Virtual Device-D

User Guide

ZEBRA

P1070987-003

Information in this document is subject to change without notice.

For further information regarding legal and proprietary statements, please go to:

COPYRIGHTS: www.zebra.com/copyright
WARRANTY: www.zebra.com/warranty
END USER LICENSE AGREEMENT: www.zebra.com/eula
SOFTWARE: www.zebra.com/linkoslegal

Terms of Use

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

Product Improvements Continuous improvement of products is a policy of Zebra Technologies. All specifications and designs are subject to change without notice.

Liability Disclaimer Zebra Technologies takes steps to ensure that its published Engineering specifications and manuals are correct; however, errors do occur. Zebra Technologies reserves the right to correct any such errors and disclaims liability resulting therefrom.

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

Part Number: P1070987-003 Rev. A

Contents

Introduction

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

Contents

Overview

The Virtual Device-D application enables Zebra mobile and tabletop printers to work with many host systems that are using Datamax®Prodigy Plus® 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-D Features

The Virtual Device-D 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 and Barcodes* on page 62).
- Provides support of Datamax®Prodigy Plus® commands (see *Commands* on page 34).

Supported Printers

This manual describes the Virtual Device-D language for Zebra mobile and tabletop 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-D 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 (a/b/g/n)—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-D. However, Set/Get/Do (SGD) commands and file download all operate properly with Virtual Device-D enabled.
- Virtual Device-D fonts can only be used with Virtual Device-D commands. They cannot be used with other languages.
- The Virtual Device-D mode application will not respond to CPCL, ZPL, or EPL commands. Instead, commands will be processed by the Virtual Device-D application.

Install, Register, and Enable Virtual Device-D

This section provides you with instructions on how to install and enable the Virtual Device-D 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-D Application

Zebra provides two options to download the Virtual Device-D 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 77*.

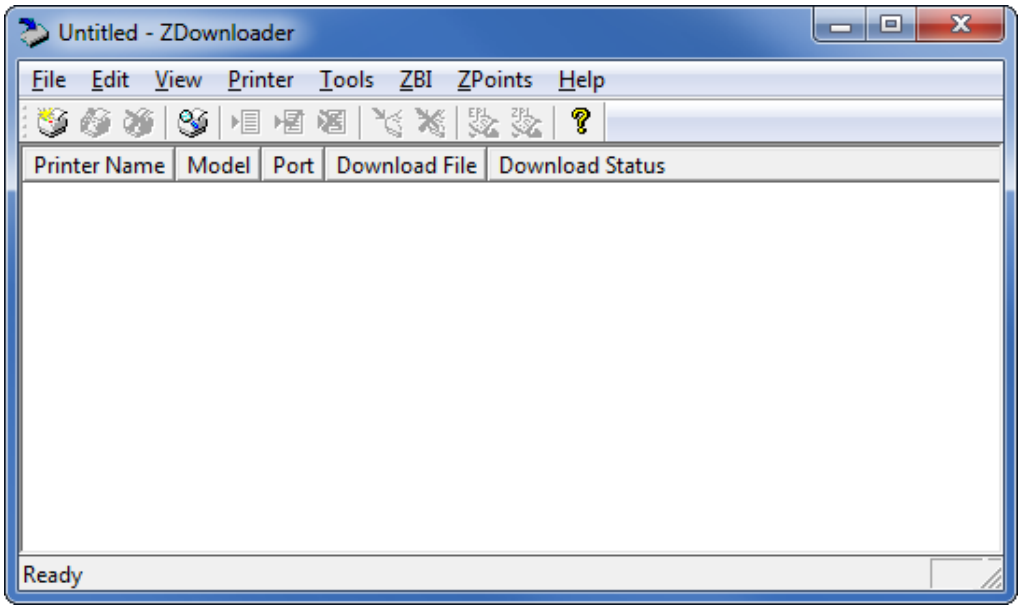
- On an Android device with the Zebra Printer Setup Utility for Android Devices (available for free on Google Play™)

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

Using ZDownloader

The ZDownloader application can update Virtual Device-D 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)

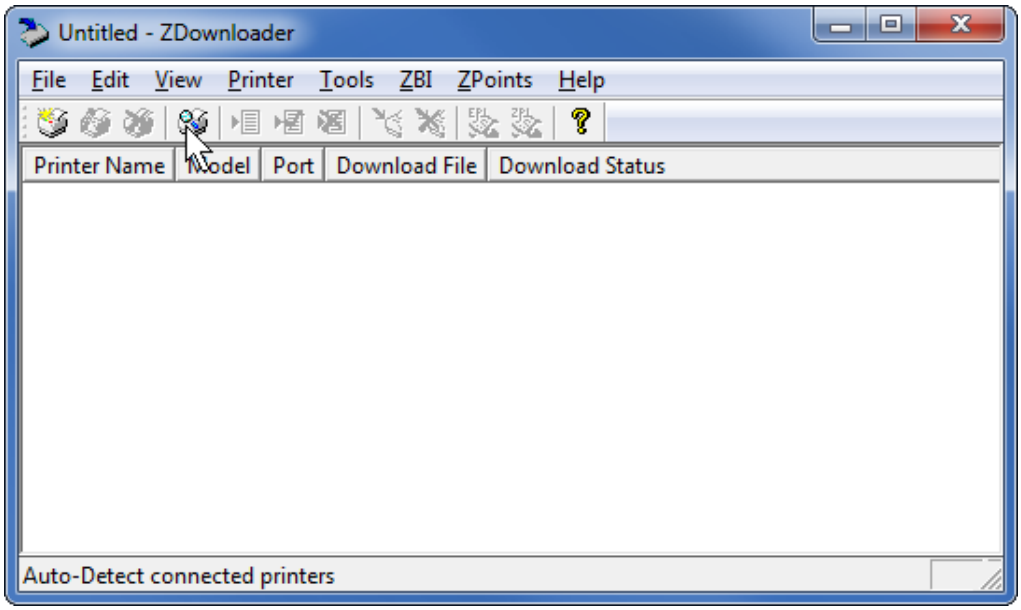
If your printer is connecting via the serial or parallel interfaces, or is not detected by using the Auto-Detect method, use the Manual Add method.

Auto-Detect Printers

Use Auto-Detect for USB or IP Ethernet interfaces.

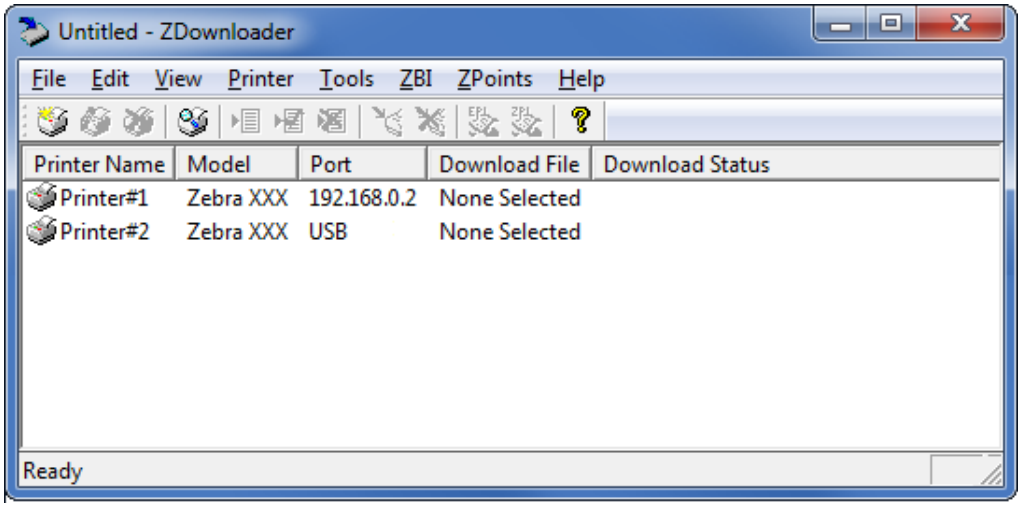
Note • Ethernet connected printers are detected by the application broadcasting a UDP packet out onto the network. UDP port number 4201 is used for the discovery process. Some networks filter out UDP packets. This means that the ZDownloader utility may not be able to detect all of the printers on your 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:

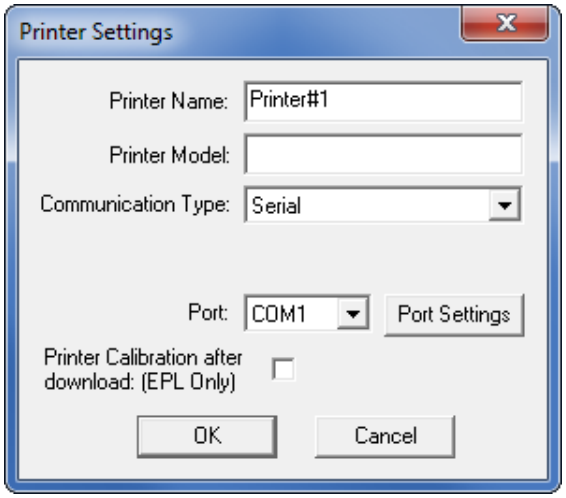
1. In the ZDownloader toolbar, select **Printer** > **Auto-Detect**.
   OR
   Right-click in the ZDownloader window and select **Auto-Detect Printers**.
   The printers detected are added to the printer list.



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.

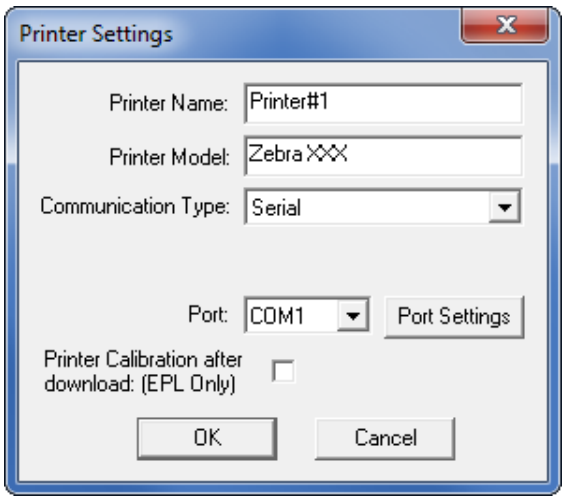


2. Add a printer name and your printer model in the appropriate fields.

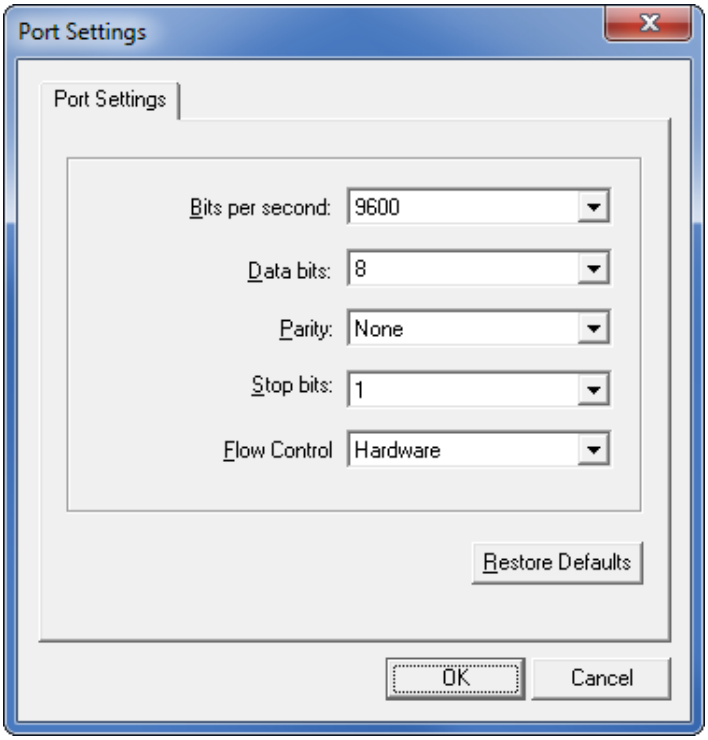
If you are adding a…	Then…
Serial Printer	Go to *Adding a Serial Printer*.
Parallel Printer	Go to *Adding a Parallel Printer on page 16*.
Network Printer	Go to *Adding a Network Printer on page 17*.

Adding a Serial Printer

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



4. Click **Port Settings**.
   The following window appears.

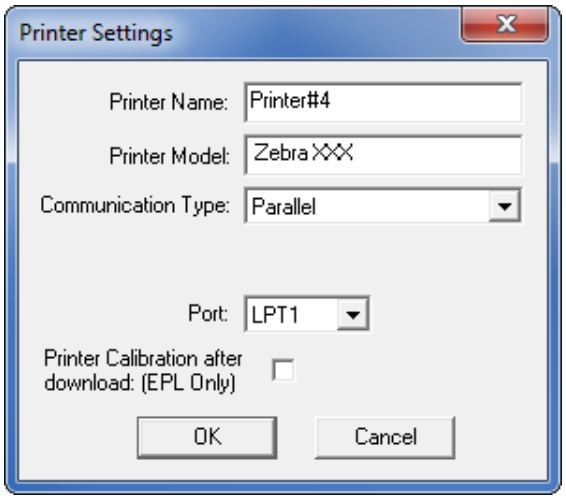


5. Adjust the settings as necessary. The printer's serial port settings must match the computer's serial port settings. For more information about the settings, refer to the User Guide for your printer.
6. Click **OK** to save the port settings.
7. Click **OK** to add the printer.

Adding a Parallel Printer

8. Set **Communication Type** to **Parallel**.

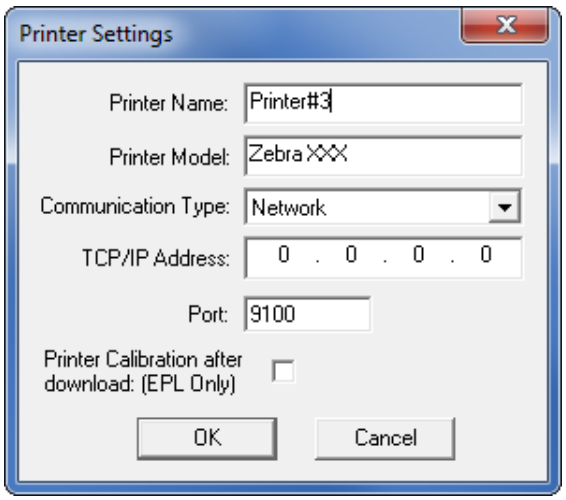
   The available parallel ports will be shown in the Port drop-down box.



9. Select the port to which the printer is connected. No additional configuration is necessary.
10. Click **OK** to add the printer.

Adding a Network Printer

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

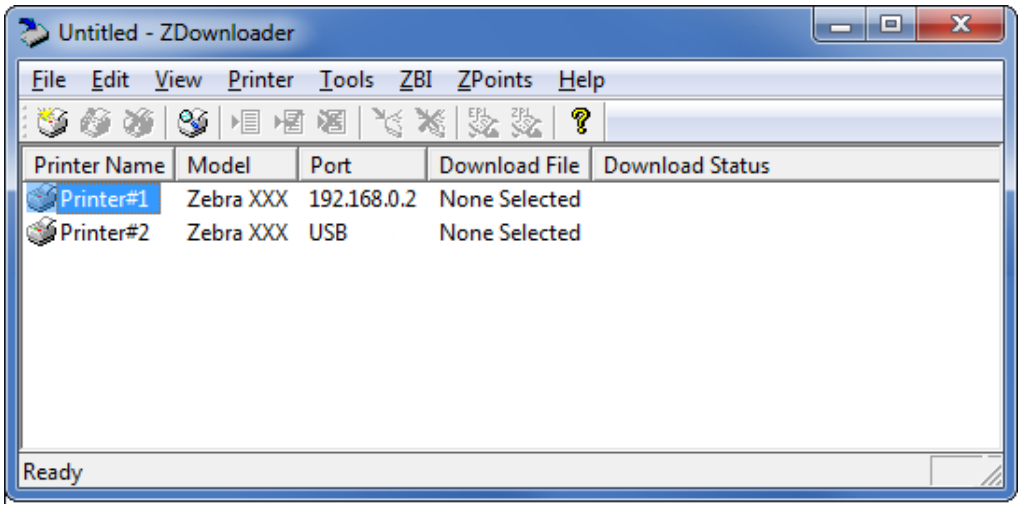


12. Enter the printer's IP address.
13. Click **OK** to save the network settings.
14. Click **OK** to add the printer.

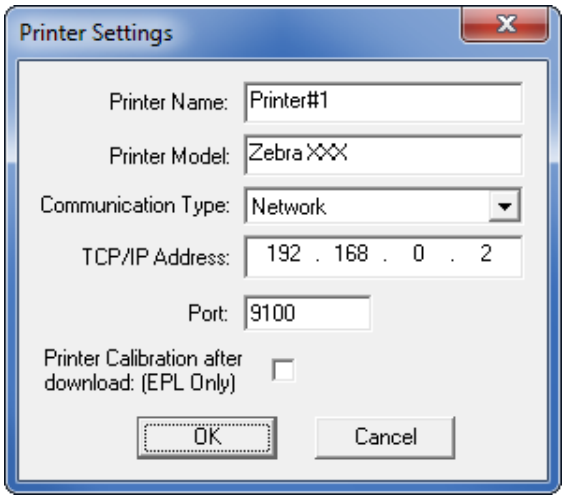
Modifying Printers in the List

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.

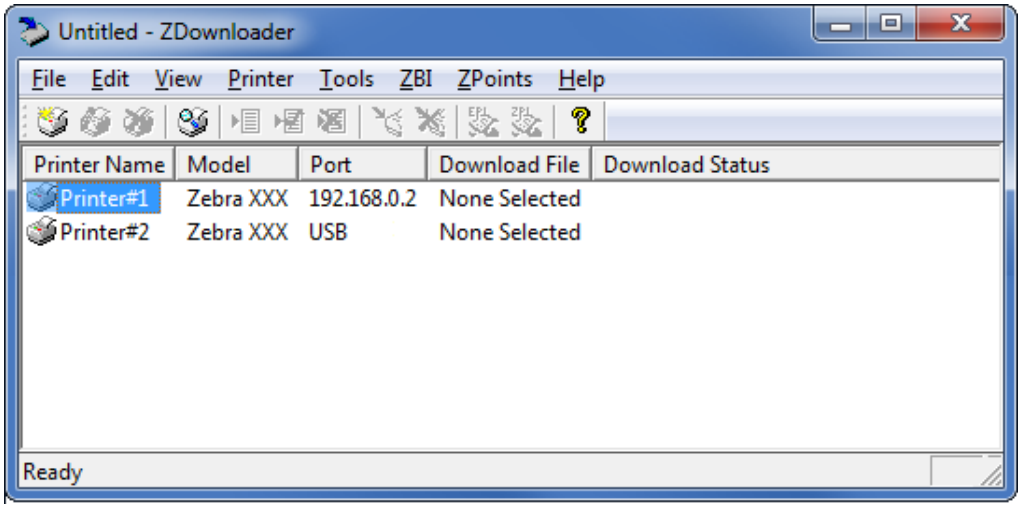


3. Modify the settings as desired.
4. Click **OK** to save the settings.

Deleting Printers from the List

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

1. Select one or more printers to delete.

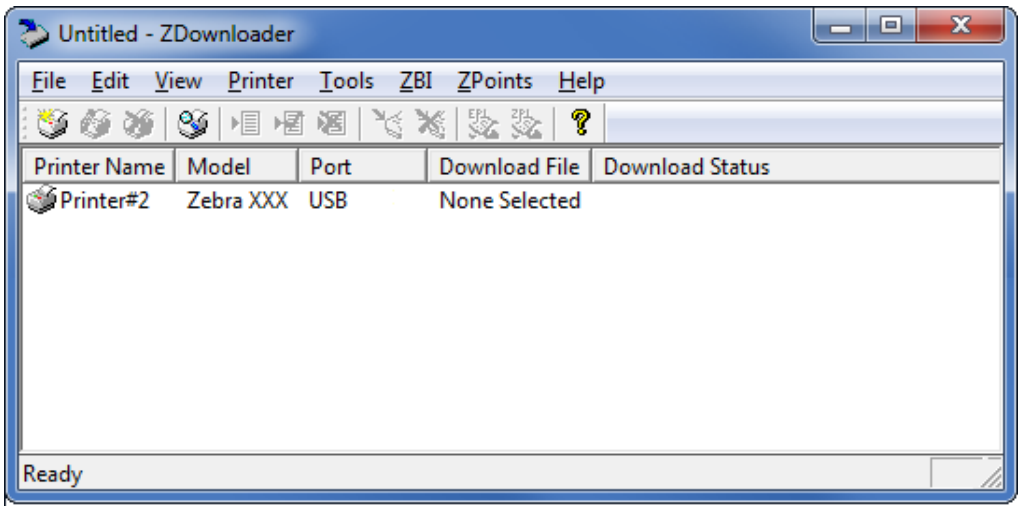


2. In the toolbar, select **Printer** > **Delete**.

   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

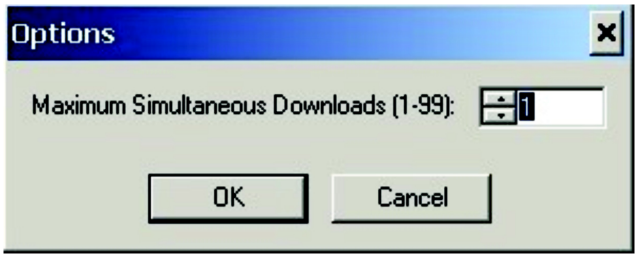
To download the Virtual Device-D app to your printer(s), you must select the file to send to each printer. ZDownloader, by default, downloads files to one printer at a time. If you have multiple printers to update and want to speed up the process, you can increase the number of simultaneous downloads.

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…**.

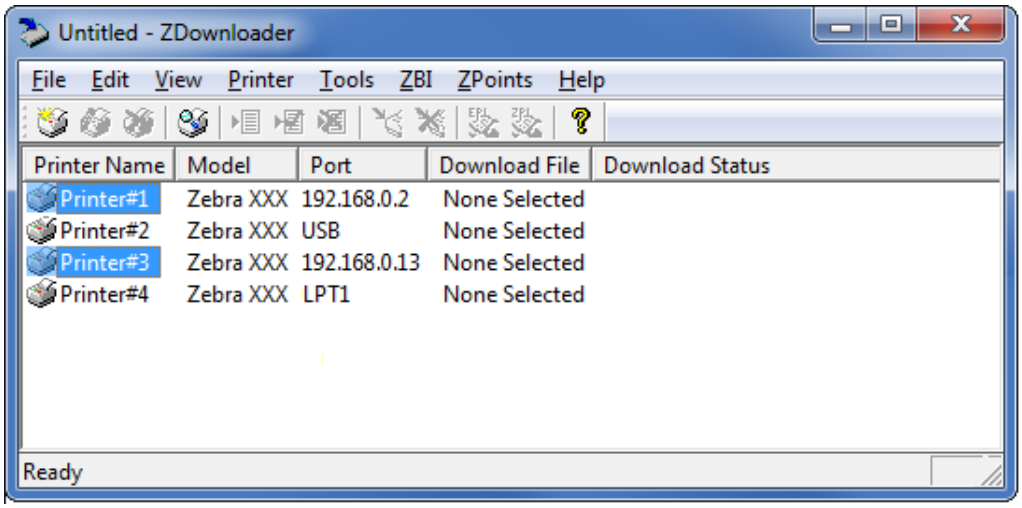
   The following prompt appears.



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-D 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

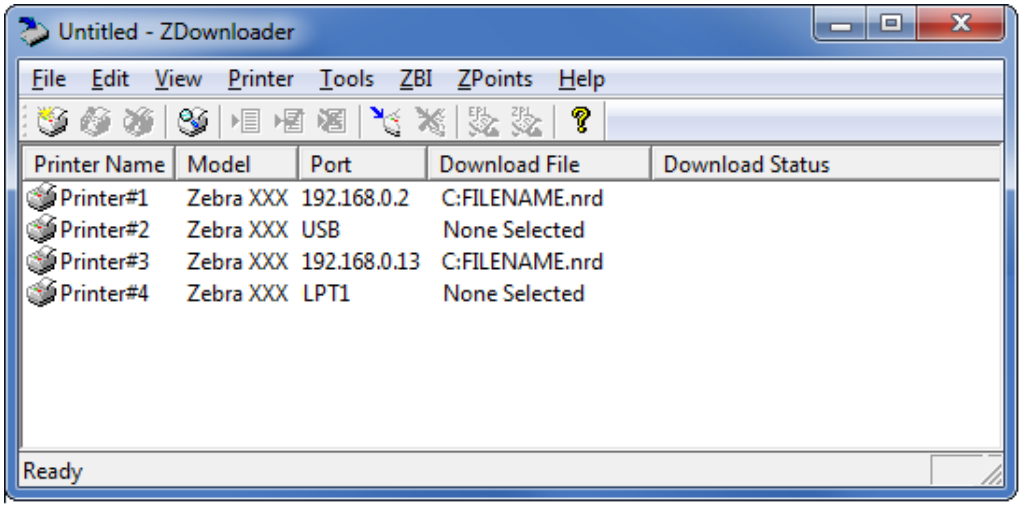
   Right-click on one of the selected printers and select **Select Firmware File…**.

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.

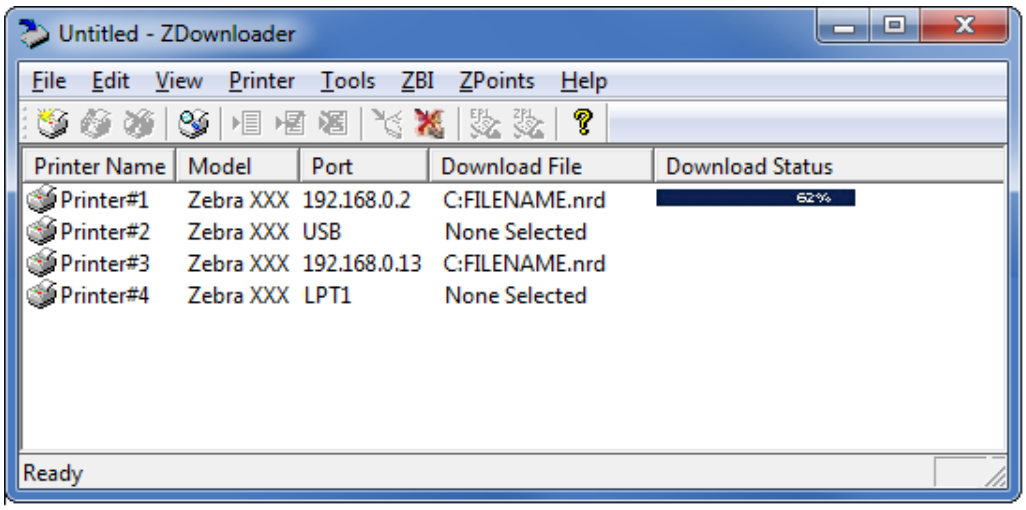


5. Start the download process by doing one of the following:
   - Select **Printer** > **Download to Selected**.
   - Select the printer(s) of interest and select the **Printer** and then select **Download To Selected**.
6. In the toolbar, select **Printer** > **Download All**.

   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-D 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-D on your printer, send the following command:

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

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 61.

Using the User Menus

This section includes instructions for the following printers:

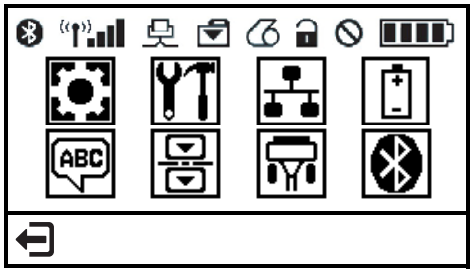
- *QLn420 Printers* on page 24
- *QLn320 and QLn220 Printers* on page 27
- *ZT230, ZT400 Series, ZT510, ZT600 Series, ZD500 Series, and ZD600 Series Printers* on page 30

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

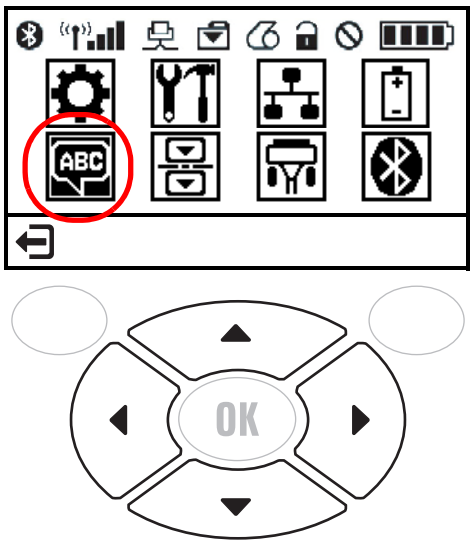
QLn420 Printers

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

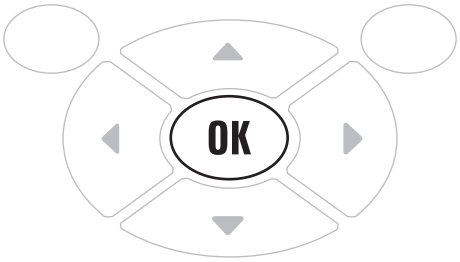
The printer displays the Home Menu.



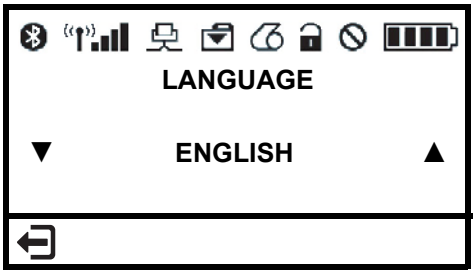
2. Use the **ARROWS** to navigate to the **LANGUAGE** menu.



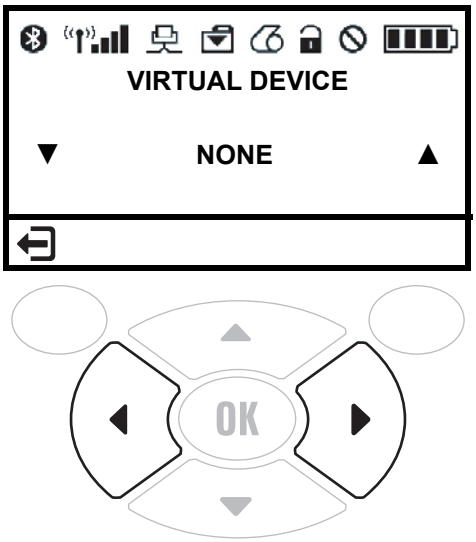
3. Press the **OK** button.



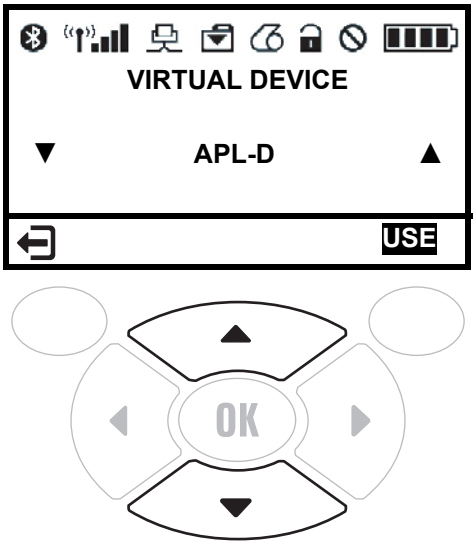
The printer displays the **LANGUAGE** selection screen.



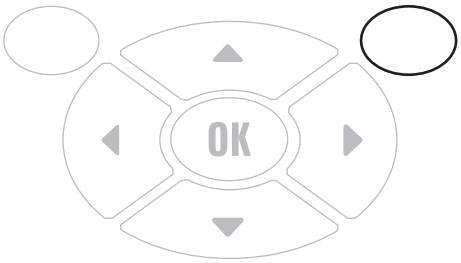
4. Use the **LEFT** or **RIGHT ARROW** to navigate to the **VIRTUAL DEVICE** selection screen.



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



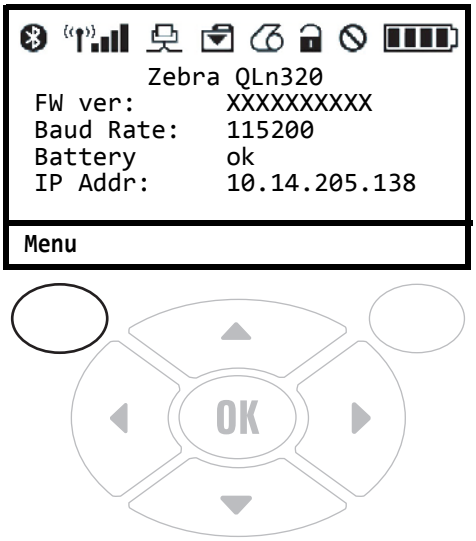
6. Press the **RIGHT SOFT KEY** to select **USE**.



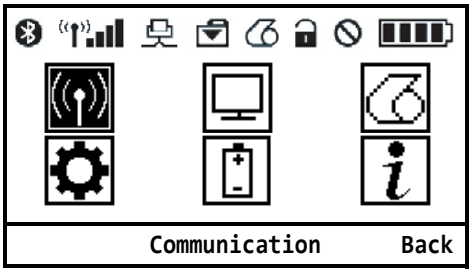
The printer restarts and uses the Virtual Device that you selected.

QLn320 and QLn220 Printers

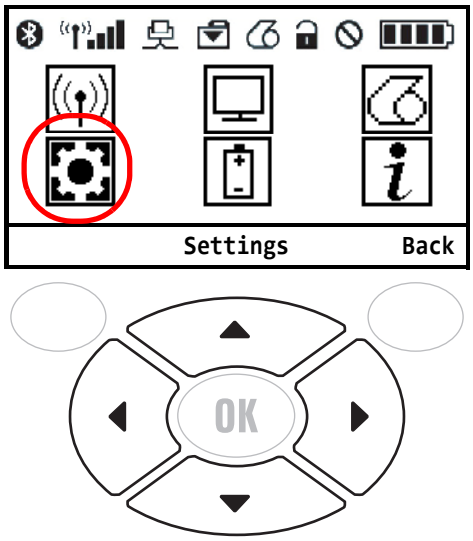
1. From the printer's idle display screen, press the **LEFT SOFT KEY** to select the Home icon.



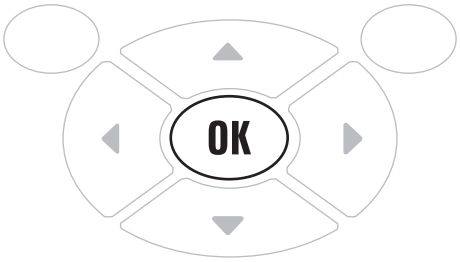
The printer displays the Home Menu.



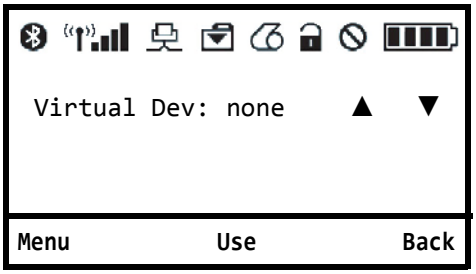
2. Use the **ARROWS** to navigate to the **SETTINGS** menu.



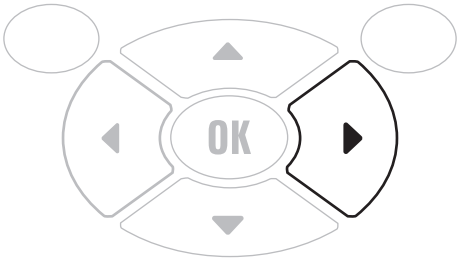
3. Press the **OK** button.



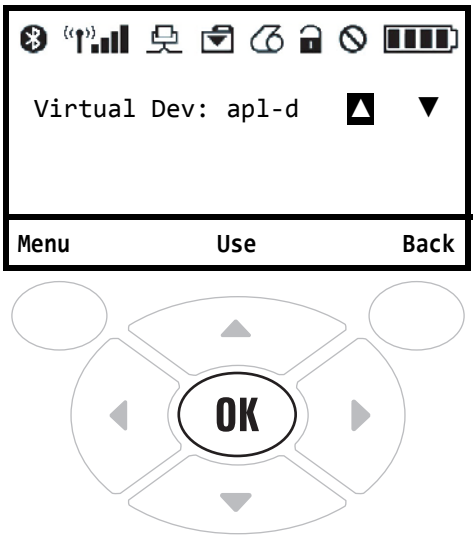
The printer displays the **VIRTUAL DEVICE** selection screen.



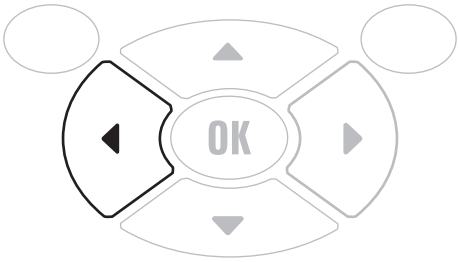
4. Press the **RIGHT ARROW** to highlight the up arrow on the display.



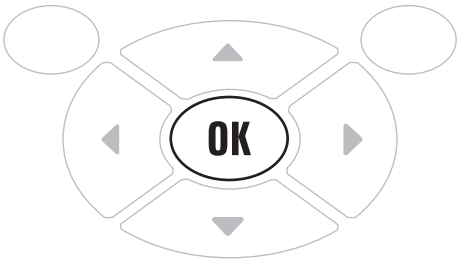
5. With the up arrow highlighted, press the **OK** button until you scroll to the **APL-D** option.



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



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



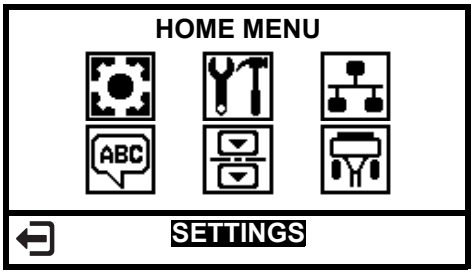
The printer restarts and uses the Virtual Device that you selected.

ZT230, ZT400 Series, ZT510, ZT600 Series, ZD500 Series, and ZD600 Series Printers

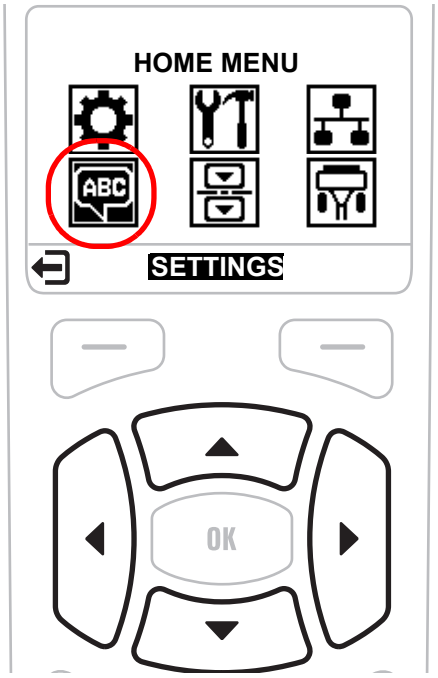
Note • The ZT230 control panel is shown in this procedure. The control panel for the other printers is similar.

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

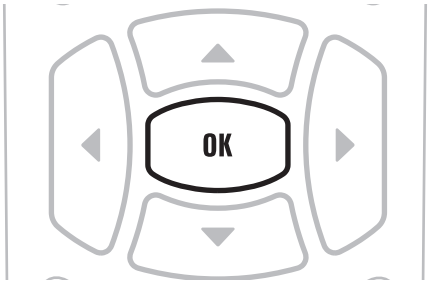
The printer displays the Home Menu.



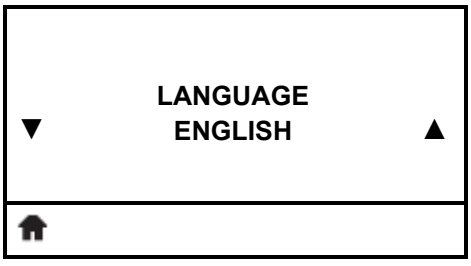
2. Use the **ARROWS** to navigate to the **LANGUAGE** menu.



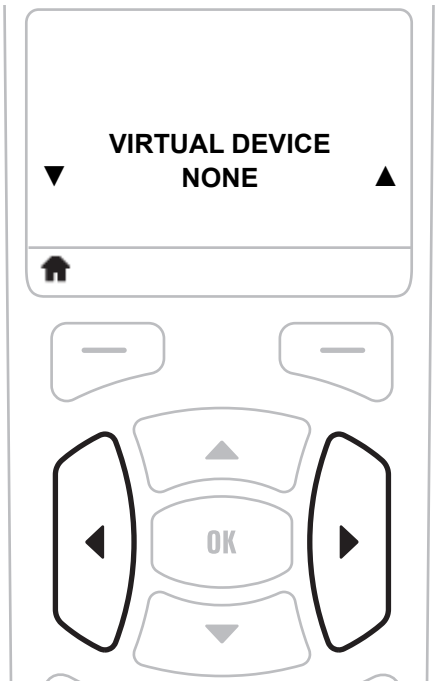
3. Press the OK button.



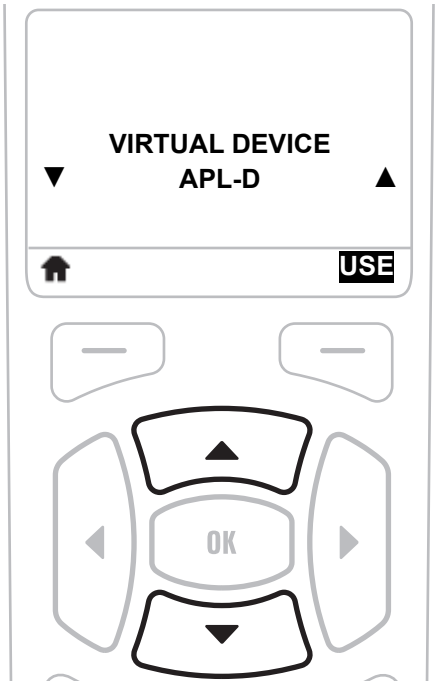
The printer displays the **LANGUAGE** selection screen.



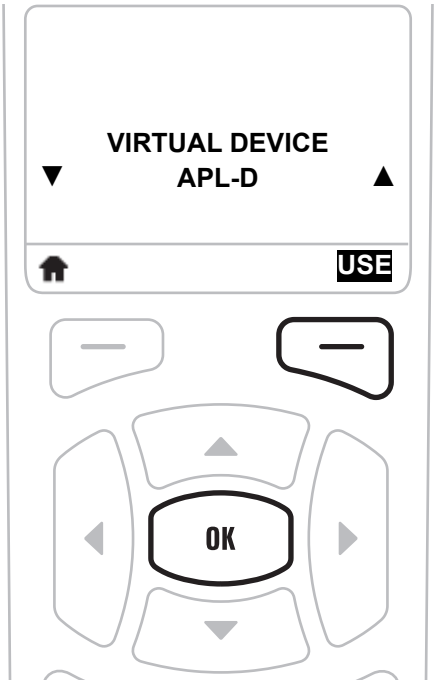
4. Use the **LEFT** or **RIGHT ARROW** to navigate to the **VIRTUAL DEVICE** selection screen.



5. Use the **UP** or **DOWN ARROW** to scroll to the **APL-D** 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-D app.

Contents

Table of Commands

Command	Function	Supported
Immediate Commands		
<SOH># on page 39	Reset the Printer	✓
<SOH>A on page 39	Send ASCII Status String	✓
<SOH>B on page 39	Toggle Pause	✓
<SOH>C on page 40	Stop/Cancel	✓
<SOH>D on page 40	SOH (Immediate Command) Shutdown	✓
<SOH>E on page 40	Send Batch Quantity	✓
<SOH>F on page 40	Send Status Byte	✓
System-Level Commands		
<STX>A on page 42	Set Time and Date	✓
Use this command to set the printer's time and date.<STX>a on page 42	Enable Feedback Characters	✓
1F = after a batch of labels is completed<STX>B on page 42	Get Printer Time and Date Information	✓
<STX> b	Set Cutter Signal Time.	—
<STX>C on page 43	Copy Module	✓
<STX>c on page 43	Set Continuous Paper Length	✓
<STX>D	Memory Dump (Test Mode Only)	—
<STX>d	Set Printer to Double Buffer Mode	—
Use this command to cause the printer to operate in continuous mode with the specified label length.<STX>E on page 43	Set Print Quantity for Stored Label Format	✓
<STX>e on page 43	Select Transmissive (Edge) Sensor	✓
<STX>F on page 44	Form Feed	✓
<STX>f on page 44	Set Form Stop Position (Backfeed Command)	✓
<STX>G on page 44	Print Last Label Format	✓
<STX>g	Internal Batch Software Mode	—
<STX>H	Set Cutter Signal Time	—
Purpose on page 44	Input Image Data	✓
<STX>i	Downloading Scalable Fonts	—
<STX>J	Request Memory Module Status OR Set Pause for Each Label	—

Command	Function	Supported
<STX>K on page 45	Offset Distance, Top-of-Form	✓
<STX>k on page 45	Test RS-232 Port	✓
<STX>L on page 45	Enter Label-Formatting Command Mode	✓
<STX>M on page 45	Set Maximum Label Length	✓
<STX>m on page 46	Set Printer to Metric	✓
<STX>N	Enter Internal Batch Mode	—
<STX>n on page 46	Set Printer To Inches	✓
Use this command to tell the printer to receive measurements in inches. *<STX>O on page 46*	Set Start Print Position	✓
<STX>o on page 46	Cycle Cutter	✓
<STX>P on page 46	Character (HEX) Dump Mode	✓
<STX>p on page 47	Controlled Pause	✓
<STX>Q on page 47	Clear All Modules	✓
<STX>q on page 47	Clear Module	✓
<STX>R	Ribbon Saver On/Off	—
<STX>r on page 47	Select Reflective Sensor	✓
<STX>S on page 48	Set Feed Rate	✓
<STX>STEST	Test Module Memory	—
<STX>s	Set Printer to Single Buffer Mode	—
<STX>T on page 48	Printhead Dot Pattern Test Label	✓
<STX>t on page 48	Test RAM Memory Module	✓
<STX>U on page 48	Label Format Field Replacement	✓
<STX>V on page 49	Software Switch Settings	✓
<STX>v on page 49	Printer's Firmware Version Information	✓
<STX>W on page 49	Request Memory Module Information	✓
<STX>w on page 49	Test Flash Memory Module	✓
<STX>X on page 50	Set Default Module	✓
<STX>x	Delete File from Module	—
<STX>Y	Output Sensor Values	—
<STX>y on page 50	Select Font Symbol Set	✓
<STX>Z on page 50	Print Internal Information and Dot Pattern	✓
<STX>z	Pack Module	—
Label-Formatting Commands		
: on page 51	Set Cut By Amount	✓

Command	Function	Supported
A on page 51	Set Format Attribute	✓
C on page 51	Set Column Offset Amount	✓
c on page 52	Set Cut By Amount	✓
D on page 52	Set Width and Height Dot Size	✓
E on page 52	Terminate Label Formatting Mode and Print Label	✓
G on page 52	Place Data in Global Register	✓
H on page 53	Enter Heat Setting	✓
M	Select Mirror Mode	—
m on page 53	Set Metric Mode	✓
n	Set Inch Mode (Imperial)	—
P on page 53	Set Print Speed	✓
p on page 53	Set Label Backup Speed	✓
Q on page 54	Set Quantity of Labels to Print	✓
R on page 54	Set Row Offset Amount	✓
r on page 54	Recall Stored Label Format	✓
S on page 54	Set Slew Rate	✓
s on page 55	Store Label Format in Module	✓
T on page 55	Set Field Data Line Terminator	✓
U	Make Previous Field a String Replace Field	—
W	Wait Mode	—
X on page 55	Terminate Label-Formatting Mode	✓
y on page 55	Select Font Symbol Set	✓
Z	Zip Mode	—
z on page 56	Zero (Ø) Conversion to "0"	✓
+ or > on page 56	Make Last Field Entered Increment Numeric (or Alphanumeric)	✓
- or < on page 57	Make Last Field Entered Decrement Numeric (or Alphanumeric)	✓
^ on page 57	Set Count By Amount	✓
<STX> S on page 58	Recall Global Data and Place in Field	✓
<STX> T on page 58	Print Time and Date	✓
Front-Loading Commands		
*<ESC>*c#D on page 59*	Assign Font ID Number	✓
<ESC>)s#W on page 59	Font Descriptor	✓
*<ESC>*c#E on page 59*	Character Code	✓
<ESC>(s#W on page 60	Character Download Data	✓

Control Codes

Control Codes are required for the printer to receive a command sequence. The code also specifies what type of command is being sent. Alternate control codes are available, which can be substituted for the standard control characters.

Table 1 shows the alternate control codes available.

Table 1 • Alternate Control Codes

Control Character	Standard	Main Frame
SOH	0x01	0x5E
STX	0x02	0x7E
CR	0x0D	0x0D
ESC	0x1B	0x1B
* “Count By”	0x5E	0x40

* **Note:** See label-formatting command ^ on page 57, Set Count By Amount.

Immediate Commands

<SOH>#

Description Reset the Printer

Syntax <SOH>#

Purpose Use this command to reset all settings to the last saved value and clears out the printer's buffers.

<SOH>A

Description Send ASCII Status String

Syntax <SOH>A

Purpose This command returns status information from the printer in a string of eight Y or N (true or false) characters:

Byte	Condition Indicated by Y
1	Interpreter busy (imaging)
2	Media out
3	Ribbon out
4	Printing batch
5	Busy printing
6	Printer paused
7	Label presented
8	N/A (always No)

<SOH>B

Description Toggle Pause

Syntax <SOH>B

Purpose Use this command to pause and unpause the printer. When paused, printing pauses until the <SOH>B command or the <STX>p command is sent to the printer or until the user presses PAUSE on the printer's control panel.

<SOH>C

Description Stop/Cancel

Syntax <SOH>C

Purpose Use this command to cancel the batch of labels that is currently printing and pauses the printer.

<SOH>D

Description SOH (Immediate Command) Shutdown

Syntax <SOH>D

Purpose Use this command to cause immediate commands (^A) to be ignored. This function is required before you load graphic images or fonts because some may contain data strings that would be misinterpreted as immediate commands. You can turn immediate commands back on by sending a valid SOH command three times, one second apart, or by resetting the printer.

<SOH>E

Description Send Batch Quantity

Syntax <SOH>E

Purpose Use this command to tell the printer to return a 4-digit number that indicates the amount of labels that are remaining to print in the current batch.

<SOH>F

Description Send Status Byte

Syntax <SOH>F

Purpose Use this command to return status information from the printer as `1` or `0` (true or false).

Bit	Condition Indicated by 1
8	N/A (always 0)
7	Label presented
6	Printer paused
5	Busy printing
4	Printing batch
3	Ribbon out
2	Media out
1	Interpreter busy (imaging)

System Level Commands

<STX>A

Description Set Time and Date

Syntax <STX>A*wmdyhMJ*

Range

w = 1 digit indicating the day of the week (1 indicates Monday)

m = 2 digits indicating the month

d = 2 digits indicating the day

y = 4 digits indicating the year

h = 2 digits indicating the hour (24-hour format)

M = 2 digits indicating the minutes

J = 3 digits indicating the Julian date or a constant (when set to 000, the Julian date is calculated automatically. For other values, the number prints as a constant and will not increment each day.)

Purpose Use this command to set the printer's time and date.<STX>a

Description Enable Feedback Characters

Syntax <STX>a

Purpose Use this command to enable status bytes to be returned from the printer after certain events.

- 07 = invalid character
- 1E = after each label is printed
- 1F = after a batch of labels is completed<STX>B

Description Get Printer Time and Date Information

Syntax <STX>B

Purpose Use this command to recall the printer's time and date in the following format: *wmdyhMJ*
where

w = 1 digit indicating the day of the week (1 indicates Monday)

m = 2 digits indicating the month

d = 2 digits indicating the day

y = 4 digits indicating the year

h = 2 digits indicating the hour (24-hour format)

M = 2 digits indicating the minutes

J = 3 digits indicating the Julian date or a constant (when set to 000, the Julian date is calculated automatically. For other values, the number prints as a constant and will not increment each day.)

<STX>C

Description Copy Module

Syntax <STX>C

Purpose Use this command to copy the data on Module B to Module A.

<STX>c

Description Set Continuous Paper Length

Syntax <STX>c*a*

Range
a = a four-digit number indicating the length of each label format

Purpose Use this command to cause the printer to operate in continuous mode with the specified label length.<STX>E

Description Set Print Quantity for Stored Label Format

Syntax <STX>E*a*

Range
a = a four-digit number (include leading zeros, if necessary)

Notes Use this command in conjunction with *<STX>G* on page 44 to specify the print quantity for the last stored label format and print the labels.

Example

```
<STX>E0035
<STX>G
```

Prints 35 of the last label format.

<STX>e

Description Select Transmissive (Edge) Sensor

Syntax <STX>e

Supported Based on testing, this command works the same on Zebra printers with the Virtual Device-D app as on the Prodigy Plus printer.

Purpose Use this command to tell the printer to use the transmissive sensor to detect the gaps between labels.

<STX>F

Description Form Feed

Syntax <STX>F

Purpose Use this command to tell the printer to feed one label.

<STX>f

Description Set Form Stop Position (Backfeed Command)

Syntax <STX>f*a*

Range
a = a three-digit number indicating the backfeed distance

Purpose Use this command to set the backfeed distance.

<STX>G

Description Print Last Label Format

Syntax <STX>G

Purpose Use this command to print the last stored label format.

<STX>I

Description Input Image Data

Syntax <STX>I*abcd*<CR>*data*

Range
a = specify the memory module, A to E
b = the data type (optional); A = ASCII characters (0 to 9, A to F, 7 bit)
c = the image format
F = 7-bit image load file
B = 8-bit .BMP format, image flipped
b = 8-bit .BMP format, image saved as received
I = 8-bit .IMG format, image flipped
i = 8-bit .IMG format, image saved as received
P = 8-bit .PCX format, image flipped
p = 8-bit .PCX format, image saved as received
d = an image name, up to 16 characters and terminated by <CR>
data = the image data

Purpose Use this command to download image data to the printer from the host.

<STX>K

Description Offset Distance, Top-of-Form

Syntax <STX>K

Purpose Use this command to adjust the label top position.

<STX>k

Description Test RS-232 Port

Syntax <STX>k

Purpose Use this command to cause the printer to transmit a Y from the port from which the command was received.

<STX>L

Description Enter Label-Formatting Command Mode

Syntax <STX>L

Purpose Use this command to set the printer to the label-formatting command input mode, where you send it record structures and label-formatting commands (see *Label-Formatting Commands* on page 51). The printer ignores immediate commands, system-level commands, and font-loading commands while it is in label-formatting mode.

<STX>M

Description Set Maximum Label Length

Syntax <STX>M*a*

Range
a = a four-digit number indicating the maximum label length

Purpose Use this command to tell the printer the maximum distance to find the label's edge before determining a media error.

<STX>m

Description Set Printer to Metric

Syntax <STX>m

Purpose Use this command to tell the printer to measure metrically. The printer default is inches.

<STX>n

Description Set Printer To Inches

Syntax <STX>n

Purpose Use this command to tell the printer to receive measurements in inches.
<STX>O

Description Set Start Print Position

Syntax <STX>O*a*

Range
a = a four-digit number indicating the distance from the top of the label to the start print position

Purpose Use this command to define the print start position.

<STX>o

Description Cycle Cutter

Syntax <STX>o

Purpose Use this command to instantly cause the cutter to cut.

<STX>P

Description Character (HEX) Dump Mode

Syntax <STX>P

Purpose Use this command to place the printer in Hex Dump Mode, where any data sent to the printer is printed in raw ASCII format. Reset the printer to exit this mode.

<STX>p

Description Controlled Pause

Syntax <STX>p

Purpose Use this command to pause the printer.

<STX>Q

Description Clear All Modules

Syntax <STX>Q*a*CLEAR

Range
a = specify the memory module, A to C

Purpose Use this command to clear all Flash, RAM, and Internal Modules in the printer.

<STX>q

Description Clear Module

Syntax <STX>q*a*

Range
a = the memory module, A to E

Purpose Use this command to erase the selected memory module.

<STX>r

Description Select Reflective Sensor

Syntax <STX>r

Purpose Use this command to tell the printer to look for a black mark between labels using the reflective sensor.

<STX>S

Description Set Feed Rate

Syntax <STX>S*a*

Range
a = a letter from A to S

Purpose Use this command to set the feed rate.

<STX>T

Description Printhead Dot Pattern Test Label

Syntax <STX>T

Purpose Use this command to tell the printer to print a test label with dot patterns.

<STX>t

Description Test RAM Memory Module

Syntax <STX>t

Purpose Use this command to test all RAM modules.

<STX>U

Description Label Format Field Replacement

Syntax <STX>U*ab*<CR>

Range
a = a two-digit format field number
b = a new data string, which must be followed by <CR>

Purpose Use this command to put new data into format fields.

<STX>V

Description Software Switch Settings

Syntax <STX>V*a*

Range
a = a one-digit ASCII value from 0 to F

Purpose Use this command to allow multiple option settings to be modified without using the front panel menu.

<STX>v

Description Printer's Firmware Version Information

Syntax <STX>v

Purpose Use this command to query the printer about its firmware. The printer responds with its current firmware version.

<STX>W

Description Request Memory Module Information

Syntax <STX>W*a*

Range
a = the data type
F = font
G = graphic
L = label

Purpose Use this command to request a listing of all fonts, graphics, or formats on the printer's memory modules.

<STX>w

Description Test Flash Memory Module

Syntax <STX>w*a*

Range
a = the memory module, A or B

Purpose Use this command to test all non-volatile memory modules. The printer responds with the module tested, the size of the module, and the test results.

<STX>X

Description Set Default Module

Syntax <STX>X*a*

Range
a = the memory module, A to E

Purpose Use this command to set the default memory module to which to download data.

<STX>y

Description Select Font Symbol Set

Syntax <STX>y*ab*

Range
a = the byte size designation
S = single-byte symbol sets
U = double-byte symbol sets
b = the two-digit symbol set designation

Purpose Use this command to specify the scalable font symbol set.

<STX>Z

Description Print Internal Information and Dot Pattern

Syntax <STX>Z

Purpose Use this command to print a configuration label and a test label with dot patterns.

Label-Formatting Commands

:

Description Set Cut By Amount

Syntax :*a*

Range
a = a four-digit number from 0001 to 9999, indicating how many labels to print before a cut

Purpose Use this command to set the quantity of labels to be printed between cuts.

A

Description Set Format Attribute

Syntax A*a*

Range
a = the attribute mode
- 1 = XOR mode (default). The areas where text strings, images, or barcodes intersect is not printed.
- 2 = Transparent mode. The areas where text strings, images, and barcodes intersect is printed, allowing fields to be printed on top of one another.
- 3 = Reserved.
- 4 = Reserved.

Purpose Use this command to specify the type of format operation.

C

Description Set Column Offset Amount

Syntax C*a*

Range
a = a four-digit number for column offset amount. The default is 0000.

Purpose Use this command to horizontally adjust where printing starts.

C

Description Set Cut By Amount

Syntax `c`*a*

Range
a = a two-digit number from `01` to `99`, indicating how many labels to print before a cut

Purpose Use this command to set the quantity of labels to be printed between cuts. (Same function as *:* on page 51.)

D

Description Set Width and Height Dot Size

Syntax `D`*ab*

Range
a = the dot width multiplier (`1` or `2`)
b = the dot height multiplier (`1`, `2`, or `3`)

Purpose Use this command to change the minimum resolution of the printer by changing the size of each printed dot.

E

Description Terminate Label Formatting Mode and Print Label

Syntax `E`

Purpose Use this command to force a label to print immediately based on the data it has received up to that point.

G

Description Place Data in Global Register

Syntax `G`

Purpose Use this command to store the data from the last specified field so it can be recalled from another field.

H

Description Enter Heat Setting

Syntax H*a*

Range
a = a two-digit number from 00 to 20

Purpose Use this command to adjust the darkness relative to the front panel setting.

m

Description Set Metric Mode

Syntax m

Purpose Use this command to set the printer to measure metrically.

P

Description Set Print Speed

Syntax P*a*

Range
a = a letter from A to P

Purpose Use this command to set the rate at which the label advances while printing.

p

Description Set Label Backup Speed

Syntax p*a*

Range
a = a letter from C to I

Purpose Use this command to set the rate at which the label backfeeds.

Q

Description Set Quantity of Labels to Print

Syntax `Q`*a*

Range
a = a four-digit number from `0001` to `9999`, indicating how many labels to print

Purpose Use this command to set the quantity of labels to be printed.

R

Description Set Row Offset Amount

Syntax `R`*a*

Range
a = a four-digit number from `0001` to `9999`, indicating the distance to offset

Purpose Use this command to vertically adjust where printing starts.

r

Description Recall Stored Label Format

Syntax `r`*a*

Range
a = a label name (up to 16 characters)

Purpose Use this command to retrieve a label format that is stored on a memory module.

S

Description Set Slew Rate

Syntax `S`*a*

Range
a = a letter from `C` to `S`

Purpose Use this command to set the rate at which to feed blank labels.

s

Description Store Label Format in Module

Syntax s*ab*

Range
a = the memory module, A to E
b = a label name (up to 16 characters)

Purpose Use this command to store a label format on a specific module.

T

Description Set Field Data Line Terminator

Syntax T*a*

Range
a = a two-character ASCII representation of a HEX code to be used for the end-of-data terminator

Purpose Use this command to change the line terminator for the next format record, which allows you to use special binary control codes, such as carriage returns, into data to be printed.

X

Description Terminate Label-Formatting Mode

Syntax X

Purpose Use this command to change to the system-command mode without printing a label.

y

Description Select Font Symbol Set

Syntax y*ab*

Range
a = the byte size designation
S = single-byte symbol sets
U = double-byte symbol sets
b = the two-digit symbol set designation

Purpose Use this command to specify the scalable font symbol set. (Same as <*STX*>*y* on page 50.)

z

Description Zero (Ø) Conversion to "0"

Syntax z

Purpose Use this command to eliminate slashes from zeros in fonts 0-8 and bar codes.

+ or >

Description Make Last Field Entered Increment Numeric (or Alphanumeric)

Syntax +*ab* or >*ab*

Range

\+ = numeric increment, > = alphanumeric increment

a = a fill character for leftmost characters in the incrementing field

b = the amount by which to increment the value

Purpose Use this command to increment a value each time a label is printed.

Example

```
<STX>L<CR>
1322000000000054321<CR>
+03<CR>
Q0006<CR>
E<CR>
```

This example generates a label format with a single field that increments. The first value will be 54321, and the value will increment by 3 for the next five labels.

- or <

Description Make Last Field Entered Decrement Numeric (or Alphanumeric)

Syntax *-ab* or *<ab*

Range
- = numeric increment, *<* = alphanumeric increment
a = a fill character for leftmost characters in the incrementing field
b = the amount by which to increment the value

Purpose Use this command to decrement a value each time a label is printed.

Example

```
<STX>L<CR>
1322000000000000543BC<CR>
<03<CR>
Q0006<CR>
E<CR>
```

This example generates a label format with a single field that decrements. The first value will be `543BC`, and the value will decrease by 3 for the next five labels.

^

Description Set Count By Amount

Syntax *^a*

Range
a = a two-digit number specifying the number of labels to be printed before incrementing/decrementing fields (default = `1`)

Purpose Use this command to print multiple labels with the same data while incrementing them sequentially as specified.

Example

```
<STX>L<CR>
13220000000000054321<CR>
+01<CR>
^02<CR>
Q0008<CR>
E<CR>
```

This example prints two labels with the field value before incrementing the value by 1. A total of eight labels is printed with four of each value.

<STX> S

Description Recall Global Data and Place in Field

Syntax <STX>S*a*

Range

a = a letter from A to P, specifying the global register containing the data to copy into the data field

Purpose Use this command to indicate when the current field should use data previously stored by a G command (see *G on page 52*).

<STX> T

Description Print Time and Date

Syntax <STX>T*a*<CR>

Range

a = a set of characters indicating which parts of the real-time clock data to use

- A = day of the week (Monday = 1)
- BCD = day of week name
- EF = month number
- GH...O = month name
- PQ = day of the month
- RSTU = year
- VW = hour in 24-hour format
- XY = hour in 12-hour format
- Za = minutes
- gh = seconds
- bc = AM or PM
- def = Julian date

Purpose Use this command to print the time and date using the real-time clock.

Example

```
<STX>L<CR>
121100001000100<STX>TBCD GHI PQ, RSTU<CR>
E<CR>
```

Assuming that the current date is Thursday, May 14, 2014, the printed label shows:

THU MAY 14, 2014

Font-Loading Commands

<ESC>*c#D

Description Assign Font ID Number

Syntax <ESC>*c#D

Range
= the three-digit font ID number from 100 to 999 (000 to 099 are reserved for resident printer fonts)

Purpose Use this command to assign an ID number to the font that will be downloaded next.

<ESC>)s#W

Description Font Descriptor

Syntax <ESC>)s#W*a*

Range
= from one to three ASCII digits, indicating the number of bytes of font descriptor data
a = the font descriptor

Purpose Use this command to download general information for the current font.

<ESC>*c#E

Description Character Code

Syntax <ESC>*c#E

Range
= from one to three ASCII digits, 0 to 999, indicating the value of the character

Purpose Use this command to specify the ASCII decimal value of the character data that will be downloaded next.

<ESC>(s#W

Description Character Download Data

Syntax <ESC>(s#W*a*

Range

= from one to three ASCII digits, 0 to 999, indicating the number of bytes of bitmapped data

a = the bitmapped data

Purpose Use this command to download all information for the previously specified character.

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-d"` = enable Virtual Device-D `"none"` = disable any Virtual Device app (ZPL and CPCL function normally)

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

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

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

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

apl.framework_version

Description For this Virtual Device, this command returns the firmware version.

Type `getvar`

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

Supported Fonts and Barcodes

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

Contents

Fonts

Table 2 • Supported Fonts

Font	Example
0	FONT 0 !"#$%&;()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~▒
1	FONT 1 !"#$%&;()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^_ `abcdefghijklmno pqrstuvwxyz{|}~▒ ÇüéâäàåçêëèïîìÄÅ æÆôöòûùÿÖÜø£Ø×ƒ íóúñÑªº¿®¬½¼¡«»

Table 2 • Supported Fonts (Continued)

Font	Example
2	FONT 2 !"#$%&;()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNOA PQRSTUVWXYZ[\]^_ 'abcdefghijklmno 'pqrstuvwxyz{¦}~▒ ÇüéâäàåçêëèïîìÄÅ æÆôöòûùÿÖÜø£Ø×ƒ áíóúñÑªº¿ ¬½¼
3	FONT 3 #$%& ()*+,-./ 0123456789: ABCDEFGHIJKLMNO PQRSTUVWXYZ Ç ÄÅ£Ø ÖÜ Æ ÖÜ£Ø

Table 2 • Supported Fonts (Continued)

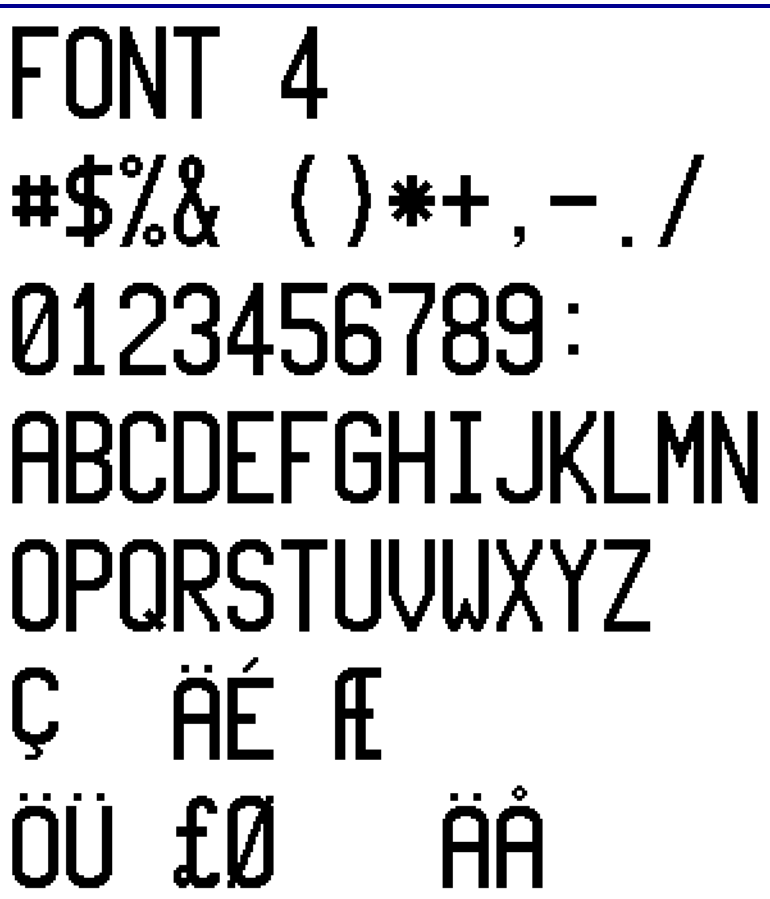
Font	Example
4	

Table 2 • Supported Fonts (Continued)

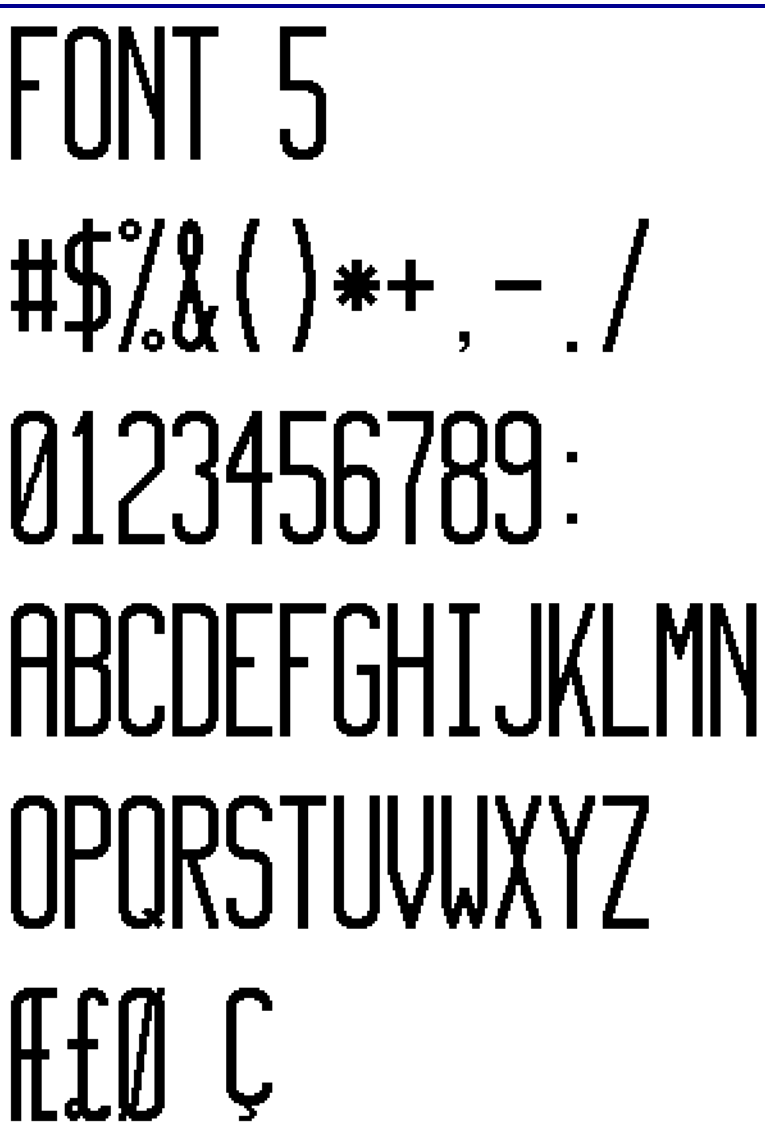
Font	Example
5	

Table 2 • Supported Fonts (Continued)

Font	Example
6	

Table 2 • Supported Fonts (Continued)

Font	Example
7	FONT 7 !"#$%&';()*+,-./ 0123456 7 89:;<=>?@H ABCDEFGHIJKLMNO PQRSTUVWXYZ[\]^Y abcdefghijklmn opqrstuvwxyz{|}J
8	FONT 8 0123456789<> +CENTSXZ

Table 2 • Supported Fonts (Continued)

Font	Example
9	FONT 9 !"#$%&;()*+,-./ 0123456789:;<=>? @ABCDEFGHIJKLMNO PQRSTUVWXYZ[\] ^ _ `abcdefghijklmno Épqrstuvwxyz{|}~⌂ ÇüéâäàåçêëèïîìÄÅ ÉæÆôöòûùÿÖÜø£Ø×ƒ áíóúñÑªº¿®¬½¼¡«» ▒▓ | ┤ ÁÂÀ©╣ ║╗╝¢¥┐ └┴┬├─┼ãÃ ╚╔╩╦╠═╬¤ ðÐÊËÈıÍÎÏ┘ ┌ ¦▀ ÓßÔÒõÕµþÞÚÛÙýÝ¯´ -±‗¾¶§÷ ¸°¨·132■

Barcode Fonts

If you copy and paste the information from the following barcode examples, <STX> must be replaced with a binary STX character (0x02).

Table 3 • Supported Barcodes

Barcode ID/ Description	Example	
A Code 3 of 9	<STX>L D11<CR> 1A0000000150100012345678 9<CR> 121100000000100Barcode A<CR> E	
B UPC-A	<STX>L D11 1B0000000150100012345678 90<CR> 121100000000100Barcode B<CR> E	
C UPC-E	<STX>L D11 1C00000001501000123 45<CR> 121100000000100Barcode C<CR> E	

Table 3 • Supported Barcodes (Continued)

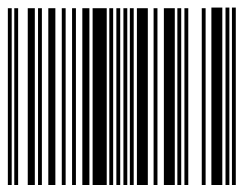
Barcode ID/ Description	Example	
D Interleaved 2 of 5	<STX>L D11 1D0000000150100012345678900<CR> 121100000000100Barcode D<CR> E	
E Code 128	<STX>L D11 1E0000000150100012345678900<CR> 121100000000100Barcode E<CR> E	
F EAN-13	<STX>L D11 1F00000001501000123456789012<CR> 121100000000100Barcode F<CR> E	
G EAN-8	<STX>L D11 1G00000001501000123456<CR> 121100000000100Barcode G<CR> E	

Table 3 • Supported Barcodes (Continued)

Barcode ID/ Description	Example	
H HBIC (Code 39 with modulo 43 checksum)	<STX>L D11 1H0000000150050+0123456789<CR> 121100000000100Barcode H<CR> E	
I Codabar	<STX>L D11 1I63040001501000A1234567890D 121100000000100Barcode I E	
J Interleaved 2 of 5 with modulo 10 checksum	<STX>L D11 1J0000000150100012345678905<CR> 121100000000100Barcode J<CR> E	
K Plessey	<STX>L D11 1K0000000150100012345678905<CR> 121100000000100Barcode K<CR> E	

Table 3 • Supported Barcodes (Continued)

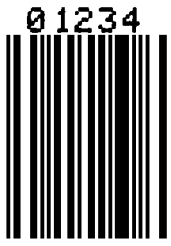
Barcode ID/ Description	Example	
L Interleaved 2 of 5 with modulo 10 checksum and shipping bearer bars	<STX>L D11 1L0000000150100012345678901 2<CR> 121100000000100Barcode L<CR> E	 Barcode L
M 2-digit UPC Addendum	<STX>L D11 1M000000015010042<CR> 121100000000100Barcode M<CR> E	 Barcode M
N 5-digit UPC Addendum	<STX>L D11 1N00000001501000 1234<CR> 121100000000100Barcode N<CR> E	 Barcode N

Table 3 • Supported Barcodes (Continued)

Barcode ID/ Description	Example	
O Code 93	<STX>L D11 1O0000000150100Company42<CR> 121100000000100Barcode O<CR> E	
p Postnet	<STX>L D11 1p000000015010032569<CR> 121100000000100Barcode p<CR> E	
Q UCC/EAN Code 128	<STX>L D11 1Q000000015010001234567890123456 78<CR> 121100000000100Barcode Q<CR> E	

Table 3 • Supported Barcodes (Continued)

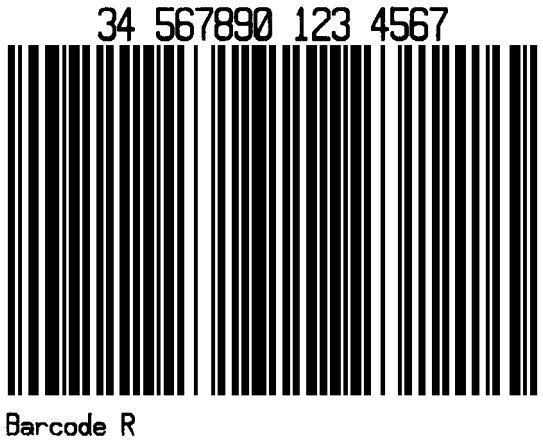
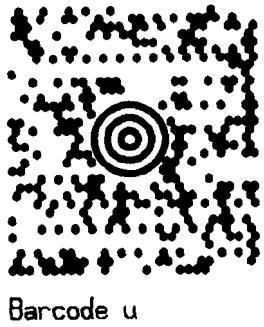
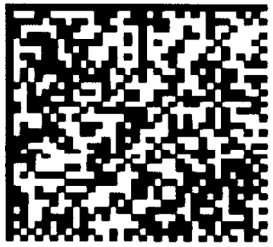
Barcode ID/ Description	Example	
R UCC/EAN Code128 K-MART NON EDI	<STX>L D11 1R00000001501000123456789012345 67<CR> 121100000000100Barcode R<CR> E	
S UCC/EAN Code 128 Random Weight	Not Supported	
T Telepen	Not Supported	
u UPS MaxiCode, Modes 2 and 3	<STX>L D11<CR> 1u0000001200120#3[)>RS01GS96123456GS068GS001 GS1Z12345675GSUPSNGS12345EGS089GS 1GS10.1GSYGSGSGSUTRSEOT 121100000000100Barcode u<CR> E	

Table 3 • Supported Barcodes (Continued)

Barcode ID/ Description	Example	
v FIM	Not Supported	
z PDF-417	<STX>L D11 1z0000000150100F1000000PDF417<CR> 121100000000100Barcode z<CR> E	 Barcode z
Wc or W1c DataMatrix	<STX>L D11<CR> 1W1c4400001000100200000000DATAMATRIX<CR> 121100000000100Barcode W1c<CR> E	 Barcode W1C

ZDownloader Utility

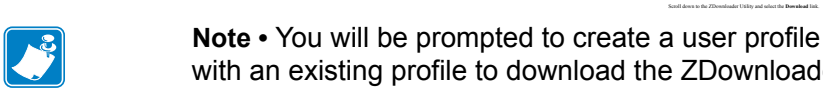
This section provides you with the instructions for downloading and installing the ZDownloader Utility.

Contents

Downloading the ZDownloader Utility

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

1. Open a web browser and navigate to www.zebra.com.
2. Click on the **Support & Downloads** header on the webpage.
3. Select a printer.
4. When the printer page opens, locate and select the **Software Utilities** tab.



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

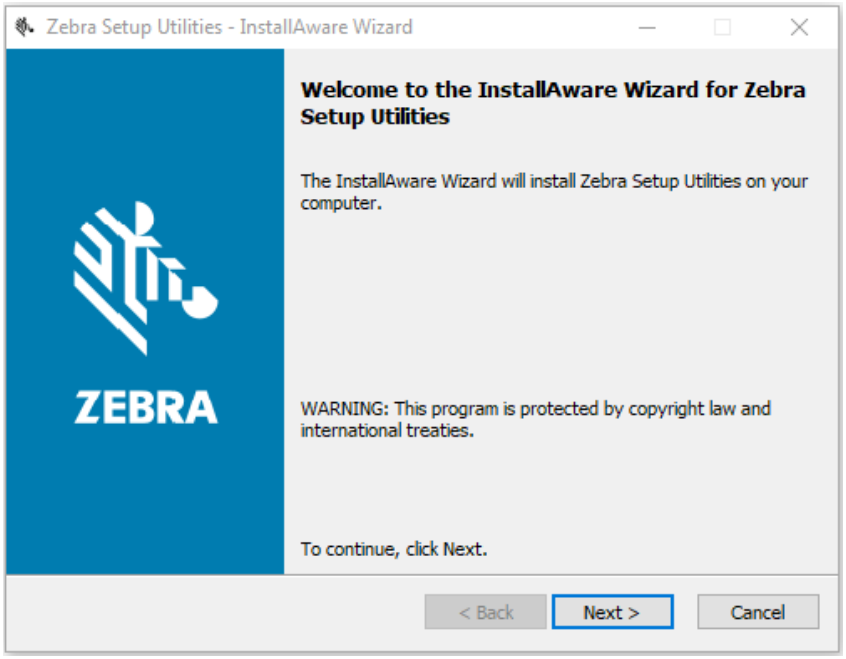
5. Click on the **Accept and Begin Download Now** button.
   The installation file download will begin.

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**.

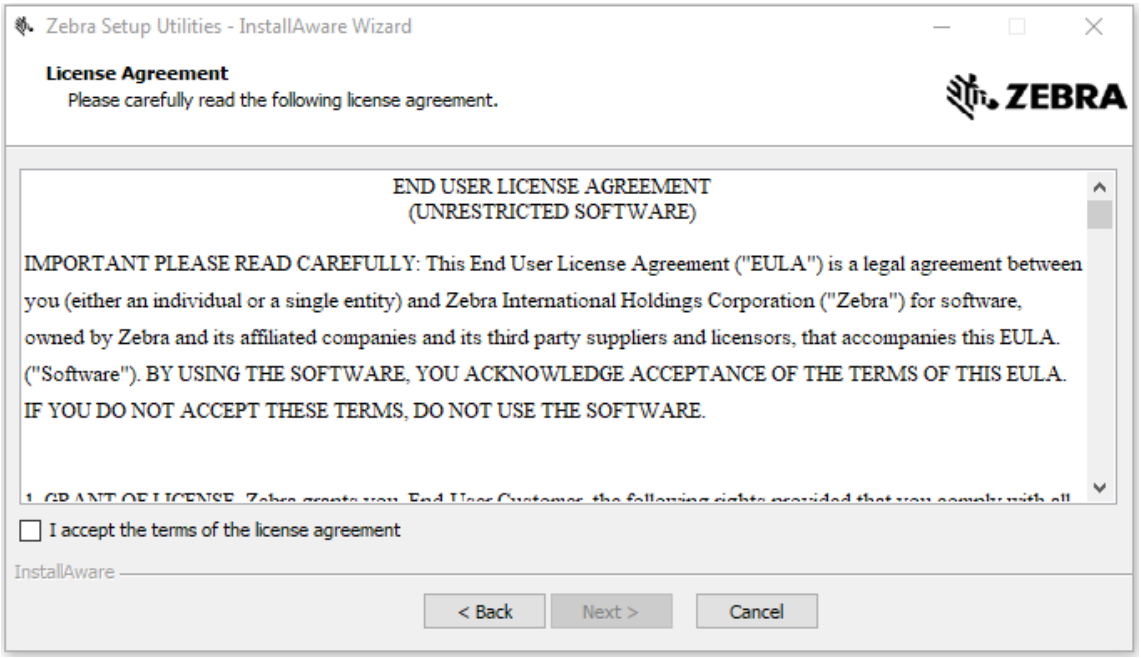
   The utility installs on your computer. When installation is complete, the Firmware Downloader and ZBI Key Manager installation wizard appears.



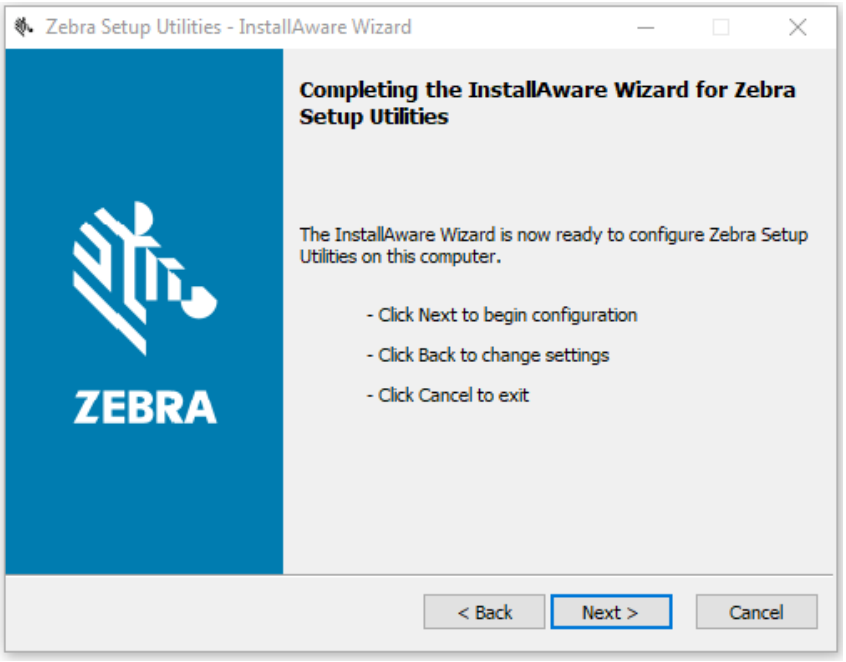
3. Click **Next**.

   The End User License Agreement appears.

4. Read the terms of the agreement.

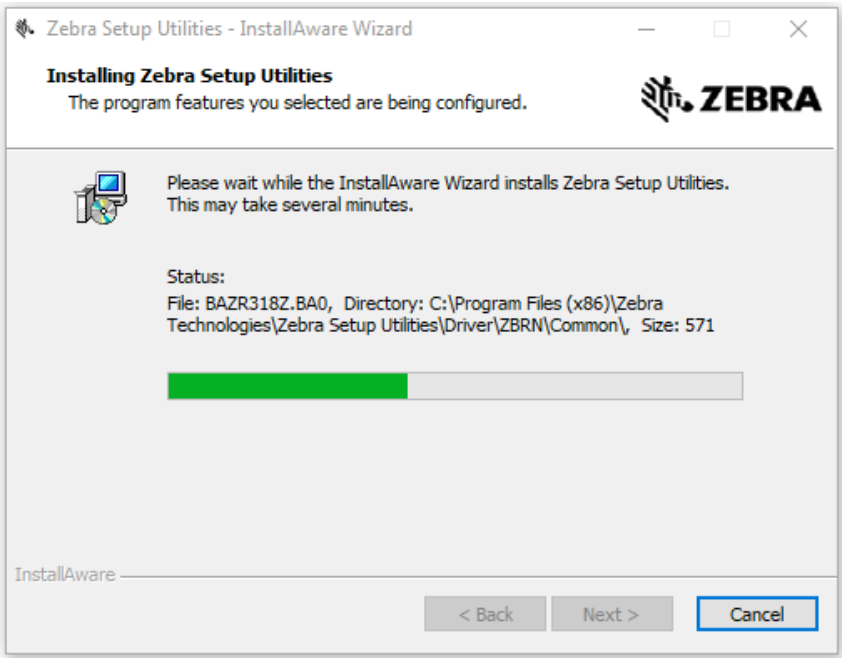


5. Click the **checkbox** to accept the terms.
6. Click **Next**.
7. Click **Next**.
   The installation wizard displays information about the installation.

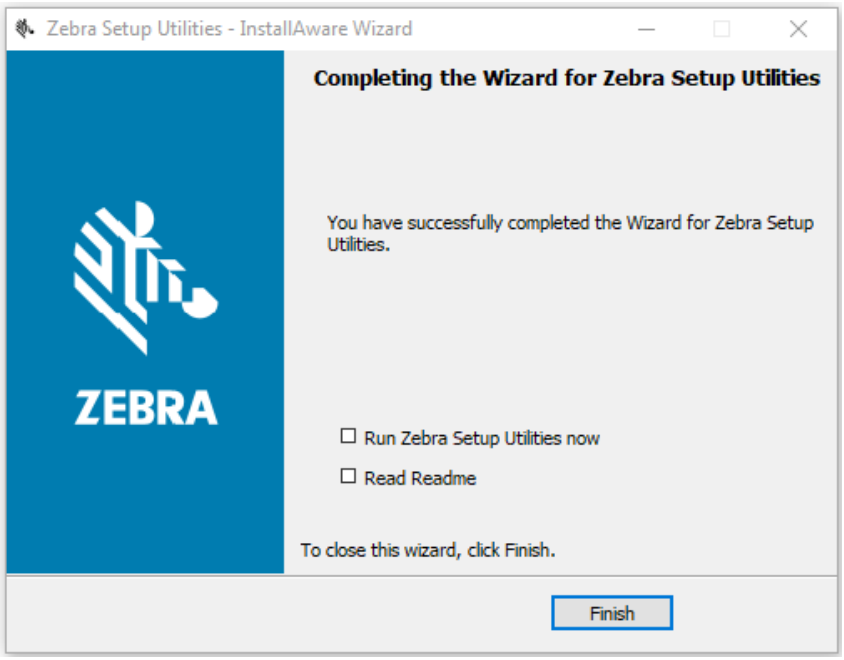


8. Click **Next**.

   The installation wizard installs the application.



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



Index

R

S

T

U

V

W

X

Z

Corporate Headquarters

Zebra Technologies Corporation
3 Overlook Point
Lincolnshire, IL 60069 USA
T: +1 847 634 6700
Toll-free +1 866 230 9494
F: +1 847 913 8766

http://www.zebra.com

P1070987-003