Virtual Device-M

User Guide

ZEBRA

P1072179-003

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Part Number: P1072179-003 Rev. A

Contents

Introduction

This section describes the features and functions of a Zebra printer that is running the Virtual Device-M application.

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Overview

The Virtual Device-M application enables Zebra Link-OS printers to work with many host systems that are using Monarch® printers. In most cases, no changes will be required to the host application. This feature can help customers to make a smooth transition to Zebra printers and save them the time and expense of having to rewrite their host software.

Virtual Device-M Features

The Virtual Device-M application:

- Uses existing features of Zebra printers, when available.
- Offers fonts similar to the original device. These fonts will use 120 KB or more of memory space.
- Supports the Bluetooth®, Serial, Ethernet, WLAN, and USB interfaces.
- Offers many outline fonts, barcodes, and specific commands and features of target printer models (see *Supported Fonts* on page 72).
- Provides support of Monarch commands (see *Commands* on page 35).

Supported Printers

This manual describes the Virtual Device-M language for Zebra Link-OS printers and should be used by any person who needs to support that language on one of the following Zebra printers:

Printer	Firmware
iMZ Series	V73.19.6Z and later
QLn Series	V68.19.6Z and later
ZT200 Series	V72.19.6Z and later
ZT400 Series	V75.19.7Z and later
ZT510	V80.20.02Z and later
ZT600 Series	V80.20.02Z and later
ZD400 Series	V77.19.14Z or V84.20.05Z and later
ZD500 Series	V74.19.6Z and later
ZD600 Series	V84.20.05Z and later
ZQ300 Series	V81.20.06Z and later
ZQ500 Series	V76.19.10Z and later

Note • The Virtual Device-M language is supported only on 203 dpi printers.

For complete printer operation, use this manual in combination with the User Guide for your printer.

Configuring Network Connectivity

Your printer may be equipped with one or more of the following interfaces:

- Bluetooth—For detailed information to connect a Bluetooth device, refer to the *Bluetooth User Guide*.
- Wired print server—For detailed information, refer to the *ZebraNet Wired and Wireless Print Servers User Guide*.
- Wireless print server—For detailed information, refer to the *ZebraNet Wired and Wireless Print Servers User Guide*.

For other connectivity options, refer to the User Guide for your printer. Copies of these manuals are available at http://www.zebra.com/manuals.

Notes

- Other command languages are disabled when running Virtual Device-M. However, Set/Get/Do (SGD) commands and file download all operate properly with Virtual Device-M enabled.
- Virtual Device-M fonts can only be used with Virtual Device-M commands. They cannot be used with other languages.
- The Virtual Device-M mode application will not respond to CPCL, ZPL, or EPL commands. Instead, commands will be processed by the Virtual Device-M application.

Install, Register, and Enable Virtual Device-M

This section provides you with instructions on how to install and enable the Virtual Device-M application on one or more Zebra printers.

Contents

Acquiring the Virtual Device Application

To get the Virtual Device app, perform the following from your computer:

1. Open a web browser and navigate to http://www.zebra.com/virtualdevices.
2. Locate your printer type in the list of printers, and then click **Download Now**.
3. Fill out the information on the Virtual Device Download Request form.
4. Click **Submit**.
5. Read the End User License Agreement.
6. Click **Accept and Begin Download Now**.

   Your browser prompts you to open or save the archive containing the Virtual Device app.
7. Save and store the Virtual Device app archive file to your computer.

   The archive file contains the following:

   - The Virtual Device `.NRD` file to be downloaded to a Zebra printer.
   - A `.txt` file that contains the SGD command for immediately activating the Virtual Device app.
8. Extract the files from the archive to your computer.

Downloading the Virtual Device-M Application

Zebra provides two options to download the Virtual Device-M app to the printer.

- On a computer with the ZDownloader Utility

  The ZDownloader Utility is the only method shown in this manual. For instructions on how to download and install the ZDownloader Utility, see *ZDownloader Utility* on page 76.

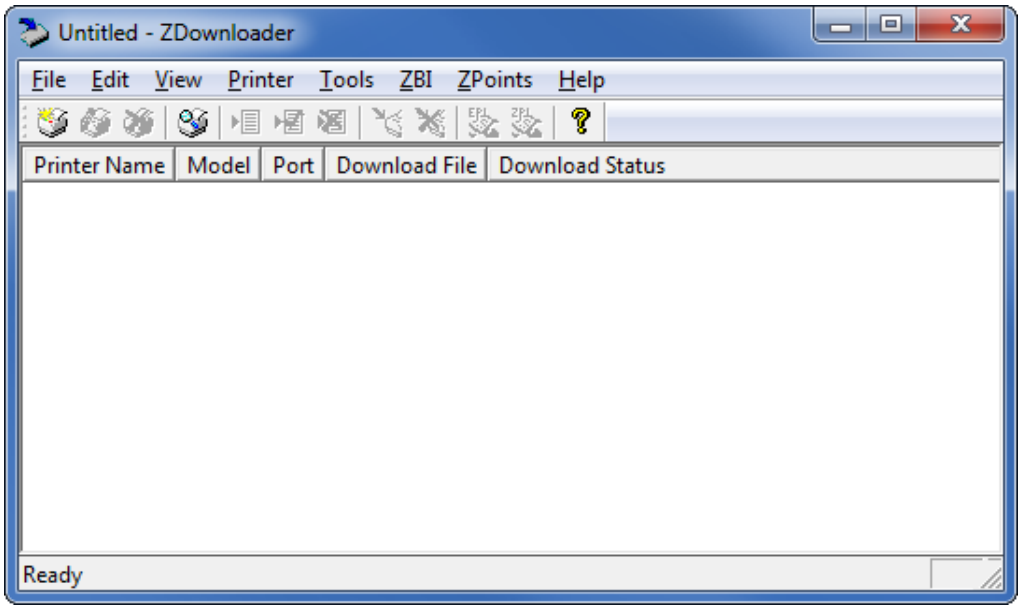
- On an Android device with the Zebra Printer Setup Utility for Android Devices (available for free on Google Play™)

  For information on using the Zebra Printer Setup Utility for Android Devices and to download the user guide, navigate to http://www.zebra.com/setup.

Using ZDownloader

The ZDownloader application can update Virtual Device-M files in Zebra printers connected by Serial, Parallel, USB, and IP Ethernet networks.

Figure 1 • Initial ZDownloader Screen



Adding Printers to the ZDownloader List

There are two ways to add printers to the list:

- Auto-Detect (use for USB or IP Ethernet interfaces)
- Manual add (use for Serial, Parallel, or IP Ethernet interfaces)

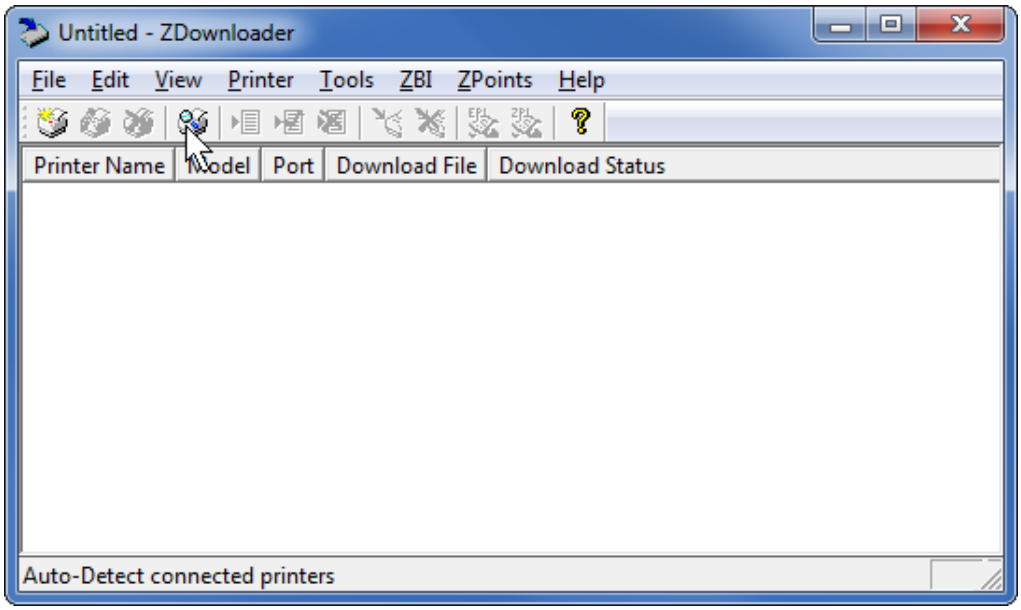
If your printer is connecting via the serial or parallel interfaces, or is not detected by using the Auto-Detect method, use the Manual Add method.

Auto-Detect Printers

Use Auto-Detect for USB or IP Ethernet interfaces.

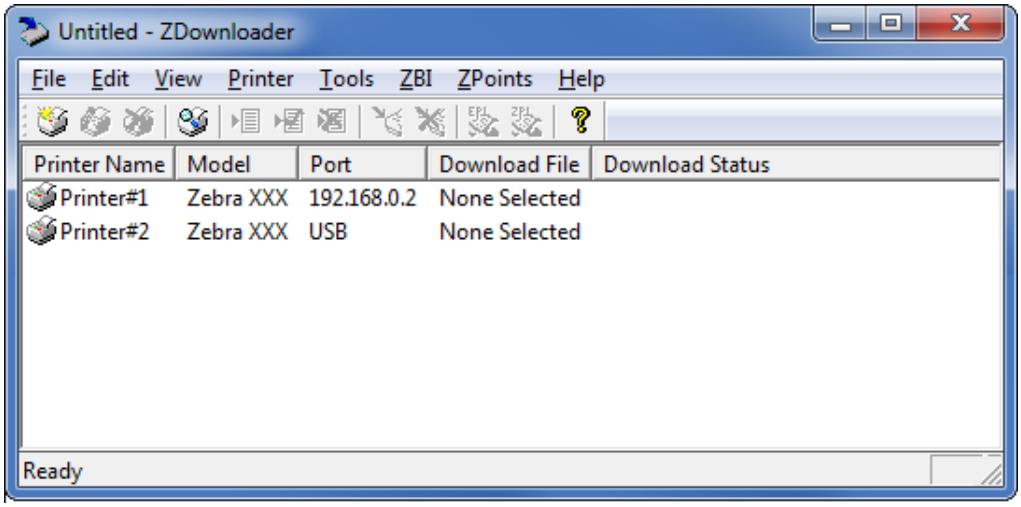
Note • Ethernet connected printers are detected by the application broadcasting a UDP packet out onto the network. UDP port number 4201 is used for the discovery process. Some networks filter out UDP packets. This means that the ZDownloader utility may not be able to detect all of the printers on your network. See your network administrator for more information. If you are not able to Auto-Detect your network printers, follow instructions for manually adding a printer.

USB printers can only be added by using Auto-Detect. The ZDownloader utility can support as many USB printers as your computer can support (most computers typically can support up to 255).



To Auto-Detect printers connected via the USB or IP Ethernet interfaces, perform the following steps:

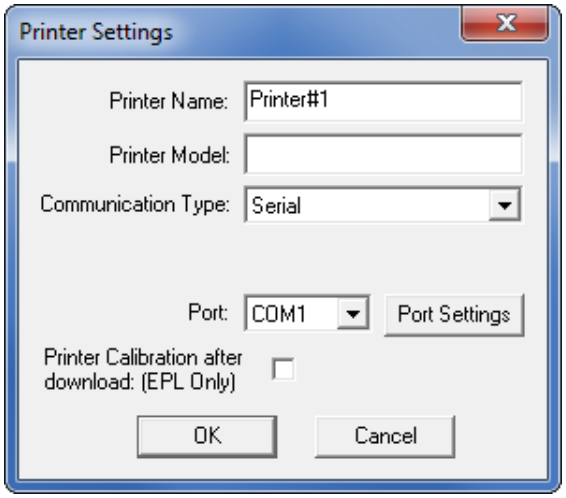
1. In the ZDownloader toolbar, select **Printer** > **Auto-Detect**.
   OR
   Right-click in the ZDownloader window and select **Auto-Detect Printers**.
   The printers detected are added to the printer list.



Manually Add Printers

To manually add printers connected via the Serial, Parallel, or Network interfaces, perform the following steps:

1. In the ZDownloader toolbar, select **Printer** > **Add…**.
   OR
   Right-click in the ZDownloader window and select **Add Printer…**.
   The following window appears.

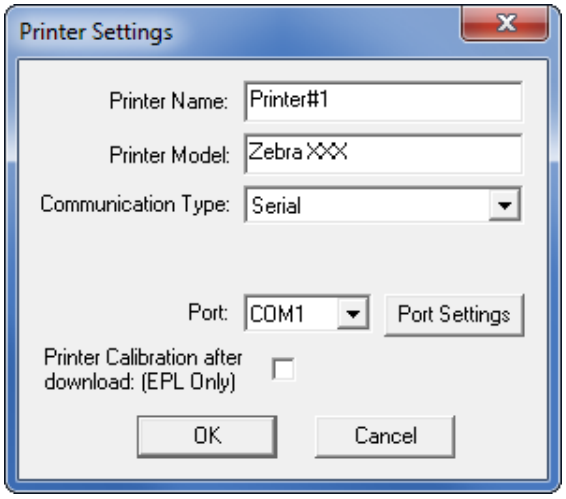


2. Add a printer name and your printer model in the appropriate fields.
3. What type of printer are you adding?

If you are adding a…	Then…
Serial Printer	Go to *Adding a Serial Printer*.
Parallel Printer	Go to *Adding a Parallel Printer* on page 17.
Network Printer	Go to *Adding a Network Printer* on page 18.

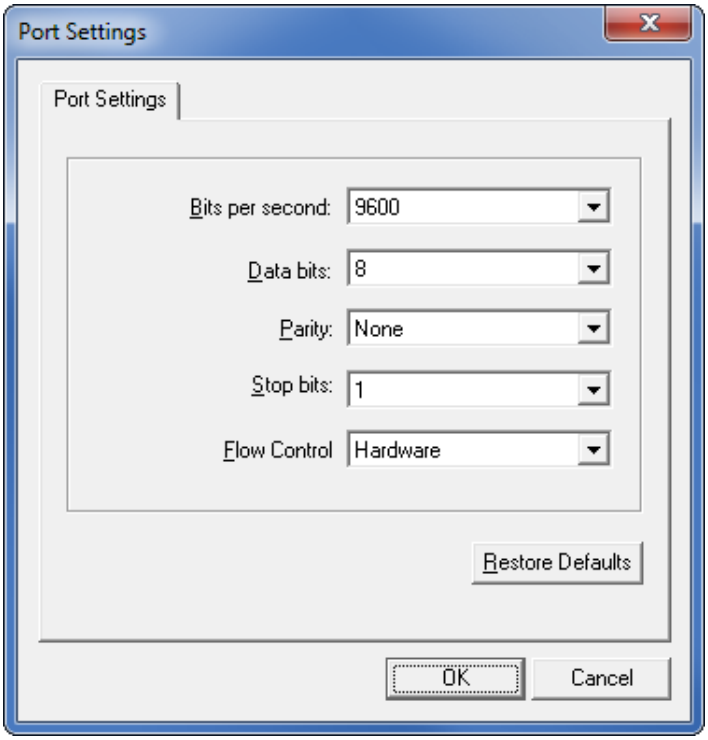
Adding a Serial Printer

4. Select the serial port to which the printer is connected.



5. Click **Port Settings**.

   The following window appears.



6. Adjust the settings as necessary. The printer's serial port settings must match the computer's serial port settings. For more information about the settings, refer to the User Guide for your printer.

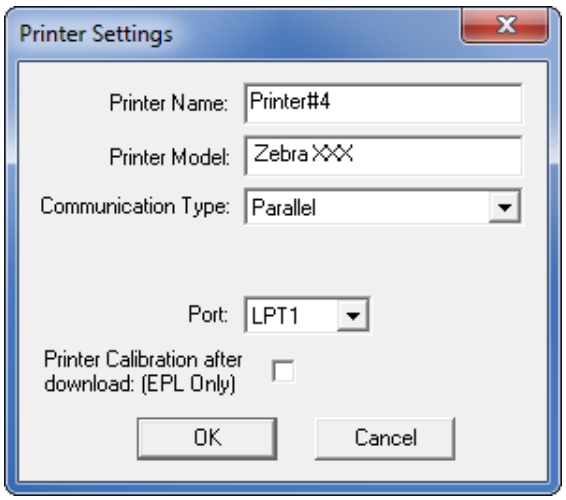
7. Click **OK** to save the port settings.

8. Click **OK** to add the printer.

Adding a Parallel Printer

9. Set **Communication Type** to **Parallel**.

   The available parallel ports will be shown in the Port drop-down box.

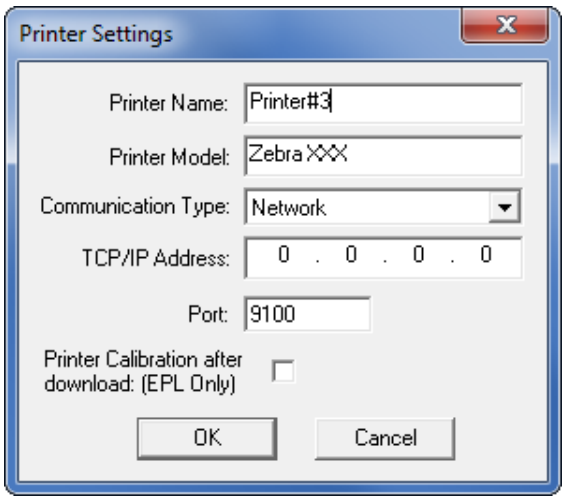


10. Select the port to which the printer is connected. No additional configuration is necessary.

11. Click **OK** to add the printer.

Adding a Network Printer

12. Set **Communication Type** to **Network**.
    The following window appears.

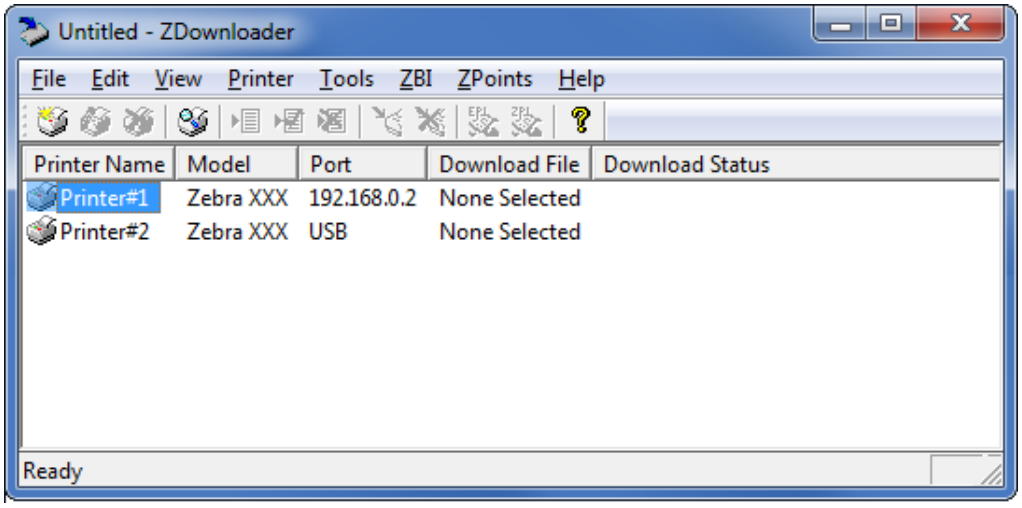


13. Enter the printer's IP address.
14. Click **OK** to save the network settings.
15. Click **OK** to add the printer.

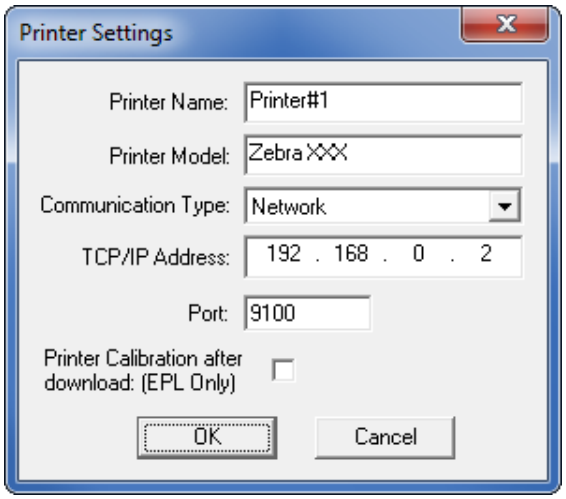
Modifying Printers in the List

To change printer settings for a printer in the list, perform the following steps:

1. Select the printer to modify.



2. In the toolbar, select **Printer** > **Modify Printer…**.
   OR
   Right-click on the printer and select **Modify Printer…**.
   The printer settings for the selected printer are displayed.

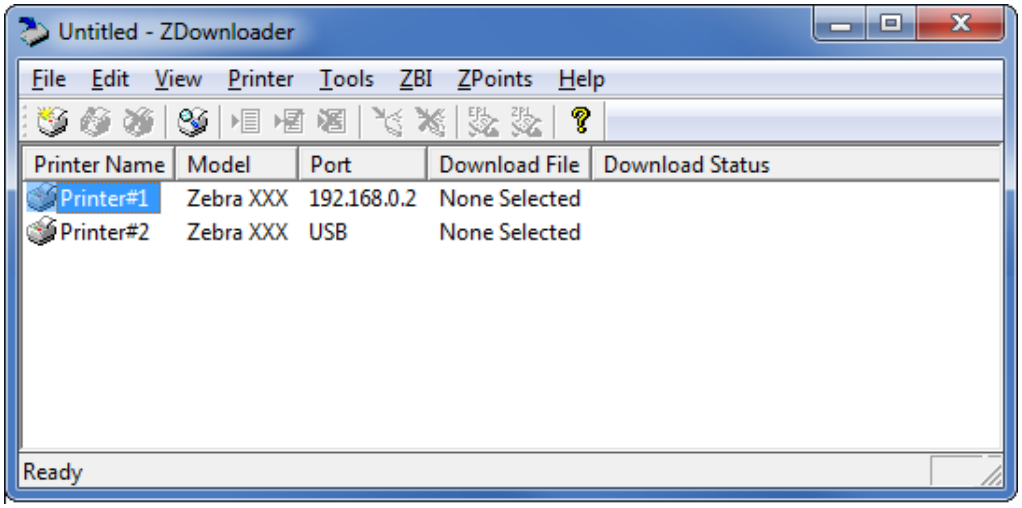


3. Modify the settings as desired.
4. Click **OK** to save the settings.

Deleting Printers from the List

To delete printers from the list, perform the following steps:

1. Select one or more printers to delete.

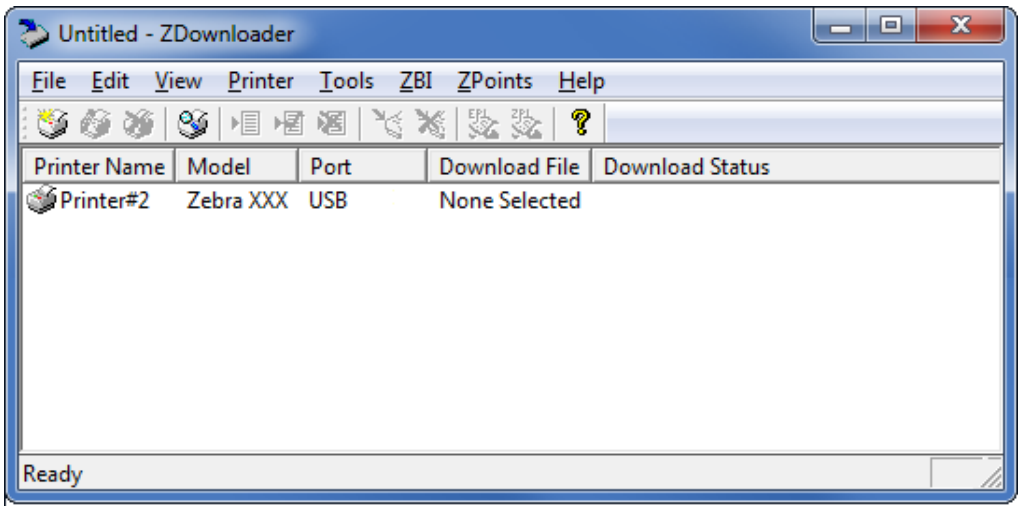


2. In the toolbar, select **Printer** > **Delete**.

   OR

   Right-click on one of the selected printers and select **Delete Printer(s)**.

   The printer is removed from the list.



Downloading the Virtual Device App to Selected Printers

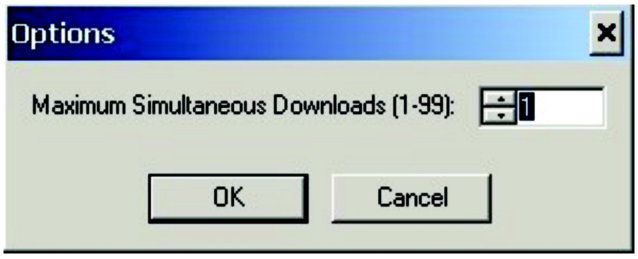
To download the Virtual Device-M app to your printer(s), you must select the file to send to each printer. ZDownloader, by default, downloads files to one printer at a time. If you have multiple printers to update and want to speed up the process, you can increase the number of simultaneous downloads.

Note • More simultaneous downloads require more of your computer resources. Some computers may slow down with simultaneous downloads or as more printers are added for simultaneous downloading.

To allow simultaneous downloads, perform the following step:

1. Click **Tools > Options…**.

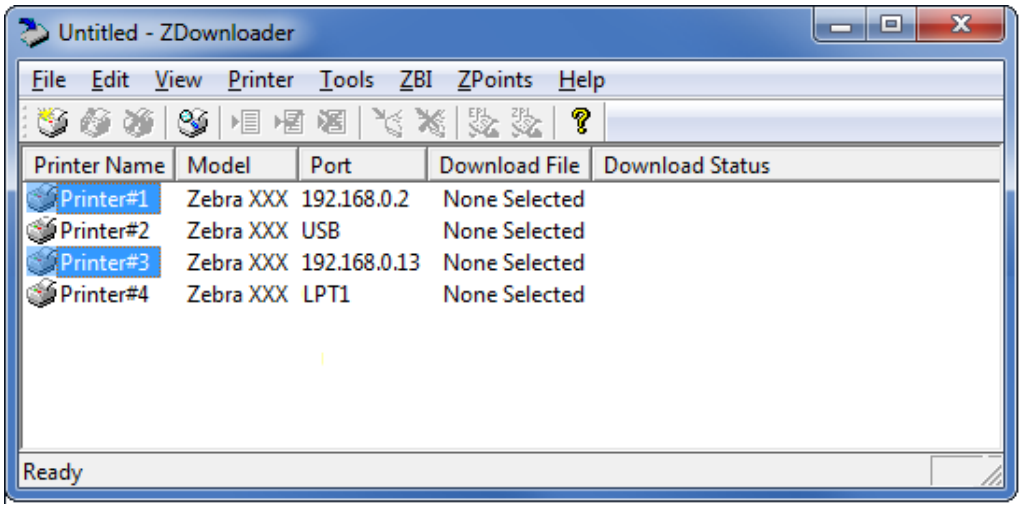
   The following prompt appears.



2. Raise the number shown to allow multiple simultaneous downloads.
3. Click **OK**.

To download the Virtual Device app file to one or more printers, perform the following steps:

1. Select the printers to which you want to download the Virtual Device-M app file. To select multiple printers, hold down the Ctrl or Shift key, and then click on the desired printers.



2. In the toolbar, select **File** > **Select Firmware File…**.

   OR

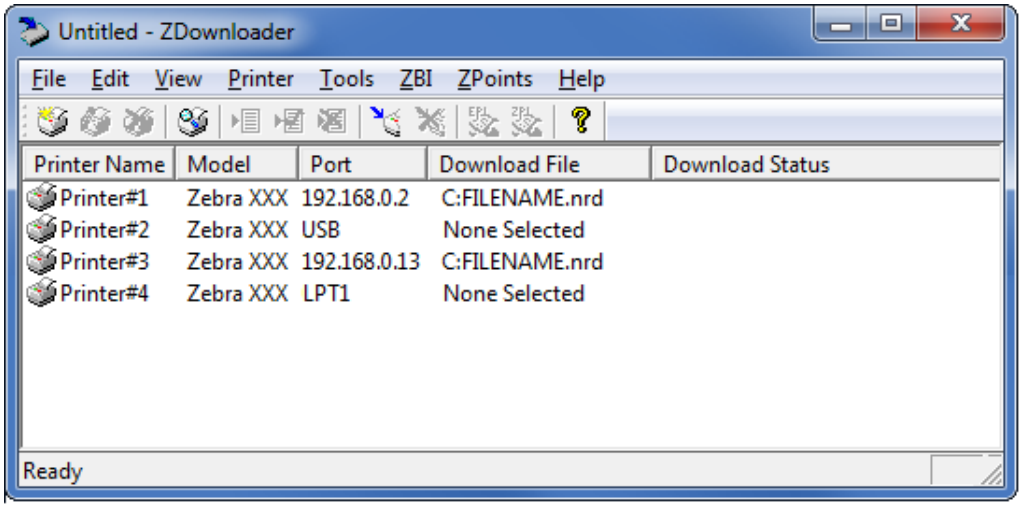
   Right-click on one of the selected printers and select **Select Firmware File…**.

3. Navigate to the Virtual Device app file that you acquired previously.

4. Click Open.

   The file that you selected appears under Download File for the selected printers.

   Printers that are present in the list but that do not have a file selected will be ignored when Downloading starts.

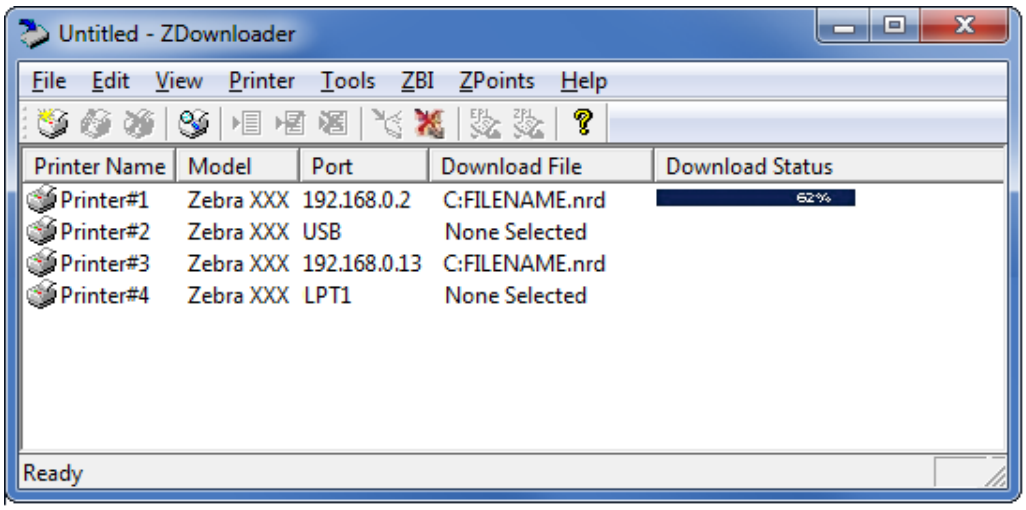


5. Start the download process by doing one of the following:
   - Select **Printer** > **Download to Selected**.
   - Select the printer(s) of interest and select the **Printer** and then select **Download To Selected**.
6. In the toolbar, select **Printer** > **Download All**.

   OR

   Right-click in the ZDownloader window and select **Download All**.

   After downloading has begun, the progress of each printer will be shown in the Download Status column.



Canceling a Download in Progress

The Cancel Download toolbar button and the Printer > Cancel Download menu options become active when the files are downloading.

To cancel downloading to ALL printers in the list, perform the following step:

1. Click **Printer** > **Cancel Download**.

   OR

   Right-click in the ZDownloader window and select **Cancel Download**.

To cancel downloading to SPECIFIC printers in the list, perform the following step:

1. Select one or more printers with a download in progress.
2. Click **Printer** > **Cancel Download.**

   OR

   Right-click on a selected printer and select **Cancel Download**.

Registering the Virtual Device

ZDownloader maintains a log file of all items downloaded to a Zebra printer along with the printer serial number. You can register your Virtual Device installation with Zebra Repair and Tech Support to ensure that a printer sent in for repair is returned with the Virtual Device installed, and when engaging Zebra Tech Support, they will have records of the item being loaded. To register your Virtual Device installation, you must send the log file created by ZDownloader to the Zebra log file management group.

ZDownloader Log File

To send the log file, complete these steps:

1. Based on your operating system, navigate to the appropriate folder:
   - Microsoft® Windows® XP
     `C:\Program Files\Common Files\FirmwareDownloader`
   - Microsoft Windows 7, Windows 8, and Windows 10
     `C:\ProgramData\Zebra Technologies\Firmware Downloader and ZBI Key Manager`
2. Copy the log file (`DownloadLog.txt`), and email to Zdownloader@zebra.com.

   If you are downloading from several computers, you need to send the log file from each computer. If you download files to printers on one day and do not send the file the same day, please note this in your email so that the log file management group picks up the previous load detail. Otherwise, they only pick up the load data for the day that the log file is sent.

Enabling the Virtual Device

You can enable Virtual Device-M by sending a Set/Get/Do (SGD) command to the printer or by selecting the option through the printer's menus.

Using an SGD Command

To enable Virtual Device-M on your printer, send the following command:

```
! U1 setvar "apl.enable" "apl-m"
```

To disable Virtual Devices on your printer and return to normal function, send the following command:

```
! U1 setvar "apl.enable" "none"
```

You must restart the printer after changing the value of `apl.enable`. For more information about this SGD command, see *apl.enable* on page 70.

Using the User Menus

This section includes instructions for the following printers:

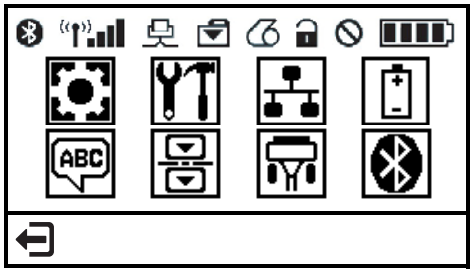
- *QLn420 Printers* on page 25
- *QLn320 and QLn220 Printers* on page 28
- *Supported ZTxxx And ZDxxx Printers With A Display* on page 31

If necessary, refer to the User Guide for your printer for additional information about your printer's control panel.

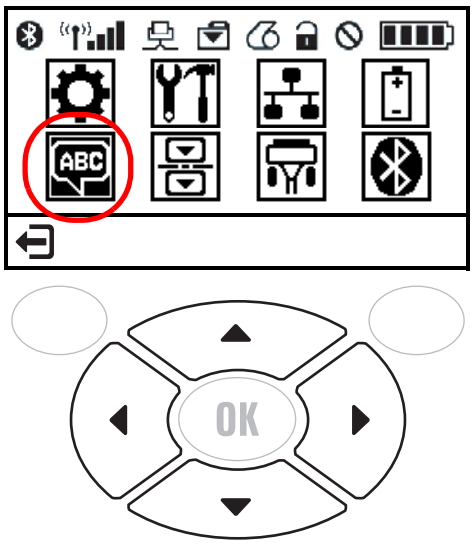
QLn420 Printers

1. From the printer's idle display screen, press the **LEFT SOFT KEY** to select the Menu option.

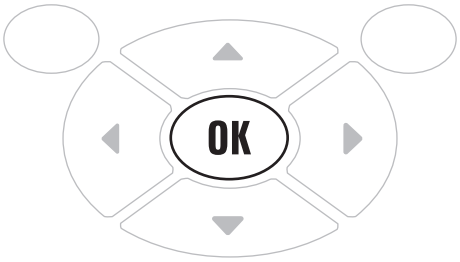
The printer displays the Home Menu.



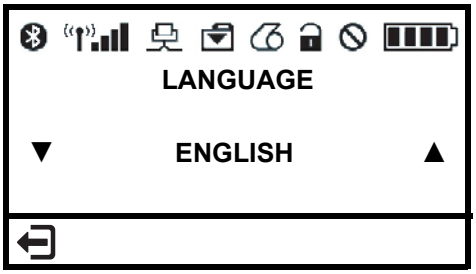
2. Use the **ARROWS** to navigate to the **LANGUAGE** menu.



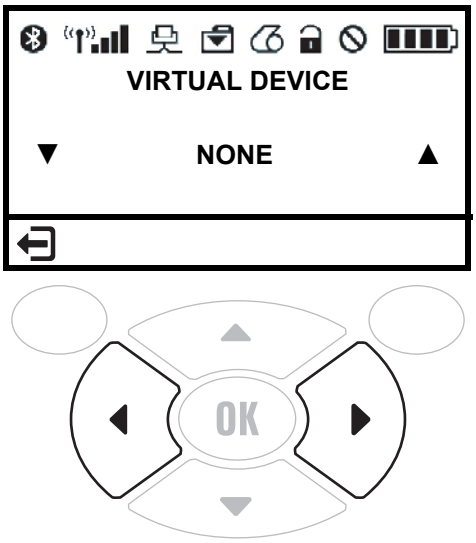
3. Press **OK**.



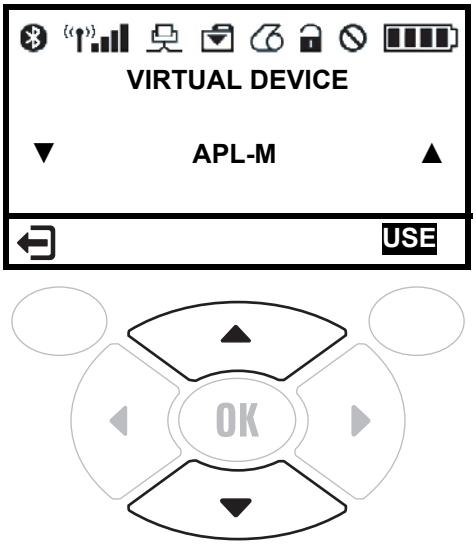
The printer displays the **LANGUAGE** selection screen.



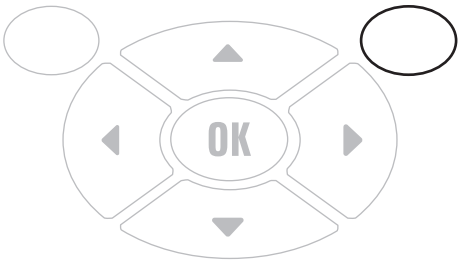
4. Use the **LEFT** or **RIGHT ARROW** to navigate to the **VIRTUAL DEVICE** selection screen.



5. Use the **UP** or **DOWN ARROW** to scroll to the **APL-M** option.



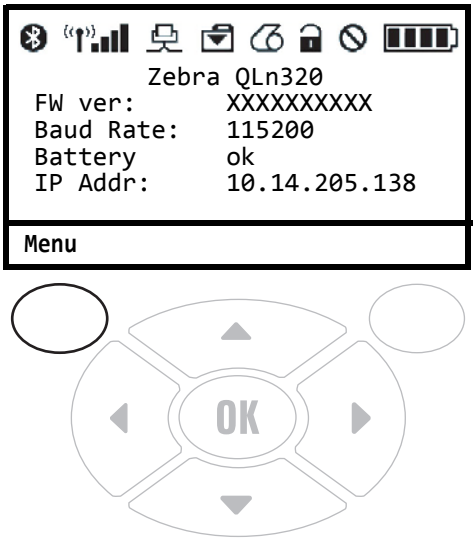
6. Press the **RIGHT SOFT KEY** to select **USE**.



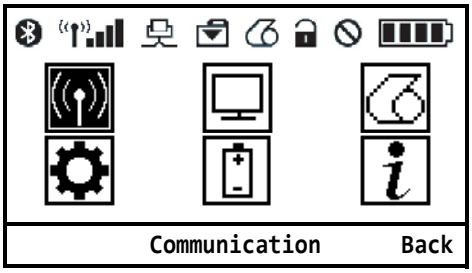
The printer restarts and uses the Virtual Device that you selected.

QLn320 and QLn220 Printers

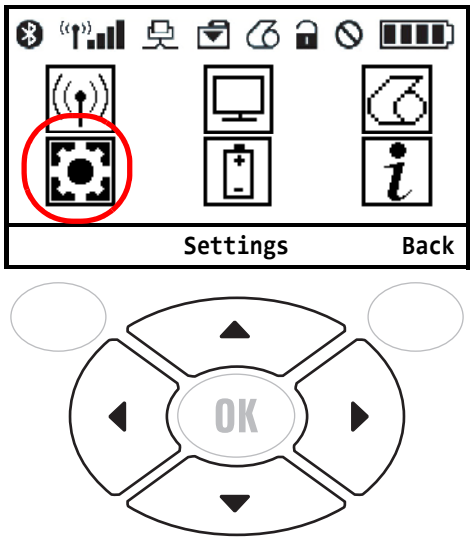
1. From the printer's idle display screen, press the **LEFT SOFT KEY** to select the Menu option.



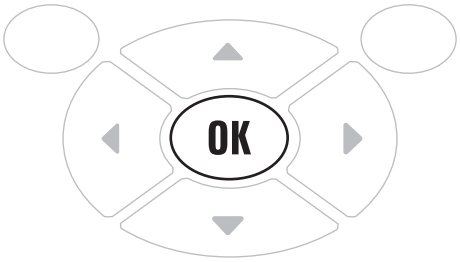
The printer displays the Home Menu.



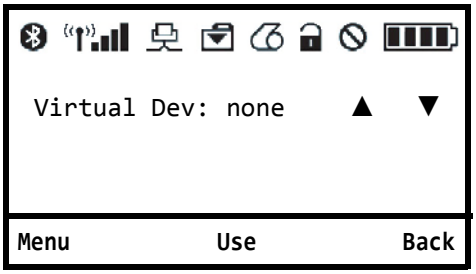
2. Use the **ARROWS** to navigate to the **SETTINGS** menu.



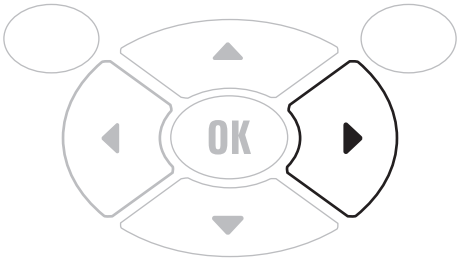
3. Press **OK**.



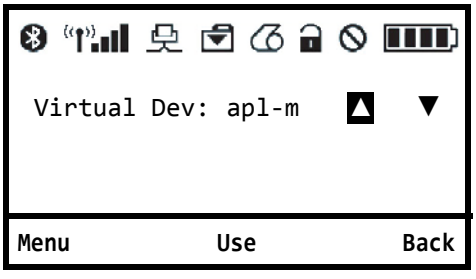
The printer displays the **VIRTUAL DEVICE** selection screen.

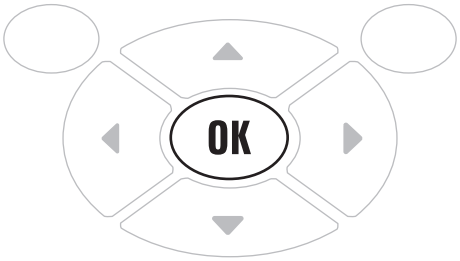


4. Press the **RIGHT ARROW** to highlight the up arrow on the display.

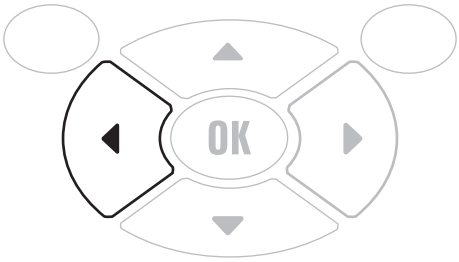


5. With the up arrow highlighted, press the **OK** button until you scroll to the **APL-M** option.

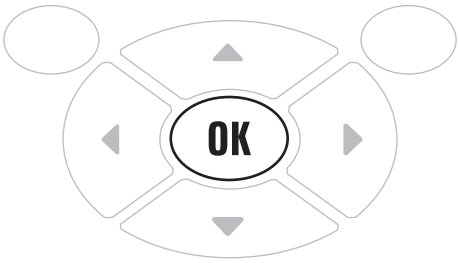




6. Press the **LEFT ARROW** to highlight **APL-M**



7. Press **OK** to select **USE**.



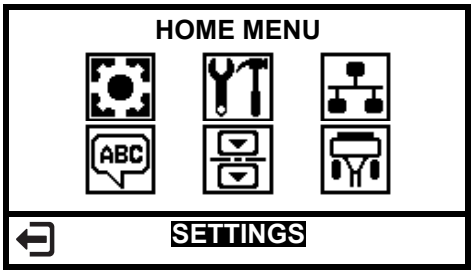
The printer restarts and uses the Virtual Device that you selected.

Supported ZTxxx And ZDxxx Printers With A Display

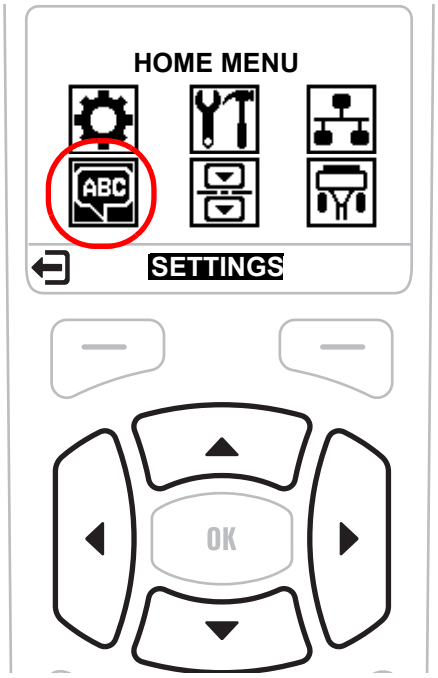
Note • The ZT230 control panel is shown in this procedure. The control panel for the other printers is similar.

1. From the printer's idle display screen, press the **LEFT SOFT KEY** to select the Home icon.

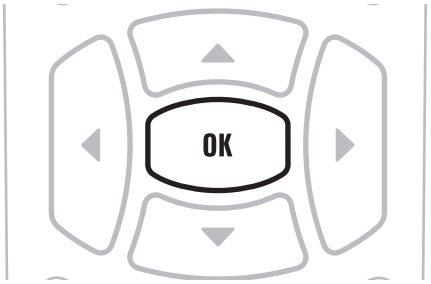
The printer displays the Home Menu.



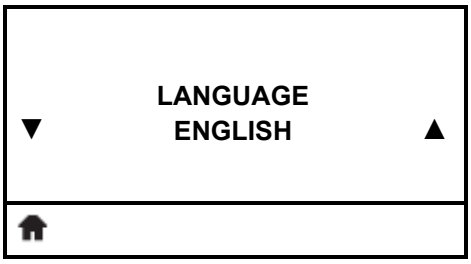
2. Use the **ARROWS** to navigate to the **LANGUAGE** menu.



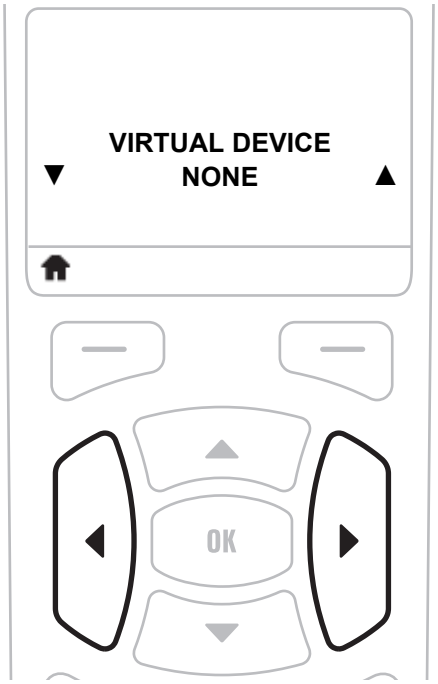
3. Press **OK**.



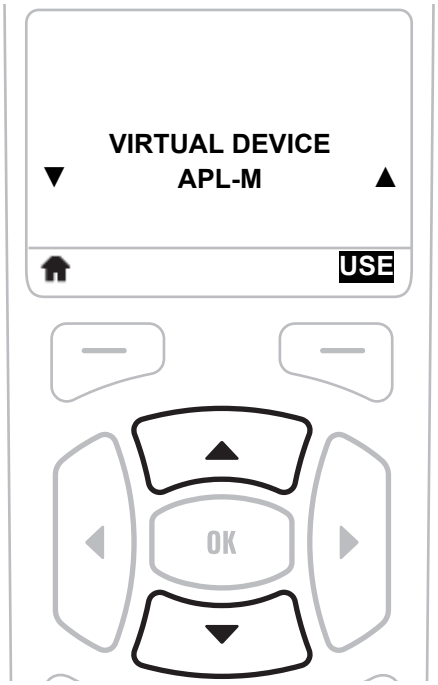
The printer displays the **LANGUAGE** selection screen.



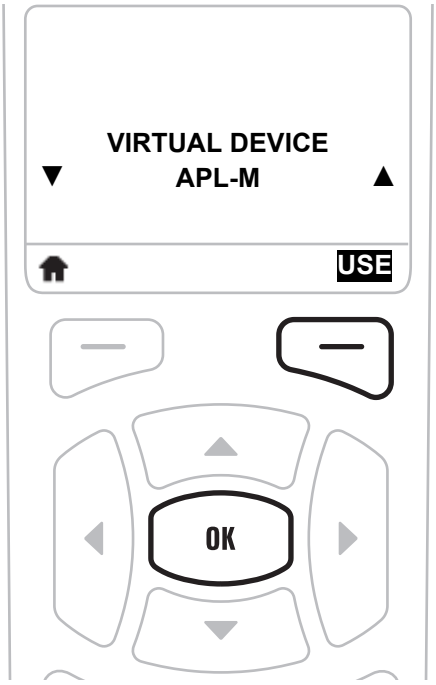
4. Use the **LEFT** or **RIGHT ARROW** to navigate to the **VIRTUAL DEVICE** selection screen.



5. Use the **UP** or **DOWN ARROW** to scroll to the **APL-M** option.



6. Press the **RIGHT SOFT KEY** or **OK** to select **USE**.



The printer restarts and uses the Virtual Device that you selected.

Commands

This section provides a detailed listing of commands for use on your Zebra printer with the Virtual Device-M app.

Contents

Command Packet Syntax

Use the following symbols when creating packets:

Character	Decimal Value	Description
{ left bracket	123	start of header
} right bracket	125	end of header
| vertical bar	124	field separator*
, comma	044	parameter separator
" " quotation marks	034	Use quotation marks to enclose character strings ("Abc"). Use empty quotes ("") to identify null strings or unused fields.
'abc' single quotation marks	039	Use single quotation marks (apostrophe or grave accent) to enclose comments. Any data enclosed in these is ignored. Comments within a quoted string are not supported.

Table of Supported Commands

Command	Function	Supported
Printer Configuration Commands		
{I,A, ... |} on page 39	Defining the System Setup Packet	✓
{I,B, ... | } on page 39	Defining the Supply Setup Packet	✓
{I,C ... | } on page 40	Defining the Print Control Packet	✓
{I,D, ... | } on page 41	Defining the Monetary Formatting Packet	✓
{I,E, ... | } on page 42	Defining the Control Characters Packet	✓
{I,F, ... | } on page 44	Defining the Communication Settings Packet	✓
{I,G, ... | } on page 45	Defining the Backfeed Control Packet	✓
{I,M, ... | }	Defining the Memory Configuration Packet	—
{header,packet#,C, device | } on page 45	Clearing Packets from Memory	✓
{W, ... | } on page 46	Using the Font Packet	✓
{header,format#,action,device | }	Uploading Format Header Information	—
{V, ... | }	Defining a Verifier Configuration Packet	—
{N, ... | C ... | }	Defining a Network Console Packet	—

Command	Function	Supported
{I,X, ... | }	Defining the RFID Setup Packet for UHF	—
Field Definition Commands		
{F, ... | on page 47	Defining the Format Header	✓
T, ... | on page 47	Defining Text Fields	✓
B, ... | on page 49	Defining Barcode Fields	✓
D, ... | on page 53	Defining Non-Printable Text Fields	✓
C, ... | on page 53	Defining Constant Text Fields	✓
L, ... | on page 55	Defining Line Fields	✓
Q, ... | on page 55	Defining Box Fields	✓
V, ... |	Defining Verifier Fields	—
X, ... |	Defining the RFID Data Field	—
Commands for Defining Field Options		
R,1, ... | on page 57	Option 1: Fixed Data	✓
R,2, ... |	Option 2: Data Type Restrictions	—
R,3, ... |	Option 3: Data Entry Templates	—
R,4, ... | on page 57	Option 4: Copy Data	✓
R,5, ... |	Option 6: Upload Field Data	—
R,6, ... | on page 58	Option 6: Upload Field Data	✓
R,20, ... |	Option 20: Define Data Entry Prompts	—
R,21, ... |	Option 21: Define Extended Field Names	—
R,30, ... | on page 58	Option 30: Pad Data	✓
R,31, ... | on page 58	Option 31: Calculate Check Digit	✓
R,42, ... | on page 59	Option 42: Price Field	✓
R,50, ... | on page 59	Option 50: Barcode Density	✓
R,51, ... | on page 60	Option 51: PDF417 Security/Truncation	✓
R,52, ... | on page 60	Option 52: PDF417 Width/Length	✓
R,53, ... | on page 60	Option 53: Optional Settings for Aztec	✓
R,60, ... | on page 61	Option 60: Incrementing/Decrementing Fields	✓
R,61, ... | on page 62	Option 61: Reimage Field	✓
R,62, ... | on page 62	Option 62: Bypass Barcode	✓
R,64, ... |	Option 64: Program AFI Field for UHF RFID	—
{A ... | *}* on page 62	Using Check Digits	✓
Commands for Creating Graphics		
{G, ... | on page 64	Defining a Graphic Header	✓

Command	Function	Supported
B, ... | on page 64	Creating Bitmap Fields	✓
N, ... | on page 65	Creating Next-Bitmap Fields	✓
D, ... | on page 65	Creating Duplicate Fields	✓
G, ... | on page 66	Defining the Graphic Field	✓
Printing Commands		
{B, ... | on page 67	Defining the Batch Header	✓
E, ... | on page 67	Defining the Batch Control Field	✓
field#, ... | *...* | on page 68	Defining Batch Data Fields	✓
Status Polling Commands		
ENQ on page 69	Inquiry Request (ENQ)	✓
{J,#} on page 69	Job Request	✓

Printer Configuration Commands

{I,A, ... |}

Description Defining the System Setup Packet

Syntax

```
{I,A,powerup_mode,language,sep_on,slash_zero,symbol_set | }
```

Range

`A` = system setup packet

`powerup_mode` = online mode

- `0` = online mode (default)
- `1` = offline mode

`language` = display language

- `0` = English (default)
- `1` = French
- `2` = German
- `3` = Spanish
- `4` = Japanese
- `5` = Portuguese
- `6` = Italian
- `7` = Swedish
- `8` = Spanish2
- `9` = Danish
- `10` = Dutch
- `11` = Finnish
- `12` = Norwegian

`sep_on` = batch separators (Do not use batch separators with continuous media.)

- `0` = no separator (default)
- `1` = print a separator
- `2` = print a double-length separator (two tags)

`slash_zero` = slash zero

- `0` = print a standard zero (0) (default)
- `1` = print a zero with a slash through it (`0`)

`symbol_set` = symbol set

- `1` = ANSI
- `2` = Code Page 437 (Latin U.S.)
- `3` = Code Page 850 (Latin 1)

Notes Use this command to select the power-up mode and display language, to print separators between batches, to select how the number zero prints, and to select the symbol set.

{I,B, ... | }

Description Defining the Supply Setup Packet

Syntax {I,B,*supply_type*,*ribbon_on*,*feed_mode*,*supply_posn*,*cut_posn*,*skip_index* | }

Range

B = supply setup packet

supply_type = supply type

- 0 = black mark supply
- 1 = die cut or edge aperture supply (default)
- 2 = continuous media
- 3 = Reserved
- 4 = Reserved
- 5 = Reserved

ribbon_on = ribbon

- 0 = direct thermal mode (no ribbon)
- 1 = thermal transfer mode (ribbon is used) (default)
- 2 = high energy ribbon installed

feed_mode = feed mode

- 0 = continuous operation (default)
- 1 = on-demand mode

supply_posn = supply position

-300 to 300

cut_posn = Not supported.

skip_index = skip index mode

- 0 = disable skip index mode (default)
- 1 = enable skip mode. Allows the printer to print an image over multiple labels.

{I,C ... | }

Description Defining the Print Control Packet

Syntax {I,C,*contrast*,*print_adj*,*margin_adjust*,*speed_adj*,*ph_width* | }

Range

C = print control packet

contrast = print contrast

-699 to 699. 0 is the default.

print_adj = vertical print position adjustment. A positive number moves the print up on the label, while a negative number moves the print down.

-450 to 450. 0 is the default.

margin_adj = horizontal print position adjustment. A positive number moves the print to the right, while a negative number moves the print to the left.

-99 to 99. 0 is the default.

speed_adj = specify a print speed in inches per second (ips). Check the specifications for your printer to verify the print speeds that your printer supports.

- 0 = default
- 25 = 2.5 ips
- 40 = 4.0 ips

60 = 6.0 ips
80 = 8.0 ips
100 = 10.0 ips
120 = 12.0 ips

ph_width = the width of the printhead in dots. Use 0.

Notes Use this command to set the print contrast, print position, and print speed.

{I,D, ... | }

Description Defining the Monetary Formatting Packet

Syntax {I,D,*cur_sym*,*secondary*,*decimals* | }

Range

D = monetary formatting packet

cur_sym = currency symbol

0 = No symbol
1 = USA ($, Dollar- default)
2 = UK (£, Pound)
3 = Japan (¥, Yen)
4 = Germany (Deutsche Mark)
5 = France (₣, Franc)
6 = Spain (₧, Peseta)
7 = Italy (₤, Lira)
8 = Sweden (kr, Krona)
9 = Finland (Markka)
10 = Austria (Schilling)
11 = India (?, Rupee)
12 = Russian (Ruble)
13 = Korean (?, Won)
14 = Thai (?, Baht)
15 = Chinese (¥, Yuan)
16 = Euro (€)

Note: To use these symbols, select the internal symbol set.

secondary = Secondary sign. Secondary symbols print only if you designate at least one decimal place.

0 = no secondary sign (default)
1 = print a secondary sign

decimals = the number of digits to the right of the decimal.

0 = none
1 = one digit
2 = two digits (default)
3 = three digits

Notes Use this command to select the currency symbol to print with a price field and to specify the number of digits after a decimal.

{I,E, ... | }

Description Defining the Control Characters Packet

Syntax {I,E,"*ANSI_cd*","*string1*","*string2*" | }

(Note the quotation marks required for several parameters.)

Range

E = control characters packet

"*ANSI_cd*" = This parameter includes seven parts. The last two are optional.

~123 = start of header { (left bracket)
~044 = parameter separator , (comma)
~034 = quoted strings " (quotes)
~124 = field separator | (vertical bar)
~125 = end of header } (right bracket)
~126 = data escape ~~ (double tilde) character (optional)
def. ch. = immediate command character (optional). The character must be defined before this command can be used.

Up to three characters from 0 to 255. The caret (~094) is usually used.

"*string 1*" = terminator for status requests and ENQ requests.

Up to three characters from 0 to 255. The default is "013".
"" disables this sequence.

"*string 2*" = terminator for job requests and data uploads.

Up to three characters from 0 to 255. The default is none.
"" disables this sequence.

Notes Use this command to change the MPCLII control characters, enable or disable immediate commands, and change the default terminator character. After the parameters are changed, all packets, including any future configuration packets, must use the new control characters.

Resetting Control Characters

You can change the characters in the previous example back to their original settings by downloading this packet:

```
{I?E?"~123~044~034~124~125~126~094" | }
```

where ? is the parameter separator set previously. Check your printer's configuration label for the printer's settings.

Immediate Commands

Immediate commands can be sent in a packet or embedded in your application. You must send each command separately, or errors can result. The commands in the table assume that the defined immediate command control character is ^.

Table 1 • Immediate Commands

^CA	Cancel all batches in the printer's print queue (but not the receive buffer) unless an error condition exists.
^CB	Cancel the batch being printed unless an error condition exists.
^DD or ^DC*d*	Disable the MPCL data escape character (~) and inhibit MPCL from acting on any data escape sequence from the host. ^DC*d* sets the MPCL data escape character to the ASCII character specified by *d*.
^EA	Clear a printer error message. May need to be sent multiple times.
^ER	Reset a printer error message, allowing normal operation to resume.
^FD	Feed a label when printer is idle. Same function as pressing the printer's FEED button.
^FF1	Format Flash memory
^FF2	Return the number of bytes of available Flash memory.
^GD	Disable the conversion of formats designed in 203 dpi dot units to 300 dpi.
^GE	Enable the conversion of formats designed in 203 dpi dot units (not English or Metric) to 300 dpi.
^ID or ^IC*d*	Disable the Immediate Command feature. ^IC*d* sets the Immediate Command escape character to the ASCII character specified by *d*.
^IE	Enable the Immediate Command feature.
^MC	Return the customer ID or RPQ version to the host. (00 to 99)
^MD	Return the printhead dot density to the host. 00 = 203 dpi 01 = 300 dpi
^MI	Return the customer ID or RPQ revision level to the host. (00 to 99)
^MM	Return the model number to the host.
^MP	Return the prototype number to the host. (00 to 99)
^MR	Return the revision number to the host. (00 to 99)
^MV	Return the version number to the host. (00 to 99)
^PR	Reset the printer.
^RB	Repeat the last printed batch, printing the same number of labels as specified in the original batch. This command does not work if using batch separators.
^RS	Resynchronize supply when media roll is changed. The printer ignores this command if printing.
^SD or ^SC*d*	Disable the status polling feature by turning off the status polling control character. ^SC*d* sets the status polling control character to the ASCII character specified by *d*.
^SFa *	Load script with host response.
^SFb *	Load script without host response.
^SFc *	Enable script.

Table 1 • Immediate Commands

^SFd *	Disable script.
^SFe *	Upload script version information.
^SFf *	Delete script.
^SFg *	Turn on ENQ status polling before it reaches the script.
^SFh *	Turn off ENQ status polling before it reaches the script.
^SFi *	Turn on immediate commands before it reaches the script.
^SFj *	Turn off immediate commands before it reaches the script.
^TP	Print a test label.
^VLC *	Clear data that was uploaded, not all logged data. With this command, data is cleared after a successful upload.
^VLD *	Disable verifier data logging.
^VLE *	Enable verifier data logging.
^VLU *	Upload the log file to the last port that received host data (serial, parallel, USB, or Ethernet). Repeat this command until data is successfully uploaded. Data can be cleared after it has been uploaded.

* Not supported.

{I,F, ... | }

Description Defining the Communication Settings Packet

Syntax {I,F,*baud*,*word_length*,*stop_bits*,*parity*, *flow_control* | }

Important • Do not add any characters (such as a carriage return/line feed), in your communication settings packet, or communication errors may occur.

Range

F = communication settings packet

baud = baud rate

0 = 1200
1 = 2400
2 = 4800
3 = 9600 (default)
4 = 19200
5 = 38400
6 = 57600
7 = 115200

word_length = word length

0 = 7-bit word length
1 8-bit word length (default)

stop_bits = stop bits

0 = 1-stop bit (default)
1 = 2-stop bits

parity = parity

0 = none (default)
1 = odd parity
2 = even parity

flow_control = flow control
0 = none
1 = DTR (default)
2 = CTS
3 = XON/XOFF

Note: If you use the DOS COPY command to download your formats, set “Flow Control” to DTR (not XON/XOFF).

Notes Use this command to set the communication parameters, such as the baud rate, word length, stop bits, parity, and flow control for serial communications. Make sure that the values that you set on your printer match those of the host computer.

{I,G, ... | }

Description Defining the Backfeed Control Packet

Syntax {I,G,*action*,*dis_pos*,*bkfd_dis* | }

Range
G = backfeed control packet
action = backfeed action
0 = disable backfeed (default)
1 = enable backfeed
dis_pos = dispense position (optional). Adjusts the stopping point of the label.
50 to 200 dots. Default is 65 dots.
bkfd_dis = backfeed distance (optional). Amount to move label backwards. This distance cannot be greater than the dispense position.
10 to 200 dots. Default 65 dots.

Notes Use this command to enable or disable the backfeed option and to set the dispense position and backfeed distance.

{*header*,*packet#*,*C*, *device* | }

Description Clearing Packets from Memory

Syntax {*header*,*packet#*,*action*,*device* | }

Range
header = identifies the packet
A = check digit scheme
F = format
G = graphic
W = font

packet# = identification number of the packet to clear (1 to 999) or font number (0 to 9999).
0 is for all fonts.
action = action. C clears the packet.
device = storage device.
F = Flash
R = volatile RAM

{W, ... | }

Description Using the Font Packet

Syntax {W,*font#*,*action*,*device*,*data_length*,*data_record* | }

Range
W = Writable Font Header
font# = the font identifier from 0 to 9999.
0 is for all fonts. Any other number is the font number.
action
A = add the specified font.
C = clear all or specified fonts, except any in Flash memory. To remove those in Flash memory, format the memory.
H = upload font size information.
M = upload font memory usage information.
device
F = Flash memory
R = volatile RAM
Z = all devices (use for upload).
data_length (optional) = The length of the font data. If you are creating fonts, you need to have font data included with this packet.
68 to 16384
data_record (optional) = Multiple data records define a font. The first character must be the algorithm: H (hex) or R (run-length). The remainder of the record is up to 2710 characters of font data in double quotes. Separate the algorithm and the data with a comma (,), and end the record with |.

Notes Use this command to add fonts, clear downloaded fonts from memory, or upload other font information.

Field Definition Commands

{F, ... |

Description Defining the Format Header

Syntax {F,*format#*,*action*,*device*,*measure*,*length*,*width*,*"name"* |

Range
F = format header.
format# = a unique number to identify the format.
1 to 999
action = enter A to add the format to the printer.
device = the format storage device.
F = Flash memory (must be formatted first)
R = volatile RAM
measure = unit of measure.
E = English - in 1/100 inches
M = metric - in 1/10 mm
G = graphic - in dots
length = print length in selected unit of measure.
width = print width, from left to right, in selected unit of measure.
"name" = format name (optional). 0 to 16 characters, enclosed in quotation marks.

Notes A format header begins a format file.

T, ... |

Description Defining Text Fields

Syntax T,*field#*,*# of char*,*fix/var*,*row*,*column*,*gap*,*font*,*hgt_mag*,*wid_mag*,*color*,*alignment*,*char_rot*,*field_rot*,*sym_set* |

Range
T = text field
field# = a unique number to identify the field.
1 to 999 digits
# of char = the maximum number of printed characters in the field.
0 to 2710 characters
fix/var = Fixed or variable length field.
F = fixed length
V = variable length
row = For monospaced fonts, the distance from the bottom of the print area to the pivot point (which varies based on how the text is justified). For proportionally spaced fonts, the distance from the bottom of the print area to the baseline of the characters in the field.
column = the distance from the left edge of the print area to the pivot point.
gap = the number of dots between characters.

0 to 99

font = the font style. Fonts 5 and 6 are for numeric data only.

1	Standard
2	Reduced
3	Bold
5	HR1
6	HR2
10	9-pt emulated bold typeface
11	6-pt emulated typeface

hgt_mag = a height magnifier, 1 to 7 times (4 to 255 points for scalable/downloaded TrueType fonts).

wid_mag = a width magnifier, 1 to 7 times (4 to 255 points for scalable/downloaded TrueType fonts).

color = text color

options for standard printer fonts:

B	Opaque, Normal, Black, Normal
D/R/W	Opaque, Normal, White, Normal
O	Transparent, Normal, Black, Normal

options for scalable fonts:

A/N	Opaque, Normal, Black, Bold
B/O	Opaque, Normal, Black, Normal
E/S	Opaque, Italics, Black, Bold
F/T	Opaque, Italics, Black, Normal

alignment = the alignment of text in the field. Use L, B, or E for any font.

- L = left aligned
- C = centered (monospaced fonts only)
- R = right aligned (monospaced fonts only)
- B = aligned at midpoint of the field
- E = aligned at endpoint of the field

char_rot = character rotation.

- 0 = normal
- 1 = rotated 270 degrees
- 2 = rotated 180 degrees
- 3 = rotated 90 degrees

field_rot = field rotation. Rotation is affected by the pivot point (which varies based on how the text is justified). The default is the lower-left corner of the field as the pivot point.

- 0 = normal
- 1 = rotated 270 degrees
- 2 = rotated 180 degrees
- 3 = rotated 90 degrees

sym_set = the symbol set.

- 0 = Internal symbol set
- 1 = ANSI symbol set

437 = DOS code page 437 (domestic)
850 = DOS code page 850 (international)

Notes Create a separate definition for each text field. If text falls on two lines, each line of text requires a separate definition.

B, ... |

Description Defining Barcode Fields

Syntax B,*field#*,*# of char*,*fix/var*,*row*,*column*,*font*,*density*,*height*,*text*,*alignment*,*field rot*,*type*,*sep_height*,*segment* |

Range

B = barcode field.

field# = a unique number to identify the field.

1 to 999

# of char = the maximum number of characters. If the barcode uses a check digit, add one extra character for the check digit.

0 to 2710 characters (varies based on barcode type)

Barcode Type (B13)	Maximum Number of Characters*
1 - GS1 DataBar 14	13 - no check digit input
2 - GS1 DataBar 14 Truncated	13 - no check digit input
3 - GS1 DataBar 14 Stacked	13 - no check digit input
4 - GS1 DataBar 14 Stacked Omni directional	13 - no check digit input
5 - GS1 DataBar Limited	13 - no check digit input
6 - GS1 DataBar Expanded	**
7 - UPCA	11 - no check digit input
8 - UPCE	10 - no check digit input
9 - EAN13	12 - no check digit input
10 - EAN8	7 - no check digit input
11 - UCC/EAN128 and CC A/B	**
12 - UCC/EAN128 and CC C	**

* If too few characters are entered, the barcode is padded to the left with zeros.

** For more information, refer to the GS1 General Specification.

fix/var = Fixed (F) or variable (V) length field.

Barcode	Number of Characters	Fixed or Variable
UPCA	12	F
UPCA+2	14	F
UPCA+5	17	F
UPCA+Price CD	12	F
UPCE	7	F
UPCE+2	9	F
UPCE+5	12	F
EAN8	8	F
EAN8+2	10	F
EAN8+5	13	F
EAN13	13	F
EAN13+2	15	F
EAN13+5	18	F
EAN13+Price CD	13	F
POSTNET	9 or 11	F
Interleaved 2 of 5 or Interleaved I 2 of 5 with Barrier Bar	0 - 2710	F or V
Code 39 (w/ or w/o CD) or MOD43	0 - 2710	F or V
Codabar (NW7)	0 - 2710	F or V
Code 128	0 - 2710	F or V
Code 16K	0 - 2710	V
Code 93	0 - 2710	V
MSI	0 - 14	F or V
PDF 417	0 - 2710	F or V
Maxicode*	0 to 93 (alphanumeric); 0 to 128 (numeric)	F or V
Data Matrix*	0 to 2335 (alphanumeric) 0 to 2710 (numeric)	V
QR Code*	1167 - 2710 (numeric) 707 - 2710 (alphanumeric)	V
Aztec*	0 - 2710	F or V
GS1 DataBar*	0 - 2710	F or V

row = the distance from the bottom of the print area to the pivot point (which varies based on how the text is justified). Include other text or numbers that may appear with the row measurement.

column = the distance from the left edge of the print area to the pivot point.

font = the barcode ID

- 1 = UPCA
- 2 = UPCE
- 3 = Interleaved 2 of 5
- 4 = Code 39 (no check digit)
- 5 = Codabar
- 6 = EAN8
- 7 = EAN13
- 8 = Code 128
- 9 = MSI
- 10 = UPCA +2
- 11 = UPCA +5
- 12 = UPCE +2
- 13 = UPCE +5
- 14 = EAN8 +2
- 15 = EAN8 +5
- 16 = EAN13 +2
- 17 = EAN13 +5
- 22 = POSTNET
- 23 = Code 93
- 31 = Code 16K
- 32 = PDF417
- 33 = MaxiCode
- 35 = Data Matrix (ECC-200)
- 36 = QR Code
- 37 = Aztec
- 38 = GS1 DataBar
- 40 = Code 39 (MOD 43 check digit)
- 41 = UPCA & Price CD
- 44 = EAN13 & Price CD
- 50 = Interleaved 2 of 5 with Barrier Bar

density = Barcode density.

height = the barcode height in 1/100 inches, 1/10 mm, or dot increments. The minimum values are:

inches	19
metric	48
203 dpi	38
300 dpi	57

For POSTNET, PDF417, MaxiCode and Aztec barcodes always use 0.

text = the appearance of any text with the barcode. For UPC and EAN use 0 to 7. For all others, use 8, except where noted.

- 0 = QR Code Model 2 (default)
- 1 = no check digit or number system QR Code Model 1
- 2 = MaxiCode Mode 2 (Numeric Postal Code) QR Code Model 2

3 = MaxiCode Mode 3 (Alphanumeric Postal Code)
5 = number system at bottom, no check digit
6 = check digit at bottom, no number system
7 = check digit with number system at bottom
8 = no text, bar code only. MaxiCode (auto detect modes 2 or 3), Data Matrix, GS1 DataBar, and Aztec.

alignment = instructions to align the bar code data correctly in the field.

L = left aligned. MaxiCode, Data Matrix, QR Code, GS1 DataBar, and Aztec must use this option.
R = right aligned
C = centered
B = centered variable-width barcodes (may not allow pad-character centering with Code 128, Code 39, and such)
E = right aligns variable width barcodes.

field rot = Field rotation. Field rotation rotates the whole field, not just the characters. Rotation is affected by the pivot point, which varies depending on how text is justified. Lower left corner of field is the pivot point.

0 = normal (use for MaxiCode)
1 = rotated 270 degrees
2 = rotated 180 degrees
3 = rotated 90 degrees

Note: Serial bar codes with an 8-dot narrow element do not automatically print at 2.5 IPS. Serial bar codes printed at speeds greater than 2.5 IPS may not scan properly.

type = the barcode family. (GS1 DataBar barcode only. Do not include this parameter for other barcodes.)

1	GS1 DataBar 14 (default)
2	GS1 DataBar 14 Truncated
3	GS1 DataBar 14 Stacked
4	GS1 DataBar 14 Stacked Omni directional
5	GS1 DataBar Limited
6	GS1 DataBar Expanded
7	UPCA
8	UPCE
9	EAN13
10	EAN8
11	UCC/EAN128 and CC A/B
12	UCC/EAN128 and CC C

sep_height = the height of the separator between the linear barcode and a 2D barcode. (GS1 DataBar barcode only. Do not include this parameter for other barcodes.) The choices are 1 (default) or 2.

segment = the width of the segment. (GS1 DataBar barcode only. Do not include this parameter for other barcodes.) The range is even numbers from 2 to 22 (default).

Notes Each barcode field requires a separate definition.

D, ... |

Description Defining Non-Printable Text Fields

Syntax D,*field#*,*# of char* |

Range

D = non-printable text field.

field# = a unique number to identify the field.

0 to 999

# of char = the maximum number of characters in the field where the data will ultimately be used.

0 to 2710 characters for text fields. For barcode fields, the maximum depends on the barcode type.

Notes Use this command to create non-printable text fields, which allow you to enter data that are not printed in their raw format. The non-printable text fields can be used to hold data that is later used in a merged field.

C, ... |

Description Defining Constant Text Fields

Syntax C,*row*,*column*,*gap*,*font*,*hgt mag*,*wid mag*,*color*,*alignment*,*char rot*,*field rot*,*"fixed char"*, *sym set* |

Range

C = constant text field.

row = For monospaced fonts, the distance from the bottom of the print area to the pivot point (which varies based on how the text is justified). For proportionally spaced fonts, the distance from the bottom of the print area to the baseline of the characters in the field.

column = the distance from the lower-left edge of the print area to the pivot point.

gap = the number of dots between characters (203 dots per inch).

0 to 99.

Any number other than 0 or the default number affects your field width.

Default spacing:

Standard	3 dots
Reduced	1 dot
Bold	3 dots
9-pt emulated bold typeface	varies with each letter
6-pt emulated typeface	varies with each letter

font = the font style. Fonts 5 and 6 are for numeric data only.

1 Standard

2 Reduced

3 Bold

5 HR1

6 HR2

10 9-pt emulated bold typeface

11 6-pt emulated typeface

hgt mag = a height magnifier, 1 to 7 times (4 to 255 points for scalable/downloaded TrueType fonts).

wid mag = a width magnifier, 1 to 7 times (4 to 255 points for scalable/downloaded TrueType fonts).

color = text color

options for standard printer fonts:

B	Opaque, Normal, Black, Normal
D/R/W	Opaque, Normal, White, Normal
O	Transparent, Normal, Black, Normal

options for scalable fonts:

A/N	Opaque, Normal, Black, Bold
B/O	Opaque, Normal, Black, Normal
E/S	Opaque, Italics, Black, Bold
F/T	Opaque, Italics, Black, Normal

alignment = the alignment of text in the field. Use L, B, or E for any font.

L = left aligned
C = centered (monospaced fonts only)
R = right aligned (monospaced fonts only)
B = aligned at midpoint of the field
E = aligned at endpoint of the field

char rot = character rotation.

0 = normal
1 = rotated 270 degrees
2 = rotated 180 degrees
3 = rotated 90 degrees

field rot = field rotation. Rotation is affected by the pivot point (which varies based on how the text is justified). The default is the lower-left corner of the field as the pivot point.

0 = normal
1 = rotated 270 degrees
2 = rotated 180 degrees
3 = rotated 90 degrees

"fixed char" = Fixed characters to appear in the field. Maximum 2710 characters. Enclose in quotation marks.

sym set = the symbol set.

0 = Internal symbol set
1 = ANSI symbol set
437 = DOS code page 437 (domestic)
850 = DOS code page 850 (international)

Notes Use this command to create constant text fields, which print on all labels. The information in a constant field cannot be changed by data in a batch.

L, ... |

Description Defining Line Fields

Syntax *L,type,row,column,angle/end row,length/end col,thickness,*
"pattern" |

Range

L = Line Field

type = the type of line. Only vertical and horizontal lines are supported.

- S = With a line **segment**, you define the starting and ending points.
- V = With a **vector**, you define the starting point, the angle, and the length of the line.

row = the distance from the bottom of the print area to the beginning of the line.

column = the distance from the left edge of the print area to the beginning of the line.

angle/end row

segments: the distance from the bottom of the print area to the end of the line. On horizontal lines, this value must match the *row* value.

vectors: the angle of the line.

0, 90, 180, 270

length/end col

segments: the distance from the left edge of the print area to the end of the line. On vertical lines, this value must match the *column* value.

vectors: the length of the line in dots.

thickness = the line thickness in dots. The line weight is added upward for horizontal lines and to the right for vertical lines.

1 to 99

"pattern" = the line pattern. Enter "".

Notes Use this command to define line fields, which can be used to form borders or to strike through text (such as original prices that are being marked down). Line fields are not assigned field numbers, but they are counted toward the number of fields in a label format.

Q, ... |

Description Defining Box Fields

Syntax Q,row,column,end row,end col,thickness,"pattern" |

Q = box (quadrilateral) field.

row = the distance from the bottom of the print area to the lower-left corner of the box.

column = the distance from the left edge of the print area to the lower-left corner of the box.

end row = the distance from the bottom of the print area to the upper-right corner of the box.

end col = the distance from the left edge of the print area to the upper-right corner of the box.

thickness = the line thickness in dots. The line thickness fills in from the edges of the box.

1 to 99

"pattern" = the line pattern. Enter "".

Notes Use this command to define box fields, which can be used to form borders or to highlight items on the label. Box fields are not assigned field numbers, but they are counted toward the number of fields in a label format.

Commands for Defining Field Options

You can use multiple options with most fields. Options are processed by the printer in the order in which they are received, so place the options in the order that achieves the results that you need. Define options immediately after the field to which they apply.

Note • Some options cannot be used together.

R,1, ... |

Description Option 1: Fixed Data

Syntax `R,1,"fixed char" |`

Range

`R` = option header

`1` = option 1

`"fixed char"` = any characters to insert, enclosed in quotation marks. When defining fixed characters for part of a field, use underscores (_) in non-fixed positions. Any spaces are considered fixed characters. Underscore characters are stripped out and the data is compressed if no data is supplied by the batch and the field length is variable.

`0` to `2710` characters

Notes Use this option to specify information that you want printed on all labels (such as a company name or a store number). Fixed characters can be defined for all or part of a field.

R,4, ... |

Description Option 4: Copy Data

Syntax `R,4,src fld,src start,# to copy,dest start, copy code |`

Range

`R` = option header

`4` = option 4

`src fld` = the field number from which data is to be copied.

`0` to `999`

`src start` = in the source field, the position number of the first character to be copied. Character positions are numbered from the left.

`1` to `2710`

`# to copy` = the number of characters to copy.

`1` to `2710`

`dest start` = the position number where copied characters should start printing in the destination field.

`1` to `2710`

copy code = the copy method.
- 1 = copy the field as-is (including characters such as price symbols, pad characters, and check digits).
- 2 = copy unformatted data (without characters such as price symbols, pad characters, and check digits).

Notes Use this option to create a field that uses data from another field. This allows you to create merged fields and subfields more easily by copying the information from multiple fields into one field.

R,6, ... |

Description Option 6: Upload Field Data

Syntax R,5,*device* |

Range
R = option header
6 = option 6
device = the last port that received host data. Use H for host.

Notes Use this option to upload data from any field. Use commas to separate multiple fields of data.

If you are using a batch quantity of 1, data are uploaded at the end of the batch. If you are using a batch quantity greater than 1, data are uploaded after each label.

R,30, ... |

Description Option 30: Pad Data

Syntax R,30,*L/R*,"*character*" |

Range
R = option header
30 = option 30
L/R = the type of padding:
- L = pad the field on the left
- R = pad the field on the right

"*character*" = the pad character, which must be within the 0 to 255 decimal range and enclosed inside quotation marks.

Notes Use this option to pad a field by filling in blank spaces with the character specified.

R,31, ... |

Description Option 31: Calculate Check Digit

Syntax R,31,*gen/ver*,*check digit #* |

Range
R = option header
31 = option 31
gen/ver = enter G to generate a check digit.
check digit # = the check digit scheme number, which identifies a check digit scheme that was already defined.
1 to 10

Notes Use this option to generate a check digit. You cannot use this option if the field contains a UPC, EAN, or Code 39 (with the MOD43 check digit) barcode.

R,42, ... |

Description Option 42: Price Field

Syntax R,42,*appearance code* |

Range
R = option header
42 = option 42
appearance code = Enter 1.

Notes Use this option to print a price field in standard notation, as defined by the country selection. Do not use this option with options 31 or 60, and avoid using it with barcodes.

R,50, ... |

Description Option 50: Barcode Density

Note • The text below a barcode does not print correctly with UPC-A, UPC-E, or EAN when using this option.

Syntax R,50,*narrow*,*wide*,*gap*,*nar_space*,*wide_space* |

Range
R = option header
50 = option 50
narrow = the dot width of the narrow element.
1 to 99
wide = the dot width of the wide element.
1 to 99
gap = Reserved.
nar_space = Reserved.
wide_space = Reserved.

Notes Use this option with barcode fields if you want to create a custom density. Note that some barcodes do not print correctly and may not be scannable with this option.

R,51, ... |

Description Option 51: PDF417 Security/Truncation

Syntax R,51,*security*,*stand/default* |

Range
R = option header
51 = option 51
security = the security level. Higher security levels add data to a barcode, improving the possibility that it may scan correctly if it is damaged.
0 to 8 (0 is the default)
stand/default = Truncation selector. Valid values:
S = (default) a standard PDF417 bar code
T = truncated

Notes Use this option to define a security level or to select if a PDF417 barcode is standard or truncated.

R,52, ... |

Description Option 52: PDF417 Width/Length

Syntax R,52,*row/column*,*dimension* |

Range
R = option header
52 = option 52
row/column = specify if you are defining the number of rows or the number of columns.
R = row
C = column
dimension = the number of rows or columns defined for the barcode. The default is 4.
3 to 90 for rows
1 to 30 for columns

Notes Use this option immediately after a PDF417 barcode field to define the width or length of the barcode. If you specify the number of columns (width), the barcode length changes. If you specify the number of rows (length), the barcode width changes.

R,53, ... |

Description Option 53: Optional Settings for Aztec

Syntax R,53,*error_ctrl*,*ECI*,*menu_sym*,*str_append*,"*string*" |

Range
R = option header
53 = option 53
error_ctrl = the error control level. Some damaged barcodes may still scan if the error control level is high enough.
0 (default)
1 to 99
101 to 104
201 to 232
300
ECI = the ECI Data flag. The default is 0.
0 = Disable
1 = Enable
menu_sym = the Menu Symbol flag. The default is 0.
0 = Disable
1 = Enable
str_append = the structured append information. The default is 1.
1 to 26 characters
"string" = the string to append. The default is "". The string must be enclosed in quotation marks.
0 to 24 characters

Notes Use this option with an Aztec barcode to set various parameters.

R,60, ... |

Description Option 60: Incrementing/Decrementing Fields

Syntax R,60,*I/D*,*amount*,*l pos*,*r pos* |

Range
R = option header
60 = option 60
I/D = increment or decrement.
I = incrementing field
D = decrementing field
amount = the amount to increase or decrease.
0 to 999
l pos = the leftmost position in the increment/decrement portion of the field. The default is 1.
0 to 2710
r pos = the rightmost position in the increment/decrement portion of the field. The default is to use the entire field length.
0 to 2710

Notes Use this option to designate a field that increments or decrements from label to label. Do not use this option with option 42 (price field).

R,61, ... |

Description Option 61: Reimage Field

Syntax `R,61 |`

Range
`R` = option header
`61` = option 61

Notes Use this option to reimage the constant field that appears next to a variable field.

R,62, ... |

Description Option 62: Bypass Barcode

Syntax `R,62 |`

Range
`R` = option header
`62` = option 62.

{A ... | }

Description Using Check Digits

Syntax
`{A,selector,action,device,modulus,fld_length, D/P,"weights" | }`

Range
`A` = Check Digit Header.
`selector` = a number from 1 to 10.
`action` = enter `A` to add the check digit scheme.
`device` = the format storage device. Check digits that are saved in Flash memory are saved even if the printer is power cycled.
`F` = Flash memory (must be formatted first)
`R` = volatile RAM
`modulus` = a number used to divide the sum of products or the sum of digits.
`2` to `11`
`fld_length` = the maximum number of characters that the field will contain.
`0` to `2710` characters
`D/P` = the algorithm, which determines how the check digit is calculated.
`D` = sum of digits
`P` = sum of products
`"weights"` = a string of digits used for calculation. A weight string is a group of two or more numbers that is applied to a field. The number of digits in this string must equal the number in *`fld_length`*, and the string must be enclosed in quotation marks.

`0` to `2710` digits

Notes Use this option to specify check digit criteria. Option 31 is used to calculate a check digit.

Commands for Creating Graphics

Every graphic packet must contain a graphic header, which is followed by other optional graphic fields: bitmap, next-bitmap, duplicate, constant text, line, and box.

{G, ... |

Description Defining a Graphic Header

Syntax {G,*graphID*,*action*,*device*,*units*,*row*,*col*,*mode*,"*name*" |

Range

G = graphic header

graphID = a unique number to identify the graphic image.
1 to 999

action = enter A to add the graphic to the printer.

device = the graphic storage device:
- F = Flash memory (saved when the printer is turned off)
- R = volatile RAM
- T = temporary storage

units = the unit of measure. For bitmapped graphics, G (dots) is the only valid option.

row = the distance from the bottom of the graphic image area to the beginning of the first bitmap line. Unless you want a fixed amount of white space around the graphic image, use 0.

column = the distance from the left edge of the graphic image area to the left edge of the first bitmap line. Unless you want a fixed amount of white space around the graphic image, use 0.

mode = the imaging mode. Enter 0.

"*name*" = a name for the graphic (optional) enclosed in quotation marks.
0 to 8 characters

Notes Use this command to define a graphic header.

B, ... |

Description Creating Bitmap Fields

Syntax B,*row*,*column*,*algorithm*,"*data*" |

B = bitmap field.

row = the distance (in dots) from the graphic image's bottom margin to the bitmap line.

column = the distance (in dots) from the graphic image's left edge to the bitmap line.

algorithm = the coding method for bitmap data:
- H = hex representation
- R = run length encoding

"*data*" = a character string made up of hex or run length encoding. Do not put spaces or other character between the numbers.
0 to 2710 characters

Notes Use this command to define a bitmap field. Each unique row of dots within the graphic image requires a bitmap field. A bitmap field can be repeated by using a duplicate field.

N, ... |

Description Creating Next-Bitmap Fields

Syntax `N,adjdir,adjamt,algorithm,"data" |`

Range

`N` = next-bitmap field

`adjdir` = increments or decrements the row count. Inserts the duplicate line after or before the current row.

- `0` = increments (inserts after) 1
- `1` = decrements (inserts before)

`adjamt` = the amount of row adjustment in dot rows. Using `0` overwrites the same line.

- `0` to `999`

`algorithm` = the coding method for bitmap data:

- `H` = hex representation
- `R` = run length encoding

`"data"` = a character string made up of hex or run length encoding. Do not put spaces or other character between the numbers.

- `0` to `2710` characters

Notes Use this command to use the bitmap or duplicate field data without having to recalculate row and column locations.

D, ... |

Description Creating Duplicate Fields

Syntax `D,adjdir,adjamt,count |`

Range

`D` = duplicate field.

`adjdir` = increments or decrements the row count. Inserts the duplicate line after or before the current row.

- `0` = increments (inserts after) 1
- `1` = decrements (inserts before)

`adjamt` = the amount of row adjustment in dot rows.

- `0` to `999`

`count` = the number of times to duplicate the line.

- `0` to `999`

Notes Use this command to duplicate a prior bitmap or next-bitmap field without retyping the data. A duplicate field represents one row of dots on the image. This can be useful if you have a graphic with a lot of repetition.

G, ... |

Description Defining the Graphic Field

Syntax G,*graphID*,*row*,*column*,*mode*,*rotation* |

G = graphic field.

graphID = a unique number to identify the graphic image.

1 to 999

row = the distance from the bottom of the print area to bottom of the graphic image. The row specified in a constant text line, bitmap, line, or box field is added to this value to determine the actual position in the format.

column = the distance from the left edge of the print area to the and the left edge of the graphic image. The column specified in a constant text line, bitmap, line, or box field is added to this value to determine the actual position in the format.

mode = the imaging mode. Enter 0.

rotation = the orientation of the graphic on the supply. Enter 0.

Notes Use this command to define a graphic field, which references the graphic image by the graphID in the graphic header. You must include this field if the graphic will be stored in RAM.

Printing Commands

A batch packet contains the following three parts:

- batch header—identifies the format and how many labels to print.
- batch control—defines the print job.
- batch data (optional)—defines the actual information printed on the label. A batch header begins the file. It tells which format the batch uses and how many labels to print. To record batch data, make a copy of the worksheet.

{B, ... |

Description Defining the Batch Header

Syntax {B,*format#*,*N/U*,*quantity* |

Range
B = batch header.
format# = the format number to use.
1 to 999
N/U = how image is generated.
- N = New (default). Erase the image and reimage all of the fields using online data. Any missing fields will be blank.
- U = Update the last image with one or more fields. All of the other fields remain the same as the last queued batch.

quantity = the quantity to print.
0 to 32000

Notes Use this command to define the batch header, which identifies the format and how many labels to print.

E, ... |

Description Defining the Batch Control Field

Syntax E,*feed_mode*,*batch_sep*,*print_mult*,*multi_part*,
cut_type,*cut_mult*,*ver_mode*,*cable_det* |

Range
E = Batch Control Field.
feed_mode = Options:
- 0 = Continuous Feed (default)
- 1 = On-Demand

batch_sep = batch separators (Do not use batch separators with continuous media.)
- 0 = no separator (default)
- 1 = print a separator
- 2 = print a double-length separator (two tags)

print_mult = the number of tags to print with the same image.

1 to 999. 1 is the default.

multi_part = the number of identical parts on one tag.

1 to 5. 1 is the default.

cut_type = enable or disable the cutter.

0 = do not cut (default)
1 = cut before the first tag, during the batch, and after the last tag.
2 = cut in strips, not each tag.
3 = cut before the first tag, during the batch, and after the last tag. No printed tags will be left between the printhead and cutter.
4 = do not cut before the first tag, but cut during the batch and after the last tag.
5 = cut in strips, not each tag. No printed tags will be left between the printhead and cutter.

cut_mult = the number of tags to print as a group before cutting. A value of 1 cuts after each tag.

0 to 32000. 0 is the default.

ver_mode = enable or disable the verifier.

0 = disable the verifier (default)
1 = enable the verifier

cable_det = enable verifier cable detection. The printer can be set to detect when a verifier's cable is disconnected.

0 = the printer does not detect when a cable is disconnected (default)
1 = detect when the I/O cable is disconnected
2 = detect when the I/O or data cables are disconnected

Notes Use this command to define the batch control field, which defines the print job and applies to the batch that immediately follows it. The batch header must precede this field.

field#, ... | ... |

Description Defining Batch Data Fields

Syntax *field#*,"*data_string*" | C,"*continuation*" |

field# = Identifies the text, bar code, or non-printable text field in which to insert the following data. Range: 1 to 999.

"*data_string*" = provide the actual information to appear in fields, enclosed in quotation marks.

0 to 2710 characters

C = Identifies information to be appended to the data string. This parameter is optional.

"*continuation*" = (optional) provide the actual information to be added to the batch packet, enclosed in quotation marks. You can use this option to break up longer fields.

0 to 2710 characters

Notes Batch data fields should be sent in field number order.

Status Polling Commands

There are two types of Status Polling:

- Inquiry Request—information about the readiness of the printer.
- Job Request—information about the current (or last received) job downloaded to the printer.

ENQ

Description Inquiry Request (ENQ)

An ENQ character, which is user-defined and does not appear as a visible character in printer responses, acts as a request for printer status information. An ENQ command is processed as soon as it is received, whether it is a stand-alone command or part of a packet.

Printer status is returned to the host in a 3-byte (3-character) sequence. The first byte is the ENQ character, and the second and third bytes are printer status codes.

{J,#}

Description Job Request

Syntax {J,#}

Range
J = job status request
0, 1, 2 = returns ASCII-coded strings or numeric error codes
3 = returns an error number
4 = returns a number of labels printed in batch

Notes A Job Request returns status information about the most recently processed print job. You can send a job request after an ENQ or batch. You can send two levels of Job Requests:

- Numeric Error Codes Only (0, 1, or 2)
- Verbose (3 or 4)

The job response varies, depending on the type of request sent to the printer.

Set/Get/Do (SGD) Commands

The following SGD commands were added for use with your Virtual Device app. For more detailed information on SGD commands, see the *Programming Guide for ZPL II®, ZBI 2, Set/Get/Do, Mirror, and WML* (formerly the *ZPL II Programming Guide*).

apl.enable

Description This command enables or disables a Virtual Device app.

Note •
- ZPL and CPCL may not function normally when a Virtual Device app is enabled.
- You must restart the printer after changing the value of `apl.enable`.

Type `setvar`

Commands	Details
`setvar`	This command instructs the printer to enable a virtual device. *Format:* `! U1 setvar "apl.enable" "value"` *Values:* `"apl-m"` = enable Virtual Device-M `"none"` = disable any Virtual Device app (ZPL and CPCL function normally)

Example 1 • This example shows how to enable the Virtual Device-M app:

```
! U1 setvar "apl.enable" "apl-m"
```

Example 2 • This example shows how to disable the Virtual Device-M app:

```
! U1 setvar "apl.enable" "none"
```

apl.version

Description This command returns the version of the currently running Virtual Device app.

Type `getvar`

Commands	Details
`getvar`	*Format:* `! U1 getvar "apl.version"`

apl.framework_version

Description This command returns the level of support for Virtual Devices in the printer operating system.

Type `getvar`

Commands	Details
`getvar`	*Format:* `! U1 getvar "apl.framework_version"`

Supported Fonts

This section provides you with examples of the fonts available on the Zebra printers with Virtual Device-M.

Table 2 • Supported Fonts

Font	Example
1	Standard font !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{¦}~ ÇüéâäàåçêëèïîìÄÅ ÉæÆôöòûùÿÖÜ¢£¥₧ƒ áíóúñÑªº¿⌐¬½¼¡«» $£¥₧FPL₭₥₲₨₩฿¥ € _ Ø ø αß ™

Table 2 • Supported Fonts (Continued)

Font	Example
2	Reduced font !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{¦}~ ÇüéâäàåçêëèïîìÄÅ ÉæÆôöòûùÿÖÜ¢£¥₧ƒ áíóúñÑªº¿⌐¬½¼¡«» $£¥DMFPL.KrMK$RsPe₩B¥ € _ 0 ⌀ αβ TM
3	Bold font !"#$%&'()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ P ¢ ½ $£¥DMFPL.KrMK$RsPe₩B¥ € _
5	HR1 Font: 0123456789
6	HR2 Font: 0123456789

Table 2 • Supported Fonts (Continued)

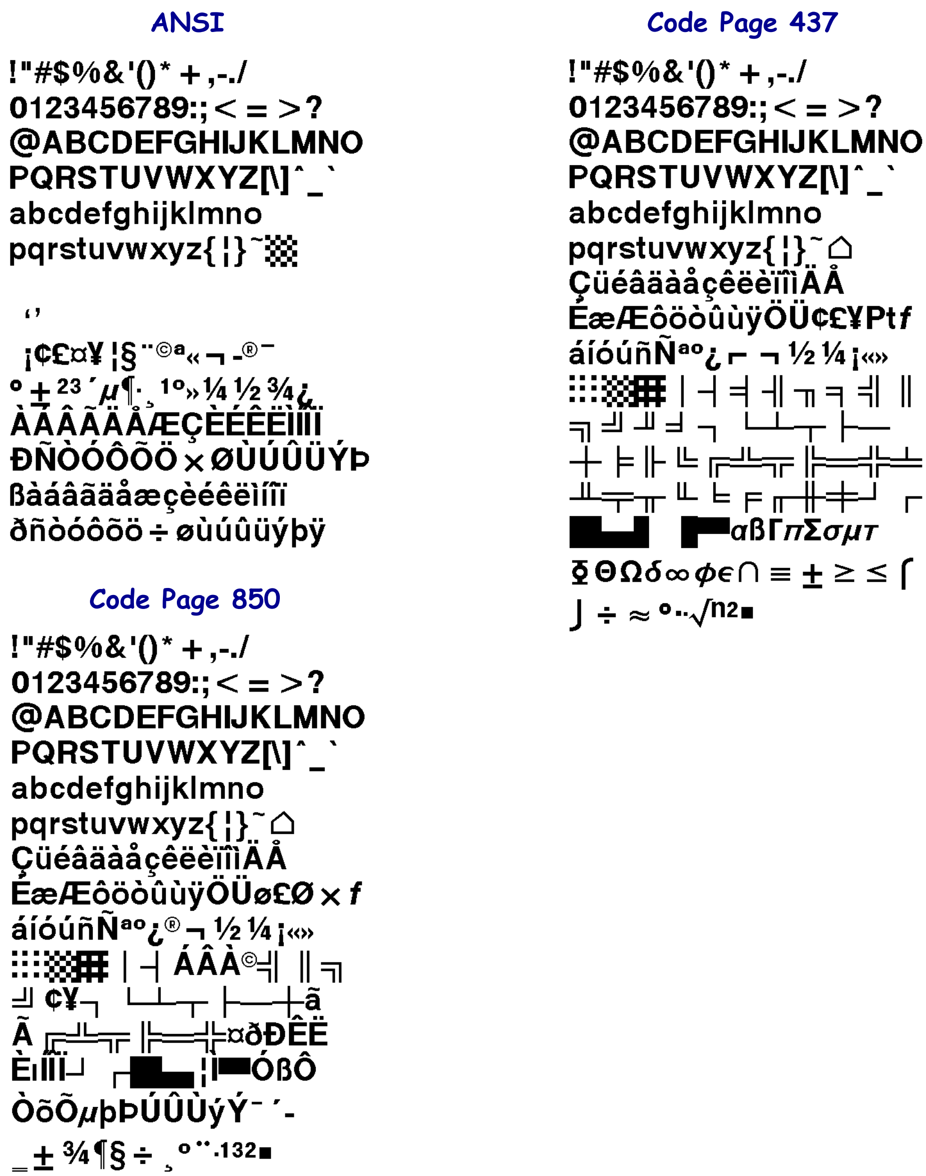
Font	Example
10	9-point emulated bold font 

Table 2 • Supported Fonts (Continued)

Font	Example
11	6-point emulated font

ANSI

!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`
abcdefghijklmno
pqrstuvwxyz{|}~▒
‘’
¡¢£¤¥¦§¨©ª«¬-®¯
°±²³´µ¶·¸¹º»¼½¾¿
ÀÁÂÃÄÅÆÇÈÉÊËÌÍÎÏ
ÐÑÒÓÔÕÖ×ØÙÚÛÜÝÞ
ßàáâãäåæçèéêëìíîï
ðñòóôõö÷øùúûüýþÿ

Code Page 437

!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`
abcdefghijklmno
pqrstuvwxyz{|}~⌂
ÇüéâäàåçêëèïîìÄÅ
ÉæÆôöòûùÿÖÜ¢£¥Pt*f*
áíóúñÑªº¿⌐¬½¼¡«»
▒▓│┤╡╢╖╕╣║
╗╝╜╛┐└┴┬├─
┼╞╟╚╔╩╦╠═╬╧
╨╤╥╙╘╒╓╫╪┘┌
█▄▌▐▀αßΓπΣσμτ
≡±≥≤⌠
⌡÷≈°∙·√ⁿ²■

Code Page 850

!"#$%&'()*+,-./
0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`
abcdefghijklmno
pqrstuvwxyz{|}~⌂
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ÉæÆôöòûùÿÖÜø£Ø×*f*
áíóúñÑªº¿®¬½¼¡«»
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╝¢¥┐└┴┬├─┼ã
Ã╚╔╩╦╠═╬¤ðÐÊË
ÈıÍÎÏ┘┌▄▌¦Ì▀ÓßÔÒõ
ÕµþÞÚÛÙýÝ¯´-±‗¾¶
§÷¸°¨·¹³²■

ZDownloader Utility

This section provides you with the instructions for downloading and installing the ZDownloader Utility.

Contents

Downloading the ZDownloader Utility

To download the ZDownloader Utility, perform the following from your computer:

1. Open a web browser and navigate to http://www.zebra.com.
2. Click on the **Support & Downloads** header on the web page.
3. Select a printer.
4. When the printer page opens, locate and select the **Software Utilities** tab.
5. Scroll down to the ZDownloader Utility and select the **Download** link.

Note • You will be prompted to create a user profile or login to http://www.zebra.com with an existing profile to download the ZDownloader Utility.

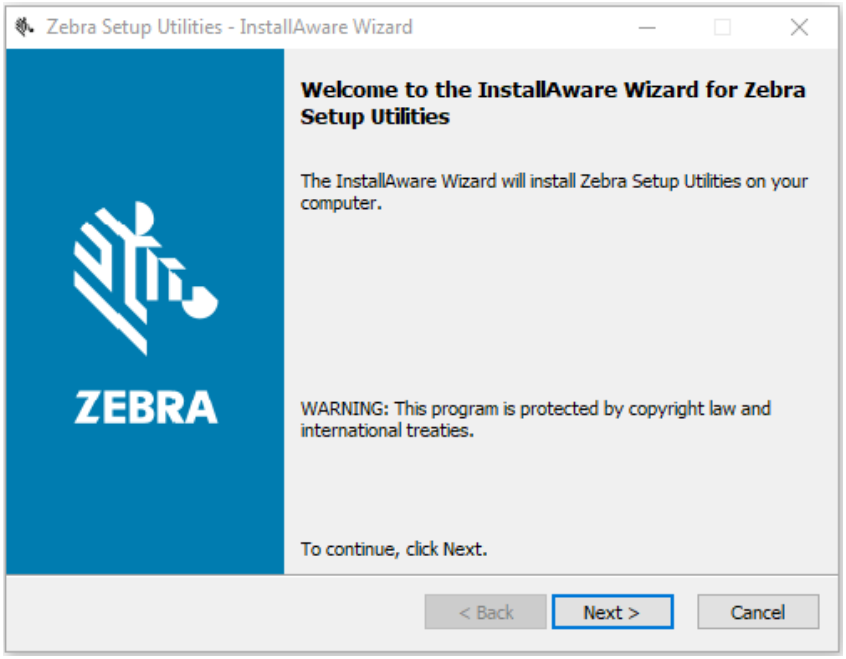
6. Click on the **Accept and Begin Download Now** button.
   The installation file download will begin.

Installing the ZDownloader Utility

To install the ZDownloader Utility, perform the following from your computer:

1. Run the installation file after the download is complete.
2. If you are prompted to allow the application to make changes to your computer, click **Yes**.

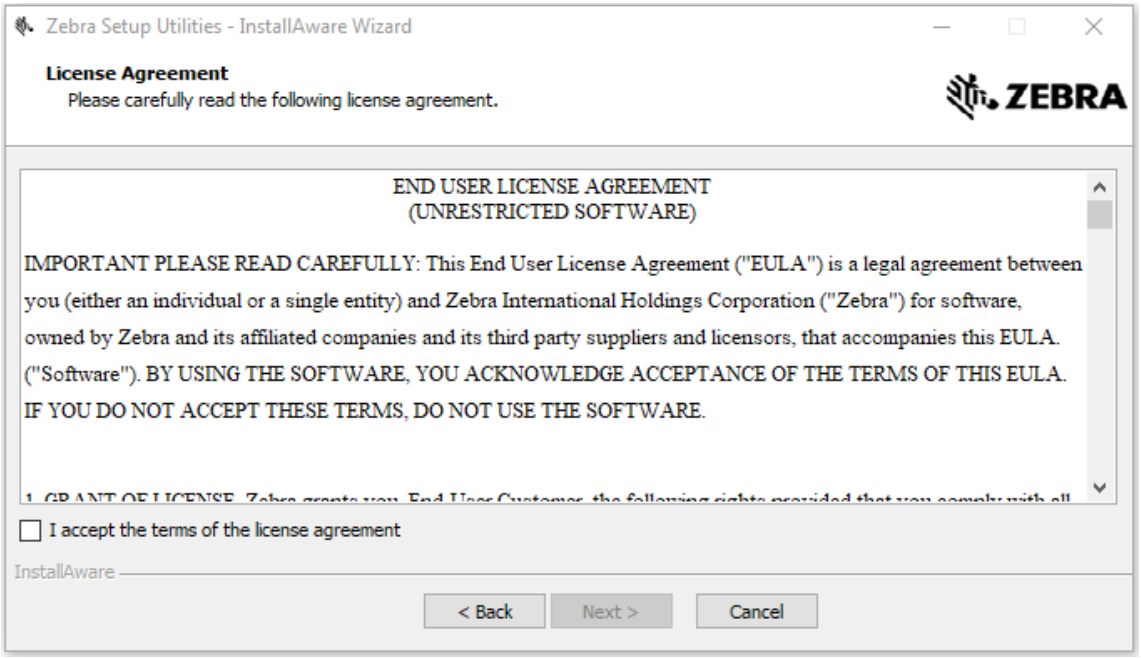
   The utility installs on your computer. When installation is complete, the Firmware Downloader and ZBI Key Manager installation wizard appears.



3. Click **Next**.

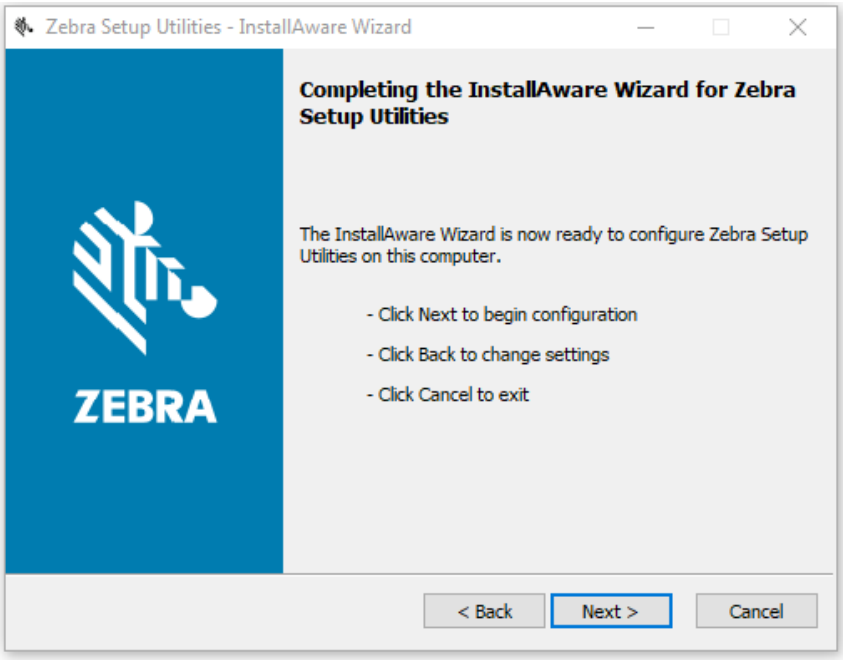
   The End User License Agreement appears.

4. Read the terms of the agreement.



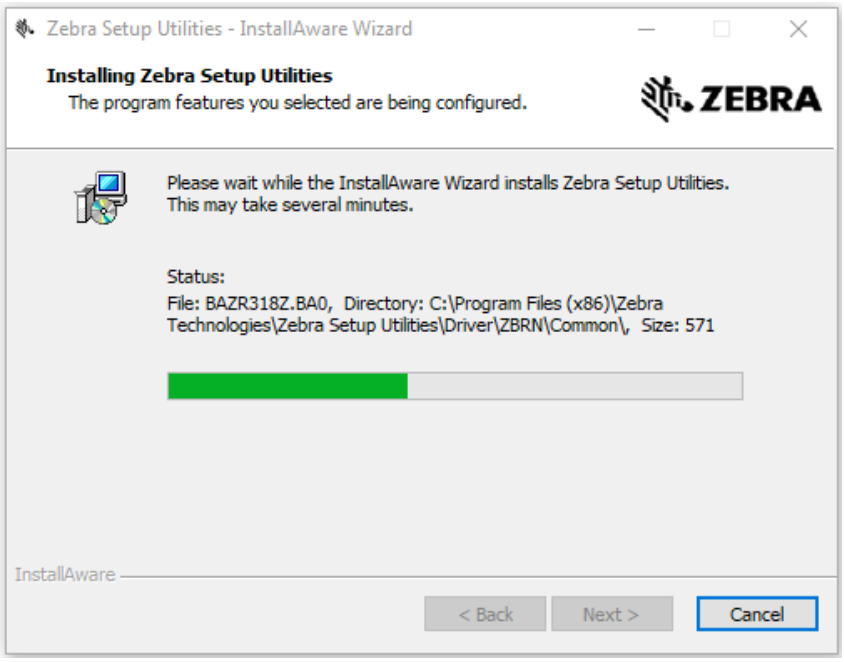
5. Click the **checkbox** to accept the terms.
6. Click **Next**.

   The installation wizard displays information about the installation.

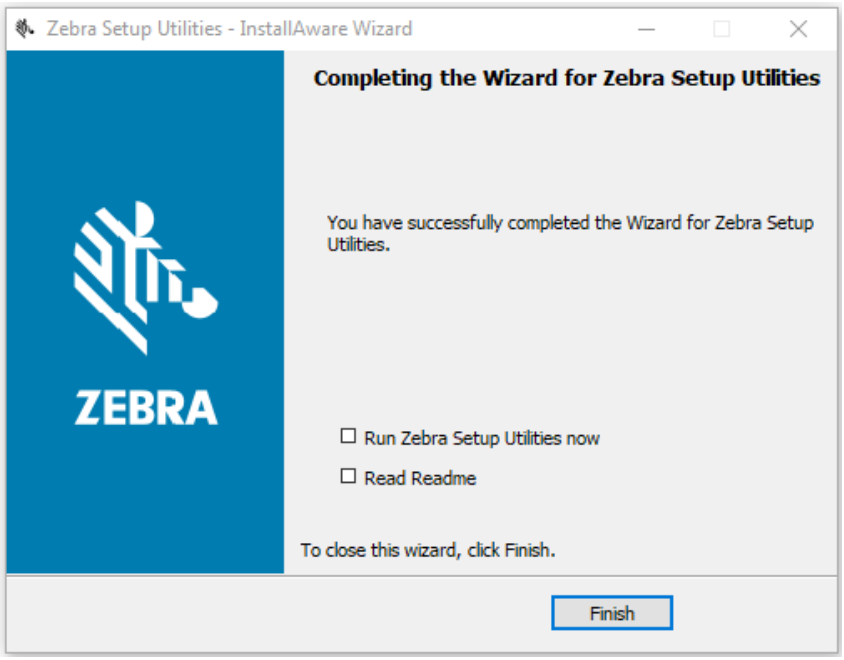


7. Click **Next**.

   The installation wizard installs the application.



8. Click **Finish** to close the wizard.



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