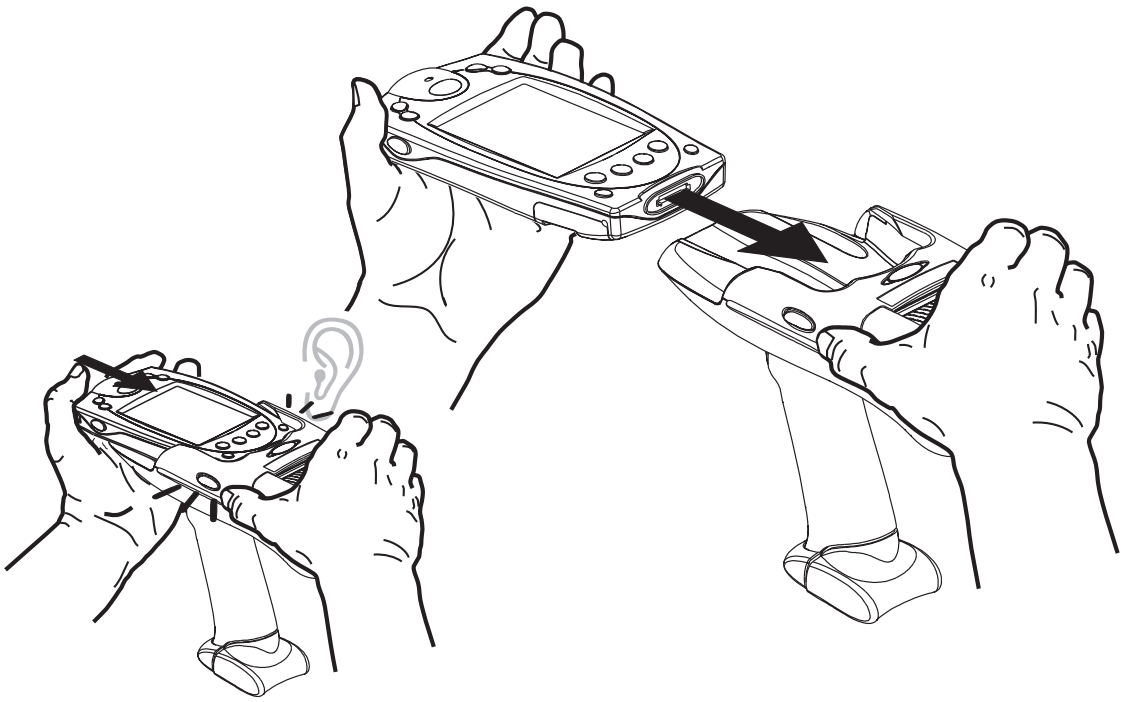
Mating the Terminal to the Printer

The terminal can be inserted into and mate with the printer. The printer connects to the terminal via a unique serial connector (port) and a patented latching mechanism.

The terminal's hand strap maybe installed or removed. The strap should be closed and secured to itself to avoid interference with the scanner, binding or catching on other objects.

To mate the terminal to the printer:

1. Secure the strap.
2. Turn the terminals power off.
3. Slide the terminal into the printer until it latches in place. Both latches typically will make an audible click when the terminal is engaging properly with the printer.



Verify that the terminal is secured properly, gently pull the terminal outward and wiggle it.

AutoSense: Media Sensing with the Terminal Installed

Prior to printing, the media sensing levels and the label's length and gap distances between labels must be set to print properly. The user initiates the TR 220's AutoSense feature to set and store these parameters in the printer.

Use the following procedure to run the printer's AutoSense routine.

Step 1 Load media into the printer.

Step 2 To turn on the printer, activate (select) an application previously loaded in the terminal that is designed to use the TR220 printer. The printer status indicator should be on and green, if the printer is ready to operate.

The software application in the terminal must activate the printer via a serial port signal (5volts) for the printer to operate. Contact your system integrator or administrator to identify the proper software, application, and terminal combination to operate the printer.

Step 3 Turn the terminal off.

Step 4 Press and hold the Feed button down turn the terminal on. Release the Feed button after the printer status indicator is blinking green.

Step 5 The indicator will stop blinking and then go solid green. The printer will advance 3-4 labels (or approximately 12 inches) while performing the adjustment. When the adjustment is complete, a status summary label will be printed and the printer will be placed in Diagnostic Dump mode.

Step 6 Press the Feed Button once to exit "Dump Mode".

The printer is ready to print.

Terminal Configuration Information

In order to successfully use the TR220, the 5V output signal must be activated, and a printing library needs to be installed. The printing library, printer manual, printcap file and sample printing code are included in the Symbol SDK. Symbol software tools are available online at:

http://devzone.symbol.com

External 5V Signal

The terminals each require particular software drivers that enable Palm and Windows CE applications to control the activation of the external 5V signal. However, these drivers are not readily found on all terminals nor do they all work the same way. The steps required by each terminal to allow for the control of the external 5V signal are given below.

SPT 1700

The power driver (powerdrv35r.prc) and trigger scan mgr (1700_trigger_scanmgr.prc) must be installed through a Hot-Sync operation followed by a soft reset. Once installed, the application developer then initializes the serial communication port with the "srmOpen" function and "upwr" port parameter to activate the external 5V signal.

SPT 1800

The power driver for the SPT 1800 is pre-installed and does not require any other software installation. By initializing the serial communication port with the "srmOpen" function and "upwr" port parameter, the external 5V signal is activated.

PPT 2700 and 2800

The driver is pre-installed on the PPT 2700 and PPT 2800 terminals. By selecting “Com7” as the active serial communication port, the external 5V signal is automatically activated.

Printer Command Language

For SPT 1700 and SPT 1800 terminals, you must use EPL2 Page Mode commands via the "ptwriteprinter" command. Refer to the Symbol Software Development Kit for more information. For PPT 2700 and 2800 terminals, refer to the PPT 2700 and PPT 2800 WinCE SDK.

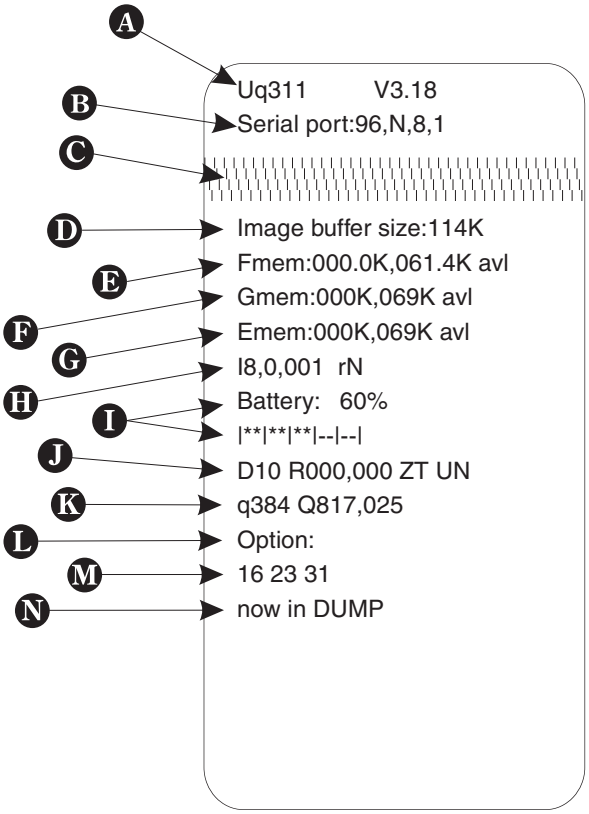
The Feed Button, Scan Trigger and Status Indicators

Printer State	Media	Feed Button	Printer Response
Terminal mated with Power Off	N/A	Tap or Hold	No Action
Terminal mated with Power On	N/A	Tap and Release	Wakes up printer from Standby Mode. Standby Mode is initiated by eight seconds of printer inactivity.
Terminal mated with Power On, door latched, ready, not printing	Labels or Tags Loaded	Tap	Form Feed: the printer advances to the top of the next label or tag.
Terminal mated with Power On, door latched, ready, not printing	Labels or Tags Loaded	(If in Standby mode, tap and release to wake up printer) Press and Hold	Continuous Form Feed: the printer advances media continuously until the button is released, then continues to the top of the next label or tag.
Terminal mated with Power On, door latched, ready, not printing	Continuous Media Loaded	(If in Standby mode, tap and release to wake up printer) Press and Hold	The printer advances media continuously while the button is pressed. Upon release, the printer will advance one form length (set by programming command).
Terminal mated with Power On, door latched	Media Out	(If in Standby mode, tap and release to wake up printer) Press and Hold	Motor will turn equivalent of 15mm media motion, printer will detect no media condition and then motor will stop.
No terminal, door latched, ready, not printing	Media Loaded	Uses the Feed button and **Scan Trigger** to initiate the AutoSense Routine for detecting the media without the terminal, see page 10 for details.	
Terminal mated door latched, ready, not printing	Media Loaded	Uses the Feed button and the terminal to initiate the AutoSense Routine for detecting the media with the terminal installed, see page 12 for details.	

Status Indicator	Battery Indicator	Condition	Printer Operational State
Dark	Dark	Off	Terminal Power Off or is not mated. The printer's battery is missing or not connected.
Green	N/A	Ready or Printing	Terminal Power ON, printer operation normal. Note: If a print job is in process and the terminal power goes off or the terminal is disconnected after passing the print job to the printer, the printer status indicator will remain green and the print job will finish. The status indicator will then go dark (off) after completion of this print job.
Red	N/A	Media Out	Terminal Power On. Printer is not printing. No media is detected.
Orange	N/A	Error - Syntax (Data) Error - Media Detection	Terminal Power ON, printer is not printing, Error condition detected. 1) If the error report status is commanded to be "off' via software, the status indicator will only indicate motor or print head over temperature errors. 2) If error reporting status is enabled by the **US** command, then all programming syntax and media detection errors will result in an Orange-constant status indicator condition.
N/A	Blinking Orange	Low Battery Warning	Indicates battery remaining charge power level is less than 40% initial full charge. Printer will operate normally while this warning is displayed.
N/A	Orange Constant	Battery Replacement or Recharge required	Indicates battery remaining charge power level is less than 20% of full charge and requires recharging. The printer will finish printing jobs in progress, but will not start new print jobs until the battery charge level is greater than 20%.

Dump Mode Printer Status Label

The operator can use the Dump Mode Status printout to check the battery charge status, print quality, verify printer to terminal serial interface settings (printer and terminal must match) and the firmware version number. The rest of the information on the printout is for program development and debug.



Dump Mode Print Sample

A. Printer I.D. code number and firmware version number.
B. Serial port configuration.
C. Print head test pattern.
D. Amount of memory available for the Image buffer.
E. Amount of memory used and memory available for Form storage.
F. Amount of memory used and memory available for Graphics storage.
G. Amount of memory used and memory available for Soft fonts.
H. Currently selected Character Set (**I**) and Image Buffer mode setting (**rN** = Double Buffering Disabled)
I. Battery Status
J. Currently selected Heat Density (**D**), Reference Point (**R**), Print Orientation (**Z**) and Error Status (**U**).
K. Currently selected Form Width (q) and Length (**Q**).
L. Current Hardware and Software Option status - (Not Supported)
M. Current AutoSense Through (Gap) Sensor values. The three numbers represent;
1. Backing Transparent point
2. Set point
3. Label Transparent point.

N. Current Dump Mode Status

2
Operator Maintenance

This section provides information on operator maintenance procedures for your printer.

Maintaining Your Printer

The printer requires regular maintenance to optimize printing and extend the serviceable life of your printer. Zebra Technologies uses only high quality components and materials in its printers. The printers are manufactured and tested under a strict quality management program. Although only minimal routine maintenance is required, following these simple maintenance guidelines will ensure longer life with quality printing performance.

The printer's design allows for cleaning of printer's media path. The operator can safely clean the print head, platen roller and areas adjacent to the media path surfaces by following the simple procedures and guidelines on the following pages.

Media, Cleaning and Handling

The printer requires periodic cleaning to maximize the print quality and print head life. The main factors that contribute to reduced head life (and platen life) are:

Touching the print head! Static electricity can discharge and damage the print head. The body's oils and acids also damage the print head.

Cleaning - For optimum performance, clean the print head regularly after every 3-5 rolls of media.

Abrasion - Over time, the movement of media across the print head will wear through the protective ceramic coating, exposing and eventually damaging the print elements (dots).

Use of proper media - Use only approved media. Non-approved media may contain chemicals that can destroy or dramatically reduce the print head's life.

Temperature - Print head density (heat) setting. Set the density to the lowest possible setting that prints a good image.

Using Zebra Technologies approved media also helps ensure that your printer will have a longer life with quality printing performance.

See www.zipzebra.com for your on-line thermal label and ribbon media source. ZipZebra has bar code label and ribbon supplies for Zebra and Eltron label printers, and thermal printer ribbons and labels for other popular thermal label printing systems.

Print Care Guidelines

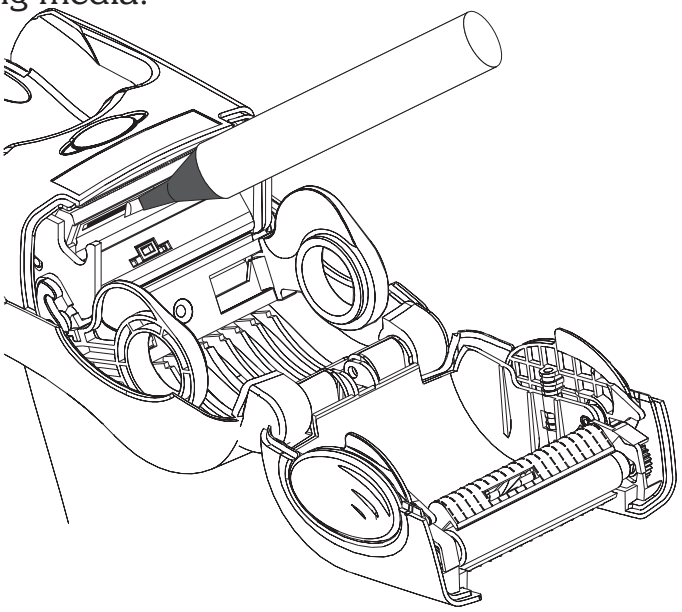
- Remove the outer layer of media from the label roll before loading media. Tape or adhesive that holds the loose end and the outside length of media becomes contaminated when handled or stored. When you remove this part of the media, you remove potentially contaminating oils, dust, and adhesives.
- Clean the print head every 3-5 label rolls.
- Clean the platen (drive) roller to remove contaminates. Note - Paper or label liner particles do not normally affect print operation.

Cleaning the Print Head

As you use your printer, the print head may become contaminated resulting in poor print quality. Every 3-5 rolls of media the print head should be cleaned with a cleaning pen.

1 Open the media door and remove the media.

2 Gently rub the cleaning pen across the upper black and colored areas of the print head. Allow the print head to dry for 1 minute before loading media.



Do Not Clean the Print Head with sharp objects! Only used approved cleaning materials.

Cleaning the Printer

Cleaning the outside of the printer is not generally recommended except in cases where the contaminates may migrate to the media or the platen roller (both contact the print head).

Linerless media printers need additional cleaning to avoid adhesive buildup on the ribs in the media path near the platen roller.

Always Remove The Battery And Terminal Before Cleaning the Platen Roller or General Printer Cleaning.

Do Not Clean The Battery.

Do Not Clean the Printer's Serial Port Connector.

The exterior surfaces and the media path surfaces (except the print head) can be cleaned with a lint free, clean, damp cloth very lightly moistened with medical grade alcohol. Medical grade alcohol (95% pure or better) may be used to help remove any adhesive or label material buildup.

Avoid cleaning the media sensors. Remove accumulated dust with a dry swab from the sensors by gently wiping them off. If adhesives or other contaminates get on the sensor, then an alcohol moistened swab may be used. Clean several times to remove any film that may be left from the initial cleaning or sensors may not function properly. Using too much alcohol can allow it to get between the electronic components and will require a much longer drying time before the printer will function properly.

Cleaning the Platen Roller

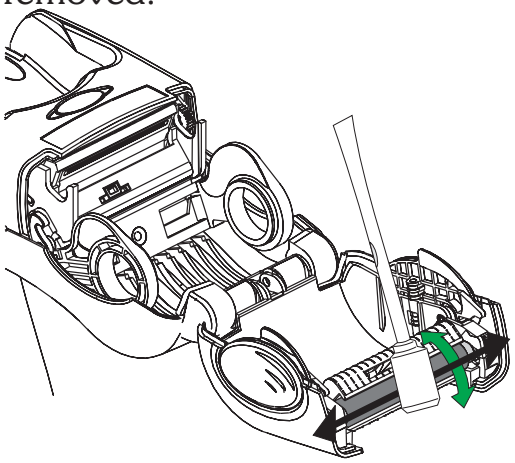
The standard platen (drive) roller normally does not require cleaning. Paper and liner dust can accumulate without effecting print operations. Contaminates on the platen roller can damage the print head or cause the media to slip when printing. Adhesive, dirt, general dust, oils and other contaminates should be cleaned immediately off the platen.

The non-stick platen roller on Linerless media printers requires frequent cleaning to keep adhesive buildup from occurring and transferring to the print head and the media path.

The platen can be cleaned with a fiber free swab (such as a Texpad swab) or a lint free, clean, damp cloth very lightly moistened with medical grade alcohol (95% pure or better). *Do Not Use the Cleaning Pen!*

1 Open the media door and remove the media.

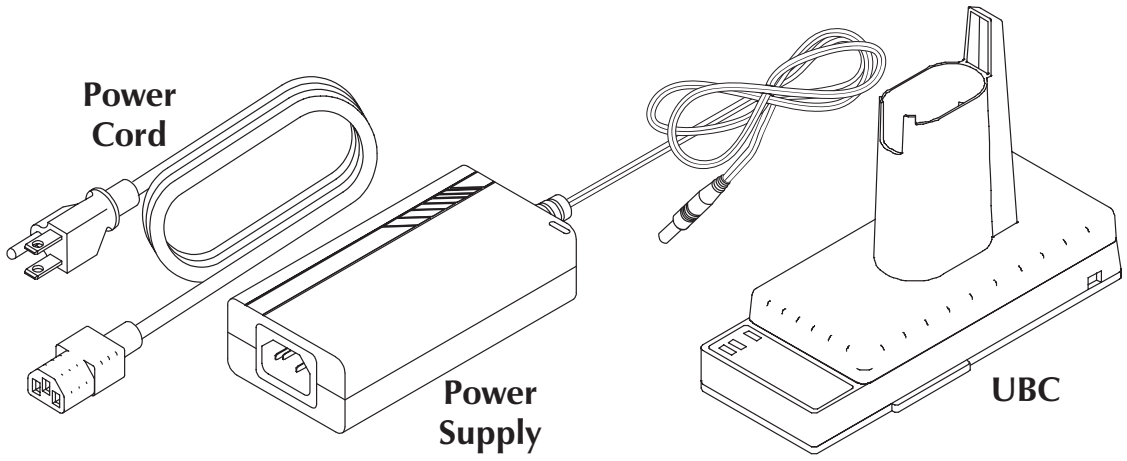
2 Clean the platen surface with the alcohol moistened swab. Rotate the platen while swabbing. Repeat this process two to three times with a new swab to remove residual contaminates. Adhesives and oils, for example, may be thinned by the initial cleaning but not completely removed.



Allow the printer to dry for 1 minute before loading labels.

3
Universal Battery Charger Accessory

The Universal Battery Charger (UBC) is not included with the printer and is sold as an accessory. The UBC is designed specifically for use with TR 220 printer. It provides the proper voltage and currents to safely charge your printer's lithium-ion battery. The UBC accessory contains the following:



The Universal Battery Charger (UBC) is the only approved, safe method to charge your battery. Using other methods to charge your printer's battery may damage the battery or in the worst cases cause a fire or explosion.

See the Battery Warnings on page v

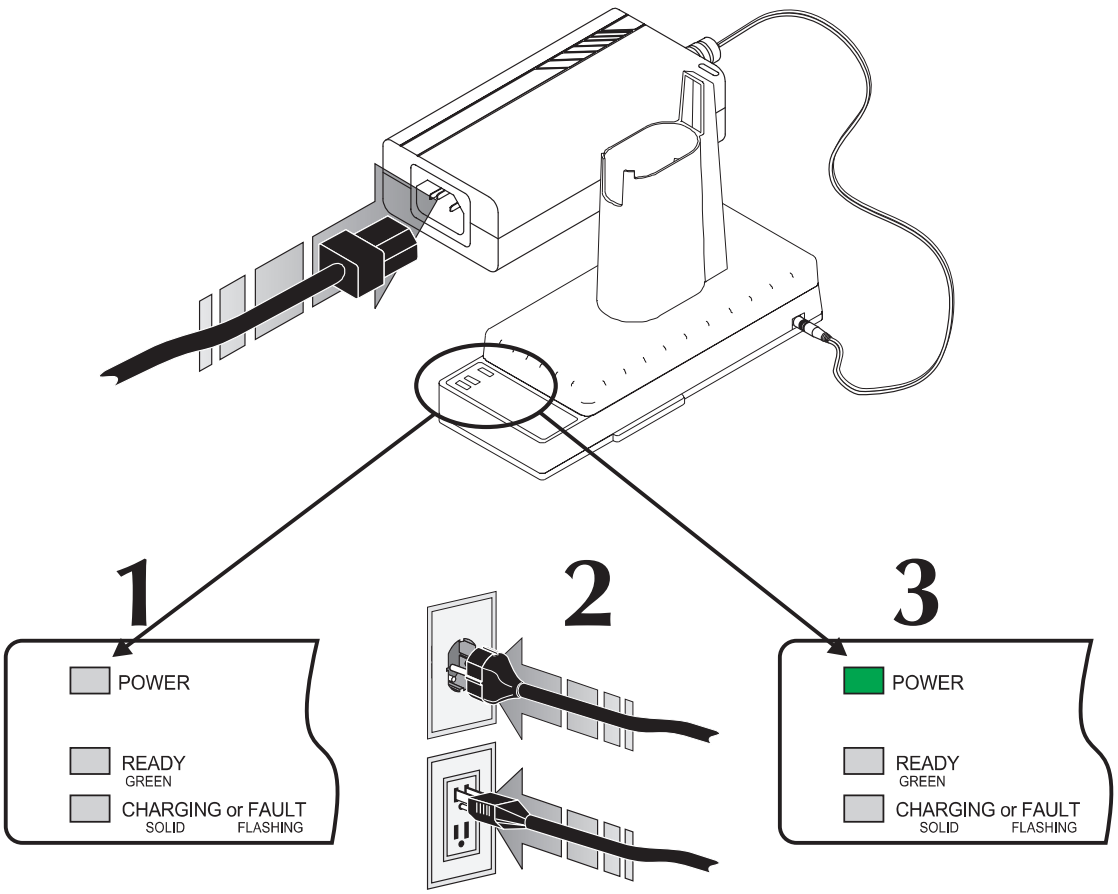
Using the UBC The single unit UBC configuration setup is outlined below.

1 Plug the DC Power cable into the UBC.

2 Plug the AC Power cord into the power supply. The power supply has a standard modular AC plug design to accommodate multiple grounded power cord variations. The power supply is capable of utilizing a wide range of input voltages from 100 to 240 VAC.

Plug the other end of the AC Power cord into a properly grounded AC power receptacle.

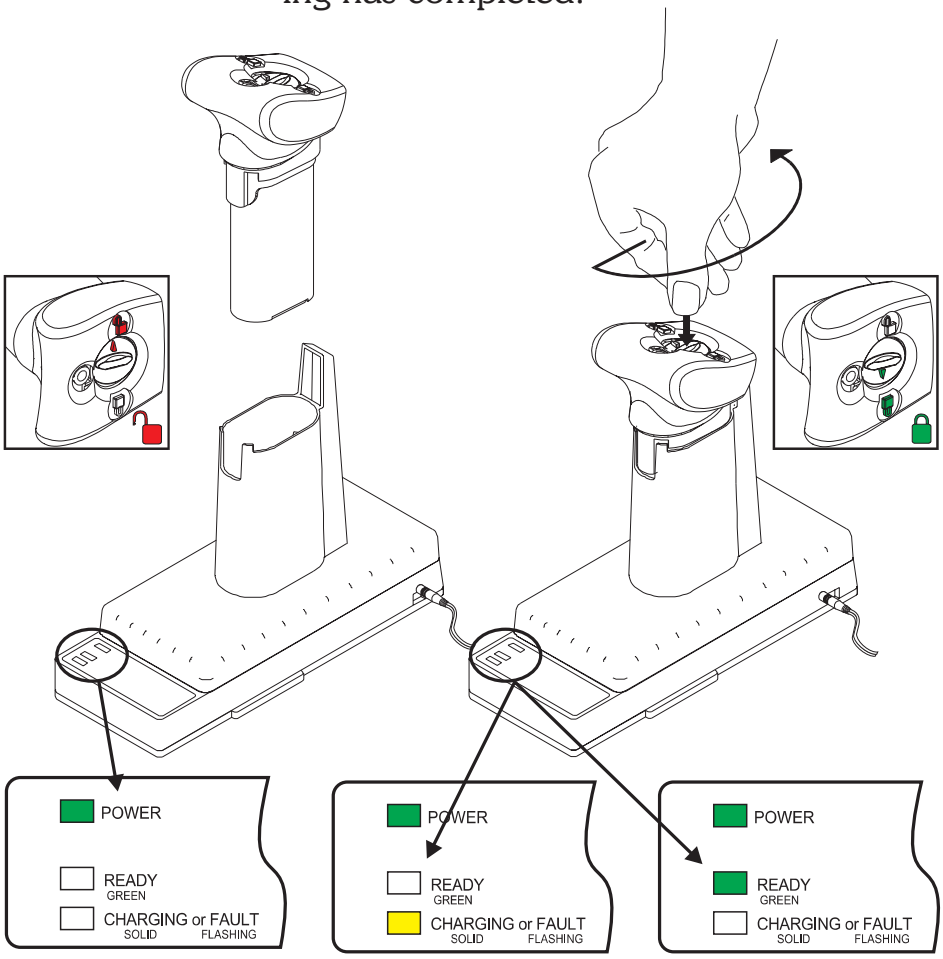
3 The UBC's Power indicator will light green.



Charging the Battery

The printer's battery is keyed and designed to only install into it's UBC. This is to protect the battery and operator from improper charging.

1. Set the battery's lock to the unlocked position and insert it into the UBC.
2. Insert the battery and while pushing down on the battery, turn the battery's lock to the locked position.
3. The UBC's Charge indicator will flash for a few seconds while the battery and charger are initializing and then go solid yellow while charging.
4. The Ready indicator will go green when charging has completed.



UBC Status Indicators

POWER - Solid Green when the UBC has power connected and is ready to charge.

READY - Solid Green when the battery is ready to use.

CHARGING / **FAULT** - Solid Yellow when the battery is charging.

CHARGING / **FAULT** - Flashing Yellow when the battey has been rejected due to battery failure (short, dead cell, etc.).

Appendix A - Troubleshooting

Problem	Solution or Reason
Printer Status Unknown Terminal Not Mated Status indicators are: Printer - DARK Battery - DARK	**Sleep Test** - Press the Feed Button until the Printer Status Indicator blinks green and release the trigger and button. This is normal operation. If the indicators are: 1. Both Dark - The battery needs to be installed, charged or is defective. 2. Both Dark - Printer failure. 3. Battery Status - Orange or Blinking Orange - Battery Low, needs charge. 3. Printer Status other than blinking green - Remove and re-insert the battery to reset the printer. Repeat Sleep Test. **Function Test and Status Report** - Run the *AutoSense: Media Sensing without the Terminal* procedure (see page 10) to verify printer operation. The Dump Mode printout includes battery charge status.
Terminal Mated and ON Terminal application software is active - Status Unknown The status indicators are: Printer - DARK Battery - DARK	**Sleep Test** - Printer only Press the Feed Button and verify printer status is blinking green. If the indicators are: 1. Both DARK - The battery needs to be installed, charged or is defective. 2. Both DARK - Remove the terminal and verify printer operational readiness with the Sleep Test and Function Test above. 3. Printer Status - Blinking GREEN - Printer is not activated via software. Install or activate a printer aware application on the terminal.
Terminal Mated and ON The status indicators are: Printer - GREEN Battery -N/A	Printer operating normally. 1. Printer Ready - Printer aware software is active. 2. Printer is receiving data through interface.

Problem	Solution or Reason
Terminal Mated and ON The status indicators are: Print - Blinking GREEN Battery - N/A	1. Printer is in a functional diagnostic or test mode. 2. With the Feed button depressed - printer is in Sleep test, AutoSense and other diagnostics modes. 3. Error condition - Reset printer by removing and re-installing the battery.
Print command(s) sent The status indicators are: Print - ORANGE Battery - N/A	1. Printer has a syntax or command error. Check program and resend print job.
Printing stops and STATUS indicator lights ORANGE or RED.	1. Perform AutoSense gap sensor adjustment on page 12. 2. Possible problem with label stock. Use only approved labels and tags. 3. Possible label jam. 4. **Terminal** - Application may have set insufficient memory for label size or is caused by other programming issues. Contact your system integrator or administrator to identify the configuration for proper printing. **Integrator** - *Check the printer's memory configuration. Refer to the EPL2 Programming manual.*
AutoSense - Media Change The status indicators are: Print - ORANGE Battery - N/A	1. **Media type has changed** from labels or black line media to continuous media. Prints ***"no gap detected"*** or ***"no black line detected"***. **Terminal** - change to an application that supports the media or insert the correct media for the application. Contact your system integrator or administrator to identify the proper software media combination. *Note - The media setting is programmed into the printer via printer commands embedded into the print job.*

Problem	Solution or Reason
The status indicators are: Print - Blinking ORANGE with momentary GREEN Battery - N/A	1. Firmware download in process.
Terminal Mated and ON Media Loaded and a Print Command or Feed has been issued to printer The status indicators are: Print - RED Battery - N/A	1. Media is out. Reload with new media. 2. Sensor has contaminates on it or label jam. Check media path. 3. Clean platen roller. Platen roller may be contaminated causing media to slip. 4. Verify that the media cover is closed properly. 5. Power-up failure. Reset the printer by removing and replacing the battery
Terminal Mated and ON The status indicators are: Print - GREEN Battery - N/A	1. Printer ready to receive flash programming during firmware download.
Terminal Mated and ON Media Loaded Will not print or FEED labels The status indicators are: Print - GREEN	1. Verify that the terminal is mated correctly to the printer. 2. Check that the media roll is loaded with the direct thermal side facing up. Ensure top cover is locked closed. 3. Clean platen roller. Platen roller may be contaminated causing media to slip. 4. **Terminal** - Application software sending the print job may have print density (darkness) set to low. Contact your system integrator or administrator to identify the proper software media and density setting combination for proper printing. *Note - The media setting is programmed into the printer via printer commands embedded into the print job.*

Problem	Solution or Reason
Printing is faded or poor quality.	1. Clean the print head with cleaning pen. 2. **Terminal** - Adjust print darkness within software. Application software sending the print job may have print density (darkness) set to low. Note - The media setting is programmed into the printer via printer commands embedded into the print job. 3. Check the media and verify that print surface is facing up.
Printer appears to be working (media is being fed out), but nothing is printed. The status indicators are: Print - GREEN	1. Verify the roll is loaded with the direct thermal side facing up. 2. Verify that the media is the correct type. Use approved direct thermal media only. Thermal transfer or regular paper will not print. 3. Clean the print head with cleaning pen. 4. **Terminal** - Application software sending the print job may have print density (darkness) set to low. Contact your system integrator or administrator to identify the proper software media and density setting combination for proper printing. *Note - The media setting is programmed into the printer via printer commands embedded into the print job.*
Prints only partial label or skips a label.	1. Perform AutoSense gap sensor adjustment on page 12. 2. Label caught on print head. Clean print head. 3. Top cover is not properly latched. 4. **Terminal** - Possible software problem. Contact your system integrator or administrator to identify the configuration for proper printing. **Integrator** - *Check the printer's memory configuration. Refer to the EPL2 Programming manual.*

Serial Interface Communication Configuration

The printer's serial port is configured with the **Y** command for the printer. The printer supports interface data rates from 1200 to 38,400 baud. See the EPL2 programmer's manual for details.

The printer's serial port default configuration is:

9600 baud
8 bit data
1 stop bit
No parity

The printer and the terminal communication speeds and settings must match. Check the printer's settings with the AutoSense routine's "Dump Mode" status printout.

Symbol Terminal Serial Interface

The figure below displays the connections needed to communicate with the printer via the printer's custom serial interface. The printer's connector is a SMK p/n CSS5014-0314R.

Pin #	Signal	Description
1	5.0V input	5.0V applied by terminal, used to turn printer on.
2	DSR	Not Used
3	RxD	Data Receive
4	RTS	Ready to Send (Hardware flow control)
5	TxD	Data Transmit
6	CTS	Clear to Send (Hardware flow control)
7	I1	Interrupt 1 used by terminal application to initiate scanning. (Terminal side is "high" activate)
8	I2	Not Used
9	DTR	Not Used
10	XGND	Digital Ground (Connected to PCB ground)
11	PGND	Power Ground (Connected to PCB ground)
12	8V input	Reserved
13	Thermistor	Connected to PCB ground
14	Thermistor	Connected to Analog input of microprocessor (used to monitor stepper motor operating temperature)

Appendix B
TR 220 Command Reference

This section outlines the mobile printer EPL2 commands supported by the TR 220 printer. It is intended as a quick reference for EPL2 page mode programmers. The EPL Page Mode Programmer's manual is available in electronic form on the user' documentation CD or on the Internet at www.zebra.com .

Command Summary for the TR220 Mobile Printer

The EPL2 command and description are noted in the left columns, while the unique TR220 operation appears in the right column.

Command	Description	TR220 Unique Operation
A	ASCII Text	
AUTOFR	Automatic Form Printing	Not Supported
B	Bar Code	
b	MaxiCode	
	PDF417	
C	Counter	
C	Cut Immediate	Not Supported
D	Density	
EI	Print Soft Font Info.	
EK	Delete Soft Font	
eR	User Definable Error Response	Not Supported
ES	Store Soft Font	
f	Cut/Peel Position	Not Supported
FE	End Form Store	
FI	Print Form Info.	
FK	Delete Form	
FR	Retrieve Form	
FS	Store Form	
GG	Retrieve Graphics	
GI	Print Graphics Info.	
GK	Delete Graphic	
GM	Store Graphic	
GW	Direct Graphic Write	
I	Character Set Selection	
JB	Disable Top Of Form Backup	
JF	Enable Top Of Form Backup	
LE	Line Draw Exclusive	
LO	Line Draw Black	
LS	Line Draw Diagonal	
LW	Line Draw White	
M	Memory Allocation	
N	Clear Image Buffer	
o	Cancel Customized Settings	
oB	Cancel Customize Bar Code	
oE	Line Mode Font Substitution	Not Supported
oH	Macro PDF Offset	
oM	Disable Initial Esc Sequence Feed	Not Supported
oR	Character Substitution (Euro)	

Command Summary for the TR220 Mobile Printer

Command	Description	TR220 Unique Operation
oW	Customize Bar Code Parameters	
O	Options Select	Not Supported
OEPL1	Set Line Mode	Not Supported
P	Print	
PA	Print Automatic	
Q	Set Form Length Transmissive (Gap) Sensor Black Line Sensor Continuous Stock	
q	Set Form Width	
R	Set Reference Point	
r	Set Double Buffer Mode	Single Buffer Only
S	Speed Select	Auto Selects Speed
TD	Define Date Layout (& Print Date)	Not Supported
TS	Set Real Time Clock	Not Supported
TT	Define Time Layout (& Print Time)	Not Supported
U	Print Configuration	
UA	Enable Clear Label Counter Mode	
UB	Reset Label Counter Mode	
UE	External Font Information Inquiry	
UF	Form Information Inquiry	
UG	Graphic Information Inquiry	
UI	Host Prompts/Codepage Inquiry	
UM	Codepage & Memory Inquiry	
UN	Disable Error Reporting	
UP	Codepage & Memory Inquiry/Print	
UQ	Configuration Inquiry	
US	Enable Error Reporting	Status LED Enable
U%	Host Prompt/Battery Inquiry	Mobile Printers Only
U%	Host Prompt/Motor Temperature Inquiry	Mobile Printers Only
V	Define Variable	
W	Windows Mode	Not Supported
xa	Sense Media	
X	Box Draw	
Y	Serial Port Setup	
Z	Print Direction	
?	Download Variables	
^@	Reset Printer	
^ee	Status Report - Immediate	Not Supported

General Printer Configuration Information

The TR 220 mobile printer has features that require special consideration when programming. The EPL2 command support has been modified to maximize battery charge utilization and ignore unusable features. Some of the features and commands that need special consideration when developing applications include the following:

- The TR 220 printer operates in Single Buffer Mode only.
- Single buffering increases the maximum image buffer size to 2235 dots long (22 inches/ 558.8mm) with the maximum print width of 384 dots (1.89 inches/ 48 mm).
- Speed (**S**) is automatically adjusted to maximize battery life. It can not be set by programming.
- Density (**D**) has a default value of 10. The programmer should set this value to the lowest level that produces a usable label to maximize battery life.
- The use of large, highly dot dense images (solid black) is not recommended. This will reduce battery charge utilization. The printer is rated to print at 25% density (3mm solid black bar across the print width alternated with a 9mm non-printing bar or an equivalent density pattern).
- Long multiple label or high density print jobs may cause the printer to temporarily delay printing operations while the motor or print head cool to safe operation temperatures.
- The Enable Error Reporting (**US**) command enables the command syntax error reporting via the orange printer status indicator.

U% Host Prompts/Motor Temperature

Description EPL2 Mobile Printers Only (TR 220) - This command will cause the printer to **send to the host** the motor temperature status through the mobile printer's serial port.

Syntax **U%**
The printer will send motor temperature in 2°C increments to the host via the serial port. The printer uses the data format of **NNdeg C**, where **NN** equals the motor temperature.

Range Reported (Degrees Celsius): 24≤**NN**<60

U%

EPL2 Mobile printers suspend printing operations, including printer to host communication, until the motor returns to safe operating temperatures.

The mobile printer will stop printing are 60°C or higher.

The printer will resume printing at 50°C.

Example: U%↵ : Command sent to printer
: Printer responds with motor temperature
: **24 deg C**

U$ Host Prompts/Battery Status

Description EPL2 Mobile Printers Only (TR 220) - This command will cause the printer to **send to the host** the battery charge status.

Syntax **U$**

The printer will send information about battery charge status in increments of 10 percent. The printer uses the data format of **VccNNN%**, where **NNN** represents the battery's charge level.

EPL2 Mobile printers suspend all <u>new</u> printing operations, including printer to host communication, until the battery charge level is greater than 20%.

Print jobs or forms (single label or batch operations) will continue processing until finished.

The mobile printer will accept new commands and print after the battery charge is greater than 20%.

Example: U$↵ : Command sent to printer
: Printer responds with
: **Vcc90%**

US Enable Error Reporting

Description Use this command to enable the printer's status reporting feature.

Serial Port - If an error occurs, the printer will send a NACK(0x15), followed by the error number, to the computer. If no errors occur, the printer will echo ACK(0x6) after each **P** command.

If paper or ribbon empty occurs, the printer will send, through the serial port, a"-07" and "Pnnn" where nnn is the number of labels remaining to print.

Mobile Printers Only (TR220) - *Enables command error reporting via printer's status indicator, as well as, the serial port.*

Syntax **US[p_1]**
The printer's default setting is off.

Parameters **p_1 = 1 Optional Parameter**
If no errors occur, the printer will echo ACK(0x6) after each label that is successfully printed.

US Command - Enable Error Reporting

Code	Error/Status Description
00	No Error
01	Syntax Error
02	Object Exceeded Label Border
03	Bar Code Data Length Error (e.g.: EAN-13 is a 12 or 13 digit only)
04	Insufficient Memory to Store Data
05	Memory Configuration Error
06	RS-232 Interface Error
07	Paper
08	Duplicate Name: Form, Graphic or Soft Font
09	Name Not Found: Form, Graphic or Soft Font
10	Not in Data Entry Mode
12	Pause Mode or Paused in Peel mode
13	Mobile Printers: Print head too hot
14	Mobile Printers: Motor too hot
15	Mobile Printers: Battery low warning (≥ 40%)
16	Mobile Printers: Battery low limit (≥ 20%)
50	Does not fit in area specified
51	Data length to long
93	PDF-417 coded data to large to fit in bar code